(2010)

SYLLABUS OF SUBJECTS

Graduate School of Advanced Technology and Science

The University of Tokushima

Chapter 1

MASTER's DEGREE

Intelligent Structures and Mechanics Systems Engineering — Civil and Environmental Engineering

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Applied Fluid Dynamics

2 units (selection)

Kunihiko Ishihara · Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering, Teacher of Civil Engineering

Target〉 This subject is concerned with flood flow, sediment transport and riverbed variation. The aim of this subject is to understand fundamentals of those phenomena as well as numerical solution methods for the basic equations.

Outline〉 First, characteristics of flood flow, sediment transport and riverbed variation are interpreted and the basic equations of those phenomena are deduced and presented. Next, fundamentals of numerical solution methods for partial differential equations are lectured to be put into practical usage for numerical simulation of various kinds of flood flow and riverbed variation. Finally, some simple problems are given to practice computer programming by FORTRAN.

Style〉 Lecture and excercise

Keyword〉 ***flood flow, sediment transport, riverbed variation, numerical model***

Relational Lecture〉 "Advanced Disaster Reduction Engineering"(0.7), "Advanced Water Circulation Engineering"(0.7)

Requirement〉 Fundamental knowlege of hydraulics, river engineering and numerical analysis is necessary.

Notice〉 not specified.

Goal〉 fundamentals of flood flow, sediment transport and riverbed variation are understood and numerical techniques for those problems are aquired at practical level.

Schedule〉

1. guidance (river problems and numerical analysis)
2. basic equations of river flow
3. critical condition of sediment motion
4. formulas of bed load
5. formulas of susupended load
6. basic equations of riverbed variation
7. test(1)
8. outline of numerical solution of differential equations
9. numerical models for river flow (1)
10. numerical models for river flow (2)
11. numerical models for riverbed variation (1)
12. numerical models for riverbed variation (2)
13. problem setting and orientation for programming
14. practice of programing (1)
15. practice of programing (2)
16. test(2), presentation

Evaluation Criteria〉 marks of tests (1) and (2) are summed with the weights of 6 and 4, respectively, and the passing mark is 60%.

Textbook〉 Japan Sabo-Gakkai, Numerical solution of riverbed variation in mountain rivers, Sankaido Publ..

Reference〉 not specified.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197156

Student〉 only for specified course

Contact〉

⇒ Okabe .

Advanced Structural Dynamics

2 units (selection)

Fumiaki Nagao · Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Minoru Noda · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To understand the dynamic response and control of structures

Outline〉 In the first half of the semester, following the 'Introduction on Structural Dynamics' learned in under graduate course, methodologies to construct the physical and mathematical models of structural oscillations are reviewed and meanings of their mathematical solutions are examined again in physical standpoint. In the latter half, random vibration theories based on the statistics and probability and passive and active structural oscillation control are introduced. For the purpose to deepen the understanding, many exercises are prepared.

Style〉 Lecture and excercise

Keyword〉 ***analysis of dynamic response, analysis of random vibrations, control of dynamic response***

Fundamental Lecture〉 "Stractural Dynamics and Exercise"(1.0)

Relational Lecture〉 "Advanced Structural Design"(0.5)

Goal〉 To understand the dynamic response and control of structures

Schedule〉

1. Introduction
2. Basic descriptive properties of random data
3. Joint properties of random data
4. Theory of stationary random processes
5. Models of random excitations
6. Stochastic responses of SDOF systems
7. Stochastic responses of MDOF systems
8. Stochastic responses of continuous systems
9. Design of structures for random excitations
10. Controls of vibrations
11. Passive vibration control
12. Semi-acvtive vibration control
13. Acvtive vibration control
14. Aerodynamic vibration of structures
15. Control of Aerodynamic vibration of structures

Evaluation Criteria〉 evaluated by attitude in class (80%) and reports (20%)

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197296

Contact〉

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Advanced Fracture and Structural Mechanics

2 units (selection)

Yoshifumi Nariyuki · Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To understand method of matrix displacement analysis of plane framed structures which is widely used as a suitable method for computer programming.

Outline〉 First, method of matrix displacement analysis of plane framed structurs is explained. Next, some problems are given for exercises in analysis of them. Finally, term examination is set. This class is a seminar type using textbook written in English.

Style〉 Lecture

Keyword〉 ***framed structure, matrix displacement method, plane frame, elastic analysis,*** **英文**

Fundamental Lecture〉 "Structural Mechanics 1"(1.0), "Structural Mechanics 3"(1.0), "Applied Structural Mechanics"(0.8), "Structural Analysis with Exercise"(0.8)

Relational Lecture〉 "Advanced building construction"(0.5), "Advanced Civil and Environmental Engineering Seminar"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level structure mechanics.

Notice〉 Students have to prepare for each lesson.

Goal〉 To understand method of matrix displacement analysis of plane frames

Schedule〉

1. Guidance/A few historical remarks(pp.1-10)
2. Basic considerations of structural analysis 1(pp.11-16)
3. Basic considerations of structural analysis 2/Determinate and indeterminate structures(pp.16-21)
4. Methods of analysis (pp.21-26)
5. Displacement method/Stiffness matrix of a bar element subjected to axial force(pp.26-33)
6. Bar structure stiffness matrix(pp.33-39)
7. Some properties of stiffness matrices/Stiffness matrix of a bar element subjected to torsion(pp.39-44)
8. Stiffness matrix of a beam element (pp.44-47)
9. Assembly of the structure stiffness matrix by the direct stiffness method 1(pp.47-54)
10. Assembly of the structure stiffness matrix by the direct stiffness method 2(pp.54-59)
11. Symmetrical geometry(pp.59-64)
12. Further remarks on prescribed displacements(pp.64-70)
13. Problem exercises(pp.71-72)
14. Problem exercises(pp.72-73)
15. Term examination
16. Restoration of answer papers and comments

Evaluation Criteria〉 Term examination and report are marked out of 60 and 40 respectively and those marks are summed up. The passing mark is 60.

Textbook〉 Matrix and finite element displacement analysis of structures, D.J. DAWE, Clarendon press, Oxford, 1984

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197414

Student〉 Able to be taken by only specified class(es)

Contact〉

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(Office Hour: 年度ごとに学科の掲示を参照すること)

Advanced Properties of Material

2 units (selection)

Hiroyuki Mizuguchi · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Understanding on the relationship between micro-structures and macro-properties of construction materials paticularly concrete using waste or by-products in a concept of sustainable materials cycling society.

Outline〉 It is necessary undersatanding appropriate material for a construction method to satisfy the required performances in each civil work. For this reason, it is very important to understand the relationship between micro-structures and macro-mechanical propterties of concrete or material using waste or by-products roperties for construction materials. And, it is introduced a concept on construction material in sustainable material cycling society.

Style〉 Lecture

Keyword〉 ***construction material, concrete, susatinable cycling society***

Relational Lecture〉 "Advanced reinforced concrete engineering"(0.5)

Requirement〉 No requirement.

Notice〉 Official language is English and Japanese, but main language is English.

Goal〉 Understanding on the relationship between micro-structures and macro-properties of construction materials particularly eco-concrete.

Schedule〉

1. Guidance on lecture
2. Portland cement concrete(1)
3. Portland cement concrete(2)
4. Sulphur concrete(1)
5. Sulphur concrete(2)
6. Phosphate cement
7. Magnesium oxychloride and oxysulphate cements
8. Regulated cement
9. High alumina cement
10. Alkali-aggregate reaction
11. Biological attack and unsoundness of cements containing MgO and CaO
12. Frost action(1)
13. Frost action(2)
14. Carbonation shrinkage
15. Sea water attack
16. Comments for Reports on Concrete

Evaluation Criteria〉 Evaluate by presantation in the lecture and reports for each subject.

Textbook〉 Ramachandran,V.S.,Feldman,R.F. and Beaudoin,J.J.:Concrete Science, Chap.810,Heyden & Son Ltd,1981.

Reference〉

- ◇ Standard Specificatiin for Concrete JACE.
- ◇ Okada,K. and Muguruma,H. Ed.,Concrete Handbook,Asakura Co. Ltd,1981.
- ◇ Nevill,A.M.:Properties of concrete,Fourth and Final Ed.,Pearson Education, 2002.

Webpage〉 http:///www.ce.tokushima-u.ac.jp/ksys/mizuguchi.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197258

Student〉 Able to be taken by student of other faculty and university

Contact〉

⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: (Mon. 12:00-13:00, 17:00-18:00))

Project Management

2 units (selection)

Susumu Namerikawa · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this lecture is to understand PMBOK (Project Management Body of Knowledge), which is global standard in project management.

Outline〉 This lecture is outlined as follows: A)Current of global standardize pivoted on U.S. in project management. B)PMBOK (Project Management Body of Knowledge), which is global standard in project management.

Style〉 Lecture

Keyword〉 ***PMBOK***

Fundamental Lecture〉 "Construction Management"(0.2)

Goal〉 Understanding of project management body of knowledge

Schedule〉

1. Guidance
2. Project and Project Management
3. Initiating Processes
4. Project Charter
5. Scope and WBS
6. Resource Planning and Estimate
7. Control of Project Planning 1
8. Control of Project Planning 2
9. Develop Project Planning 1
10. Develop Project Planning 2
11. Develop Project Team
12. Performance Measurement Baseline
13. Change Control
14. Closing Processes
15. Professional Responsibility
16. Semester Examination

Evaluation Criteria〉 Achievement level of the target is evaluated by the semester examination. Score of 60points or over is required to clear the target.

Textbook〉 Textbook is ibtroduced in the class. Realted documents is distributed to students.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197479

Student〉 Able to be taken by student of other department

Contact〉

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Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示を参照すること)

Quantum mechanics and advanced lecture in quantum physics

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the quantum mechanics.

Outline〉 Basics of quantum mechanics are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics***

Goal〉 To understand the outline of quantum mechanics.

Schedule〉

1. Introduction
2. Variational method
3. Lagrangian
4. Hamiltonian
5. Poisson's bracket expression
6. Quantization
7. Operator
8. Wavefunction
9. Expectation value
10. Schrödinger equation
11. Example (1) the square well potential
12. Example (2) the linear harmonic oscillator
13. Angular momentum
14. Example (3) hydrogen atom
15. Heisenberg equation
16. Field quantization

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197469

Contact〉

⇒ Yoshitaka Michihiro (A203)

Solid State Ionics

2 units (selection)

Koichi Nakamura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces topics in solid state ionics, conduction mechanism in ionic conductors and techniques to study solid state ionics.

Outline〉 Basic experimental and theoretical approaches to understand solid state ionics are introduced and discussed in terms of "ion dynamic".

Keyword〉 ***ionic conductor, ionic diffusion, secondary battery***

Goal〉

1. To understand basic physical and chemical properties of ionic conductors.
2. To understand basic technique to study ionic conductors.

Schedule〉

1. Introduction to solid state ionics
2. Band theory and conduction mechanism
3. Defect in Ionic crystal
4. Diffusion in solid
5. Diffusion mechanism in solid
6. Solid electrolyte - Oxides, Silver halide -
7. Solid electrolyte - Li compounds -
8. Mixed conductor
9. Electrical conductivity measurement
10. Electrical conductivity on ionic conductors
11. Nuclear Magnetic Resonance
12. Relaxation model in NMR
13. NMR on ionic conductors
14. Application - Ion secondary batteries -
15. Topics and future in solid state ionics

Evaluation Criteria〉 固体イオニクスに関するレポートで評価し，60%以上で合格とする.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197238

Contact〉

⇒ Nakamura (A216, koichi@pm.tokushima-u.ac.jp) Mail

Methods for analysis of mathematical phenomena

2 units (selection)

Hitoshi Imai · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering, Cheng-Hai Jin · Professor / International Center

Target〉 To learn the to analyze the mathematical phenomena.

Outline〉 Methods used in analysis of mathematical phenomena are introduced. Especially, those in numerical analysis are focused on.

Style〉 Lecture

Keyword〉 ***mathematics, numerical analysis***

Fundamental Lecture〉 "Numerical Analysis"(1.0)

Relational Lecture〉 "Advanced Computational Science"(0.5)

Requirement〉 Only the premise that have studied basic mathematics.

Goal〉 The adequacy of the two-dimensional boundary value problem governed by the Poisson equation can be understood by the finite difference method, etc.

Schedule〉

1. Introduction to computer
2. Common sense in numerical computation
3. High-speed computation (Parallel computing)
4. Finite difference method I
5. Finite difference method II
6. Finite difference method III
7. Finite difference method IV
8. Finite element method I
9. Finite element method II
10. Finite element method III
11. Finite element method IV
12. Boundary element method I
13. Boundary element method II
14. Boundary element method III
15. Iterative method

Evaluation Criteria〉 Evaluation by the report.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197303

Contact〉

⇒ Imai(A220, +81-88-656-7541, The inquiry by means of the cellular phone or E-mail is not acceptable) (Office Hour: Office hours: Thursday 14:00-15:00)

Differential Equations

2 units (selection)

Nobuyoshi Fukagai · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Introduction to mathematical theory of differential equations.

Outline〉 Boundary value problems of second order linear differential equations.

Style〉 Lecture

Keyword〉 **微分方程式の境界値問題, *Sturm-Liouville* 問題**

Goal〉 To be familiar with Sturm-Louville type equations.

Schedule〉

1. Introduction
2. Helmholtz's equation
3. Eigenvalues and eigenfunctions
4. Green's function
5. Residue analysis
6. Expansion of Green's function
7. Fourier series
8. Existence theorem
9. Sturm-Liouville problems
10. Characteristic function
11. Solvability of boundary value problems
12. Basic estimates
13. Distribution of eigenvalues
14. Eigenfunction expansion
15. Review

Evaluation Criteria〉 Evaluation will be based on assignments.

Reference〉 望月清 · トルシン 『数理物理の微分方程式』 培風館

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197458

Student〉 Able to be taken by student of other department

Contact〉

⇒ 工学部数学教室 (A棟219室)

Advanced Computational Science

2 units (selection)

Toshiki Takeuchi · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class provides the basic technology for numerical calculation for the differential equation.

Outline〉 The numerical calculation methods for the differential equation are introduced.

Style〉 Lecture

Keyword〉 ***numerical analysis, numerical computation, differential equation***

Fundamental Lecture〉 "Numerical Analysis"(1.0), "Basic Mathematics/微分積分学 I"(1.0), "Basic Mathematics/微分積分学 II"(1.0)

Relational Lecture〉 "Methods for analysis of mathematical phenomena"(1.0), "Numerical Analysis"(1.0)

Requirement〉 Students have to understand basic mathematics of undergraduate-level.

Goal〉 To understand principle of numerical calculation methods.

Schedule〉

1. Introduction to numerical simulation
2. Mathematical model
3. Lagrange interpolation
4. Spline interpolation
5. Least squares method
6. Finite difference method
7. Arbitrary precision formula
8. Application to ordinary differential equation
9. Application to partial differential equation
10. Gauss-Seidel method
11. Successive Over-Relaxation method
12. Explicit method
13. Implicit method
14. Crank-Nicolson method
15. Numerical instabilities

Evaluation Criteria〉 Assignments count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197210

Student〉 Able to be taken by only specified class(es)

Contact〉

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(Office Hour: 木曜日 14:00-15:00)

Topics of Analysis for Mathematical Science

2 units (selection)

Atsuhito Kohda · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Mathematical theory and technique for analysis of engineering phenomena

Outline〉 Mathematical theory to analyze problems in engineering and its application, mainly theory and technique of differential equations

Style〉 Lecture

Relational Lecture〉 "Advanced applied analysis"(0.2), "Differential Equations" (0.2)

Requirement〉 If you like undergraduate-level mathematics, it will be sufficient.

Goal〉 To be familiar with mathematical theory, that helps engineering study.

Schedule〉

1. Theory of sets and maps
2. Cardinal numbers and bijection
3. Equivalence relations and cryptography
4. Linear space and tensor
5. Vector analysis and differential form
6. Cauchy's theorem and vector analysis
7. Differential form and Cauchy's theorem
8. Projective plane
9. Quadratic curves and projective plane
10. All quadratic curves are circles?
11. The index of vector fields
12. Applications of the index:fundamental theorem of algebra
13. Vector fields on the unit sphere
14. Why there is the north pole on the earth
15. Mathematics and computers
16. Summary

Webpage〉 http://math1.pm.tokushima-u.ac.jp/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197299

Contact〉

⇒ Kohda (A211, +81-88-656-7546, kohda@pm.tokushima-u.ac.jp) Mail
(Office Hour: 月曜 12:00~ 13:00)

Advanced applied analysis

2 units (selection)

Kuniya Okamoto · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To learn the functional analytic methods which are basic tools for mathematical sciences.

Outline〉 This subject provides basic theory of functional analysis which is considered as linear algebra in infinite-dimensional spaces. Functional analytic approaches to phenomena described by differential equations are introduced.

Style〉 Lecture

Relational Lecture〉 "Topics of Analysis for Mathematical Science"(0.5)

Goal〉 To apply the theory of modern analysis and recognize its significant role.

Schedule〉

1. Differential equations and their solutions
2. Exponential of matrices 1
3. Uniqueness of solutions
4. Existence of solutions
5. Eigenvalues and eigenspaces
6. Projective representation
7. Exponential of matrices 2
8. Generalized eigenvalue problems
9. Dunford integrals
10. Holomorphic functions of matrices
11. Solution curve and stability
12. Stability of solutions
13. Ljapunov's method
14. Nonlinear case
15. Linear approximations
16. Summary

Evaluation Criteria〉 Evaluation by the report.

Reference〉 『新微分方程式対話』 笠原皓司著, 日本評論社

Webpage〉 http://math9.pm.tokushima-u.ac.jp/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197150

Contact〉

⇒ 岡本(A212室, TEL/FAX: 656-9441, E-mail: okamoto@pm.tokushima-u.ac.jp)

Advanced Water Circulation Engineering

2 units (selection)

Takao TAMURA · Associate Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The objective of this subject is to learn models and theories on rainwater and solute runoff system in river basin.

Outline〉 The models and theories on rainwater and solute runoff system in river basin are introduced. The Muskingum method is a commonly used lumped flood routing method for handling a variable discharge-storage relationship. The kinematic wave model is the simplest distributed model defined by the continuity equation for an unsteady flow and the momentum equation assuming the friction and gravity forces balance each other. A report of solving problems related to lecture items is imposed.

Style〉 Lecture

Keyword〉 ***linear and non-linear lumped flood routing method, kinematics distributed flood routing method, rainwater runoff system in forested basin, solute runoff system in forested basin***

Relational Lecture〉 "Applied Fluid Dynamics"(0.7), "Advanced Disaster Reduction Engineering"(0.7)

Requirement〉 Fundamental knowlege of hydraulics, river engineering and numerical analysis is necessary.

Notice〉 not specified.

Goal〉

1. Understand the theory of both linear and non-linear lumped and kinematics distributed flood rooting models.
2. Understand the evaluation technique and study results on the water conservation function and the water quality conservation function of forests.

Schedule〉

1. Unit Hydrograph
2. Response Function
3. Unit Hydrograph Derivation
4. Lumped Flow Routing
5. Runge-Kutta Method
6. Muskingum Method
7. Linear Reservoir Model
8. Classification of Distributed Routing Models
9. Kinematic Wave Celerity
10. Analytical Solution of Kinematic Wave
11. Finite-Difference Approximations
12. Numerical Solution of Kinematic Wave
13. Muskingum-Cunge Method
14. Conservation function of forest
15. Water quality conservation function of forest
16. New development of water conservation function of forest

Evaluation Criteria〉 Reports

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197494

Student〉 Able to be taken by only specified class(es)

Contact〉

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(Office Hour: 年度ごとに学科の掲示を参照すること)

Advanced slope disaster reduction

2 units (selection)

Jing-Cai Jiang · Associate Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 1. The first objective of this subject is to learn models and theories on rainwater and solute runoff system in river basin. 2. The second objective of this subject is to make students aware of the slope stability methods and to develop an understanding of the procedures and processes involved in the design of engineered slopes and slope stabilization works.

Outline〉 In the first part of this subject, models and theories on rainwater and solute runoff system in river basin are introduced. The Muskingum method is a commonly used lumped flood routing method for handling a variable discharge-storage relationship. The kinematic wave model is the simplest distributed model defined by the continuity equation for an unsteady flow and the momentum equation assuming the friction and gravity forces balance each other. A report of solving problems related to lecture items is imposed. Topics of the second part covered include slope stability analysis methods, types of shear strengths for both engineered and natural slopes, selection of strength parameters, types of slope stabilization works and their design, and seismic instability of slopes. This subject is related on engineering.

Style〉 Lecture

Keyword〉 ***linear and non-linear lumped flood routing method, kinematics distributed flood routing method, stability analysis, shear strengths, slope stabilization***

Relational Lecture〉 "Advanced Disaster Reduction Engineering"(0.5), "Advanced Geomechanics"(0.5), "Advanced Soil Mechanics"(0.5)

Requirement〉 not specified

Goal〉

1. On the completion of this subject, students should have a knowledge of slope engineering practices in static and seismic stability analyses, determination of shear strengths, and design of slope remedial works.
2. The students should understand the measurement and selection of the peak, fully softened, and residual shear strengths for use in stability analyses, and understand the design outline of slope stabilization works.

Schedule〉

1. Examples and causes of slope failure
2. Introduction of slope disaster reduction
3. Static slope stability methods (Part 1)
4. Static slope stability methods (Part 2)
5. Total stress analysis and effective stress analysis
6. Types of shear strengths for engineered and natural slopes
7. In-situ determination of shear strengths
8. Laboratory determination of shear strengths
9. Determination of shear strengths by back analysis (Part 1)
10. Determination of shear strengths by back analysis (Part 2)
11. Slope stabilization (unloading and drainage)
12. Slope stabilization (anchors)
13. Slope stabilization (piles)
14. Slope stabilization (soil reinforcement)
15. New development of slope disaster reduction
16. Examination

Evaluation Criteria〉 Reports and tests.

Textbook〉 Reading and discussing materials are distributed.

Reference〉 Soil Strength and Slope Stability by Michael J. Duncan and Stephen G. Wright (John Wiley & Sons)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197282

Contact〉

⇒ Jiang (A311, +81-88-656-7346, jiang@ce.tokushima-u.ac.jp) Mail (Office Hour: 年度ごとに学科の掲示を参照すること)

Advanced Disaster Reduction Engineering

2 units (selection)

Susumu Nakano · Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this subject is to understand the present conditions in natural disaster reduction and to learn theory and technology about disaster reduction measures.

Outline〉 First, the present conditions for natural disaster reduction in Japan are presented. Next, effective methods to promote voluntary activities for disaster reduction are presented with practices.

Style〉 Lecture and excercise

Keyword〉 ***regional disaster reduction, voluntary activities of disaster reduction***

Relational Lecture〉 "災害リスク論"(1.0), "Advanced Earthquake Engineering" (0.5), "Applied Fluid Dynamics"(0.5)

Requirement〉 not specified

Notice〉 not specified

Goal〉

1. To understand the present conditions in regional disaster reduction
2. To learn the basises of theory and technology for voluntary activities of disaster reduction

Schedule〉

1. Guidance, Outline of this subject
2. Strategy for natural disaster reduction
3. Strategy for earthquake disaster reduction
4. Voluntary activities of disaster reduction
5. Risk management for natural disaster in a company, report(1)
6. Damage assumption for the Nankai earthquake
7. Practice of disaster imaging (1)
8. Practice of disaster imaging (2)
9. Practice of disaster imaging (3)
10. Disaster imaging game "Crossroad"
11. Practice with the DIG game "Crossroad"
12. How to make a map for natural disaster reduction
13. Practice of making a map for natural disaster reduction (1)
14. Practice of making a map for natural disaster reduction (2)
15. Education for disaster reduction, Report(2)

Evaluation Criteria〉 marks of report (1) and (2) are summed with the weights of 4 and 6, respectively, and the passing mark is 60%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Webpage〉 http://hyd.ce.tokushima-u.ac.jp/suiko/index.htm

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197346

Student〉 Able to be taken by only specified class(es)

Contact〉

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(Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと。)

Advanced Geomechanics

2 units (selection)
Teacher of course

Target〉 The purpose of this lecture is to let the students understand the three major solution procedures for problems in geomechanics, that is Limit Equilibrium Method, Limit Analysis Method and Slip Line Method, and their applications to practical situations such as slope stability, earth pressure and bearing capacity problems.

Outline〉 Beginning with fundamentals of effective stress analysis and total stress analysis, the lecture is given of limit equilibrium stability analysis method considering progressive failure, limit analysis method, slip line method, and their applications.

Style〉 Lecture

Keyword〉 ***limit equilibrium method, limit analysis, slip line method***

Fundamental Lecture〉 "Geomechanics"(1.0), "Soil Mechanics 2"(1.0), "Geotechnical Engineering"(1.0)

Relational Lecture〉 "Advanced Soil Mechanics"(0.5), "Advanced Foundation Engineering"(0.5)

Requirement〉 Students are required to have a good knowledge of undergraduate-level soil mechanics.

Goal〉

1. To understand shear failure of soils
2. To understand effective stress analysis and total stress analysis
3. To understand stability analysis of slopes considering progressive failure
4. To understand analysis procedure for stability problems

Schedule〉

1. Introduction
2. Effective stress analysis (part 1)
3. Effective stress analysis (part 2)
4. Total stress analysis
5. Limit equilibrium method (part 1)
6. Limit equilibrium method (part 2)
7. Progressive failure analysis of slope stability (part 1)
8. Progressive failure analysis of slope stability (part 2)
9. Progressive failure analysis of slope stability (part 3)
10. Limit analysis (part 1)
11. Limit analysis (part 2)
12. Limit analysis (part 3)
13. Slip line method (part 1)
14. Slip line method (part 2)
15. Summary
16. Semester examination

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197276

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Teacher of course

Advanced Environmental Ecology

4 units (selection)

Mahito Kamada · Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Yoichi Kawaguchi · Associate Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose is to develop the knowledge and skill for conservation and restoration of ecosystems.

Outline〉 Current situation of ecosystems and technical problems for conservation and restoration are explained. The way of ecosystem management is emphasized to improve ecosystem. All students must give a presentation to introduce their own activities.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***ecosystem management, environmental conservation, nature restoration***

Goal〉 Every student has basic knowledge and skill to improve ecosystem function in the actual society.

Schedule〉

1. Guidance
2. Interdisciplinary aspects for ecosystem management 1
3. Interdisciplinary aspects for ecosystem management 2
4. Current situation and problems in ecosystem management 1
5. Current situation and problems in ecosystem management 2
6. Current situation and problems in ecosystem management 3
7. Current situation and problems in ecosystem management 4
8. View points to know the structure and function of ecosystems 1
9. View points to know the structure and function of ecosystems 2
10. View points to know the structure and function of ecosystems 3
11. View points to know the structure and function of ecosystems 4
12. Toward an adequate management of ecosystems 1
13. Toward an adequate management of ecosystems 2
14. Toward an adequate management of ecosystems 3
15. General discussion / Report

Evaluation Criteria〉 Result is evaluated by contents of the reports, which are set after every related lectures. Over 60% marks is necessary to pass.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197179

Student〉 Able to be taken by student of other department and faculty

Contact〉

⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: 年度ごとに学科の掲示を参照すること．)
⇒ Kawaguchi (308, +81-88-656-9025, kawaguchi@ce.tokushima-u.ac.jp) Mail
(Office Hour: 金曜午後)

Advanced Soil Mechanics

2 units (selection)

Hisashi Suzuki · Associate Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this lecture is to learn the critical state mechanics which is formed a theoretical base of a modern soil mechanics for clay and sand.

Outline〉 The purpose of Advanced Soil Mechanics is to learn the critical state mechanics which is formed a theoretical base of a modern soil mechanics for clay and sand. Firstly, the results of typical experiments related to shear properties of a saturated clay are shown and a constituve law existing at stress-strain relationship of clays are explained. Secondally, the reltaionship is expanded to the thory of sand and the differences between clay and sand are made clear easily. The elasto-plastic theory for soil is explained using the cam clay model and its applications to numerical analysis are explained showing new research results. Finally, the critical soil mechanics is learned through this lecture.

Style〉 Lecture

Keyword〉 ***critical soil mechanics, cam clay model, flow rule, constitutive law for soils***

Goal〉 Values of stress-strains and pore pressures for saturated soils in various states can be calculated by using critical state soil mechanics theory.

Schedule〉

1. cam clay model
2. shear properties of saturated clay
3. existence of critical state line
4. Drained and Undraind tests of normally consolidated clay
5. 3 dimensional expression of critical state line
6. existence of Roscoe Surface
7. shape of Roscoe Surface
8. behavior of overconsolidated clay
9. yield surface of Hvorslev Surface
10. the 2 and 3 dimensional complete stste boundary surface
11. mechanical behavior of sands
12. equivalent consoliated pressure
13. elasto-plastic theory of saturated clay
14. cam clay model
15. state boundary equation for cam clay model
16. term-end test

Evaluation Criteria〉 Degree of achievement for the aim is examined by the semester test and the passing mark is more than 60%.

Textbook〉 Some prints are distributed in lectures.

Webpage〉 http://www.ce.tokushima-u.ac.jp/www/jiban/jiban.html

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197401

Contact〉

⇒ Suzuki(A403, 088-656-7347, suzuki@ce.tokushima-u.ac.jp)

City and Transport System Planning

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Junko Sanada · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Kojiro WATANABE · Assistant Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Advanced course on concept and case study of social and public policies on urban, regional and transport planning. Study on contents and usage of measures on such planing fields.

Outline〉 Lectures on Systems approaches on city planning and transport planning, theories and usage of planning models and planning methods. A unit is consisted of three hours llecture and an hour training.

Style〉 Lecture and excercise

Keyword〉 ***city planning, transport planning, GIS***

Fundamental Lecture〉 "Urban & Transport Planning"(1.0), "Project Evaluation Methods for Infrastructure Planning"(1.0)

Relational Lecture〉 "都市 · 地域計画論"(0.5), "Infrastructure Planning"(0.5)

Goal〉

1. Understanding of problems and recent strategies on city and transport planning
2. Understanding of concensus buidling method for developing city and transport strategies

Schedule〉

1. Problems of City and Transport Systems 1
2. Problems of City and Transport Systems 2
3. Recent Planning Strategies of City and Transport System 1
4. Recent Planning Strategies of City and Transport System 2
5. Recent Planning Strategies of City and Transport System 3
6. Recent Planning Strategies of City and Transport System 4
7. Debate by gropus on transport strategies
8. City and Regional Planning 1
9. City and Regional Planning 2
10. City and Regional Planning 3
11. City and Regional Planning 4
12. Introduction of GIS
13. Practice on GIS for City and Transportation Planning 1
14. Practice on GIS for City and Transportation Planning 2
15. Practice on GIS for City and Transportation Planning 3

Evaluation Criteria〉 Achievement level of the each target is evaluated by the submitted essays and reports. Score of 60points or over is required to clear the target. Students are required to clearr the both of targets. Total score is average of the scores of two targets.

Textbook〉 Textbook is ibtroduced in the class. Realted documents is distributed to students.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197398

Student〉 Able to be taken by student of other department

Contact〉

⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Sanada (A411, +81-88-656-7578, sanajun@ce.tokushima-u.ac.jp) Mail
⇒ WATANABE (kojiro@ce.tokushima-u.ac.jp) Mail (Office Hour: See the department notice board every year)

Advanced Foundation Engineering

4 units (selection)

Katsutoshi Ueno · Associate Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this lecture is to understand the method to analyze failure and deformation of soil structures. In this lecture, deformation and failure characteristics of soil and their modeling methods are explained first. In particular, shear testing apparatus, shear deformation and strength characteristics, are explained in detail. Then computer implementation of the model for deformation and failure characteristics of soil is explained in detail. Topics of this lecture are as follows: 1. Shear testing apparatus and test methods, 2. Basic shear deformation characterisics of soil and its application, 3. Introduction to finite element method, 4. Failure criteria and elast-plastic model of soil.

Outline〉 Purpose of this lecture is to let the students understand how to solve deformation and failure problems of foundation structures. Beginning with shear testing, the lecture is given shear deformation and strength characteristics of soil and their modeling for numerical methods, implementation of the numerical models into finite element method. Keywords are: 1 shear testing apparatus and methods, 2 Basic shear characteristics of soil and its application, 3 Foundamentals of finite element method, 4 failure criteria and elast-plastic constitutive model of soil.

Style〉 Lecture

Keyword〉 ***finite element method, elast-plastic constitutive equation***

Requirement〉 nothing

Notice〉 This class will be

Goal〉

1. To understand fundamentals of soil characteristics and its testing method
2. Modeling mechanical characteristics and installing to FEM, and analysis deformation and failure phenomenon of foundation stractures

Schedule〉

1. Shear test apparatus and method (Direct shear test) 1
2. Shear test apparatus and method (Direct shear test) 2
3. Shear test apparatus and method (conventional and true triaxial compression test) 1
4. Shear test apparatus and method (conventional and true triaxial compression test) 2
5. Fundamentals of shear defomation characteristica of soil 1
6. Fundamentals of shear defomation characteristica of soil 2
7. Failure criteria 1
8. Failure criteria 2
9. Stress-strain relationships of soil 1
10. Stress-strain relationships of soil 2
11. Modeling of stress-strain relationship of soil 1
12. Modeling of stress-strain relationship of soil 2
13. Constitutive equation of soil and its application 1
14. Constitutive equation of soil and its application 2
15. Basic of FEM and its programming 1
16. Basic of FEM and its programming 2
17. Features of geotechnical FEM 1
18. Features of geotechnical FEM 2
19. Imprementation of constitutive model of soil 1
20. Imprementation of constitutive model of soil 2
21. Introduce of failure criteria 1
22. Introduce of failure criteria 2
23. Introduce of stress dependency 1
24. Introduce of stress dependency 2
25. boundary condition
26. Loading of initial stress
27. Examples of analysis 1
28. Examples of analysis 2
29. exercises in analysis 1
30. exercises in analysis 2
31. exercises in analysis 3
32. report on object 2

Textbook〉 別途指示する.

Reference〉 別途指示する.

Webpage〉 http://kiso.ce.tokushima-u.ac.jp/~ueno/index.html

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197201

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Mochizuki (A405, +81-88-656-9721, motizuki@ce.tokushima-u.ac.jp) Mail
⇒ Ueno (A504, +81-88-656-7342, ueno@ce.tokushima-u.ac.jp) Mail (Office Hour: 学科の掲示を参照のこと)

Advanced Earthquake Engineering

2 units (selection)

Atsushi Mikami · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To learn fundamental knowledge in Earthquake Engineering.

Outline〉 To provide students with fundamental knowledge in Earthquake Engineering including (1) Seismology (2) Ground Motion (3) Finite Element Analysis.

Style〉 Lecture

Keyword〉 ***seismology, wave propagation theory, ground motion, finite element analysis***

Relational Lecture〉 "Advanced Structural Dynamics"(0.5)

Requirement〉 Fundamental knowledge of dynamics of structures

Goal〉 To understand fundamental knowledge in earthquake engineering

Schedule〉

1. Introduction
2. Earthquake Mechanism
3. Fault Model
4. Propagation of Seismic Waves
5. Surface Ground Motions
6. Probabilistic Analysis Methods for Input Ground Motion
7. Synthesis and Simulation Methods Stochastic for Input Ground Motion
8. Microtremor Measurments and Analysis
9. Numerical Analysis in Earthquake Engineering
10. Introduction to Finite Element Analysis
11. Direct Method
12. Strong Form and Weak Form
13. Choice of Approximating Functions
14. Choice of Weight Function
15. Domain Discretization
16. Finite Element Formulation

Evaluation Criteria〉 Evaluation by Reports, Minimum Requirement=60%

Textbook〉

◇ Introduction to seismic spectral analysis
◇ Finite Element Method

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197339

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Mikami (A512, +81-88-656-9193, amikami@ce.tokushima-u.ac.jp) Mail
(Office Hour: Friday, 16:00-19:00 (or by appointment))

Advanced reinforced concrete engineering

4 units (selection)

Chikanori Hashimoto · Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Takao Ueda · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The objective of this subject is to understand the recent technology on methods of structual analysis of reinforced concrete structures and the recent technology on maintenance of reinforced concrete structures.

Outline〉 It is important that understanding the new type structures, the design method and the analytical method of concrete structures to realize a durable, safe and low-priced concrete structure. In this lecture, the realizing method of high performance concrete structures and the application of finite element method for concrete structures is explained, including the new type structures, application of new materials for concrete structures, PRC structures, the durability design and the slife cycle design. A lecture items is as follows. 1. Deteriration mechanism RC structures. 2. Evaluation of durability of RC structures. 3. Repair method of RC structures. 4. Programming of bending analysis for RC and PRC structures using the fiber model. 5. Basic concept of durability design. 6. Basic concept of life cycle design. 7. Engineering ethics for civil engineers.

Style〉 Lecture and excercise, Practice

Keyword〉 ***programming of bending analysis, new materials nad new construction methods, field visit, deterioration mechanism, evaluation of durability, repair method, life cycle design***

Requirement〉 It is necessary for students to learn the basic attainments on the concrete technology and reinfroced concrete mechanics.

Notice〉 Each subject is lectured for 180 minutes such as two times as the lecture's time of usaally other subject. So be careful.

Goal〉

1. The purpose is to understand the recent technology on methods of structual analysis of reinforced concrete structures and the recent techinology on materials and construction methods concerned wtih reinfroced concrete structures.
2. The purpose is to understanind the recent techinology on maintenance of concrete structures.

Schedule〉

1. Guidance and Programming of bending analysis for RC and PRC structures using the fiber model (1).
2. Programming of bending analysis for RC and PRC structures using the fiber model (2).
3. Recent technology on application of the new materials for reinfroced concrete structures(1).
4. Recent technology on application of the new materials for reinforced concrete structures(2).
5. Recent technology on the new construction methods for reinforced concrete structures(1).
6. Recent technology on the new construction methods for reinforced concrete structures(2).
7. Field vist.
8. Enginnering ethics in practice the case study approach on construction of concrete stuructures.
9. Deterioration mechanism of reinforced concrete structures (1).
10. Deterioration mechanism of reinforced concrete structures (2).
11. Evaluation of durability of reinforced concrete structures (1).
12. Evaluation of durability of reinforced concrete structures (2).
13. Repair method of reinforced concrete structures (1).
14. Repair method of reinforced concrete structures (2).
15. Life cycle design of reinforced concrete structures.
16. Preliminary

Evaluation Criteria〉 Evaluate by reports for each subject.

Textbook〉

- ◇ Handout of photo copying materials for each subject (Hashimoto).
- ◇ Infrastructure Maintenance Engineering, University of Tokyo Press (Ueda)

Reference〉 Standard Specifications for Concrete Structures, "Maintenance"

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197372

Advanced Lecture in Technical English

4 units (selection)
Teacher of course

Target〉 The purpose of this subject is to develop the ability of reading comprehension of English technical papers of each special field.

Outline〉 First, a technical paper of each special field is selected by students according to their teacher's instruction. Next, understanding of selected paper and translation of it into Japanese are made. Finally, translation reports are submitted and presented to their respective teachers. Number of papers selected in each semester is one.

Style〉 Portfolio

Keyword〉 ***technical English, reading comprehention, translation into Japanese***

Fundamental Lecture〉 "Introduction to Technical English"(0.5)

Relational Lecture〉 "Advanced Civil and Environmental Engineering Seminar" (0.5)

Requirement〉 Students are required to have fundamental knowledge of English.

Goal〉 To translate English technical papers of each special field into Japanese.

Schedule〉

1. Guidance
2. Selection of a technical English paper in the first semester.
3. Reading comprehension and translation into Japanese.
4. Submission of translation report 1.
5. Oral examination 1.
6. Selection of a technical English paper in the second semester.
7. Reading comprehension and translation into Japanese.
8. Submission of translation report 2.
9. Oral examination 2.

Evaluation Criteria〉 Both of the reports(No.1 & No.2) are marked out of 50 and those marks are summed up. The passing mark is 60.

Textbook〉 Tech Talk Pre-Intermediate (Oxford University Press)

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197197

Student〉 Able to be taken by only specified class.

Contact〉

⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: Friday11:55~ 12:50)

Technical English Conversation

2 units (selection)

Angus McDonald·Alexander · Foreign Teacher / マックイングリッシュスクール, Atsushi Mikami · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this subject is to develop technical English conversation ability of students who aim to be an international engineers.

Outline〉 Lecture and exercise on technical English conversation are given by a foreign teacher. In addion, prerarration for TOEIC is partially included in this class.

Style〉 英語 (Speaking 中心)

Keyword〉 ***technical English, English conversation, TOEIC***

Fundamental Lecture〉 "Introduction to Technical English"(0.8)

Relational Lecture〉 "Advanced Civil and Environmental Engineering Seminar" (0.5)

Requirement〉 Not specified.

Goal〉 To be fairly good at speaking English as a future engineer.

Schedule〉

1. Introduction and pre-course test.
2. First meeting and spelling
3. Saying what you want.
4. E-mail addresses and telephone messages
5. Describing controls, facilities and tests
6. Describing features, materials, shapes
7. Explaining what things do and dimensions.
8. Tools and equipment
9. Warning signs
10. Locating things
11. Suggesting solutions
12. Work tasks
13. Explaining functions
14. Reporting damage
15. Describing a project
16. Test

Evaluation Criteria〉 Based on attendance and test score.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197196

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Mikami (A512, +81-88-656-9193, amikami@ce.tokushima-u.ac.jp) Mail
(Office Hour: Friday 9:30~ 11:00)

Note〉 English-Japanese and Japanese-English dictionaries should be brought without fail.

Advanced Structural Design

2 units (selection)

Fumiaki Nagao · Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Minoru Noda · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this class is to evaluate the safety of structures based on the probabilistic models for static and dynamic lords and resistance variables and structural reliability theories

Outline〉 The probabilistic models for static and dynamic lords and resistance variables, some structural reliability theories and outlines of recent topics to structural design are explained.

Style〉 Lecture

Keyword〉 ***safety of structures, probabilistic models for loads, structural reliability theories***

Relational Lecture〉 "Advanced Structural Dynamics"(0.5)

Goal〉 To understand the safety of structures

Schedule〉

1. probabilistic models for static and dynamic lords and resistance variables 1
2. probabilistic models for static and dynamic lords and resistance variables 2
3. probabilistic models for static and dynamic lords and resistance variables 3
4. probabilistic models for static and dynamic lords and resistance variables 4
5. probabilistic models for static and dynamic lords and resistance variables 5
6. limit state of structures 1
7. limit state of structures 2
8. evaluation of structural safety 1
9. evaluation of structural safety 2
10. evaluation of structural safety 3
11. evaluation of structural safety 4
12. evaluation of structural safety 5
13. recent topics to structural design 1
14. recent topics to structural design 2
15. recent topics to structural design 3

Evaluation Criteria〉 evaluated by attitude in class (80%) and reports (20%)

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197222

Contact〉

⇒ Nagao (A515, +81-88-656-9443, fumi@ce.tokushima-u.ac.jp) Mail (Office Hour: 年度ごとに学科の掲示を参照すること)
⇒ Noda (A514, +81-88-656-7323, tarda@ce.tokushima-u.ac.jp) Mail (Office Hour: 年度ごとに学科の掲示を参照すること)

Urban and Regional Planning

2 units (selection)

Akio Kondo · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 The concept and technique to describe not only the vision but also design in the future urban and regional plan are lectured.

Outline〉 The technique of urban and regional planning is explained using various materials in practical planning. The debate is introduced to develop the ability in design of planning for students.

Style〉 Lecture and excercise

Keyword〉 ***urban and regional planning, proposition of vision, planning design***

Fundamental Lecture〉 "Advanced Environmental Systems Engineering"(0.2)

Relational Lecture〉 "Information Engineering of Regional Environment"(0.8)

Requirement〉 特になし

Notice〉 特になし

Goal〉 To understand the concept and technique to describe the future urban and regional plan.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of urban planning
3. Examples of regional planning
4. Planning and law
5. Examples of application of law
6. Economic analysis in planning (Theory)
7. Economic analysis in planning (Application)
8. Concept of systems analysis in planning
9. Application of systems analysis in planning
10. Explanation of Exercise
11. Exercise of planning 1
12. Exercise of planning 2
13. Presentation of planning
14. Discussion about the future of region
15. Discussion about the vision of region

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/kondo/top/index.htm

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197400

Student〉 Able to be taken by only specified class(es)

Contact〉

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(Office Hour: 月曜日9·10校時)

Note〉 特になし

Advanced building construction

2 units (selection)

Shoji Miyamoto · Part-time Lecturer

Target〉 The purpose of this subject is to learn the bases of structure design caluculation and seismic safety evaluation of a building construction.

Outline〉 In this subject, invited extraordinary lecturer, who is a first class authorized practical architect and builder, introduces design calculation and seismic safety evaluation of a building construction.

Style〉 Lecture

Keyword〉 ***design calculation, seismic safety evaluation***

Fundamental Lecture〉 "Introduction of Architecture"(0.5), "Architectural Environmental Engineering"(0.5), "Architectural Planning"(0.5)

Relational Lecture〉 "Advanced Fracture and Structural Mechanics"(0.5)

Requirement〉 Student are required to have a good understanding of undergraduate-level structure mechanics.

Goal〉 To understand the bases of design calculation and seismic safety evaluation of a building

Schedule〉

1. Guidance/Introduction
2. Basis of design calculation (part 1)
3. Basis of design calculation (part 2)
4. Basis of design calculation (part 3)
5. Basis of design calculation (part 4)
6. Basis of design calculation (part 5)
7. Basis of design calculation (part 6)
8. Basis of design calculation (part 7)
9. Basis of seismic safety evaluation (part 1)
10. Basis of seismic safety evaluation (part 2)
11. Basis of seismic safety evaluation (part 3)
12. Basis of seismic safety evaluation (part 4)
13. Basis of seismic safety evaluation (part 5)
14. Basis of seismic safety evaluation (part 6)
15. Basis of seismic safety evaluation (part 7)
16. Assignment of term paper

Evaluation Criteria〉 Assignments count 100%

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197229

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Miyamoto(s.miyamoto@viola.ocn.ne.jp)
⇒ SAto(A511, sato@ce.tokushima-u.ac.jp)
⇒ Nariyuki (A510, +81-88-656-7326, nariyuki@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday 16:20-17:50)

Principles of Disaster Risk

2 units (selection)

Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Ryoichi Yamanaka · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand concept of risk, risk management, damage reducing measure ability to natural disaster

Outline〉 To understand histrical earthquakes and tsunamis , characteristics of earthquake and tsunami, prediction of damage , to cultivate presentation skill and debate ability.

Keyword〉 ***earthquakes and tsunamis, disaster prevention assessment, risk management***

Relational Lecture〉 "Principle of Environmental Risk"(0.5)

Goal〉 Training-up of technical knowledge to the natural disaster, the basic knowledge which can correspond to the risk management and the crisis management

Schedule〉

1. Histrical Earthquakes in Japan
2. Histrical Tsunamis in Japan
3. Characteristics of Earthquake
4. Characteristics of Tsunami
5. Generation Characteristics of Nankai Earthquake
6. Generation Characteristics of Nankai Earthquake and Tsunami
7. Disaster Prevention for Earthquakes and Tsunamis
8. Disaster Prevention Assessment for Earthquakes and Tsunamis
9. What is Risk Management ?
10. Practice of Risk Management for Earthquakes and Tsunamis(1)
11. Practice of Risk Management for Earthquakes and Tsunamis(2)
12. Presentation of Tsunami Risk Assessment

Evaluation Criteria〉 Assignments Count 100%

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197246

Student〉 To be limited to students of course

Contact〉

⇒ Kozuki (Eco505, +81-88-656-7335, kozuki@eco.tokushima-u.ac.jp) Mail
(Office Hour: 火曜日, 14:35 から 16:05, 18:00 から 19:30)

mitigation engineering

2 units (selection)

Ryoichi Yamanaka · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering, Naoko Mitani · Part-time Lecturer / 徳島市環境リーダー
Takashi Nakanishi · Part-time Lecturer / 総合科学部

Target〉 To understand the background and the significance of mitigation and to acquire fundamental principles of mitigation technique.

Outline〉 To explain concept, history, technology and examples of mitigation for national land development and global environment problems

Style〉 Lecture

Keyword〉 ***mitigation, coastal environment, ecosystem, environmental restoration***

Fundamental Lecture〉 "Principles of Disaster Risk"(1.0), "Urban and Regional Planning"(1.0)

Relational Lecture〉 "Advanced Environmental Ecology"(0.5), "Advanced Environmental Systems Engineering"(0.5)

Goal〉 To acquire ideas and fundamental of mitigation

Schedule〉

1. Guidance of this subject
2. History of the national land development
3. Deterioration of costal environment(1)
4. Deterioration of costal environment(2)
5. Mitigation for coastal environment(1)
6. Mitigation for coastal environment(2)
7. Mitigation of global environment problems(1)
8. Mitigation for coastal environment(3)
9. Mitigation for coastal environment(4)
10. Law and examples of the promotion of nature restoration
11. Mitigation of global environment problems(2)
12. Mitigation for coastal environment(5)
13. Environmental Risk
14. Mitigation of global environment problems(3)
15. Examination
16. Discussion

Evaluation Criteria〉 Evaluate learning results by reports, debates and examination

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197498

Contact〉

⇒ Yamanaka (総合研究実験棟 (エコ棟)504 号室, +81-88-656-7334, yamanaka@eco.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 14:35-17:50)

Information Engineering of Regional Environment

2 units (selection)

Masashi Okushima · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 The information of regional environment, technique of analysis, information management and geographic information system are explained. The method and technique using for application of environmental information to development of regional policies are lectured.

Outline〉 The information of regional environment, technique of analysis, information management and geographic information system are explained using the various kinds of materials and examples in practical planning.

Style〉 Lecture and excercise

Keyword〉 ***information of regional environment, technique of analysis, geographic information system***

Relational Lecture〉 "Urban and Regional Planning"(0.8), "Advanced Environmental Systems Engineering"(0.2)

Requirement〉 特になし

Notice〉 Please download files for this lecture from next URL, print out and take to the lecture room. The materials are not distributed in the lecture.

Goal〉 To obtain the knowledge of the information of regional environment, technique in survey, information management and computer aid systems, and apply them to design of regional plan and political simulation.

Schedule〉

1. guidance and purpose of this subject
2. multi-variable analysis
3. expert system
4. fuzzy reasoning
5. neural network
6. genetic algorithm
7. game theory
8. complex system
9. shortest path method
10. using database
11. color mapping
12. geometoric analysis
13. GIS programing
14. geographical search
15. presentation of results of exercise

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/kondo/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197344

Student〉 Able to be taken by only specified class(es)

Contact〉

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Note〉 特になし.

Advanced Civil and Environmental Engineering Seminar

4 units (compulsory)
Teacher of course

Target〉 The first purpose of this subject is to obtain the fundamental knowledge regarding research theme and develop the abilities to find and solve problems and present the results of research. The second one is to improve the ability to communicate in English by taking TOEIC.

Outline〉 Papers regarding research theme are read. The reports on contents of those papers are submitted to your own techears. The contents of those reports are presented at seminars. In addition, taking TOEIC is required.

Style〉 Portfolio

Keyword〉 ***civil and environmental engineering, paper, seminar, TOEIC***

Relational Lecture〉 "Technical English Conversation"(0.5), "Advanced Lecture in Technical English"(0.5)

Notice〉 Students should follow their own teacher's advices on how to find papers to be read and schedule for seminars and promptly inform their own teachers of scores on TOEIC every time without fail.

Goal〉

1. To obtain the fundamental knowledge regarding research theme and the presentation ability.
2. To get a larger score on TOEIC than criteria set separately by specified course.

Schedule〉

1. Guidance
2. Seminar on research theme
3. TOEIC

Evaluation Criteria〉 Attainment level of goal 1 is evaluated by presentations and submitted materials in seminars and passing mark is 60%. Attainment level of goal 2 is evaluated from the score on TOEIC and passing mark is 60%. To get credits of this subject, it is necessary to pass both criteria. Grade is finally calculated by summing both marks with the weights of 60% and 40%, respectively.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197228

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
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⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: Friday 11:55~ 12:50)
⇒ Nariyuki (A510, +81-88-656-7326, nariyuki@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday 16:20-17:50)

Advanced Civil and Environmental Engineering Exercise

4 units (compulsory)
Teacher of course

Target〉 The purpose of this subject is to obtain deeper knowledge of related phenomena and develop the abilities to find and solve problems and creativity through some exercises toward each Master's thesis.

Outline〉 Exercises for discovering and solving various problems related to research theme are performed.

Style〉 Portfolio

Keyword〉 ***exercise, discovery of problem, solution of problem, civil and environmental engineering***

Goal〉 To understand how to discover and solve problems regarding research theme.

Schedule〉

1. Guidance
2. Discovery of problems
3. Investigation on the method for solving problems
4. Report

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197223

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday 11:00~ 12:30)

Advanced Civil and Environmental Engineering Laboratory

4 units (compulsory)
Teacher of course

Target〉 The purpose of this subject is to obtain deeper knowledge of related phenomena and develop the abilities to find and solve problems and creativity through some experiments and investigations toward each Master's thesis.

Outline〉 Experiments and investigations are performed toward Master's thesis.

Style〉 Portfolio

Keyword〉 ***experiment, investigation, Master's thesis***

Goal〉 To understand how to discover and solve problems regarding research theme.

Schedule〉

1. Guidance
2. Discovery of problems
3. Designs of experiments and Investigations
4. Experiments and Investigations
5. Report (Master's thesis)

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197227

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: 年度ごとに学科の掲示を参照すること．)

Advanced Internship on Civil and Environmental Engineering

4 units (selection)
Teacher of course

Target〉 To make clear images on future jobs from wider aspects and increase knowledge and technical skill to the levels applicable in actual scenes.

Outline〉 Actual works at out of the university such as research institutes, govermental office, private enterprise,etc. are experienced.

Style〉 Portfolio

Keyword〉 ***internship, extension, special knowledge, special technique***

Notice〉 Propriety and place of practice must be decided after a consultation with a supervisor.

Goal〉 To master practical knowledge and technical skill.

Schedule〉

1. Guidance
2. Consultation with supervisor about practice
3. Practical Exercise
4. Report
5. Presentation

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197224

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: Friday 11:55~ 12:50)

Intelligent Structures and Mechanics Systems Engineering — Mechanical Engineering

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Applied Fluid Dynamics

2 units (selection)

Kunihiko Ishihara · Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering, Teacher of Civil Engineering

Target〉 This theme is concerned with Flow-induced vibration and noise. The aimof this theme is to understand the generation mechanism and to learn the prediction and countermeasure techniques

Outline〉 In application of fluid dynamics, there are two aspects such as the performance and safty of turbomachines. This theme discusses how the fluid dunamics is applied to the safty design about several examples described below. 1. Vibration of turbomachine blade, 2. Flow-induced vibration of structures in a piping syatem. 3. Vibration of heat exchanger tube bundles, 4. Areroacoustics, 5. Self sustaine tone, etc. The aim of this theme is to understand their generation mechanisms and to train the ability of obtaining the countermeasure's plan

Keyword〉 ***aeroacoustics, flow-induced vibration, self-sustained tone, noise***

Relational Lecture〉 "Energy Conversion System"(0.5), "Advanced Applied Dynamics of Machine"(0.5)

Requirement〉 Fundamental knowledge of fluid dynamics and vibration engiuneering is necessary

Notice〉 not specified

Goal〉 training of researcher and engineer in an enterprise

Schedule〉

1. Guidance(Flow-induced vibration and noise)
2. Fundamental knowledge of acoustics(1)(Nature of sound)
3. Fundamental knowledge of acoustics(2)(Distant attenuation of sound)
4. Fundamental knowledge of acoustics(3)(Difraction of sound)
5. Intermediate tesut(1) and samarise
6. Aeroacoustics(1) (Present state of investigation of aeroacoustics)
7. Aeroacoustics(2) (Kind of aeroacoustics and basic equation)
8. Aeroacoustics(3) (Prediction method of sound from cylindrical body)
9. Aeroacoustics(4) (Prediction method of sound from plate)
10. Intermediate test(2) and samarise
11. Flow-induced vibration(1) (Examples of trouble)
12. Flow-induced vibration(2) (Cause of vibration of cylindrical structure)
13. Flow-induced vibration(3) (Shirking of self excited vibration)
14. Flow-induced vibration(4) (Steady drag force and random vibration)
15. Flow-induced vibration(5) (Vibration of tube array)
16. Final test

Evaluation Criteria〉 aberage of tests (1)~ (3) and reports are summed with the weights of 7 and 3, respectively, and the passing mark is 60%.

Textbook〉 prints

Reference〉 not specified

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197155

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ishihara (M518, +81-88-656-7366, ishihara@me.tokushima-u.ac.jp) Mail
(Office Hour: 木曜日 ·17:00~ 18:00)

Advanced Applied Dynamics of Machine

2 units (selection)

Junichi Hino · Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The basic technologies which evaluate and control dynamic behavior of mechnical systems and their applied technologies are made to master.

Outline〉 The theoretical and experimental modal analysis methods to grasp dynamic properties of structures and derive mathematical models are studied. In recent vibration analysis, the vibration analysis procedures with computers are of increasing mportance. The algorithms to solve eignevalue problems and numerical Integration methods of ordinary differential equations are introduced. Subsequently, active and passove vibration control methods of mechanical systems are studied are lectured.

Style〉 Lecture

Keyword〉 ***vibration analysis, modal analysis, vibration control***

Requirement〉 Students are required to have a good understanding of undergraduate-level appied mechancs and related subjects.

Goal〉

1. To understand dynamic design method
2. To understand modal analysis
3. To aqcuire computer vibration analysis precedure
4. To understand vibration control method

Schedule〉

1. Modeling of mechanical systems
2. Formulation of mechanical systems
3. Natural frequencies and mode shapes
4. Eigenvalue problem and solution
5. Computational analysis of mechanical systems; Runge Kutta Method
6. Computational analysis of mechanical systems; Newmark Method
7. Experimrntal modal analysis; Vibration testing
8. Experimrntal modal analysis Modal identification; SDOF Merhod
9. Experimrntal modal analysis Modal identification; MDOF Method
10. Active and passive control methods
11. Vibration control with a dynamic absorber
12. Vibration control and state equation
13. Vibration control, pole placement method
14. Vibration control, observer
15. Vibration control, optimal control
16. Examination

Evaluation Criteria〉 Assignments count 50% and examinations count 50%

Textbook〉

◇ Printed synopses are used.
◇ To be introduced in thte class

Reference〉 To be introduced in thte class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197295

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Hino (M422, +81-88-656-7384, hino@me.tokushima-u.ac.jp) Mail (Office Hour: monday 17.00-18.00)

Advanced Fracture and Structural Mechanics

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Daisuke Yonekura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Because the machine and structure should be safety, it is important to evaluate the stress distribution in front of the defect like crack which is in the component of machine. In Fracture Mechanics, the stress distribution is expressed by stress intensity factor, K. Also, the fracture of component depends on fracture toughness of material. In this lecture, it is explained that for the defect like crack, how the stress intensity factor is expressed. It is then mentioned that how the fracture is toughness evaluated. The students should submit the reports each exercises. Finaly, the knowledge of safety design and fracture prevention for machine and structure can be mastered.

Outline〉 The purpose of fracture mechanics is the evaluation of the strength and fracture of machine and structure and then is the guarantee of safety of machine and structure. We should study the mechanical behavior of crack, the stress distribution in front of crack, the fracture analysis by fracture mechanics and the nonlinear mechanical behavior of elastic-plastic state. It is explained the theory of safety design and prevention of fracture for machine and structure.

Keyword〉 ***fracture, safety design, crack, machine/structure, stress intensity factor***

Relational Lecture〉 "Solid Mechanics"(0.5), "Material Engineering"(0.5), "Physical properties of materials"(0.5)

Goal〉

1. Concept of Fracture Mechanics
2. Application to fracture anaysis of stress intensity factor
3. Concept of Fracture Toughness
4. Concept of J Integral

Schedule〉

1. Introduction of linear fracture mechanics
2. Stress intensity factor
3. Fracture toughness and fracture analysis
4. Safety design of machine by fracture mechanics
5. Elastic-plastic deformation in front of crack tip
6. Linear and nonlinear fracture mechanics
7. Midterm examination
8. Concept of J integral
9. Evaluation method of J integral
10. Fracture toughness by J integral
11. Condition of fracture initiation
12. Stabe and unstable fracture
13. Application of nonlinear fracture mechanics
14. Fracture analysis by nonlinear fracture mechanics
15. Summary
16. Final examination

Evaluation Criteria〉 Over 60% of group discussion, reports and examination

Textbook〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197413

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp)
Mail (Office Hour: Monday 16:00-17:00)

Physical properties of materials

2 units (selection)

Tatsuya Okada · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering, Hideo Nishino · Associate Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Electron microscopy, the most effective observation method of crystallographic defects which dominate mechanical properties of materials, is briefly discribed. Ultrasonic propagation phenomena depending on the elastic properties of materials and their applicaitons are also described.

Outline〉 Mechanical properties of crystalline materials are dominated by microscopic lattice defects. In the first half of this lecture, transmission electron microscopy, a powerful experimental method for direct observation of microscopic defects in materials, is discussed. Emphasis is put on the understanding of crystal orientation determination from electron diffraction patterns, based on the idea of reciprocal lattice. In the last half of this lecture, basic properties of wave propagation for ultrasonic material characterizations are discussed. The aim of the lecture is to give ultrasonic propagation phenomena. Several theoretical deductions of the wave equation from the continuity equation, the Navier-Stokes equation, the equation of state and the energy conservation low, respectively, and wave simulations are also shown in the lecture.

Style〉 Lecture

Keyword〉 ***transmission electron microscopy***

Fundamental Lecture〉 "Material Engineering"(1.0)

Goal〉

1. To understand the Ewald sphere construction for the analysis of electron diffraction patterns.
2. To understand the wave equation for 3-dimentional anisotropic solid material and computer simulation for wave-propagation.

Schedule〉

1. Transmission electron microscope, Basic crystallography
2. Bragg's law and reciprocal lattice
3. Ewald sphere construction, Structure factor
4. Electron diffraction
5. Diffraction from single crystal
6. Kikuchi pattern
7. Kinematical theory
8. Introduction of wave propagations and NDI techniques with ultrasounds
9. Displacement, stress and strain of 3-dimentional anisotropic solid material
10. Methematical deduction of wave equation for 3-dimentioal anisotropic solid material
11. Physical meanings of wave equation
12. Finite differential simulation of wave equation
13. Boundary descriptions for wave equation
14. Physics for ultrasonic guided waves
15. Methematics for SH mode guided waves
16. Examination

Evaluation Criteria〉 Assignment 50%, Examination 50%

Reference〉 坂著「結晶電子顕微鏡学」(内田老鶴圃)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197259

Contact〉

⇒ Okada (M616, t-okada@me.tokushima-u.ac.jp) Mail
⇒ Nishino (M618, +81-88-656-7357, nishino@me.tokushima-u.ac.jp) Mail

Project Management

2 units (selection)

Susumu Namerikawa · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this lecture is to understand PMBOK (Project Management Body of Knowledge), which is global standard in project management.

Outline〉 This lecture is outlined as follows: A)Current of global standardize pivoted on U.S. in project management. B)PMBOK (Project Management Body of Knowledge), which is global standard in project management.

Style〉 Lecture

Keyword〉 ***PMBOK***

Fundamental Lecture〉 "Construction Business Management"(0.2)

Goal〉 Understanding of project management body of knowledge

Schedule〉

1. Guidance
2. Project and Project Management
3. Initiating Processes
4. Project Charter
5. Scope and WBS
6. Resource Planning and Estimate
7. Control of Project Planning 1
8. Control of Project Planning 2
9. Develop Project Planning 1
10. Develop Project Planning 2
11. Develop Project Team
12. Performance Measurement Baseline
13. Change Control
14. Closing Processes
15. Professional Responsibility
16. Semester Examination

Evaluation Criteria〉 Achievement level of the target is evaluated by the semester examination. Score of 60points or over is required to clear the target.

Textbook〉 Textbook is ibtroduced in the class. Realted documents is distributed to students.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197478

Student〉 Able to be taken by student of other department

Contact〉

⇒ Namerikawa (A412, +81-88-656-9877, namerikawa@ce.tokushima-u.ac.jp)
Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示を参照すること)

Quantum mechanics and advanced lecture in quantum physics

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the quantum mechanics.

Outline〉 Basics of quantum mechanics are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics***

Goal〉 To understand the outline of quantum mechanics.

Schedule〉

1. Introduction
2. Variational method
3. Lagrangian
4. Hamiltonian
5. Poisson's bracket expression
6. Quantization
7. Operator
8. Wavefunction
9. Expectation value
10. Schrödinger equation
11. Example (1) the square well potential
12. Example (2) the linear harmonic oscillator
13. Angular momentum
14. Example (3) hydrogen atom
15. Heisenberg equation
16. Field quantization

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197468

Contact〉

⇒ Yoshitaka Michihiro (A203)

Superconductivity and superconducting materials

2 units (selection)

Yutaka Kishimoto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand basics and recent developments in superconductivity.

Outline〉 This class reviews quantum mechanics and introduces superconductivity and recent superconducting materials.

Style〉 Lecture

Keyword〉 ***superconductivity, Cooper pair, superconducting energy gap, density of states, anisotropic superconductivity***

Goal〉 To understand the outline (1 - 11) and recent advanced topics (12 - 15) of superconductivity.

Schedule〉

1. Introduction to superconductivity
2. Review of quantum mechanics (1), Schrödinger equation and wave function
3. Review of quantum mechanics (2), operators and expected values
4. Review of quantum mechanics (3), perturbation theory
5. Free electron model of metals
6. Phenomenological theory of superconductivity
7. To understand Meissner effect on the basis of quantum mechanics
8. Formation of Cooper pair
9. Formation of superconducting energy gap
10. Density of states, and energy gap at finite temperatures
11. Introduction to Nuclear Magnetic Resonance method
12. Frontier of superconductivity (1), strong coupling superconductor
13. Frontier of superconductivity (2), heavy Fermion superconductor
14. Frontier of superconductivity (3), copper oxide high Tc superconductor
15. Summary

Evaluation Criteria〉 Reports on several subjects in the class.

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197362

Contact〉

⇒ Kishimoto (A202, +81-88-656-7548, yutaka@pm.tokushima-u.ac.jp) Mail
(Office Hour: 金曜日 16:00-17:30)

Advanced Computational Science

2 units (selection)

Toshiki Takeuchi · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class provides the basic technology for numerical calculation for the differential equation.

Outline〉 The numerical calculation methods for the differential equation are introduced.

Style〉 Lecture

Keyword〉 ***numerical analysis, numerical computation, differential equation***

Fundamental Lecture〉 "Numerical Analysis"(1.0), "Basic Mathematics/微分積分学 I"(1.0), "Basic Mathematics/微分積分学 II"(1.0)

Relational Lecture〉 "Methods for analysis of mathematical phenomena"(1.0), "Numerical Analysis"(1.0)

Requirement〉 Students have to understand basic mathematics of undergraduate-level.

Goal〉 To understand principle of numerical calculation methods.

Schedule〉

1. Introduction to numerical simulation
2. Mathematical model
3. Lagrange interpolation
4. Spline interpolation
5. Least squares method
6. Finite difference method
7. Arbitrary precision formula
8. Application to ordinary differential equation
9. Application to partial differential equation
10. Gauss-Seidel method
11. Successive Over-Relaxation method
12. Explicit method
13. Implicit method
14. Crank-Nicolson method
15. Numerical instabilities

Evaluation Criteria〉 Assignments count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197209

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Takeuchi (A206, +81-88-656-7544, takeuchi@pm.tokushima-u.ac.jp) Mail
(Office Hour: 木曜日 14:00-15:00)

Methods for analysis of mathematical phenomena

2 units (selection)

Hitoshi Imai · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering, Cheng-Hai Jin · Professor / International Center

Target〉 To learn the to analyze the mathematical phenomena.

Outline〉 Methods used in analysis of mathematical phenomena are introduced. Especially, those in numerical analysis are focused on.

Style〉 Lecture

Keyword〉 ***mathematics, numerical analysis***

Relational Lecture〉 "Advanced Computational Science"(0.5)

Requirement〉 Only the premise that have studied basic mathematics.

Goal〉 The adequacy of the two-dimensional boundary value problem governed by the Poisson equation can be understood by the finite difference method, etc.

Schedule〉

1. Introduction to computer
2. Common sense in numerical computation
3. High-speed computation (Parallel computing)
4. Finite difference method I
5. Finite difference method II
6. Finite difference method III
7. Finite difference method IV
8. Finite element method I
9. Finite element method II
10. Finite element method III
11. Finite element method IV
12. Boundary element method I
13. Boundary element method II
14. Boundary element method III
15. Iterative method

Evaluation Criteria〉 Evaluation by the report.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197301

Contact〉

⇒ Imai(A220, +81-88-656-7541, The inquiry by means of the cellular phone or E-mail is not acceptable) (Office Hour: Office hours: Thursday 14:00-15:00)

Solid State Ionics

2 units (selection)

Koichi Nakamura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces topics in solid state ionics, conduction mechanism in ionic conductors and techniques to study solid state ionics.

Outline〉 Basic experimental and theoretical approaches to understand solid state ionics are introduced and discussed in terms of "ion dynamic".

Keyword〉 ***ionic conductor, ionic diffusion, secondary battery***

Goal〉

1. To understand basic physical and chemical properties of ionic conductors.
2. To understand basic technique to study ionic conductors.

Schedule〉

1. Introduction to solid state ionics
2. Band theory and conduction mechanism
3. Defect in Ionic crystal
4. Diffusion in solid
5. Diffusion mechanism in solid
6. Solid electrolyte - Oxides, Silver halide -
7. Solid electrolyte - Li compounds -
8. Mixed conductor
9. Electrical conductivity measurement
10. Electrical conductivity on ionic conductors
11. Nuclear Magnetic Resonance
12. Relaxation model in NMR
13. NMR on ionic conductors
14. Application - Ion secondary batteries -
15. Topics and Future in solid state ionics

Evaluation Criteria〉 固体イオニクスに関するレポートで評価し，60%以上で合格とする.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197237

Contact〉

⇒ Nakamura (A216, koichi@pm.tokushima-u.ac.jp) Mail

Solid Mechanics

2 units (selection)

Atsuya Oishi · Associate Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The aim of this lecture is to master the fundamentals of the finite element method, which is important in designing the strength of machines and structures.

Outline〉 Finite element formulations for heat conduction and stress problems are described, and numerical methods used in the finite element analyses are also described.

Style〉 Lecture and excercise

Keyword〉 ***elasticity, finite element method***

Fundamental Lecture〉 "Mechanics"(1.0), "Numerical Analysis"(1.0), "Computational Mechanics"(1.0)

Relational Lecture〉 "Advanced Computational Science"(0.5), "Methods for analysis of mathematical phenomena"(0.5)

Goal〉

1. To understand a finite element formulation of a heat conduction problem
2. To understand a finite element formulation for stress analysis
3. To understand various numerical methods for finite element analyses

Schedule〉

1. Brief introduction to the finite element method
2. Finite element analysis of 1-D heat conduction problem
3. Finite element analysis of 2-D heat conduction problem
4. Formulation of 3-D stress analysis
5. Finite element analysis of 3-D stress problem
6. Fundamentals of computer science
7. Method of Numerical Integration (Newton-Cotes Integration Method)
8. Method of Numerical Integration (Gauss Integration Method)
9. Solution of a system of linear equations (Direct method)
10. Fast direct solvers
11. Solution of a system of linear equations (Iterative method)
12. Fast iterative solvers
13. Solution methods for large-scale problems
14. Mesh generation algorithms
15. Mesh generation and visualization algorithms
16. Final Examination

Evaluation Criteria〉 Assignment (30%), Examination(70%)

Reference〉

- ◇ Theory of Elasticity 3rd, S.P.Timoshenka and J.N.Goodier, McGraw-Hill, 1970.
- ◇ O.C.Zienkiewicz and K.Morgan, Finite Elements & Approximation, Dover, 2006

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197239

Student〉 only corresponging students for the course

Contact〉

⇒ Oishi (M622, +81-88-656-7365, oishi@me.tokushima-u.ac.jp) Mail

Material Engineering

2 units (selection)

Kenichi Yoshida · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering, Hitoshi Takagi · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class acquires the knowledge on solidification and growth, transformation, heat treatment, thermomechanical treatment in materials, material structure control and composite materials

Outline〉 Recent research development is remarkable in the material field. Solidification and growth of materials, transformation, heat treatment and thermomechanical treatment will be introduced from the point of engineering view based on material science. Also up-to-date topics will be lectured on material structure control and composite materials. Practices and repoprts will be imposed in each chapter to evaluate results of students. This subject is related to industrial problems.

Style〉 Lecture

Keyword〉 ***the study of failure, material structure control, environment-friendly composites***

Relational Lecture〉 "Physical properties of materials"(0.3), "Theory of Plasticity and Application to Metal Forming Processes"(0.5)

Requirement〉 Students are required to be interested in materials and have the good understanding of material science in an undergraduate course.

Goal〉

1. To understand the structural control of materials
2. To understand the mechanics of composites and the benign technology for envirnment

Schedule〉

1. Introduction to the study of failure
2. Material engineering and ethics for engineers
3. Innovation of material processing toward environmentally benign society
4. Barrier-free processing and treatment of impurity elements
5. Construction of deformation process suppressing deteriorating effects of impurites in steel material
6. High-strain rate flexible forming of aluminum and magnesium alloys
7. Material structure control due to the thermomechanical treatment of steel materials
8. Up-to-date material structure control technology
9. Concept of composite materials
10. Characteristics of composite materials
11. Functions of composite materials
12. Rule of mixture (modulus of elasticity)
13. Rule of mixture (stress)
14. Environmental problem and recycle of composite material
15. Environment-friendly green composites
16. Regular test

Evaluation Criteria〉 Regular test result 100%

Textbook〉

◇ Not used (Yoshida).
◇ Will be introduced in the class (Takagi).

Reference〉 Will be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197254

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yoshida (M619, +81-88-656-7358, yoshida@me.tokushima-u.ac.jp) Mail
(Office Hour: Thursday and Friday, 17:00 to 18:00)
⇒ Takagi (M620, +81-88-656-7360, takagi@me.tokushima-u.ac.jp) Mail
(Office Hour: Friday 17:00-18:00)

Fluids Energy Conversion Engineering

2 units (selection)

Junichiro Fukutomi · Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Masashi Ichimiya · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces united interpretation and manipulation for principles which dominates characteristics of turbomachinery which transforms dynamical energy in fluids to mechanical work. This class also aims to understand dynamics of viscous fluid which is fundamental to utilize fluid energy.

Outline〉 1.Theoretical and experimental analysis method is introduced on flow condition of turbomachinery and its characteristic. 2.Dynamics of viscous fluid which is fundamental to utilize fluid energy is introduced. Lecture heads are as follows. (1) Outline of fluid energy conversion, (2) Internal flow and performance of centrifugal turbomachinery, (3) Internal flow and performance of axial turbomachinery, (4) Anomalous phenomena of the turbomachinery, (5) Nature of viscous fluid, (6) Equations of motion for viscous fluid

Style〉 Lecture

Keyword〉 ***viscous fluid, equation of motion, energy conversion, turbomachinery***

Fundamental Lecture〉 "Fluid Dynamics"(1.0), "Fluid Dynamics"(1.0), "Fluid Machinery"(1.0)

Goal〉 To understand the principle which dominate the characteristic of turbomachinery and dynamics of viscous fluid

Schedule〉

1. Nature of viscous fluid
2. Motion of viscous fluid
3. Difference between viscous and inviscid fluids, cylinder in inviscid fluid
4. Difference between viscous and inviscid fluids, cylinder in viscous fluid
5. Similarity between viscous and inviscid fluids
6. Derivation of equations of motion for viscous fluid
7. Interpretation of equations of motion for viscous fluid
8. Summary and examination for viscous fluid
9. Hydrodynamics of centrifugal and diagonal turbomachinery
10. Hydrodynamics of axial turbomachinery
11. Characteristics of turbocharger for automobile
12. Numerical simulation of internal flow
13. Turbomachinery and noise
14. Anomalous phenomena of turbomachinery
15. One-dimensional flow of compressible fluid
16. Examination for turbomachinery

Evaluation Criteria〉 Examination for viscous fluid counts 50 points and examination for turbomachinery counts 50 points.

Textbook〉 Not used

Reference〉 Will be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197508

Student〉 Able to be taken by student of other department

Contact〉

⇒ Fukutomi (M519, +81-88-656-7367, fukutomi@me.tokushima-u.ac.jp) Mail
⇒ Ichimiya (M520, +81-88-656-7368, ichimiya@me.tokushima-u.ac.jp) Mail
(Office Hour: 毎週火曜日, 17:00~ 18:00)

Advanced thermodynamics

2 units (selection)

Tetsuya Suekane · Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Masanori Kiyota · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Quality of energy must be considered to promote effective utilization of energy as well as its quantity. Exergy is suitable for that purpose since it is based on the second law of thermodynamics. So understanding of exergy and its application to the practical systems are aimed to realize effective use of energy. The latter part is an introduction to energy and environmental problems in modern civilization based on enormous consumption of fossil fuel. Emphasis is placed on thermal engineering and fluid dynamical aspects of efficient utilization of energy and the relationship between global environment and material circulation.

Outline〉 Exergy analysis is used to realize effective use of energy. Exergy is stated and its use is ilustrated by presenting some examples. Lecture items are 1)About exergy, 2)Exergy flow in the steam power plant, 3)Exergy of combustion process, 4)Exergy flow in the co-generation system. In the latter part, emphasis is placed on the relation among the society, civilization, economics and technology from the viewpoints of global warming and/or huge consumption of energy.

Keyword〉 ***exergy, global warming on the earth, fossil fuels***

Requirement〉 The knowledge of engineering thermodynamics.

Goal〉

1. Aquiring ability to apply exergy analysis to actual energy systems
2. Obtaining deeper understanding of entropy through examples of exeregy analysis
3. Understandings of energy and environmental issues from global point of views.

Schedule〉

1. About exergy
2. Consevation of exergy
3. Calcuration of exergy
4. Exergy flow of steam power plant
5. Second law analysis of combustion process
6. Exergy of fuel
7. Exergy flow of co-generation systems (1)
8. Exergy flow of co-generation systems (2)
9. Environmental economics and sociology
10. History of the earth
11. Global warming and carbon emissions of anthropological activities
12. Conventional and un-conventional resources
13. Renewable energy
14. Carbon dioxide capture and storage
15. Waste management and material circulation
16. Final examination

Evaluation Criteria〉 Scores of reports and final test are used at a rate of 6 to 4.

Textbook〉 Manuscripts prepared by the lecturer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197411

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Suekane (M521, suekane@me.tokushima-u.ac.jp) Mail
⇒ Kiyota (M522, kiyota@me.tokushima-u.ac.jp) Mail

Advanced Heat Transfer

2 units (selection)

Yoshihiro Deguchi · Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the two- and three-dimensional steady-state heat conduction problems, a number of heat transfer problems in either periodic or transient temperature variations and phase change problem.

Outline〉 The key problem of heat transfer is to determine the rate of heat transfer at a specified temperature difference to estimate the cost, the feasibility and the size of equipment necessary to transfer a specified amount of heat in a given time. In this class, following the two- and three-dimensional steady-state heat conduction problems, a number of heat transfer problems in either periodic or transient temperature variations and phase change problem are explained.

Style〉 Lecture and excercise

Keyword〉 ***multidimensional steady-state heat conduction, periodic heat conduction, heat transfer with phase change***

Requirement〉 Students are required to have a good understanding of undergraduate-level thermodynamics , hydrodynamics and related subjects.

Goal〉 To understand the solution of multidimensional steady-state heat conduction and heat transfer with phase change problems.

Schedule〉

1. Recent topics on heat transfer
2. Multidimensional steady-state heat conduction problem (1)
3. Multidimensional steady-state heat conduction problem (2)
4. Quasi-steady-state heat conduction problem (1)
5. Quasi-steady-state heat conduction problem (2)
6. Unsteady-state heat conduction problem (1)
7. Unsteady-state heat conduction problem (2)
8. Unsteady-state heat conduction problem (3)
9. Boundary layer theory in laminar flow (1)
10. Boundary layer theory in laminar flow (2)
11. Boundary layer theory in laminar flow (3)
12. Heat transfer problem with phase change (1)
13. Heat transfer problem with phase change (2)
14. Heat transfer problem with phase change (3)
15. Heat transfer problem with phase change (4)

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197387

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Teacher of course

System Design

2 units (selection)

Katsunobu Konishi · Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces some representative methods for control system design and image recognition

Outline〉 System design is a process in which scientific principles and engineering tools are used to produce a plan which satisfy a hunan need. In this lecture, the control system design methods such as modeling, equations of motion, modal analysis, obserber and controller, and the image recognition methods such as neural network, support vector machine, mean shift and sparse template are explained.

Style〉 Lecture

Keyword〉 ***modeling, equation of motion, vibration control, neural network, support vector machine, mean shift, sparse template***

Fundamental Lecture〉 "Digital Control Theory"(1.0)

Relational Lecture〉 "Advanced Applied Dynamics of Machine"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level design engineering and automatic control theory.

Goal〉

1. To understand the modeling and control methods for mechanical systems.
2. To understand the image recognition methods for object detection

Schedule〉

1. Modeling
2. Equations of motion(1)
3. Equations of motion(2)
4. Modal analysis
5. Vibration control(1)
6. Vibration control(2)
7. Simulation
8. Intermediate examination
9. Basic image processing(1)
10. Basic image processing(2)
11. Basic image processing(3)
12. Image segmentation by mean shift
13. Object tracking by sparse template
14. Object detection by neural network
15. Object detection by HOG and SVM
16. Final examination

Evaluation Criteria〉 Evaluate based on two examinations and reports

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197270

Student〉 開講コース学生のみ受講可能

Contact〉

⇒ Konishi (M423, +81-88-656-7383, konishi@me.tokushima-u.ac.jp) Mail

Energy Conversion System

2 units (selection)

Tomoaki Yatsufusa · Associate Professor

Target〉 To understand principle of energy conversion and to consider improvement of energy conversion technologies on the point of saving energy consumption and decreasing environmental damages

Outline〉 Lecture on principle of energy conversion and its application, and on combustion mechanism and technologies of reducing toxic emissions of combustion engines as examples of energy conversion systems. This subject is concerned with industry.

Style〉 Lecture

Keyword〉 ***energy conversion, environmental protection, combustion, energy resources, toxic emissions***

Requirement〉 None

Notice〉 None

Goal〉 To understand principle of energy conversion, environmental effect of energy conversion and present technologies of energy conversion, and to recognize the importance of improvement of energy conversion technologies against environmental protection

Schedule〉

1. Present energy problem
2. Energy resources
3. Fundamental of energy conversion
4. Energy conversion by combustion
5. Combustion chemistry
6. Combustion of gaseous fuels (1)
7. Combustion of gaseous fuels (2)
8. Combustion of liquid fuels (1)
9. Combustion of liquid fuels (2)
10. Formation of emissions originated by combustion
11. Present energy conversion technologies
12. Energy conversion and energy recirculation
13. Energy conversion and environmental problems (1)
14. Energy conversion and environmental problems (2)
15. Energy saving in energy conversion

Evaluation Criteria〉 Appraise the understanding of the content of the lecture by setting some reports

Textbook〉 Yukio Mizutani, "Combustion Engineering"

Reference〉 None

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/miwa/index.html

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197146

Student〉 Any students other than Ecosystem Engineering can attend this lecture.

Contact〉

⇒ Yatsufusa .

Note〉 Need to submit some reports

Digital Control Theory

2 units (selection)

Yasuhiro Mizutani · Associate Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the fundamental concept of digital control and neural network that can be used to design the optimal control systems based on the modern control theory.

Outline〉 In this lecture the fundamental conception of a digital control system and digital control strategies to apply the modern control theory is presented. In particular, two freedom control and a neural network is explained. The recent topics related to control engineering are also introduced.

Style〉 Lecture

Keyword〉 ***two freedom control, neural network, optimal control***

Fundamental Lecture〉 "Automatic Control theory 1"(1.0), "Automatic Control theory 2"(1.0)

Relational Lecture〉 "Actuator Control Theory"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level control theory and related subjects.

Goal〉

1. To understand the outline of the digital control.
2. To understand the applications of AI, neural network and fuzzy control

Schedule〉

1. Outline of digital control system
2. Difference of analog and digital control systems
3. Mathematical representation of control signal
4. Pulse transfer function
5. Stability and steady state deviation
6. Design of digital control system(PID)
7. Design of digital control system(two freedom control)
8. Design of digital control system(model prediction)
9. Intermediate examination
10. Outline of artificial intelligence
11. Exercise of artificial intelligence
12. Outline of neural network
13. Exercise of neural network
14. Outline of fuzzy theory
15. Exercise of fuzzy theory
16. Final examination

Evaluation Criteria〉 evaluate based on two examinations and reports.

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197371

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Iwata (M427, +81-88-656-9743, iwata@me.tokushima-u.ac.jp) Mail

Actuator Control Theory

2 units (selection)

Masafumi Miwa · Associate Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the characteristics of actuators, the design methods of servo system.

Outline〉 The structure and function of actuators or control valves, the design of servo system, PWM control method, the practical and intelligent control algorithm are explained.

Style〉 Lecture

Keyword〉 ***actuator, servo system, control algorithm***

Relational Lecture〉 "Digital Control Theory"(0.5), "Measurement Science and Technology"(0.5)

Requirement〉 Students are reqired to have a good understanding of undergraduate-level control engineering and related subjects.

Goal〉 To understand the design methods of servo system using actuators.

Schedule〉

1. Outline of actuators
2. Micro-drive electromotive actuators
3. Electromotive actuators
4. Novel actuators
5. Hydraulic actuators
6. Hydraulic control valves
7. Hydraulic servo system
8. Pneumatic actuators
9. Pneumatic control valves
10. Pneumatic servo system
11. PWM control method
12. Model matching methods
13. Neural controller
14. Two-degree-of-freedom control method
15. Model driven control method
16. Examination

Evaluation Criteria〉 Assignments count 30 % and examination count 70 %.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197125

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Hashimoto .

Measurement Science and Technology

2 units (selection)

Tetsuo Iwata · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering, Hiroyuki Ukida · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To understand importance of the Fourier transformation for developing various kinds of measurement techniues, measurement equipments, measurement systems.

Outline〉 Among the various measurement techniques used in the fundamental and applied research, optical measuremnt methods including their principles, methodologies, instrumentations, and evaluation methods are reviewed. In the lecture, emphasized is the importance of the concept of the Fourier transformation to understand and to deal with linear systems in the modern scientific measurement system. Practical methods of object inspections, distance measurements, and shape reconstructions using images are also lectured.

Style〉 Lecture

Keyword〉 ***measurement techniques, measurement devices, Fourier transform***

Relational Lecture〉 "Micro-Nano Engineering"(0.5), "Digital Control Theory"(0.5), "Actuator Control Theory"(0.5)

Goal〉

1. 1. To understand Fourier series and Fourier transform.
2. 2. To understand relarions among Fourier transform and measurement principles of scientific instruments.
3. 3. To understand techniques used with practicable various mearurement devices.

Schedule〉

1. Frequency response of the amplifier
2. Optical information processing
3. Fourier-transform infrared spectoroscopy
4. Subfringe interferometry
5. Computed tomography
6. Sampling theorem and quantization theorem
7. Wavelet transformation
8. Lock-in amplifier and boxcar integrator
9. Optics for microscope
10. X-ray diffration
11. Image measurement systems
12. Feature extraction from images
13. Binocular stereo method
14. Pattern projection
15. Shape from shading and texture
16. Examination

Evaluation Criteria〉 Assignments count 50% and examinations count 50%.

Textbook〉 Printed synopses are used.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197214

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Iwata (M427, +81-88-656-9743, iwata@me.tokushima-u.ac.jp) Mail
⇒ Ukida (M424, +81-88-656-9448, ukida@me.tokushima-u.ac.jp) Mail (Office Hour: 毎週金曜日 17:00~ 18:00)

Theory of Plasticity and Application to Metal Forming Processes

2 units (selection)

Takuo Nagamachi · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduce foundation of the numerical simulation by elastic and elasto-plastic finite element method and their application to metal forming processes.

Outline〉 Although metal forming techniques are diverse, the primary objective is to produce a desired shape change. The major concerns of the engineer are the forces required for the operations and the properties of the work materials. Engineering plasticity and its application to metal forming processes are introduced.

Style〉 Lecture

Keyword〉 ***elasticity, plasticity, finite element method***

Relational Lecture〉 "Production and Manufacturing System"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level plasticity and fundamentals of metal forming operations.

Goal〉 To understand foundation of the numerical simulation by elastic and elasto-plastic finite element method

Schedule〉

1. Analysis principle of finite element method
2. Stress and strain
3. Plane strain
4. Plane stress
5. Axial symmetry
6. Principle of virtual work
7. Triangle element
8. Quadrangle element
9. Axial symmetry element
10. Plastic deformation
11. Exercise of the elastic finite element method (Triangle element)
12. Exercise of the elastic finite element method (Quadrangle element)
13. Exercise of the elastic finite element method (Axial symmetry element)
14. Exercise of the elasto-plastic finite element method (Triangle element)
15. Exercise of the elasto-plastic finite element method (Quadrangle element)
16. Exercise of the elasto-plastic finite element method (Axial symmetry element)

Evaluation Criteria〉 Assignments count 50% , exercises and examinations count 50%.

Textbook〉 Predistributed printed synopsises are also used.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197207

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nagamachi (M524, ngmch@me.tokushima-u.ac.jp) Mail (Office Hour: 毎週水曜日 17 時 ~ 18 時)

Production and Manufacturing System

2 units (selection)

Yoshihiro Tada · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Work measurement based on predetermined time standard system for advanced manufacturing and production are introduced.

Outline〉 This class introduces basic-MOST for work measurement and determination of the standard time based on predetermined time standard system.

Style〉 Lecture

Keyword〉 ***industrial engineering, work measurement, standard time***

Relational Lecture〉 "Theory of Plasticity and Application to Metal Forming Processes"(0.5)

Requirement〉 Students are required to have a good understanding on fundamentals of material processing technologies and manufacturing system.

Notice〉 Students are required to prepare and review the class

Goal〉 To understand the basic concepts and related aspects of work measurement and predetermined time standard system.

Schedule〉

1. Introduction to work analysis
2. Work study and time study
3. Rating techniques
4. Predetermined time standard system
5. Fundamentals of MOST
6. General move sequence
7. Exercise of the general move sequence
8. Controlled move sequence
9. Exercise of the controlled move sequence
10. Analysis of continuous move
11. Exercise of continuous move
12. Tool use sequence
13. Exercise of the tool use sequence
14. Manual crane sequence
15. Exercise of the manual crane sequence
16. Examination

Evaluation Criteria〉 Assignments count 50%, exercises and examinations count 50%.

Textbook〉 Printed synopsises are used.

Reference〉 Work study, ISBN4-526-00084-1.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197169

Contact〉

⇒ Tada (M319, +81-88-656-7381, tada@me.tokushima-u.ac.jp) Mail

Precision Machinery

2 units (selection)

Teacher of Mechanical Engineering

Target〉 Learning of preparation and evaluation methods on thin films which are important to micro-machines and electronic parts.

Outline〉 We learn about basics of thin films, thin film preparation methods, crystal structure and stress in thin films. Since the development of residual stresses is a serious problem in thin film preparation, an evaluation and a control of the residual stresses are necessary in the fabrication of thin films. X-ray stress measurement and its application on the stress in thin films are to be understood. Recent works on stresses in thin films are introduced.

Keyword〉 ***X ray diffraction, X-ray stress measurement, crystal structure, residual stress***

Fundamental Lecture〉 "Material Engineering"(1.0)

Relational Lecture〉 "Physical properties of materials"(0.5)

Requirement〉 To master a basic concept of crysital

Notice〉 To learn by yourself thin film preparation, crystallography, X-ray diffraction, X-ray stress measurement, micromachine and so on

Goal〉

1. Understanding of thin film preparation
2. Understanding of X-ray stress measurement
3. Understanding of stresses in thin films

Schedule〉

1. Basics of thin film
2. Thin film preparation
3. Crystal structure and stress in thin films
4. Mechanical stress measurement of thin film
5. X-ray diffraction (1) Characteristics of X-rays
6. X-ray diffraction (2) Crystal structures
7. X-ray diffraction (3) Diffraction by an atom and a small crystal
8. X-ray diffraction (4) Powder diffraction
9. Report and presentation
10. Principle of X-ray stress measurement
11. Stress measurement of thn films
12. Development of residual stress
13. Recovery of residual stress
14. Thermal stress and stress migration
15. Application of thin films
16. Examination

Evaluation Criteria〉 Report & presentation 40%, examination 60%

Textbook〉 None

Reference〉

- B. D. Cullity, Elements of X-ray Diffraction, Addison-Wesley
- K. Wetzig and C. M. Schneider (Eds.), Metal Based Thin Films For Electronics, Wiley-VCH

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197328

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Hanabusa(M317, 656-7377, hanabusa@me.tokushima-u.ac.jp)

Micro-Nano Engineering

2 units (selection)
Part-time Lecturer

Target〉 This class introduces the fundamentals of micro-nano engineering.

Outline〉 Basics of micro-nano engineering for the beginners.

Requirement〉 Students are required to have a good understanding of under-graduate level physics and related subjects.

Goal〉 To understand the fundamentals of micro-nano engineering

Schedule〉

1. Basics of micro-nano engineering
2. Various micro-nano process and photo-induced process
3. Laser radiation and oscillator
4. Optical components for laser systems
5. Laser induced phenomena
6. Heat conduction in laser processing
7. Laser welding
8. Laser drilling and cutting
9. Ultra-fast laser processing
10. Micro thermal process
11. Micro/nano processing in industry
12. Thermal inkjet process
13. Piezo inkjet process
14. Inkjet for biotechnology
15. Latest inkjet technology
16. Examination

Evaluation Criteria〉 Assignments counts 100%

Textbook〉 Norimitsu Hirai, Practical Laser Technology, Kyoritsu publishing ISBN4-320-08470-5 Takeshi Amari, Inkjet printer, CMC publishing ISBN4-88231-859-8 Electronic files on Web

Reference〉 Mitsuo Nakazawa, Practical Ultrafine Process and Measurement, NTS ISBN4-86043-035-2 Kenichi Iga, Basic Laser Optics, Ohm-sha ISBN4-274-02137-8 Kunihiko Sato, Yoshihiko Mukai, Masao Toyoda, Welding Engineering, Rikogaku-sha ISBN4-8445-2108-X

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197403

Advanced Lecture on Semiconductor Nanotechnology

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This class introduces basic principles of the semiconductor nanotechnology and their application to the quantum devices.

Outline〉 Basics of semiconductor physics and quantum mechanics are introduced to understand material properties of quantum confined nanostructures. Recent progress in fabrication techniques and device applications of semiconductor nanostructures (quantum wells, wires and dots) will be reviewed.

Style〉 Lecture

Keyword〉 ***quantum confined nanostructures, semiconductor nanoscience, electron devices, photonic devices***

Requirement〉 None.

Notice〉 None.

Goal〉 To understand basic properties of semiconductor nanostructures and quantum devices.

Schedule〉

1. Introduction to semiconductor nanostructures
2. Electronic states in quantum confined structures
3. Electrical properties of superlattices
4. Fabrication technique of quantum wires and wells
5. Characterization of heterointerfaces
6. Characterization of nanostructures
7. High-speed electron devices
8. Optical properties of quantum wells
9. Semiconductor laser diodes
10. Quantum effect devices
11. Fabrication technique of quantum dots
12. Quantum dot devices
13. Device application of quantum nano structures
14. Recent topics of semiconductor nanotechnology (1)
15. Recent topics of semiconductor nanotechnology (2)

Evaluation Criteria〉 Assignments count 100%

Textbook〉 None.

Reference〉 The Physics of Low-Dimensional Semiconductors, J.H. Davis, Springer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197421

Student〉 Any students can attend the class.

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

⇒ Kitada (A224, +81-88-656-7671, kitada@frc.tokushima-u.ac.jp) Mail (Office Hour: Mon. 10:00-14:00)

Seminar on Mechanical Engineering

4 units (compulsory)
Teacher of course

Target〉 To obtain deeper knowledge and presentation abilities by reading scientific papers concerning mechanical engineering related to each Master's thesis.

Outline〉 In order to complete each Master's thesis, to read and to understand scientific papers and to make a discussion with an instructor.

Keyword〉 ***Master's thesis, mechanical engineering***

Goal〉 To obtain abilities to read scientific papers concerning each Master's thesis and to make a presentation.

Schedule〉

1. To read ten scientific papers concerning each Master's thesis and to make a presentation.
2. To read five scientific papers concerning mechanical engineering and to make a presentation.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197189

Student〉 Able to be taken by only specified class(es)

Exercise on Mechanical Engineering

2 units (compulsory)
Teacher of course

Target〉 To obtain sufficient knowledge and information required for completing each Master's thesis and to make a discussion with an instructor.

Outline〉 To read scientific papers on Master's thesis and to make a presentation under the direction of each laboratory's instructor.

Keyword〉 ***Master's thesis, mechanical engineering***

Goal〉 To obtain knowledge and information concerning each Master's thesis.

Schedule〉

1. To make a research on a problem concerning each Master's thesis and to make a presentation.
2. To discuss and to make a presentation on each Master's thesis.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197185

Student〉 Able to be taken by only specified class(es)

Mechanical Engineering Labolatory

6 units (compulsory)
Teacher of course

Target〉 To obtain comprehensive abilities for completing each Master's thesis through some related experiments.

Outline〉 To carry out some experiments concerning each Master's thesis.

Keyword〉 ***Master's thesis, mechanical engineering***

Goal〉 To make a plan and to carry out experiments and to make a discussion on the results.

Schedule〉 Under the direction of the instructor, to make a plan and to carry out the experiment required for completing a Master's thesis.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197188

Student〉 Able to be taken by only specified class(es)

Earth and Life Environmental Engineering — Chemical Science and Technology

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Environmental Technology on Chemistry

2 units (selection)
Teacher of course

Target〉 The present situation and subjects on chemistry in view of environmental pollution will be introduced. Recent development in chemistry to attempt to solve those subjects will be explained.

Outline〉 Based on the historical background on environmental pollution, the recent progress on analytical chmistry, biochmistry, catalysis and chemical process engineering for environmental protection will be explained.

Style〉 Lecture and excercise

Keyword〉 ***environment, analytical chemistry, biochemistry, catalyst, chemical process***

Fundamental Lecture〉 "Advanced Analytical and Environmental Chemistry"(1.0), "Advanced Physical Chemistry"(1.0), "Advanced Materials Science"(1.0)

Relational Lecture〉 "Engineering of Biological Environment"(0.5), "Advanced Environmental Systems Engineering"(0.5)

Requirement〉 Requires undergraduate level knowlwdge of chemistry and chemical engineering.

Goal〉

1. To understand the present situation for environmental subjects on engineering.
2. To develop ability for solving the environmental subjects.

Schedule〉

1. Endocrine disrupters
2. Microwave dielectric heating: Its application to chemical reaction
3. Environmental problem and crystal growth
4. Analysis of trace elements
5. Properties of supercritical fluids and their utilization
6. Recent advances in organic chemistry: Synthesis and Function
7. The mystery of natural rubber
8. Asymmetric synthesis
9. Polymer materials and environment
10. Biodegradable polymer
11. Introduction to engineering utilization of space environment
12. Utilization of adsorption phenomena
13. Approach using apatite to studies on energy and environment
14. Present situation of phosphors for white LEDs
15. Optimization of chemical processes

Evaluation Criteria〉 Assignments count 100% mainly based on the presentation and report submitted.

Textbook〉 To be announced in the class.

Reference〉 To be announced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197158

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Committee Member of School Affair

Engineering of Biological Environment

2 units (selection)

Yoshitoshi Nakamura · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 To understand recent studies on engineering of biological environment.

Outline〉 Advanced lectures for recent studies on engineering of biological environment

Style〉 Lecture

Keyword〉 ***environment, biology, engineering***

Requirement〉 N/A

Notice〉 N/A

Goal〉

1. To understand general concepts of biomass
2. To understand biomass conversion engineering
3. To understand general concepts of bioremediation

Schedule〉

1. General concepts of biological environment
2. Characteristics of biomass and its effective utilization
3. Pretreatment of biomass by physical method
4. Pretreatment of biomass by chemical method
5. Pretreatment of biomass by biological method
6. Conversion of biomass into useful materials
7. Conversion of biomass into useful materials
8. Process system engineering for effective conversion of biomass
9. Reports
10. Classification, role, and application method of environmental organism
11. Bioremediation in water environment
12. Bioremediation in air environment
13. Bioremediation in soil environment
14. Environmental hormones, chemical pollutions and ethics
15. Recent topics and trend of industry for engineering of biological environment
16. Final Reports

Evaluation Criteria〉 Evaluation of Reports

Textbook〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197324

Contact〉

⇒ Nakamura (720, +81-88-656-7518, ynakamu@bio.tokushima-u.ac.jp) Mail
(Office Hour: 水曜日 17:00-18:00)

Advanced Environmental Systems Engineering

2 units (selection)

Yoshiyuki Kidoguchi · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering, Akio Kondo · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shuichi Hashimoto · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shoichiro Fujisawa · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Masashi Okushima · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shigeki Matsuo · Associate Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Ryoichi Yamanaka · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Takuro Tomita · Assistant Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Katsuya SATO · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shin-ichi Ito · Assistant Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand the present environmental problems and to acquire the advanced of the technique and the approach to solve problems on the point of the ecosystem engineering.

Outline〉 To explain the structure and function of environmental systems, the relationship between civil life and disaster prevention systems, and the changes of social system due to the technological revolution and the policy.

Style〉 Lecture

Keyword〉 ***environmental policy, natural disaster, energy saving technology, welfare technology, miromechanical engineering***

Goal〉

1. To understand the factor of environmental systems
2. To understand the strucure of environmental systems
3. To understand the civil life and natural disaster prevention systems

Schedule〉

1. The policy and natural disaster prevention measures (1)
2. The policy and natural disaster prevention measures (2)
3. The factor of environmental systems
4. Example of environmental systems
5. The structure of environmental systems
6. Example of structure of environmental systems
7. Civil life and nano-technology 1
8. Civil life and nano-technology 2
9. Midterm presentation
10. Well being technology 1
11. Well being technology 2
12. Ecosystem engineering 1
13. Ecosystem engineering 2
14. Hydrogen engine technology
15. Diesel engine engineering

Evaluation Criteria〉 Assignments count 100%

Textbook〉 To be introduced in th class

Reference〉 To be introduced in th class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197176

Contact〉

⇒ SATO (eco705, +81-88-656-2168, katsuyas@eco.tokushima-u.ac.jp) Mail

Quantum mechanics and advanced lecture in quantum physics

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the quantum mechanics.

Outline〉 Basics of quantum mechanics are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics***

Goal〉 To understand the outline of quantum mechanics.

Schedule〉

1. Introduction
2. Variational method
3. Lagrangian
4. Hamiltonian
5. Poisson's bracket expression
6. Quantization
7. Operator
8. Wavefunction
9. Expectation value
10. Schrödinger equation
11. Example (1) the square well potential
12. Example (2) the linear harmonic oscillator
13. Angular momentum
14. Example (3) hydrogen atom
15. Heisenberg equation
16. Field quantization

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197467

Contact〉

⇒ Yoshitaka Michihiro (A203)

Differential Equations

2 units (selection)

Nobuyoshi Fukagai · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Introduction to mathematical theory of differential equations.

Outline〉 Boundary value problems of second order linear differential equations.

Style〉 Lecture

Keyword〉 **微分方程式の境界値問題, *Sturm-Liouville* 問題**

Goal〉 To be familiar with Sturm-Louville type equations.

Schedule〉

1. Introduction
2. Helmholtz's equation
3. Eigenvalues and eigenfunctions
4. Green's function
5. Residue analysis
6. Expansion of Green's function
7. Fourier series
8. Existence theorem
9. Sturm-Liouville problems
10. Characteristic function
11. Solvability of boundary value problems
12. Basic estimates
13. Distribution of eigenvalues
14. Eigenfunction expansion
15. Review

Evaluation Criteria〉 Evaluation will be based on assignments.

Reference〉 望月清 · トルシン 『数理物理の微分方程式』 培風館

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197457

Student〉 Able to be taken by student of other department

Contact〉

⇒ 工学部数学教室 (A棟219室)

Advanced applied analysis

2 units (selection)

Kuniya Okamoto · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To learn the functional analytic methods which are basic tools for mathematical sciences.

Outline〉 This subject provides basic theory of functional analysis which is considered as linear algebra in infinite-dimensional spaces. Functional analytic approaches to phenomena described by differential equations are introduced.

Style〉 Lecture

Relational Lecture〉 "Topics of Analysis for Mathematical Science"(0.5)

Goal〉 To apply the theory of modern analysis and recognize its significant role.

Schedule〉

1. Differential equations and their solutions
2. Exponential of matrices 1
3. Uniqueness of solutions
4. Existence of solutions
5. Eigenvalues and eigenspaces
6. Projective representation
7. Exponential of matrices 2
8. Generalized eigenvalue problems
9. Dunford integrals
10. Holomorphic functions of matrices
11. Solution curve and stability
12. Stability of solutions
13. Ljapunov's method
14. Nonlinear case
15. Linear approximations
16. Summary

Evaluation Criteria〉 Evaluation by the report.

Reference〉 『新微分方程式対話』 笠原皓司著, 日本評論社

Webpage〉 http://math9.pm.tokushima-u.ac.jp/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197149

Contact〉

⇒ 岡本(A212室, TEL/FAX: 656-9441, E-mail: okamoto@pm.tokushima-u.ac.jp)

Topics of Analysis for Mathematical Science

2 units (selection)

Atsuhito Kohda · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Mathematical theory and technique for analysis of engineering phenomena

Outline〉 Mathematical theory to analyze problems in engineering and its application, mainly theory and technique of differential equations

Style〉 Lecture

Relational Lecture〉 "Advanced applied analysis"(0.2), "Differential Equations" (0.2)

Requirement〉 If you like undergraduate-level mathematics, it will be sufficient.

Goal〉 To be familiar with mathematical theory, that helps engineering study.

Schedule〉

1. Theory of sets and maps
2. Cardinal numbers and bijection
3. Equivalence relations and cryptography
4. Linear space and tensor
5. Vector analysis and differential form
6. Cauchy's theorem and vector analysis
7. Differential form and Cauchy's theorem
8. Projective plane
9. Quadratic curves and projective plane
10. All quadratic curves are circles?
11. The index of vector fields
12. Applications of the index:fundamental theorem of algebra
13. Vector fields on the unit sphere
14. Why there is the north pole on the earth
15. Mathematics and computers
16. Summary

Webpage〉 http://math1.pm.tokushima-u.ac.jp/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197298

Contact〉

⇒ Kohda (A211, +81-88-656-7546, kohda@pm.tokushima-u.ac.jp) Mail
(Office Hour: 月曜 12:00~ 13:00)

Nuclear magnetic resonance

2 units (selection)
Part-time Lecturer

Target〉 This lecture explains principles of NMR and introduces applications to solid stste physics and chemistry.

Outline〉 Nuclear magnetic moment and its interaction with an external magnetic field are explained based on quantum mechanics. Some examples of its application to solid state physics and chemistry are introduced.

Style〉 Lecture

Keyword〉 ***nuclear magnetic resonance, spectrum, spin-lattice relaxation, Knight shift, chemical shift***

Schedule〉

1. magnetic moment of nuclei and Boltzmann's distribution
2. magnetic moment of electron
3. method for NMR obserbation
4. apparatus for NMR measurement
5. spin echop and spectrum
6. spin - lattice relaxation rate
7. NMR in metals
8. high Tc superconductors
9. NMR / NQR in high Tc superconductors
10. chemical shift
11. Knight shift
12. NMR in chemistry
13. magnetism and NMR
14. NMR / NQR in superconductors
15. NMR in super ionic conductors

Textbook〉 遍歴電子系の核磁気共鳴 (朝山邦輔著，裳華房)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197167

Contact〉

⇒ Takashi Ohno (A201, 656-7549)

Solid State Ionics

2 units (selection)

Koichi Nakamura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces topics in solid state ionics, conduction mechanism in ionic conductors and techniques to study solid state ionics.

Outline〉 Basic experimental and theoretical approaches to understand solid state ionics are introduced and discussed in terms of "ion dynamic".

Keyword〉 ***ionic conductor, ionic diffusion, secondary battery***

Goal〉

1. To understand basic physical and chemical properties of ionic conductors.
2. To understand basic technique to study ionic conductors.

Schedule〉

1. Introduction to solid state ionics
2. Band theory and conduction mechanism
3. Defect in Ionic crystal
4. Diffusion in solid
5. Diffusion mechanism in solid
6. Solid electrolyte - Oxides, Silver halide -
7. Solid electrolyte - Li compounds -
8. Mixed conductor
9. Electrical conductivity measurement
10. Electrical conductivity on ionic conductors
11. Nuclear Magnetic Resonance
12. Relaxation model in NMR
13. NMR on ionic conductors
14. Application - Ion secondary batteries -
15. Topics and future in solid state ionics

Evaluation Criteria〉 固体イオニクスに関するレポートで評価し，60%以上で合格とする.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197236

Contact〉

⇒ Nakamura (A216, koichi@pm.tokushima-u.ac.jp) Mail

Advanced Materials Design

2 units (selection)

Yasuhiko Kawamura · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering
Keiji Minagawa · Associate Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 To understand functions and design of various soft materials in relation to the molecular structure and properties.

Outline〉 This class introduces structures, properties, and functions of various soft materials including functional polymers.

Style〉 Lecture

Keyword〉 ***soft matter, functional polymer, properties of polymers***

Goal〉

1. To understand properties and functions of soft materials, especially polymers, in relation to the molecular structure.
2. To understand methods of molecular and material design for obtaining desired function.
3. To research and present topics related to functional polymers.

Schedule〉

1. Introduction to softl materials
2. Structure of polymers 1
3. Structure of polymers 2
4. Properties of polymes 1
5. Properties of polymes 2
6. Functional polymers 1
7. Functional polymers 2
8. Hydrophilic polymers and hydrogels
9. Colloids
10. Amphiphilic molecules
11. Liquid crystals
12. Topics 1
13. Topics 2
14. Topics 3
15. Topics 4
16. Summary

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 荒木孝二他著，有機機能材料，東京化学同人，2006

Reference〉 Ian W. Hamley, Introduction to Soft Matter, John Wiley & Sons, New York, 2000

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197255

Contact〉

⇒ Minagawa (G612, +81-88-656-9153, minagawa@chem.tokushima-u.ac.jp)
Mail

Advanced Organic Chemistry

2 units (selection)

Yasuhiko Kawamura · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering
Masaki Nishiuchi · Associate Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 This lecture intends to reconstruct knowledge of basic organic chemistry in view of structure and reactivity aspects and thus, aims at grasping essence shown in the real organic chemistry journals.

Outline〉 We wish to discuss 1) Basic concepts of organic photochemistry, 2) chemistry of reactive intermediates, 3) logical synthesis of organic molecules, and finally, 4) physical influence on organic reactions.

Style〉 Lecture

Keyword〉 ***structure and reactivity, reactive intermediates***

Fundamental Lecture〉 "有機化学 3"(1.0), "Organic Chemistry 4"(1.0)

Relational Lecture〉 "Advanced Topics in Synthetic Chemistry"(0.5)

Goal〉

1. Understanding essence of organic chemistry journals.
2. Ability to suggest or propose the way to solve various organic chemistry subjects.

Schedule〉

1. Photochemistry: Basic Concept
2. Photochemistry: Application
3. Reactive Intermediates: Molecules in Excited States
4. Reactive Intermediates: Carbocations and Carbanions
5. Reactive Intermediates: Free Radicals
6. Reactive Intermediates: Carbenes and Nitrenes
7. Reactive Intermediates: Radical Ions
8. Interim Exam
9. Asymmetric Synthesis: Introduction
10. Asymmetric Synthesis: Basic Concept
11. Diastereoselective Reactions
12. Enantioselective Reactions
13. Asymmetric Catalysis
14. Asymmetric Synthesis: Application
15. Asymmetric Synthesis:Topics
16. Term Exam

Evaluation Criteria〉 Students are credited by the results of evaluation of their reports (50%) and scores of the final exam (50%).

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197504

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail
⇒ Nishiuchi (G409, +81-88-656-7400, nishiuch@chem.tokushima-u.ac.jp) Mail

Advanced Topics in Polymerization Reactions

2 units (selection)

Koichi Ute · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering

Tomohiro Hirano · Associate Professor / Physicochemistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to understand the principles of polymer syntheses and polymer characterizations.

Outline〉 The mechanisms in ionic, coordination, ring-opening, and metathesis polymerizations will be explained. Further, characterization of polymer properties will be introduced.

Style〉 Lecture

Keyword〉 ***living polymerization, stereospecific polymerization, coordination polymerization, property of polymer solution, solid-state properties of polymers***

Fundamental Lecture〉 "Polymer Chemistry 1"(1.0), "Polymer Chemistry 2"(1.0)

Relational Lecture〉 "Advanced Organic Chemistry"(0.5)

Requirement〉 Requires undergraduate level knowlwdge of chemistry.

Notice〉 Bring the textbook in the lectures #8 - #15.

Goal〉

1. To understand the principles of polymer syntheses.
2. To understand relationship between monomer structure and reactivity in polymerization reaction.
3. To understand the basic principles of solution properties and molecular weight determination.
4. To understand the basic principles of solid-state properties and the experimental methods for crystal structure determination.

Schedule〉

1. classification of polymerization reaction.
2. stereospecific living anionic polymerization of methacrylates
3. characterization of polymers
4. Ziegler-Natta polymerization
5. Single-site catalysts
6. metathesis polymerization
7. polymerization of acetylene
8. outline of macromolecular science, determination of molecular weight
9. properties of polymer solution 1 (membrane osmometry and the 2nd virial coefficient)
10. properties of polymer solution 2 (theory and experimentals of light scattering)
11. properties of polymer solution 3 (viscometry)
12. properties of polymer solution 4 (chromatography of polymer)
13. solid-state structure of polymer 1 (crystal and non-crystal, experimental methods for solid-state properties of polymers)
14. solid-state structure of polymer 2 (crystal structure)
15. thermal properties of polymers

Evaluation Criteria〉 Assignment counts 100% mainly based on the report submitted.

Textbook〉 伊勢典夫他著「新高分子化学序論」化学同人

Reference〉

- ◇ 佐藤恒之他著「高分子化学」朝倉書店
- ◇ 野瀬卓平他編「大学院高分子科学」講談社
- ◇ Silverstein 他著「有機化合物のスペクトルによる同定法」東京化学同人

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197283

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ute (化学棟 406, +81-88-656-7402, ute@chem.tokushima-u.ac.jp) Mail
(Office Hour: Monday 15:00 - 17:00)

⇒ Hirano (G405, hirano@chem.tokushima-u.ac.jp) Mail

Advanced Physical Chemistry

2 units (selection)

Katsuhiro Tamura · Professor / Physicochermistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering
Yasuhiro Uosaki · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering
Yoshihisa Suzuki · Associate Professor / Physicochermistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The main goal of this class is to understand the relationship between the principle of physical chemistry and real phenomena. Solvation, crystal growth, phase transition of lipid bilayer (as the model of biomembrane) and bioassay of pollutant are the main topics of this class.

Outline〉 (Solvation phenomena) Many chemical reactions are studied in liquids. Although solvation process plays a key role in these reactions, it is hard to understand the solvation quantitatively. In this lecture, "solvation thermodynamics" based on statistical mechanics is introduced and the methods to understand the solvation theoretically are explained. (Crystal Growth) Concepts and technology of crystal growth play an important role in design of materials and structure analysis. The main goal of this class is to provide a solid introduction to the fundamentals of crystal growth that can be used to describe various phenomena involving equilibrium conditions, rate processes, surface or interface properties, etc. (Phase transition and bioassay of pollutant) The physical properties of various micelles (normal and reversed micelles) and liposomal membranes are discussed. The chemical reactions including bioreactions in such molecular assemblies are also mentioned. Calorimetry and high-pressure techniques to study these chemical and physical phenomena are lectured from the viewpoint of basic and applied fields (for instance bioassay of pollutant).

Style〉 Lecture

Keyword〉 ***solvation, crystal growth, biomembrane, bioassay***

Fundamental Lecture〉 "Basic Physical Chemistry"(1.0)

Relational Lecture〉 "Advanced Topics in Materials Science"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level physical chemistry and related subjects.

Goal〉

1. To understand the fundamentals of solvation phenomena
2. To understand the fundamentals of crystal growth
3. To understand the outline of molecular assemblies and the fundamentals of thermal analysis
4. To understand bioassay as an analytical method for pollutant

Schedule〉

1. Statistical mechanics and thermodynamics
2. Chemical potential
3. Solvation thermodynamics
4. Solvation energy
5. Ion solvation
6. Thermodynamics of phase transition
7. Nucleation
8. Ideal growth rate of crystal
9. Surface structure and roughning transition
10. Surface kinetics
11. Physical properties of associated micelles and chemical reactions in the micelle.
12. Basis of calorimetry and calorimetry in biochemistry
13. Measurement of bioactivities and growth thermograms of microorganisms
14. Application of calorimetry to the measurements of pollutant
15. Bioassay of gas by using a gas pressurizing method

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be announced in the class

Reference〉 Yukio Saito, Statistical Physics of Crystal Growth, World Scientific, Singapore, 1996

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197472

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tamura (G509, +81-88-656-7416, tamura@chem.tokushima-u.ac.jp) Mail

Advanced quantumchemistry

2 units (selection)

Eiji Kanezaki · Professor / Physicochermistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 Molecular science based quantum chemistry minded for current topics will be present both in experimental and theoretical fields with emphasis on molecular spectroscopy in relation to molecular structure and molecular properties

Outline〉 Basic studies on the electronic states of molecules are presented from aspects of molecular spectroscopy under outer stresses of electric, magnetic and of optical forces to molecules or molecular assemblies. Although discussion will be mainly focused onto some resonace conditions of the forces, their double resonance will be included if time is not pressed

Style〉 Lecture

Keyword〉 ***molecular spectrocsopy***

Fundamental Lecture〉 "Quantum Chemistry"(1.0), "Physical Chemistry"(1.0)

Relational Lecture〉 "Graduate Seminar in Chemical Science and Technology" (0.5), "Advanced experiments on chemical science and technology"(0.5)

Goal〉 To understand, at least, one of the current topics in quantum chemistry

Schedule〉

1. about this lecture
2. basic concept of quantum chemistry
3. basic methods of quantum chemistry
4. advanced concept of quantum chemistry
5. advanced methods of quantum chemistry
6. basic concept for electronic states of molecule
7. advanced concept for electronic states of molecule
8. basic concept for the study in electronic states of molecule, a survey
9. basic methods for the study in electronic states of molecule
10. advanced concept for electronic states of molecule
11. introduction to interaction of molecules with outer field
12. basic concept for interaction of molecules with outer field
13. basic concept for calculation of interaction
14. advanced concept for calculation of interaction
15. more advanced concept for calculation of interaction
16. examination

Evaluation Criteria〉 レポート提出を求め，平常点を考慮して評価する

Textbook〉 ATKINS, PHYSICAL CHEMISTRY, 8th ed., 2006, Oxford University Press.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197515

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kanezaki (G516, +81-88-656-9444, kanezaki@chem.tokushima-u.ac.jp) Mail (Office Hour: refer to the official HP)

Advanced Analytical and Environmental Chemistry

2 units (selection)

Mikito Yasuzawa · Associate Professor / Physicochermistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering
Tomoki Yabutani · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 This class introduces current status and topics in the academic field of analytical chemistry and grobal environmental problems in the world.

Outline〉 The outiline of this class is an introduction of histry and advances of analytical chemistry and environmental problems. The contents for analytical chemisry include sample preparation, separation method and principles of some imrpotant analytical instruments for characterizing enviromental problems.

Style〉 Lecture

Keyword〉 ***analytical chemistry, environmental analytical chemistry***

Fundamental Lecture〉 "Global Environmental Chemistry"(1.0)

Requirement〉 Students are requied to have enough knowledges and trainings of analytical chemistry and environmental chemistry in undergraduate-level and related subjects.

Goal〉

1. To understand the current advance in analytical chemistry.
2. To understand of the earth environmental problems in the viewpoint of analytical chemistry.

Schedule〉

1. Introduction
2. Influence of chemical compunds to human health
3. Introduction of analytical methods of chemical compounds in biological samples
4. Curent topics of analysis of chemical compounds in biological samples
5. Current status of pollution in global environment by toxic chemical compounds
6. Introduction of urban atmospheric environment
7. Current statas and topics in urban atmospheric environment
8. Global climate change by greenhouse gas
9. Introduction of aquatic environment
10. Current status and topics of aquatic environment
11. Introduction of soil and lithospheric environment
12. Current status of soil and lithospheric environment
13. Introduciton of analytical method for environmental analysis
14. Current advances of analytical method for environmental analysis
15. Current topics of environmental chemistry

Evaluation Criteria〉 The final grades will be determined numerically by averaging your scores with the following weights; homework reports 70% and quizzes 30%. The score will be described as 100-points scale. You will be passed for this class if you get over 60 point.

Textbook〉 To be introcuced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197486

Contact〉

⇒ Yasuzawa (G512, +81-88-656-7421, mik@chem.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日 16:30~ 17:30)
⇒ Yabutani (G605, +81-88-656-7413, yabutani@chem.tokushima-u.ac.jp) Mail

Advanced Chemical Reaction Engineering

2 units (selection)

Shigeru Sugiyama · Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering
Ken-Ichiro Sotowa · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 This class introduces the most up-to-date analytical procedures of catalysts together with the optimization techniques that can be used for determing the optimal design and operating conditions of chemical processes.

Outline〉 The recent characterization techniques of catalysts such as XAFS and solid state NMR will be explained. Furthermore, basics of chemical reactor and process design and operation will be introduced using a chemical reaction process as an example.

Style〉 Lecture

Keyword〉 ***catalyst, reactor, process design, optimization, reaction engineering***

Fundamental Lecture〉 "Differential Equations"(0.2), "Chemical Reaction Engineering"(0.8), "Quantum mechanics and advanced lecture in quantum physics" (0.4), "Nuclear magnetic resonance"(1.0)

Relational Lecture〉 "Advanced Materials Science"(0.2), "Advanced Separation Technology"(0.2)

Requirement〉 Students are required to have a good understanding of chemical engineering and related subjects in an undergraduate course.

Notice〉 Preparations for lessons review will be needed.

Goal〉

1. To understand the advanced analytical procedures such as XAFS and solid state NMR from 1st to 7th.
2. To understand several basic optimization techniques for chemical processes from 8th to 15th.

Schedule〉

1. XAFS (1) : Introduction
2. XAFS (2) : Transmission mode
3. XAFS (3) : Fluorescence mode
4. XAFS (4) : Case study
5. Solid state NMR (1) : Intrroduction
6. Solid state NMR (2) : CP MAS
7. Solid state NMR (3) : Case study
8. Introduction to opmization problem
9. Linear programming
10. Nonlinear programming
11. Steepest descent method and line search
12. Integer programming problem
13. pinch technology
14. Process design exercise
15. Recent topics on process optimization

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 All lecture documents will be opened through U-learning system.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197165

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Sugiyama (G309, +81-88-656-7432, sugiyama@chem.tokushima-u.ac.jp) Mail (Office Hour: 16:00-18:00, Monday and Tuesday. (can be contacted whenever available))

⇒ Sotowa (Chemistry and biotechnology building, 307., +81-88-656-4440, sotowa@chem.tokushima-u.ac.jp) Mail (Office Hour: 16:00-18:00, Monday and Tuesday. (can be contacted whenever available))

Advanced Separation Technology

2 units (selection)

Masahiro Katoh · Associate Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering
Toshihide Horikawa · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to understand typical separation processes, the concepts and mathematical treatments for mass transfer.

Outline〉 Separations are prominent in manufacture of chemicals, pharmaceuticals, metals etc. Various separation methods have been developed in chemical industry. Separations are also needed for treatment of hazardous wastes and for pollution control, especially for recycle and recovery of resources. The following types of systems will be discussed: principal of various separation methods, fundamentals of mass transfer, separation with phase change, gas absorption with chemical reactions, extraction, adsorption and ion exchange, membrane separation, methods of continuous separation. Mathematical treatments will include methods of characteristics and moment analysis. To facilitate understanding and practical application, a practice or a report will be also imposed on every item.

Style〉 Lecture

Keyword〉 ***mass transfer, separation processes***

Goal〉

1. To understand several separation processes
2. To understand mathematical treatments for mass transfer

Schedule〉

1. Several separation processes and the concepts
2. Mass transfer
3. Gas absorption, steady analysis
4. Gas absorption, unsteady analysis
5. Gas absorption with chemical reaction
6. Gas absorption apparatuses
7. Adsorption equilibrium
8. Adsorption velocity and diffusion
9. Chromatography
10. Moment analysis
11. The principle of membrane separation
12. Membrane permeability
13. Separation process using hollow fiber
14. Continuous separation process
15. Test

Evaluation Criteria〉 Evaluate of approach to the lecture(40%) and test(60%).

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197487

Contact〉

⇒ Katoh (M304, +81-88-656-7429, katoh@chem.tokushima-u.ac.jp) Mail

Advanced Materials Science

2 units (selection)

Toshihiro Moriga · Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering
Kei-ichiro Murai · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to understand the basic concepts of functional materials and the most up-to-date analytical procedures, which are necessary in developing new material science.

Outline〉 Recent development in the preparation, crystal structure, luminescence and applications of silicon-based oxynitride and nitride phosphors for white light-emitting diodes (LEDs) will be explained.

Style〉 Lecture

Keyword〉 ***oxynitride, white LED, powder X-ray diffraction, XAFS***

Fundamental Lecture〉 "Physical Properties of Materials"(1.0), "Material Science" (1.0)

Relational Lecture〉 "Solid State Ionics"(0.5), "Advanced Environmental Technology on Chemistry"(0.5)

Requirement〉 Requires undergraduate level knowlwdge of materials chemistry.

Goal〉

1. To understand the basic concepts of oxynitride phosphors for white LEDs in the lectures from 1st to 8th.
2. To understand the advanced analytical procedure such as XRD and XAFS in the lectures from 9th to 15th.

Schedule〉

1. Introduction
2. Roles of phosphors in white LED
3. Classification and crystal chemistry of (oxy)nitride compounds
4. Green emitting phosphors
5. Yellow emitting phosphors
6. Red emitting phosphors
7. Synthesis of silicon-based (oxy)nitride phosphors
8. Epilogue
9. Principle of X-ray diffraction
10. Measurement and analysis of powder X-ray diffraction data
11. Crystallography for X-ray diffraction
12. Introduction to Reitveld analysis
13. Introduction to XAFS
14. Measurement of XAFS - transmission and fluorescence method -
15. Analysis of XAFS data

Evaluation Criteria〉 Assignment counts 100% mainly based on the reports submitted.

Textbook〉 To be announced in the class.

Reference〉 To be announced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197252

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Moriga (M603, +81-88-656-7423, moriga@chem.tokushima-u.ac.jp) Mail (Office Hour: Monday 4:30pm—5:30pm for 1st semester, Thursday 4:30pm—5:30pm for 2nd semester)
⇒ Murai (機械棟 305, +81-88-656-7424, murai@chem.tokushima-u.ac.jp) Mail

Advanced Topics in Synthetic Chemistry

1 unit (selection)
Part-time Lecturer

Target〉 To learn recent research topics on organic and synthetic chemistry.

Outline〉 Recent topics in reaction and syntheses in organic, organometallic, biomimetic, inorganic, and polymer chemistries.

Style〉 Lecture

Keyword〉 ***organic chemistry, synthetic chemistry***

Fundamental Lecture〉 "Organic Chemistry 2"(1.0), "Organic Chemistry 4"(1.0), "有機化学 3"(1.0)

Relational Lecture〉 "Advanced Organic Chemistry"(0.5), "Advanced Topics in Polymerization Reactions"(0.5), "Advanced Materials Design"(0.5)

Goal〉 To be able to explain the importance and breakghrough in the research area.

Evaluation Criteria〉 To be annouced by the lecturer in the class.

Textbook〉 To be accounced in the class.

Reference〉 To be announced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197464

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Advanced Topics in Materials Science

1 unit (selection)
Part-time Lecturer

Target〉 To learn recent research topics on materials science

Outline〉 Basic theories of physical and chemical properties, and structure of materials will be lectured by an lecturer from other research institutions.

Style〉 Lecture

Keyword〉 ***material, properties, chemical structure***

Fundamental Lecture〉 "Physical Chemistry"(1.0), "Inorganic Chemistry"(1.0)

Relational Lecture〉 "Advanced Physical Chemistry"(0.5), "Advanced Analytical and Environmental Chemistry"(0.5), "Advanced quantumchemistry"(0.5)

Goal〉 To be able to explain the importance and breakthrough in the research area

Schedule〉 To be annouced by the lecturer

Evaluation Criteria〉 To be announced by the lecturer in the class.

Textbook〉 To be announced by the lecturer

Reference〉 To be announced by the lecturer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197463

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kanezaki (G516, +81-88-656-9444, kanezaki@chem.tokushima-u.ac.jp)
MAIL

Advanced Topics in Chemical Process Engineering

1 unit (selection)
Part-time Lecturer

Target〉 To learn recent topics on chemical process engineering.

Outline〉 Recent trends in chemical engineering, process design and development will be explained by a lecturer from other research institutions.

Style〉 Lecture

Keyword〉 ***chemical engineering, process engineering***

Fundamental Lecture〉 "Chemical Engineering Principles"(1.0), "Chemical Reaction Engineering"(1.0), "Separation Science and Technology"(1.0), "Material Science"(1.0)

Relational Lecture〉 "Advanced Chemical Reaction Engineering"(0.5), "Advanced Materials Science"(0.5), "Advanced Separation Technology"(0.5)

Goal〉 To be able to explain the importance and breakthrough in the research area.

Schedule〉 To be announced by the lecturer in the class

Evaluation Criteria〉 To be announced by the lecturer

Textbook〉 To be announced by the lecturer

Reference〉 To be announced by the lecturer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197166

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Moriga (M603, +81-88-656-7423, moriga@chem.tokushima-u.ac.jp) Mail (Office Hour: Monday 4:30pm—5:30pm for 1st semester, Thursday 4:30pm—5:30pm for 2nd semester)

Advanced Lecture on Semiconductor Nanotechnology

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This class introduces basic principles of the semiconductor nanotechnology and their application to the quantum devices.

Outline〉 Basics of semiconductor physics and quantum mechanics are introduced to understand material properties of quantum confined nanostructures. Recent progress in fabrication techniques and device applications of semiconductor nanostructures (quantum wells, wires and dots) will be reviewed.

Style〉 Lecture

Keyword〉 ***quantum confined nanostructures, semiconductor nanoscience, electron devices, photonic devices***

Requirement〉 None.

Notice〉 None.

Goal〉 To understand basic properties of semiconductor nanostructures and quantum devices.

Schedule〉

1. Introduction to semiconductor nanostructures
2. Electronic states in quantum confined structures
3. Electrical properties of superlattices
4. Fabrication technique of quantum wires and wells
5. Characterization of heterointerfaces
6. Characterization of nanostructures
7. High-speed electron devices
8. Optical properties of quantum wells
9. Semiconductor laser diodes
10. Quantum effect devices
11. Fabrication technique of quantum dots
12. Quantum dot devices
13. Device application of quantum nano structures
14. Recent topics of semiconductor nanotechnology (1)
15. Recent topics of semiconductor nanotechnology (2)

Evaluation Criteria〉 Assignments count 100%

Textbook〉 None.

Reference〉 The Physics of Low-Dimensional Semiconductors, J.H. Davis, Springer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197421

Student〉 Any students can attend the class.

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

⇒ Kitada (A224, +81-88-656-7671, kitada@frc.tokushima-u.ac.jp) Mail (Office Hour: Mon. 10:00-14:00)

Graduate Seminar in Chemical Science and Technology

4 units (compulsory)
Teacher of course

Target〉 To improve the skills in reading academic papers and in making presentation.

Outline〉 The students will read some academic papers and make presentation on the context. Through the presentation and discussion, the students will improve the skill in making presentations and learn how the research results can be applied to the industry.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***discussion, literature, presentation***

Fundamental Lecture〉 "Undergraduate Work"(1.0), "Seminar on Chemical Science and Technology"(1.0)

Relational Lecture〉 "Advanced experiments on chemical science and technology" (0.5)

Evaluation Criteria〉 各配属先研究室の担当教員が，発表，討論などを通じて総合的に評価する

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197164

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Advanced experiments on chemical science and technology

8 units (compulsory)
Teacher of course

Target〉 To learn how to conduct a research as an independent researcher

Outline〉 Students will conduct a research work related to the master's thesis, and acquire a broader knowledge of engineering.

Keyword〉 ***research, thesis***

Fundamental Lecture〉 "Undergraduate Work"(1.0), "Seminar on Chemical Science and Technology"(1.0)

Relational Lecture〉 "Graduate Seminar in Chemical Science and Technology" (0.5)

Evaluation Criteria〉 研究への取り組み，　並びに研究を実行する中で各講座において計画される研究討論，中間報告など，さらに，M1 中間発表会における発表・質疑応答，提出された修士論文と，修士論文発表会での口頭発表審査によって評価する．

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197163

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Earth and Life Environmental Engineering — Biological Science and Technology

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Environmental Technology on Chemistry

2 units (selection)
Teacher of course

Target〉 The present situation and subjects on chemistry in view of environmental pollution will be introduced. Recent development in chemistry to attempt to solve those subjects will be explained.

Outline〉 Based on the historical background on environmental pollution, the recent progress on analytical chmistry, biochmistry, catalysis and chemical process engineering for environmental protection will be explained.

Style〉 Lecture and excercise

Keyword〉 ***environment, analytical chemistry, biochemistry, catalyst, chemical process***

Fundamental Lecture〉 "Advanced Analytical and Environmental Chemistry"(1.0), "Advanced Physical Chemistry"(1.0), "Advanced Materials Science"(1.0)

Relational Lecture〉 "Engineering of Biological Environment"(0.5), "Advanced Environmental Systems Engineering"(0.5)

Requirement〉 Requires undergraduate level knowlwdge of chemistry and chemical engineering.

Goal〉

1. To understand the present situation for environmental subjects on engineering.
2. To develop ability for solving the environmental subjects.

Schedule〉

1. Endocrine disrupters
2. Microwave dielectric heating: Its application to chemical reaction
3. Environmental problem and crystal growth
4. Analysis of trace elements
5. Properties of supercritical fluids and their utilization
6. Recent advances in organic chemistry: Synthesis and Function
7. The mystery of natural rubber
8. Asymmetric synthesis
9. Polymer materials and environment
10. Biodegradable polymer
11. Introduction to engineering utilization of space environment
12. Utilization of adsorption phenomena
13. Approach using apatite to studies on energy and environment
14. Present situation of phosphors for white LEDs
15. Optimization of chemical processes

Evaluation Criteria〉 Assignments count 100% mainly based on the presentation and report submitted.

Textbook〉 To be announced in the class.

Reference〉 To be announced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197158

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Committee Member of School Affair

Engineering of Biological Environment

2 units (selection)

Yoshitoshi Nakamura · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

⇒ Nakamura (720, +81-88-656-7518, ynakamu@bio.tokushima-u.ac.jp) Mail
(Office Hour: 水曜日 17:00-18:00)

Target〉 To understand recent studies on engineering of biological environment.

Outline〉 Advanced lectures for recent studies on engineering of biological environment

Style〉 Lecture

Keyword〉 ***environment, biology, engineering***

Requirement〉 N/A

Notice〉 N/A

Goal〉

1. To understand general concepts of biomass
2. To understand biomass conversion engineering
3. To understand general concepts of bioremediation

Schedule〉

1. General concepts of biological environment
2. Characteristics of biomass and its effective utilization
3. Pretreatment of biomass by physical method
4. Pretreatment of biomass by chemical method
5. Pretreatment of biomass by biological method
6. Conversion of biomass into useful materials
7. Conversion of biomass into useful materials
8. Process system engineering for effective conversion of biomass
9. Reports
10. Classification, role, and application method of environmental organism
11. Bioremediation in water environment
12. Bioremediation in air environment
13. Bioremediation in soil environment
14. Environmental hormones, chemical pollutions and ethics
15. Recent topics and trend of industry for engineering of biological environment
16. Final Reports

Evaluation Criteria〉 Evaluation of Reports

Textbook〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197324

Contact〉

Advanced Environmental Systems Engineering

2 units (selection)

Yoshiyuki Kidoguchi · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering, Akio Kondo · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shuichi Hashimoto · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shoichiro Fujisawa · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Masashi Okushima · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shigeki Matsuo · Associate Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Ryoichi Yamanaka · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Takuro Tomita · Assistant Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Katsuya SATO · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shin-ichi Ito · Assistant Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand the present environmental problems and to acquire the advanced of the technique and the approach to solve problems on the point of the ecosystem engineering.

Outline〉 To explain the structure and function of environmental systems, the relationship between civil life and disaster prevention systems, and the changes of social system due to the technological revolution and the policy.

Style〉 Lecture

Keyword〉 ***environmental policy, natural disaster, energy saving technology, welfare technology, miromechanical engineering***

Goal〉

1. To understand the factor of environmental systems
2. To understand the strucure of environmental systems
3. To understand the civil life and natural disaster prevention systems

Schedule〉

1. The policy and natural disaster prevention measures (1)
2. The policy and natural disaster prevention measures (2)
3. The factor of environmental systems
4. Example of environmental systems
5. The structure of environmental systems
6. Example of structure of environmental systems
7. Civil life and nano-technology 1
8. Civil life and nano-technology 2
9. Midterm presentation
10. Well being technology 1
11. Well being technology 2
12. Ecosystem engineering 1
13. Ecosystem engineering 2
14. Hydrogen engine technology
15. Diesel engine engineering

Evaluation Criteria〉 Assignments count 100%

Textbook〉 To be introduced in th class

Reference〉 To be introduced in th class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197176

Contact〉

⇒ SATO (eco705, +81-88-656-2168, katsuyas@eco.tokushima-u.ac.jp) Mail

Quantum mechanics and advanced lecture in quantum physics

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the quantum mechanics.

Outline〉 Basics of quantum mechanics are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics***

Goal〉 To understand the outline of quantum mechanics.

Schedule〉

1. Introduction
2. Variational method
3. Lagrangian
4. Hamiltonian
5. Poisson's bracket expression
6. Quantization
7. Operator
8. Wavefunction
9. Expectation value
10. Schrödinger equation
11. Example (1) the square well potential
12. Example (2) the linear harmonic oscillator
13. Angular momentum
14. Example (3) hydrogen atom
15. Heisenberg equation
16. Field quantization

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197470

Contact〉

⇒ Yoshitaka Michihiro (A203)

Superconductivity and superconducting materials

2 units (selection)

Yutaka Kishimoto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand basics and recent developments in superconductivity.

Outline〉 This class reviews quantum mechanics and introduces superconductivity and recent superconducting materials.

Style〉 Lecture

Keyword〉 ***superconductivity, Cooper pair, superconducting energy gap, density of states, anisotropic superconductivity***

Goal〉 To understand the outline of superconductivity.

Schedule〉

1. Introduction to superconductivity
2. Review of quantum mechanics (1), Schrödinger equation and wave function
3. Review of quantum mechanics (2), operators and expected values
4. Review of quantum mechanics (3), perturbation theory
5. Free electron model of metals
6. Phenomenological theory of superconductivity
7. To understand Meissner effect on the basis of quantum mechanics
8. Formation of Cooper pair
9. Formation of superconducting energy gap
10. Density of states, and energy gap at finite temperatures
11. Introduction to Nuclear Magnetic Resonance method
12. Frontier of superconductivity (1), strong coupling superconductor
13. Frontier of superconductivity (2), heavy Fermion superconductor
14. Frontier of superconductivity (3), copper oxide high Tc superconductor
15. Summary

Evaluation Criteria〉 Reports on several subjects in the class.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197363

Contact〉

⇒ Yutaka Kishimoto (A202)

Advanced Computational Science

2 units (selection)

Toshiki Takeuchi · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class provides the basic technology for numerical calculation for the differential equation.

Outline〉 The numerical calculation methods for the differential equation are introduced.

Style〉 Lecture

Keyword〉 ***numerical analysis, numerical computation, differential equation***

Fundamental Lecture〉 "Numerical Analysis"(1.0), "Basic Mathematics/微分積分学 I"(1.0), "Basic Mathematics/微分積分学 II"(1.0)

Relational Lecture〉 "Methods for analysis of mathematical phenomena"(1.0), "Numerical Analysis"(1.0)

Requirement〉 Students have to understand basic mathematics of undergraduate-level.

Goal〉 To understand principle of numerical calculation methods.

Schedule〉

1. Introduction to numerical simulation
2. Mathematical model
3. Lagrange interpolation
4. Spline interpolation
5. Least squares method
6. Finite difference method
7. Arbitrary precision formula
8. Application to ordinary differential equation
9. Application to partial differential equation
10. Gauss-Seidel method
11. Successive Over-Relaxation method
12. Explicit method
13. Implicit method
14. Crank-Nicolson method
15. Numerical instabilities

Evaluation Criteria〉 Assignments count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197211

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Takeuchi (A206, +81-88-656-7544, takeuchi@pm.tokushima-u.ac.jp) Mail
(Office Hour: 木曜日 14:00-15:00)

Methods for analysis of mathematical phenomena

2 units (selection)

Hitoshi Imai · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering, Cheng-Hai Jin · Professor / International Center

Target〉 To learn the to analyze the mathematical phenomena.

Outline〉 Methods used in analysis of mathematical phenomena are introduced. Especially, those in numerical analysis are focused on.

Style〉 Lecture

Keyword〉 ***mathematics, numerical analysis***

Relational Lecture〉 "Advanced Computational Science"(0.5)

Requirement〉 Only the premise that have studied basic mathematics.

Goal〉 The adequacy of the two-dimensional boundary value problem governed by the Poisson equation can be understood by the finite difference method, etc.

Schedule〉

1. Introduction to computer
2. Common sense in numerical computation
3. High-speed computation (Parallel computing)
4. Finite difference method I
5. Finite difference method II
6. Finite difference method III
7. Finite difference method IV
8. Finite element method I
9. Finite element method II
10. Finite element method III
11. Finite element method IV
12. Boundary element method I
13. Boundary element method II
14. Boundary element method III
15. Iterative method

Evaluation Criteria〉 Evaluation by the report.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197304

Contact〉

⇒ Imai(A220, +81-88-656-7541, The inquiry by means of the cellular phone or E-mail is not acceptable) (Office Hour: Office hours: Thursday 14:00-15:00)

Biochemical Thermodynamics

2 units (selection)

Hitoshi Matsuki · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Thermodynamic treatments for molecular aggregates constructed by self-association of bio-related substances and effects of environmental variables such as temperature, pressure and additives on the aggregates are described.

Outline〉 The former part of this lecture reviews treatments for molecular aggregates such as monolayers, micelles and vesicles constructed by self-association of bio-related substances like surfactants, lipids and amphiphilic drugs from a thermodynamic viewpoint. The latter part describes various nature of these aggregates and structure changes of the aggregates by environmental variables such as temperature, pressure and additives. Further industrial application and utilization of molecular aggregates are also explained. This lecture deals with industrial subjects.

Style〉 Lecture

Keyword〉 ***bio-related substance, molecular aggregate, thermodynamics, phase behavior, pressure***

Fundamental Lecture〉 "Physical Chemistry 2"(1.0), "Biophysical Chemistry 2" (1.0)

Relational Lecture〉 "Advanced Biophysical Chemistry"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level physical chemistry and biophysical chemistry and related subjects.

Goal〉

1. To understand the thermodynamic treatments of molecular aggregates formed by bio-related substances.
2. To understand the nature for aggregates of bio-related substances and effects of environmental variables on the aggregates.

Schedule〉

1. Thermodynamics of molecular aggregates (1) thermodynamics of adsorption at interfaces 1: surface and interfacial tension
2. Thermodynamics of molecular aggregates (2) thermodynamics of adsorption at interfaces 2: treatments of adsorbed film
3. Thermodynamics of molecular aggregates (3) phase transitions of monolayers 1: insoluble monlayers
4. Thermodynamics of molecular aggregates (4) phase transitions of monolayers 2: soluble monolayers
5. Thermodynamics of molecular aggregates (5) thermodynamics of self-association 1: phase separation model
6. Thermodynamics of molecular aggregates (6) thermodynamics of self-association 2: mass action model
7. Thermodynamics of molecular aggregates (7) micelle formation in dilute solutions 1: critical micelle concentration
8. Thermodynamics of molecular aggregates (8) micelle formation in dilute solutions 2: affecting factors
9. Structures and functions of molecular aggregates (1) solution behavior 1: Krafft point
10. Structures and functions of molecular aggregates (2) solution behavior 2: cloud point
11. Structures and functions of molecular aggregates (3) phase behavior of bilayers 1: saturated phospholipids
12. Structures and functions of molecular aggregates (4) phase behavior of bilayers 2: unsaturated phospholipids
13. Structures and functions of molecular aggregates (5) pressure effect on bilayers 1: volume change of transition
14. Structures and functions of molecular aggregates (6) pressure effect on bilayers 2: pressure-induced bilayer interdigitation
15. Structures and functions of molecular aggregates (7) phase behavior of bilayer mixtures: domain formation
16. Summary, inquiry and report preparations

Evaluation Criteria〉 More than 80% percentage of attendance and reports (100%).

Textbook〉 To be distributed materials adequately in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197321

Student〉 Able to be taken by student of other department

Contact〉

⇒ Matsuki (G607, +81-88-656-7513, matsuki@bio.tokushima-u.ac.jp) Mail
(Office Hour: Friday 16:20-17:50)

Advanced Biochemistry

2 units (selection)
Teacher of course

Target〉 This class introduces biological regulations by signal transduction in multicellular organisms.

Outline〉 Biological regulations involving enzymes, substrates, and other macromolecules are introduced. Molecular mechanisms of expression of biological activities are especially focused.

Style〉 Lecture

Keyword〉 ***signal transduction, signaling molecule, organelle***

Fundamental Lecture〉 "Biochemistry 1"(1.0), "Cell Biology"(1.0)

Relational Lecture〉 "Advanced enzyme engineering"(0.5), "Biological macromolecular chemistry"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level biochemistry.

Goal〉

1. Understanding of regulatory mechanism of synthesis and secretion of signaling molecules.
2. Understanding of signal transduction and its regulatory factors in cells.

Schedule〉

1. Cell structure and role of organelles
2. Biochemical techniques for studies of regulation of signal transduction
3. Imaging techniques for studies of regulation of signal transduction
4. Synthesis of peptide signaling molecules
5. Post-translational modifications of signaling molecules (1) Addition and processing of carbohydrate chains
6. Post-translational modifications of signaling molecules (2) Processing of polypeptides
7. Post-translational modifications of signaling molecules (3) Processing proteases and their substrates
8. Post-translational modifications of signaling molecules (4) Physiological functions of processing proteases
9. Regulation of secretion of signaling molecules
10. Quality control of signaling molecules (1) Intracellular transport
11. Quality control of signaling molecules (2) Intracellular degradation system
12. ER stress response
13. ER chaperones
14. Transcriptional regulation by ER stress
15. Development of new drugs targeting regulatory factors for signal transduction
16. Report preparation

Evaluation Criteria〉 Evaluation by report (100%)

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197310

Student〉 Able to be taken by only specified class(es)

Contact〉
⇒ 生物事務室(M棟703)

Molecular Biotechnology

2 units (selection)

Sumihare Noji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering, Hideyo Ohuchi · Associate Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 To understand advanced technology for molecular biology

Outline〉 We will present recent topics on molecular biology and its applications for genetic engineering. 1) Molecular biology on insects and its applications (3), 2) Molecular biology on brain and neural systems (3), 3) Molecular biology on vetebrate development and its applications (4). 4) Molecular biology on human diseases (4).

Style〉 Lecture in combination with Portfolio

Keyword〉 ***signlalling pathways, transcription factors, genes and diseases***

Relational Lecture〉 "Technology for Bioreaction"(0.5), "Advamced Cell Physiology"(0.5), "Advanced Biotechnology"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉 To understand molelcular mechanisms of development and diseases

Schedule〉

1. Molecular biology of insects, early development
2. Molecular biology of insects, late development
3. Molecular biology of insects, regeneration
4. Molecular biology of insects, brain development
5. Molecular biology of insects, neural development
6. Molecular biology of insects, mutations
7. Molecular biology of vertebrates, early development
8. Molecular biology of vertebrates, late development
9. report for evaluation
10. Molecular biology of vertebrates, brain and neural development
11. Molecular biology of vertebrates, regeneration
12. Molecular biology of human diseases, limbs
13. Molecular biology of human diseases, eyes
14. Molecular biology of human diseases, muscles
15. Molecular biology of human diseases, general
16. Final report for evaluation

Evaluation Criteria〉 Evaluate two reports (50% each)

Textbook〉 N/A

Reference〉 Handouts

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197483

Student〉 all

Contact〉

⇒ Noji (G803, +81-88-656-7528, noji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 15:30-17:00)

Cell Biotechnology

2 units (selection)

Hideaki Nagamune · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering
Toshifumi Tomoyasu · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 This class aims to expand the knowledge on cell biotechnology and improve the skill of debate through the debate dealing with cell biotechnology and its applications.

Outline〉 Debates among students dealing with the latest reports on technology and application concerned with production of useful materials, medical assay, and medical treatment using various cells are held in order to deepen the knowledge on cell biotechnology and its peripheral field. Training on skills of debate and communication is simultaneously carried out.

Style〉 Lecture

Keyword〉 ***cell, biotechnology, debate***

Relational Lecture〉 "Advanced Biochemistry"(0.8), "Molecular Biotechnology"(0.8), "Technology for Bioreaction"(0.8), "Biological macromolecular chemistry"(0.5), "Advanced enzyme engineering"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level of cell technology and related subjects

Goal〉

1. To understand the latest cell biotechnology and its application examples
2. To gain the ability of debate on technologies concerned in cell biotechnology

Schedule〉

1. Cell biotechnology on production of useful materials 1
2. Cell biotechnology on production of useful materials 2
3. Cell biotechnology on production of useful materials 3
4. Cell biotechnology on production of useful materials 4
5. Cell biotechnology on production of useful materials 5
6. Cell biotechnology on medical or industrial assay 1
7. Cell biotechnology on medical or industrial assay 2
8. Cell biotechnology on medical or industrial assay 3
9. Cell biotechnology on medical or industrial assay 4
10. Cell biotechnology on medical or industrial assay 5
11. Cell biotechnology on medical treatment 1
12. Cell biotechnology on medical treatment 2
13. Cell biotechnology on medical treatment 3
14. Cell biotechnology on medical treatment 4
15. Cell biotechnology on medical treatment 5

Evaluation Criteria〉 Assignments count 50%,Presentation count 50%

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197249

Student〉 Able to be taken by student of other department

Contact〉

⇒ Nagamune (G707, +81-88-656-7525, nagamune@bio.tokushima-u.ac.jp)
Mail (Office Hour: Monday 16:20-17:50)

Advanced Biophysical Chemistry

2 units (selection)

Hitoshi Matsuki · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Treatments of solutions containing biomolecules and analytical methods for interactions between biomolecular aggregates and physiologically active substances by means of the treatments are described.

Outline〉 The former part of this lecture describes solutions in which biomolecules reveal their actions from the macroscopic, microscopic and electrochemical viewpoints. The latter part deals with ligand partitioning into lipid bilayer membranes as examples of interactions between molecular aggregates formed by biomolecules and physiologically active substances. The molecular mechanisms of anesthesia until now are reviewed on the basis of the above subjects. Further industrial application of the interactions such as drug delivery systems is also explained. This lecture deals with industrial subjects.

Style〉 Lecture

Keyword〉 ***solution, molecular aggregate, ligand, interaction, mechanism of anesthesia***

Fundamental Lecture〉 "Physical Chemistry 2"(1.0), "Biophysical Chemistry 2"(1.0)

Relational Lecture〉 "Biochemical Thermodynamics"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level physical chemistry and biophysical chemistry and related subjects.

Goal〉

1. To understand the macroscopic, microscopic and electrochemical treatments of solutions.
2. To understand the partitioning modes of ligands into biomacromolecules and molecular mechanisms of anesthesia.

Schedule〉

1. Solution chemistry of bio-related substances (1) thermodynamics of solutions 1: basic equations of thermodynamics
2. Solution chemistry of bio-related substances (2) thermodynamics of solutions 2: theory of phase diagrams
3. Solution chemistry of bio-related substances (3) thermodynamics of solutions 3: equilibrium of solutions with gases, liquids and solids
4. Solution chemistry of bio-related substances(4) thermodynamics of solutions 4: interfacial phenomena
5. Solution chemistry of bio-related substances (5) statistical thermodynamics of solutions 1: basic equations of statistical mechanics
6. Solution chemistry of bio-related substances (6) statistical thermodynamics of solutions 2: ideal and regular solutions
7. Solution chemistry of bio-related substances (7) electrochemistry of solutions 1: ionic equilibrium
8. Solution chemistry of bio-related substances (8) electrochemistry of solutions 2: electrode reaction
9. Interactions between biomacromolecules and physiologically active substances (1) ligand partitioning into lipid membranes 1: nonspecific binding
10. Interactions between biomacromolecules and physiologically active substances (2) ligand partitioning into lipid membranes 2: specific binding
11. Interactions between biomacromolecules and physiologically active substances (3) effect of dissociation equilibrium of ligand
12. Interactions between biomacromolecules and physiologically active substances (4) mechanisms of anesthesia 1: introduction
13. Interactions between biomacromolecules and physiologically active substances (5) mechanisms of anesthesia 2: lipid membrane theories
14. Interactions between biomacromolecules and physiologically active substances (6) mechanisms of anesthesia 3: protein receptor theories
15. Interactions between biomacromolecules and physiologically active substances (7) action mechanisms of local anesthetics
16. Summary, inquiry and report preparations

Evaluation Criteria〉 More than 80% percentage of attendance and reports (100%).

Textbook〉 To be distributed materials adequately in the class.

Reference〉

- ◇ 本村欣士著「溶液化学」朝倉書店
- ◇ J. S. Rawlinson and F. L. Swinton "Liquids and Liquid Mixtures" Butterworths Scientific

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197327

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Matsuki (G607, +81-88-656-7513, matsuki@bio.tokushima-u.ac.jp) Mail
(Office Hour: Friday 16:20-17:50)

Advamced Cell Physiology

2 units (selection)

Yoshitoshi Nakamura · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 This class is intended to demonstrate how to use capable molecular viewers (PyMol & Coot) for protein structure, which can be used for detailed analyses of protein 3D-structure.

Outline〉 This class (portfolio) introduces how the programs (PyMol & Coot) can be used, and what their capabilities are.

Style〉 Portfolio

Keyword〉 ***protein 3D-structure, protein data bank, PyMol, Coot***

Relational Lecture〉 "Biological macromolecular chemistry"(0.5)

Requirement〉 Students are required to bring note-type PC, if necessary (Windows is better).

Goal〉

1. To understand protein coordinate file.
2. To understand operation of molecular viewers.

Schedule〉

1. Protein Data Bank and coodinate file
2. Installation of the programs
3. Getting started with mouse controls
4. Getting started with commands
5. Comand syntax
6. Atom selection
7. Ray-tracing and stereo
8. Animation
9. Tutorial 1:basics
10. Tutorial 2:advanced techniques
11. Tutorial 3:example scripts
12. Exercise 1:editing of PDB file
13. Exercise 2:structural comparison
14. Exercise 3:DALI web server
15. Exercise 4: WHAT IF web server

Evaluation Criteria〉 Drawing products with brief explanation (assignments count 100%)

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197250

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Administration Office(M703)

Advanced Microbiological Engineering

2 units (selection)
Teacher of course

Target〉 Acquire the fundamental and advanced microbiological engineering and fermentation technology

Outline〉 Target and summary of this class is to understand fermentation process of alcohol, lactic acid, amino acid, vitamin, nucleic acids, anibiotics and organic acids.

Style〉 Lecture

Keyword〉 ***fermentation, alcohol, amino acid***

Fundamental Lecture〉 "Biomolecular Design"(0.4)

Relational Lecture〉 "Advanced enzyme engineering"(0.4)

Requirement〉 Students are required to have a good understanding of under graduate-level microbiology and related subjects.

Goal〉

1. To understand the outline of microbial engineering
2. To understand the outline of fermentation

Schedule〉

1. Outline of microbial engineering
2. Outline of fermentation engineering
3. Outline of fermentation process of food
4. Fermentation process of Japanese sake
5. Fermentation process of beer
6. Fermentation process of whiskey
7. Fermentation process of lactic acid
8. Fermentation process of acetic acid
9. Subject report-1
10. Fermentation process of amino acid
11. Fermentation process of antibiotics
12. Fermentation process of vitamin
13. Fermentation process of nucleic acid
14. Subject report-2
15. Recent topics on fermentation process
16. Final Examination

Evaluation Criteria〉 Grading with two reports (50%) and final examination (50%)

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197450

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ 生物事務室(M棟703)

Biomolecular Design

2 units (selection)

Hitoshi Hori · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering, Yoshihiro Uto · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 生体機能修飾物質 (特に生理活性物質や医薬品) の設計, 合成, 生物活性の基礎となる分子機能工学的概念としての "医薬品エレクトロノミクス medicinal electronomics" につて講述する.

Outline〉 分子機能工学に関する重要な基礎的な概念としての分子軌道論による生体機能修飾物質 (特に生理活性物質や医薬品) の生体機能分子設計について解説し, "医薬品エレクトロノミクス medicinal electronomics" 的思考力を向上させる.

Style〉 Lecture

Keyword〉 ***biomolecular functional design, molecular orbital theory***

Relational Lecture〉 "Biological macromolecular chemistry"(0.5)

Goal〉

1. 分子機能工学手法としての分子軌道論を理解し, 実際, Hückel 法を使ってエチレンからベンゼンまでの分子軌道を手計算で求める.
2. medicinal electronomics 的思考力の向上のため, 簡単な生体機能修飾作用物質の分子軌道計算を実践し, それらの物性や生物活性を定量的に論じることにより, 分子軌道論の果実を味わう.

Schedule〉

1.) Biomolecular (functional) design and the concept of molecular orbital
2. Enzymatic reaction and molecular orbital
3. Quantum theory-based atomic structure and molecular bonds
4. Molecular structures and the concept of hybridized orbitals. Subject review report-1
5. Heteroatom containing structures. Discussion on subject review report-1
6. Structures of intermediates. Subject review report-2
7. Molecular orbital calculation-1: localizedπ-bond. Discussion on subject review report-2
8. Molecular orbital calculation-2: localizedπ-bond. Subject review report-3
9.) Molecular orbital calculation-3: localizedπ-bond. Discussion on subject review report-3
10. Molecular orbital calculation-4: delocalizedπ-bond (butadiene)
11. Round-table discussion on subject review report-4
12. Molecular orbital calculation-5: delocalizedπ- bond (cyclobutadiene). Subject review report-5
13. Round table discussion on subject review report-5
14. Another biomolecular design concepts: scaffold or "Ken-zan", pharmacophores, isosteres
15. Round table discussion on subject review report-6
16. Round-table discussion on this class "biomolecular design"

Evaluation Criteria〉 課した全課題レポート (100%) で評価する. レポートはそれぞれ 100 点満点で評価し, すべてのレポートが 60 点以上の場合をもって合格とする.

Textbook〉 Katsuhiro Saito "KozoYukikagaku(in Japanese)(Structural Organic Chemistry)"(Sankyo-Syuppan) and CD-ROM " WinMopac Version 3.0.3 (Trial) In Noriaki Hirayama, "Jissen Ryoshi-Kagaku (in Japanese: Practical Quantum Chemistry)"

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197481

Student〉 Able to be taken by student of other department

Contact〉

⇒ Hori (M821, +81-88-656-7514, hori@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 11:55-12:50)

Advanced Biotechnology

2 units (selection)

Hideaki Maseda · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Acquire the fundamental, advanced and applied biotechnology

Outline〉 Target and summary of this class is to understand applied microbiology, ecology, bioinstrumentation, food biotechnology, waste management and environmental biotechnology.

Style〉 Lecture

Keyword〉 ***applied microbiology, food biotechnology, environmental biotechnology***

Fundamental Lecture〉 "Engineering of Biological Environment"(0.4)

Relational Lecture〉 "Advanced enzyme engineering"(0.4)

Requirement〉 Students are required to have a good understanding of under graduate-level biotechnology and related subjects.

Goal〉

1. To understand the outline of biotechnology
2. To understand the outline of advanced biotechnology

Schedule〉

1. Outline of microbial bioengineering
2. basic and application of microbial bioengineering
3. Outline of biotechnology
4. basic and application of biotechnology
5. Ecology
6. Microbiological Ecology
7. Bioinstrumentation
8. new Bioinstrumentation
9. Outline of Food biotechnology
10. Basic Food biotechnology
11. Utilization of Food biotechnology
12. Outline of Waste management
13. Waste management
14. Outline of Environmental biotechnology
15. Environmental biotechnology
16. Final Examination

Evaluation Criteria〉 Grade will be decided by the performance on the following: Final Exam (100%).

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197151

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Maseda (生物棟 814, +81-88-656-7524, maseda@bio.tokushima-u.ac.jp)
Mail (Office Hour: Friday 16:20-17:50)

Advanced Biomaterials

2 units (selection)

Toshifumi Tomoyasu · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering
Hideaki Nagamune · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Study and investigate about the scientific background which produced the new technology.

Outline〉 Students are required to investigate how the important discovery (which acquired the Nobel Prize as an example) were established and how improved our life and research activities by these accomplishments.

Style〉 Lecture

Keyword〉 ***technology, biomaterial, research, application***

Requirement〉 Required to have a good understanding of undergraduate-level biochemistry and molecularbiology.

Goal〉

1. Understand how the important discoveries in the scientific field were performed.
2. Investigate how the important discoveries are applied to our life and research.

Schedule〉

1. Orientation
2. Discoveries concerning the role played by the chromosome in heredity. T. Morgan.
3. The production of mutations by means of X-ray irradiation. H. Muller
4. Discovery of mobile genetic elements. B. McClintock.
5. The discovery of penicillin and its curative effect in various infectious diseases. A. Fleming, E. Chain, H. Florey.
6. Discovery of tumour-inducing viruses. P. Rous.
7. Interpretation of the genetic code and its function in protein synthesis. R. Holley , H. Khorana, M. Nirenberg.
8. The discovery of restriction enzymes and their application to problems of molecular genetics. H, Smith. W, Arber.
9. Contributions concerning the determination of base sequences in nucleic acids. W. Gilbert, F. Sanger.
10. The genetic principle for generation of antibody diversity. S. Tonegawa.
11. Contributions to the developments of methods within DNA-based chemistry. K. Mullis, M. Smith.
12. Discovery concerning the genetic control of early embryonic development. L. Lewis, C. Nüsslein-Volhard, E. Wieschaus.
13. Discovery of Prions - a new biological principle of infection. S. Prusiner.
14. The development of methods for identification and structure analyses of biological macromolecules. J. Fenn, K. Tanaka, K. Wüthrich.
15. Generalization of lectures

Evaluation Criteria〉 Grades are judged about two attainment targets described above by a presentation (50 points) and a report (50 points). The student requires more than 60 points to a pass.

Textbook〉 To be introduce in the class.

Reference〉 To be introduce in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197325

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tomoyasu (G701, +81-88-656-9213, tomoyasu@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Advanced enzyme engineering

2 units (selection)

Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 This class introduces engineering of enzyme molecule for the medical application.

Outline〉 Basics of design of enzyme and their inhibitor by chemical and gene technologies for medical application are introduced.

Style〉 Lecture

Keyword〉 ***enzyme, medical application, protein engineering***

Fundamental Lecture〉 "Biochemistry 1"(1.0), "Protein Engineering"(1.0)

Relational Lecture〉 "Advanced Biochemistry"(0.5), "Biomolecular Design"(0.5), "Advamced Cell Physiology"(0.3)

Requirement〉 Students are required to have a good understanding of undergraduate-level biochemistry.

Goal〉

1. Understanding of enzyme character required for therapeutic use.
2. Understanding of design of enzyme molecule for therapeutic use.

Schedule〉

1. Introduction of medical application of enzyme
2. Basic of enzymology (1) Kinetics of enzyme reaction
3. Basic of enzymology (2) Regulation of enzyme activity
4. Therapeutic use of enzyme
5. Problem in therapeutic use of enzyme (1) Immunological problem
6. Problem in therapeutic use of enzyme (2) Drug delivery system.
7. Problem in therapeutic use of enzyme (3) Preparation of large quantity of enzyme
8. Example of design of enzyme for medical use
9. Example of design of enzyme for diagnosis
10. Engineered enzyme used for therapy of lysosome disease(1)Deficincy of beta glucosidase
11. Example of engineered enzyme used for therapy of lysosome disease (2) Deficincy of alpha glucosidase
12. Application of PEG-modified enzyme (1) Preparation of PEG asparaginase
13. Application of PEG-modified enzyme (2) Caracterization of PEG asparaginase
14. Target enzyme for development of new drug
15. Engineering of enzyme inhibitor
16. Report preparation Presentation

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197230

Student〉 Able to be taken by student of other department

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Technology for Bioreaction

2 units (selection)

Sumihare Noji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering, Hideyo Ohuchi · Associate Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Lectures for science and technology to use biological reactions. Especially, focusing on morphological formation of organisms, we will talk about how genomic infomation is decoded to bilud up body by bottom-up strategies.

Outline〉 We present lelcutures about techynology for application of biological reactions, especially meidical and engineering applications. We will focuse on 1) genome projects, 2) application of genome information, 3) application of PCR to genetic analyses, 4) in situ hybridization for analysis of gene expression pattern, 5) application of in situ hybridization, 6) transgenic animals, 7) applications of transgenic animals, 8) knock-out animals, 9) applications of knock-out animals, 10) medical applications of knock-out animals

Style〉 Lecture in combination with Portfolio

Keyword〉 ***genome science, RNA engineering, technology for developmental biology***

Relational Lecture〉 "Molecular Biotechnology"(0.5), "Molecular Biotechnology" (0.5), "Advanced Biochemistry"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉

1. To understand structures of genomes and its analitical methods
2. To understand analytical methods for gene expression
3. To understand morpholigical genes and its structures
4. To understand mechanisms of developmenal process

Schedule〉

1. Evolution
2. Genomic structures and evolution
3. Transcription factors and gene expression
4. Cis-regulaory elements and regulation of gene expression
5. Gene expression patterns
6. Functions of RNAs
7. RNA interference
8. reports for evaluation
9. Homeobox genes
10. Genes for signalling pathways
11. Genes for cell-cell adhesion factors
12. Developmental mechanisms of C. elegance
13. Developmental mechanisms of insects
14. Developmental mechanisms of invertebrate
15. Developmental mechanisms of vertebrate
16. report for evaluation

Evaluation Criteria〉 Evaluate two reports (50% each).

Textbook〉 N/A

Reference〉 From DNA to Diversity

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197326

Student〉 all students

Contact〉

⇒ Noji (G803, +81-88-656-7528, noji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 15:30-17:00)

Biological macromolecular chemistry

2 units (selection)

Yoshihiro Uto · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering, Hitoshi Hori · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 The goal is to understand the structure and function of biological macromolecules from the perspective of molecular recognition and interaction.

Outline〉 How do biological macromolecules recognize the target molecule and function? An introduction to the basic structural biology and stereochemistry of biological macromolecules. Topics include protein and nucleic acid structure. Students should make presentations focusing the molecular recognition and interaction of biological macromolecules based on the PDB data and their recent scientific papers with molecular modeling software "MacroModel".

Style〉 Lecture

Keyword〉 ***molecular interaction, molecular recognition, protein data bank, molrecular modeling***

Fundamental Lecture〉 "Biomolecular Design"(0.5)

Relational Lecture〉 "Advamced Cell Physiology"(0.5), "Advanced enzyme engineering"(0.5)

Requirement〉 To understand the organic chemistry, medicinal chemistry, and the enzyme engineering

Notice〉 None

Goal〉

1. To understand the principle of structure and function of biological macromolecule.
2. To understand the mechanisms of molecular recognition of biological macromolecule through PDB database search and molecular modeling software.

Schedule〉

1. Orientation
2. Lecture 1: force interactions involved in the drug-protein complex
3. Exercise 1: search for a protein target for drug
4. Lecture 2: stereochemical interactions involved in the drug-protein complex
5. Exercise 2: search for 3D structures of targeting protein from the PDB
6. Lecture 3: mechanisms of enzyme catalysis
7. Exercise 3: conformational analysis of targeting protein
8. Lecture 4: drug design and drug action
9. Exercise 4: conformational analysis of drug
10. Lecture 5: Drug design with computational chemistry
11. Exercise 5: molecular modeling of drug
12. Lecture 6: Molecular modeling with MacroModel
13. Exercise 6: molecular modeling of protein
14. Exercise 7: molecular modeling of drug-protein complex
15. Exercise 8: evaluation of molecular modeling
16. Report

Evaluation Criteria〉 Report 100%

Textbook〉 R. B. Silverman; The ORGANIC CHEMISTRY of DRUG DESIGN and DRUG ACTION, ELSEVIER

Reference〉 T. L. Lemke, D. A. Williams, V. F. Roche, S. W. Zito; FOYE'S PRINCIPLES OF MEDICINAL CHEMISTRY, Lippincott Williams & Wilkins

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197320

Student〉 Able to be taken by student of other department

Contact〉

⇒ Uto (M820, +81-88-656-7522, uto@bio.tokushima-u.ac.jp) Mail (Office Hour: 木曜日 16:20-17:50)

Advanced Lecture on Semiconductor Nanotechnology

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This class introduces basic principles of the semiconductor nanotechnology and their application to the quantum devices.

Outline〉 Basics of semiconductor physics and quantum mechanics are introduced to understand material properties of quantum confined nanostructures. Recent progress in fabrication techniques and device applications of semiconductor nanostructures (quantum wells, wires and dots) will be reviewed.

Style〉 Lecture

Keyword〉 ***quantum confined nanostructures, semiconductor nanoscience, electron devices, photonic devices***

Requirement〉 None.

Notice〉 None.

Goal〉 To understand basic properties of semiconductor nanostructures and quantum devices.

Schedule〉

1. Introduction to semiconductor nanostructures
2. Electronic states in quantum confined structures
3. Electrical properties of superlattices
4. Fabrication technique of quantum wires and wells
5. Characterization of heterointerfaces
6. Characterization of nanostructures
7. High-speed electron devices
8. Optical properties of quantum wells
9. Semiconductor laser diodes
10. Quantum effect devices
11. Fabrication technique of quantum dots
12. Quantum dot devices
13. Device application of quantum nano structures
14. Recent topics of semiconductor nanotechnology (1)
15. Recent topics of semiconductor nanotechnology (2)

Evaluation Criteria〉 Assignments count 100%

Textbook〉 None.

Reference〉 The Physics of Low-Dimensional Semiconductors, J.H. Davis, Springer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197421

Student〉 Any students can attend the class.

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

⇒ Kitada (A224, +81-88-656-7671, kitada@frc.tokushima-u.ac.jp) Mail (Office Hour: Mon. 10:00-14:00)

Practice for undrstanding scientific papers in bioogical technology

2 units (compulsory)
Teacher of course

Target〉 To learn how to read scientific papers for research

Outline〉 In order to obtain information on research and to learn how to present research results, students read papers related to their subjects of master thesis, present its contents, and discuss about contents of the paper.

Style〉 Lecture and excercise

Keyword〉 ***reading of papar, oral presentation***

Relational Lecture〉 "Seminar in Biological Technology"(0.5), "Biological science and technology laboratory"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn how to read papers

Schedule〉

1. presentation and discussion 1
2. presentation and discussion 2
3. presentation and discussion 3
4. presentation and discussion 4
5. presentation and discussion 5
6. presentation and discussion 6
7. presentation and discussion 7
8. presentation and discussion 8
9. presentation and discussion 9
10. presentation and discussion 10
11. presentation and discussion 11
12. presentation and discussion 12
13. presentation and discussion 13
14. presentation and discussion 14
15. presentation and discussion 15
16. presentation and discussion 16

Evaluation Criteria〉 Mutual evaluation of presentation

Textbook〉 N/A

Reference〉 Related papers

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197336

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Administration Office(M703)

Seminar in Biological Technology

2 units (compulsory)
Teacher of course

Target〉 The goal of this lecture is to aquire the knowledge necessary for research related to the Master's thesis.

Outline〉 Student elevates the reaseach ability and skill in the individual laboratory through presentation and active discussion as to the subject of study. In addition, the research skills in industrial and medical application reseaches should be acquired.

Style〉 Excercise

Keyword〉 ***discussion for research work, oral presentation***

Relational Lecture〉 "生命テクノサイエンス研究論文"(0.5), "Biological science and technology laboratory"(0.5), "Practice for undrstanding scientific papers in bioogical technology"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn how to perform research

Schedule〉

1. Research presentation 1 and discussion
2. Research presentation 2 and discussion
3. Research presentation 3 and discussion
4. Research presentation 4 and discussion
5. Research presentation 5 and discussion
6. Research presentation 6 and discussion
7. Research presentation 7 and discussion
8. Research presentation 8 and discussion
9. Research presentation 9 and discussion
10. Research presentation 10 and discussion
11. Research presentation 11 and discussion
12. Research presentation 12 and discussion
13. Research presentation 13 and discussion
14. Research presentation 14 and discussion
15. Research presentation 15 and discussion
16. Research presentation 16 and discussion

Evaluation Criteria〉 Evaluate master thesis

Textbook〉 N/A

Reference〉 Research papers

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197330

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Administration Office(M703)

Biological science and technology laboratory

10 units (compulsory)
Teacher of course

Target〉 According to the subject of study, student carriy out the research to obtain good ability and skill for reseach and for presntation.

Outline〉 Students carrry out each reseach according to the subject of study to elevate their reaseach ability and skill in the individual laboratory. In addition, they have to present their reseach reuslts for evaluation.

Style〉 Experiment

Keyword〉 ***reseach work, presentation***

Relational Lecture〉 "Practice for undrstanding scientific papers in bioogical technology"(0.5), "Internship in Biological science and technology"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉 to learn how to perform experiments

Schedule〉

1. Experiments 1
2. Experiments 2
3. Experiments 3
4. Experiments 4
5. Experiments 5
6. Experiments 6
7. Experiments 7
8. Experiments 8
9. Experiments 9
10. Experiments 10
11. Experiments 11
12. Experiments 12
13. Experiments 13
14. Experiments 14
15. Experiments 15
16. Experiments 16

Evaluation Criteria〉 Evaluate rsearch papers for the master degree

Textbook〉 N/A

Reference〉 Research papers

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197335

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Administration Office(M703)

Internship in Biological science and technology

2 units (selection)
Teacher of course

Target〉 To obtain knowledges and skills for practical works

Outline〉 To work in institutes, inductries, and companies, students can learn practical skills, knowledges, researches, etc., by internship.

Style〉 Internship

Keyword〉 ***internship***

Relational Lecture〉 "Practice for undrstanding scientific papers in bioogical technology"(0.5), "Biological science and technology laboratory"(0.5), "生命テクノサイエンス研究論文"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn what are practical knowledges, skills, and mind.

Schedule〉

1. Choose where to go to carry out the internship
2. Schedules depend on the internship program
3. Provide Reports

Evaluation Criteria〉 Evaluate Reports

Textbook〉 N/A

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197332

Student〉 Able to be taken by only specified class(es)

Earth and Life Environmental Engineering — Ecosystem Engineering

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Environmental Technology on Chemistry

2 units (selection)
Teacher of course

Target〉 The present situation and subjects on chemistry in view of environmental pollution will be introduced. Recent development in chemistry to attempt to solve those subjects will be explained.

Outline〉 Based on the historical background on environmental pollution, the recent progress on analytical chmistry, biochmistry, catalysis and chemical process engineering for environmental protection will be explained.

Style〉 Lecture and excercise

Keyword〉 ***environment, analytical chemistry, biochemistry, catalyst, chemical process***

Fundamental Lecture〉 "Advanced Analytical and Environmental Chemistry"(1.0), "Advanced Physical Chemistry"(1.0), "Advanced Materials Science"(1.0)

Relational Lecture〉 "Engineering of Biological Environment"(0.5), "Advanced Environmental Systems Engineering"(0.5)

Requirement〉 Requires undergraduate level knowlwdge of chemistry and chemical engineering.

Goal〉

1. To understand the present situation for environmental subjects on engineering.
2. To develop ability for solving the environmental subjects.

Schedule〉

1. Endocrine disrupters
2. Microwave dielectric heating: Its application to chemical reaction
3. Environmental problem and crystal growth
4. Analysis of trace elements
5. Properties of supercritical fluids and their utilization
6. Recent advances in organic chemistry: Synthesis and Function
7. The mystery of natural rubber
8. Asymmetric synthesis
9. Polymer materials and environment
10. Biodegradable polymer
11. Introduction to engineering utilization of space environment
12. Utilization of adsorption phenomena
13. Approach using apatite to studies on energy and environment
14. Present situation of phosphors for white LEDs
15. Optimization of chemical processes

Evaluation Criteria〉 Assignments count 100% mainly based on the presentation and report submitted.

Textbook〉 To be announced in the class.

Reference〉 To be announced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197158

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Committee Member of School Affair

Engineering of Biological Environment

2 units (selection)

Yoshitoshi Nakamura · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

⇒ Nakamura (720, +81-88-656-7518, ynakamu@bio.tokushima-u.ac.jp) Mail
(Office Hour: 水曜日 17:00-18:00)

Target〉 To understand recent studies on engineering of biological environment.

Outline〉 Advanced lectures for recent studies on engineering of biological environment

Style〉 Lecture

Keyword〉 ***environment, biology, engineering***

Requirement〉 N/A

Notice〉 N/A

Goal〉

1. To understand general concepts of biomass
2. To understand biomass conversion engineering
3. To understand general concepts of bioremediation

Schedule〉

1. General concepts of biological environment
2. Characteristics of biomass and its effective utilization
3. Pretreatment of biomass by physical method
4. Pretreatment of biomass by chemical method
5. Pretreatment of biomass by biological method
6. Conversion of biomass into useful materials
7. Conversion of biomass into useful materials
8. Process system engineering for effective conversion of biomass
9. Reports
10. Classification, role, and application method of environmental organism
11. Bioremediation in water environment
12. Bioremediation in air environment
13. Bioremediation in soil environment
14. Environmental hormones, chemical pollutions and ethics
15. Recent topics and trend of industry for engineering of biological environment
16. Final Reports

Evaluation Criteria〉 Evaluation of Reports

Textbook〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197324

Contact〉

Advanced Environmental Systems Engineering

2 units (selection)

Yoshiyuki Kidoguchi · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering, Akio Kondo · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shuichi Hashimoto · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shoichiro Fujisawa · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Masashi Okushima · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shigeki Matsuo · Associate Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Ryoichi Yamanaka · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Takuro Tomita · Assistant Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Katsuya SATO · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shin-ichi Ito · Assistant Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand the present environmental problems and to acquire the advanced of the technique and the approach to solve problems on the point of the ecosystem engineering.

Outline〉 To explain the structure and function of environmental systems, the relationship between civil life and disaster prevention systems, and the changes of social system due to the technological revolution and the policy.

Style〉 Lecture

Keyword〉 ***environmental policy, natural disaster, energy saving technology, welfare technology, miromechanical engineering***

Goal〉

1. To understand the factor of environmental systems
2. To understand the strucure of environmental systems
3. To understand the civil life and natural disaster prevention systems

Schedule〉

1. The policy and natural disaster prevention measures (1)
2. The policy and natural disaster prevention measures (2)
3. The factor of environmental systems
4. Example of environmental systems
5. The structure of environmental systems
6. Example of structure of environmental systems
7. Civil life and nano-technology 1
8. Civil life and nano-technology 2
9. Midterm presentation
10. Well being technology 1
11. Well being technology 2
12. Ecosystem engineering 1
13. Ecosystem engineering 2
14. Hydrogen engine technology
15. Diesel engine engineering

Evaluation Criteria〉 Assignments count 100%

Textbook〉 To be introduced in th class

Reference〉 To be introduced in th class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197176

Contact〉

⇒ SATO (eco705, +81-88-656-2168, katsuyas@eco.tokushima-u.ac.jp) Mail

Advanced Computational Science

2 units (selection)

Toshiki Takeuchi · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class provides the basic technology for numerical calculation for the differential equation.

Outline〉 The numerical calculation methods for the differential equation are introduced.

Style〉 Lecture

Keyword〉 ***numerical analysis, numerical computation, differential equation***

Fundamental Lecture〉 "Numerical Analysis"(1.0), "Basic Mathematics/微分積分学 I"(1.0), "Basic Mathematics/微分積分学 II"(1.0)

Relational Lecture〉 "Methods for analysis of mathematical phenomena"(1.0), "Numerical Analysis"(1.0)

Requirement〉 Students have to understand basic mathematics of undergraduate-level.

Goal〉 To understand principle of numerical calculation methods.

Schedule〉

1. Introduction to numerical simulation
2. Mathematical model
3. Lagrange interpolation
4. Spline interpolation
5. Least squares method
6. Finite difference method
7. Arbitrary precision formula
8. Application to ordinary differential equation
9. Application to partial differential equation
10. Gauss-Seidel method
11. Successive Over-Relaxation method
12. Explicit method
13. Implicit method
14. Crank-Nicolson method
15. Numerical instabilities

Evaluation Criteria〉 Assignments count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197208

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Takeuchi (A206, +81-88-656-7544, takeuchi@pm.tokushima-u.ac.jp) Mail
(Office Hour: 木曜日 14:00-15:00)

Topics of Analysis for Mathematical Science

2 units (selection)

Atsuhito Kohda · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Mathematical theory and technique for analysis of engineering phenomena

Outline〉 Mathematical theory to analyze problems in engineering and its application, mainly theory and technique of differential equations

Style〉 Lecture

Relational Lecture〉 "Advanced applied analysis"(0.2), "Differential Equations" (0.2)

Requirement〉 If you like undergraduate-level mathematics, it will be sufficient.

Goal〉 To be familiar with mathematical theory, that helps engineering study.

Schedule〉

1. Theory of sets and maps
2. Cardinal numbers and bijection
3. Equivalence relations and cryptography
4. Linear space and tensor
5. Vector analysis and differential form
6. Cauchy's theorem and vector analysis
7. Differential form and Cauchy's theorem
8. Projective plane
9. Quadratic curves and projective plane
10. All quadratic curves are circles?
11. The index of vector fields
12. Applications of the index:fundamental theorem of algebra
13. Vector fields on the unit sphere
14. Why there is the north pole on the earth
15. Mathematics and computers
16. Summary

Webpage〉 http://math1.pm.tokushima-u.ac.jp/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197297

Contact〉

⇒ Kohda (A211, +81-88-656-7546, kohda@pm.tokushima-u.ac.jp) Mail
(Office Hour: 月曜 12:00~ 13:00)

Advanced applied analysis

2 units (selection)

Kuniya Okamoto · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To learn the functional analytic methods which are basic tools for mathematical sciences.

Outline〉 This subject provides basic theory of functional analysis which is considered as linear algebra in infinite-dimensional spaces. Functional analytic approaches to phenomena described by differential equations are introduced.

Style〉 Lecture

Relational Lecture〉 "Topics of Analysis for Mathematical Science"(0.5)

Goal〉 To apply the theory of modern analysis and recognize its significant role.

Schedule〉

1. Differential equations and their solutions
2. Exponential of matrices 1
3. Uniqueness of solutions
4. Existence of solutions
5. Eigenvalues and eigenspaces
6. Projective representation
7. Exponential of matrices 2
8. Generalized eigenvalue problems
9. Dunford integrals
10. Holomorphic functions of matrices
11. Solution curve and stability
12. Stability of solutions
13. Ljapunov's method
14. Nonlinear case
15. Linear approximations
16. Summary

Reference〉 『新微分方程式対話』 笠原皓司著, 日本評論社

Webpage〉 http://math9.pm.tokushima-u.ac.jp/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197148

Contact〉

⇒ 岡本(A212室, TEL/FAX: 656-9441, E-mail: okamoto@pm.tokushima-u.ac.jp)

Quantum mechanics and advanced lecture in quantum physics

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the quantum mechanics.

Outline〉 Basics of quantum mechanics are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics***

Goal〉 To understand the outline of quantum mechanics.

Schedule〉

1. Introduction
2. Variational method
3. Lagrangian
4. Hamiltonian
5. Poisson's bracket expression
6. Quantization
7. Operator
8. Wavefunction
9. Expectation value
10. Schrödinger equation
11. Example (1) the square well potential
12. Example (2) the linear harmonic oscillator
13. Angular momentum
14. Example (3) hydrogen atom
15. Heisenberg equation
16. Field quantization

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197466

Contact〉

⇒ Yoshitaka Michihiro (A203)

Nano-material Engineering

2 units (selection)

Shuichi Hashimoto · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand the physical and chemical properties of materials at micro- and nano-scales for desiging and assemlbling nano-structured materials with special consideration to environmental issues

Outline〉 Physical and chemical properties as well as characterization techniques of various materials will be discussed on the basis of micro- and nanostructure.

Style〉 Lecture

Goal〉 環境との相互作用を考慮しつつさまざまな材料の性質をミクロな視点から理解すること.

Schedule〉

1. Introduction
2. Structure of solids
3. Structure of sodids
4. Optical properties of solids
5. Optical properties of solids
6. Optical properties of solids
7. Optical properties of solids, assignment1
8. Evaluation technique of nano-materials
9. Evaluation technique of nano-materials
10. Evaluation technique of nano-materials
11. Evaluation technique of nano-materials,aasignment2
12. Application of nano-materials
13. Application of nano-materials
14. Current topics in nano-materilals and nanotechnology
15. Current topics in nano-materilals and nanotechnology
16. exam

Evaluation Criteria〉 assignment1 25% assgnment2 25% exam 50%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197402

Contact〉

⇒ Hashimoto (Eco405, +81-88-656-7389, hashi@eco.tokushima-u.ac.jp) Mail

Micromechanics

2 units (selection)

Shigeki Matsuo · Associate Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand the science of micro-to-nanometer domain, and learn the techniques to investigate such a domain.

Outline〉 To study the methods for precise measurement and manufacturing, in addition, microsensors, micromachining, and microactuators. In addition, hot topics concerning science and technology will be referred and discussed at any time.

Style〉 Lecture

Keyword〉 ***micro, nano***

Goal〉 To obtain basic knowledges on the micro-to-nanometer domain

Schedule〉

1. Physics and chemistry in microdomain
2. Physics and chemistry in microdomain
3. Physics and chemistry in microdomain
4. Physics and chemistry in microdomain
5. Measurements in microdomain
6. Measurements in microdomain
7. Measurements in microdomain
8. Micromachining
9. Micromachining
10. Micromachining
11. Microsensors
12. Microsensors
13. Microsensors
14. Microactuators
15. Microactuators

Evaluation Criteria〉 Assignments count 100%.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197491

Energy and Environmental Engineering

2 units (selection)

Yoshiyuki Kidoguchi · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 This class addresses to understand characteristics and background of the global warming problem and the depletion of energy resources for effective utilization system of energy resources.

Outline〉 Lecture on fossil fuels resources, environmental pollutant and environmental loading, principal of thermal energy conversion and conversion technology, nuclear energy and thermal reactor, the renewable energy and waste energy systems.

Keyword〉 ***environmental problem, energy security, global warming, energy conversion***

Requirement〉 None

Notice〉 Basic subjects concerning the engineering

Goal〉 To understand characteristics and background of the global warming problem and the depletion of energy resources, and to master the ability solving the energy security on the point of engineering field.

Schedule〉

1. Energy Fundamentals
2. Pollution of the Atmosphere
3. Principal of Thermal Energy Conversion
4. Thermal Energy Conversion System
5. Fossil Fuels Coal, Petroleum and Natural Gas
6. Combustion Method and System of Fossil Fuels
7. Hydroelectric and Thermal Power Generation
8. Nuclear Energy
9. Introduction of New Energy
10. Geothermal Energy System
11. Wind Energy and Solar Energy SystemSystem
12. Fuel Cell
13. Biomass Energy System
14. Wastes Energy System
15. Hydrogen Energy System

Evaluation Criteria〉 Grading with attitude for lecture and some reports. Need to obtain 60 points out of 100 points for passing this lecture.

Textbook〉 Energy Environment

Reference〉 To be intriduced in the class

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/miwa/index.html

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197143

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kidoguchi (Eco502, +81-88-656-9633, kidog@eco.tokushima-u.ac.jp) Mail
(Office Hour: 随時)

Energy conversion systems

2 units (selection)

Yoshiyuki Kidoguchi · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand principle of energy conversion and to consider improvement of energy conversion technologies on the point of saving energy consumption and decreasing environmental damages

Outline〉 About 90% of world primary energy demands are provided by fossil fuel that is converted into heat, electricity, and power by combustion. The lecture will give you some information and idea about the details of combustion phenomena, and then the latest technologies of energy production and the environmental problems accompanying with energy production will be denoted. This subject is concerned with industry.

Style〉 Lecture

Keyword〉 ***energy conversion, energy resources, energy problem, climate change, combustion***

Requirement〉 None

Notice〉 None

Goal〉 To understand principle of energy conversion, environmental effect of energy conversion and present technologies of energy conversion, and to recognize the importance of improvement of energy conversion technologies against environmental protection

Schedule〉

1. Present energy problem
2. Energy resources
3. Combustion chemistry
4. Thermal and fluid dynamics in combustion phenomena
5. Combustion limit, Explosion limit
6. Toxic emissions by combustion
7. Climate change by carbon dioxide emission
8. Fossil fuel power generation
9. Carbon capture and storage (CCS)
10. Nuclear power generation
11. Efficient utilization technologies of renewable energy
12. Energy saving technologies in cars (Present technologies)
13. Energy saving technologies in cars (Future technologies)
14. Energy saving technologies in ships, railroads, and airplanes
15. Construction of social systems designed with environment

Evaluation Criteria〉 Appraise the understanding of the content of the lecture by setting some reports

Textbook〉 Yokio Mizutani, "Combustion Engineering"

Reference〉 None

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/miwa/index.html

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197144

Student〉 Any students other than this course can take this subject

Contact〉

⇒ Kidoguchi (Eco502, +81-88-656-9633, kidog@eco.tokushima-u.ac.jp) Mail

Note〉 Need to submit some reports

Urban and Regional Planning

2 units (selection)

Akio Kondo · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 The concept and technique to describe not only the vision but also design in the future urban and regional plan are lectured.

Outline〉 The technique of urban and regional planning is explained using various materials in practical planning. The debate is introduced to develop the ability in design of planning for students.

Style〉 Lecture and excercise

Keyword〉 ***urban and regional planning, proposition of vision, planning design***

Fundamental Lecture〉 "Advanced Environmental Systems Engineering"(0.2)

Relational Lecture〉 "Information Engineering of Regional Environment"(0.8)

Requirement〉 特になし

Notice〉 特になし

Goal〉 To understand the concept and technique to describe the future urban and regional plan.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of urban planning
3. Examples of regional planning
4. Planning and law
5. Examples of application of law
6. Economic analysis in planning (Theory)
7. Economic analysis in planning (Application)
8. Concept of systems analysis in planning
9. Application of systems analysis in planning
10. Explanation of Exercise
11. Exercise of planning 1
12. Exercise of planning 2
13. Presentation of planning
14. Discussion about the future of region
15. Discussion about the vision of region

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/kondo/top/index.htm

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197400

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日9·10校時)

Note〉 特になし

Information Engineering of Regional Environment

2 units (selection)

Masashi Okushima · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 The information of regional environment, technique of analysis, information management and geographic information system are explained. The method and technique using for application of environmental information to development of regional policies are lectured.

Outline〉 The information of regional environment, technique of analysis, information management and geographic information system are explained using the various kinds of materials and examples in practical planning.

Style〉 Lecture and excercise

Keyword〉 ***information of regional environment, technique of analysis, geographic information system***

Relational Lecture〉 "Urban and Regional Planning"(0.8), "Advanced Environmental Systems Engineering"(0.2)

Requirement〉 特になし

Notice〉 Please download files for this lecture from next URL, print out and take to the lecture room. The materials are not distributed in the lecture.

Goal〉 To obtain the knowledge of the information of regional environment, technique in survey, information management and computer aid systems, and apply them to design of regional plan and political simulation.

Schedule〉

1. guidance and purpose of this subject
2. multi-variable analysis
3. expert system
4. fuzzy reasoning
5. neural network
6. genetic algorithm
7. game theory
8. complex system
9. shortest path method
10. using database
11. color mapping
12. geometoric analysis
13. GIS programing
14. geographical search
15. presentation of results of exercise

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/kondo/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197344

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Okushima (ECO 603, +81-88-656-7340, okushima@eco.tokushima-u.ac.jp) Mail

Note〉 特になし.

Principles of Disaster Risk

2 units (selection)

Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Ryoichi Yamanaka · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand concept of risk, risk management, damage reducing measure ability to natural disaster

Outline〉 To understand histrical earthquakes and tsunamis , characteristics of earthquake and tsunami, prediction of damage , to cultivate presentation skill and debate ability.

Keyword〉 ***earthquakes and tsunamis, disaster prevention assessment, risk management***

Relational Lecture〉 "Principle of Environmental Risk"(0.5)

Goal〉 Training-up of technical knowledge to the natural disaster, the basic knowledge which can correspond to the risk management and the crisis management

Schedule〉

1. Histrical Earthquakes in Japan
2. Histrical Tsunamis in Japan
3. Characteristics of Earthquake
4. Characteristics of Tsunami
5. Generation Characteristics of Nankai Earthquake
6. Generation Characteristics of Nankai Earthquake and Tsunami
7. Disaster Prevention for Earthquakes and Tsunamis
8. Disaster Prevention Assessment for Earthquakes and Tsunamis
9. What is Risk Management ?
10. Practice of Risk Management for Earthquakes and Tsunamis(1)
11. Practice of Risk Management for Earthquakes and Tsunamis(2)
12. Presentation of Tsunami Risk Assessment

Evaluation Criteria〉 Assignments Count 100%

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197246

Student〉 To be limited to students of course

Contact〉

⇒ Kozuki (Eco505, +81-88-656-7335, kozuki@eco.tokushima-u.ac.jp) Mail
(Office Hour: 火曜日, 14:35 から 16:05, 18:00 から 19:30)

Well-being Technology for All

2 units (selection)

Shoichiro Fujisawa · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Katsuya SATO · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shin-ichi Ito · Assistant Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand the philosophy of welfare and the classification of disability, and to learn the importance of assistive technology.

Outline〉 The role and the neccessity of assistive technology will be explained, and provisions and means to assiste a person with disabilities in daily living will be lectured.

Keyword〉 ***assistive technology, a person with disability, aged paople, assistive products, assist of daily living***

Goal〉 To understand the role and the necessity of the well-being technology, and to understand technical provisions and means to assist a person with disability in daily living.

Schedule〉

1. History of rehabilitation engineering
2. Statistics of persons with disabilities
3. Classification of disabilities (1)
4. Classification of disabilities (2)
5. Infrastructure for persons with sensory impairments
6. Infrastructure for persons with physical impairments
7. Infrastructure for persons with intelectual impairments
8. Objective of a white cane and how to use it
9. experience of disability (1) : visual impairment
10. experience of disability (2) : visual impairment
11. Assistive products for transfer and mobility
12. Dynamics of wheelchair
13. experience of disability (3) : physical impairment
14. experience of disability (4) : physical impairment
15. Conclusion

Evaluation Criteria〉 Understanding of lecture will be evaluated through reports submitted after each lesson.

Textbook〉 To be introduced in th class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197514

Contact〉

⇒ Fujisawa (ECO704, +81-88-656-7537, s-fuji@eco.tokushima-u.ac.jp) Mail
(Office Hour: 水曜日 18:00~ 20:00)

Design of Assistive Products

2 units (selection)

Shoichiro Fujisawa · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Katsuya SATO · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shin-ichi Ito · Assistant Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 It aims to learn how to realize and how to keep the quality of assistive products in the view point of international marketing and to acquire the ability of designing of products used at office, working place and home in which the concept of adapting the device to the human being is installed.

Outline〉 Assistive technology for daily living of persons with disabilities in the society. Human factors and R & D of assistive products and services. Adapting the environment to the people instead of the people adapting to the environment. Evaluation of appropriateness of assistive technology system for a person.

Style〉 Lecture

Keyword〉 ***assistive product, Japanese Industrial Standard, International Standard, ISO, outcome measure***

Goal〉 Objective of this lecture is to understand the current state of assistive products in the world and international standard of them, and to learn designing of them. Moreover, it aimed to learn the method of outcome measure of assistive products and to be able to consider the total arrangement of products at working place and at home.

Schedule〉

1. Introduction : assitive products as industrial products, ergonomic approach
2. Situation of assistive technology in the world : North America, Europe and Japan
3. Assitive products as industrial products : Japanese Standard, International Standard an Guidelines for all people including elderly and people with disabilities
4. Human factors (1) : Decrease of physical function according to aging
5. Human factors (2) : Decrease of sensory function according to aging
6. Japan Industrial Standards of Assistive Products : Wheelchair (1)
7. Japan Industrial Standards of Assistive Products : Wheelchair (1)
8. Japan Industrial Standards of Assistive Products : Artificial Legs
9. Japan Industrial Standards of Assistive Products : Artificial Arms
10. Japan Industrial Standards of Assistive Products : Beds
11. Japan Industrial Standards of Assistive Products : Hoists
12. Personal environment control system : Smart House, ECS and Home bus system
13. Fitting of assistive products in daily living (1) : Methods of outcome measure
14. Fitting of assistive products in daily living (2) : Methods of outcome measure
15. Guideline for work place : Legislation and remodeling of work place

Evaluation Criteria〉 Results will be evaluated through the lecture and reports submitted after each lesson.

Reference〉 To be introduced in th class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197408

Contact〉

⇒ Fujisawa (ECO704, +81-88-656-7537, s-fuji@eco.tokushima-u.ac.jp) Mail
(Office Hour: 水曜日 18:00~ 20:00)

Chemistry and Technology for Recovery of Marine Resources

2 units (selection)

Takahiro Hirotsu · Professor / Marine Environment Science and Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Yoji Makita · Associate Professor / Marine Environment Science and Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 This class describe the recovery of valuable elements in seawater that have not been utilized.

Outline〉 This class describe the advanced technology of recovery of valuable elements such as uranium and lithium in sewater and the remained subjects for practical use.

Style〉 Lecture

Keyword〉 ***seawater, rare resources, recovery, uranium, lithium, adsorption, ion exchange, chelation***

Goal〉 understanding of the technology of recovery of valuable resources from seawater

Schedule〉

1. Importance of recovery of valuable resources from seawater
2. Inorganic resources in seawater
3. Recovery methods of valuable resources in seawater 1
4. Recovery methods of valuable resources in seawater 2
5. Adsorption method 1
6. Adsorption method 2
7. Development of adsorbents 1: ion-exchangers
8. Development of adsorbents 2: ion-exchangers
9. Development of adsorbents 3: chelating resins
10. Development of adsorbents 4: chelating resins
11. Mechanism of ion-exchange of lithium ions
12. Recovery process of lithium from seawater
13. Mechanism of uptake of uranium
14. Recovery process of uranium
15. Recovery costs of uranium and lithium
16. Perspective of recovery of uranium and lithium from seater

Evaluation Criteria〉 Evaluation of degree of understanding by report of some essential subjects

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197266

Student〉 Able to be taken by student of other department and faculty

Contact〉

⇒ Hirotsu (National Institute of Advanced Industrial Science and Technology, +81-87-869-3562, takahiro-hirotsu@aist.go.jp) Mail

mitigation engineering

2 units (selection)

Ryoichi Yamanaka · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering, Naoko Mitani · Part-time Lecturer / 徳島市環境リーダー
Takashi Nakanishi · Part-time Lecturer / 総合科学部

Target〉 To understand the background and the significance of mitigation and to acquire fundamental principles of mitigation technique.

Outline〉 To explain concept, history, technology and examples of mitigation for national land development and global environment problems

Style〉 Lecture

Keyword〉 ***mitigation, coastal environment, ecosystem, environmental restoration***

Fundamental Lecture〉 "Principles of Disaster Risk"(1.0), "Urban and Regional Planning"(1.0)

Relational Lecture〉 "Advanced Environmental Ecology"(0.5), "Advanced Environmental Systems Engineering"(0.5)

Goal〉 To acquire ideas and fundamental of mitigation

Schedule〉

1. Guidance of this subject
2. History of the national land development
3. Deterioration of costal environment(1)
4. Deterioration of costal environment(2)
5. Mitigation for coastal environment(1)
6. Mitigation for coastal environment(2)
7. Mitigation of global environment problems(1)
8. Mitigation for coastal environment(3)
9. Mitigation for coastal environment(4)
10. Law and examples of the promotion of nature restoration
11. Mitigation of global environment problems(2)
12. Mitigation for coastal environment(5)
13. Environmental Risk
14. Mitigation of global environment problems(3)
15. Examination
16. Discussion

Evaluation Criteria〉 Evaluate learning results by reports, debates and examination

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197498

Contact〉

⇒ Yamanaka (総合研究実験棟 (エコ棟)504 号室, +81-88-656-7334, yamanaka@eco.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 14:35-17:50)

Advanced Environmental Ecology

4 units (selection)

Mahito Kamada · Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Yoichi Kawaguchi · Associate Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose is to develop the knowledge and skill for conservation and restoration of ecosystems.

Outline〉 Current situation of ecosystems and technical problems for conservation and restoration are explained. The way of ecosystem management is emphasized to improve ecosystem. All students must give a presentation to introduce their own activities.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***ecosystem management, environmental conservation, nature restoration***

Goal〉 Every student has basic knowledge and skill to improve ecosystem function in the actual society.

Schedule〉

1. Guidance
2. Interdisciplinary aspects for ecosystem management 1
3. Interdisciplinary aspects for ecosystem management 2
4. Current situation and problems in ecosystem management 1
5. Current situation and problems in ecosystem management 2
6. Current situation and problems in ecosystem management 3
7. Current situation and problems in ecosystem management 4
8. View points to know the structure and function of ecosystems 1
9. View points to know the structure and function of ecosystems 2
10. View points to know the structure and function of ecosystems 3
11. View points to know the structure and function of ecosystems 4
12. Toward an adequate management of ecosystems 1
13. Toward an adequate management of ecosystems 2
14. Toward an adequate management of ecosystems 3
15. General discussion / Report

Evaluation Criteria〉 Result is evaluated by contents of the reports, which are set after every related lectures. Over 60% marks is necessary to pass.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197178

Student〉 Able to be taken by student of other department and faculty

Contact〉

⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: 年度ごとに学科の掲示を参照すること．)
⇒ Kawaguchi (308, +81-88-656-9025, kawaguchi@ce.tokushima-u.ac.jp) Mail
(Office Hour: 金曜午後)

City and Transport System Planning

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Junko Sanada · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Kojiro WATANABE · Assistant Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Advanced course on concept and case study of social and public policies on urban, regional and transport planning. Study on contents and usage of measures on such planing fields.

Outline〉 Lectures on Systems approaches on city planning and transport planning, theories and usage of planning models and planning methods. A unit is consisted of three hours llecture and an hour training.

Style〉 Lecture and excercise

Keyword〉 ***city planning, transport planning, GIS***

Fundamental Lecture〉 "Urban & Transport Planning"(1.0), "Project Evaluation Methods for Infrastructure Planning"(1.0)

Relational Lecture〉 "都市 · 地域計画論"(0.5), "Infrastructure Planning"(0.5)

Goal〉

1. Understanding of problems and recent strategies on city and transport planning
2. Understanding of concensus buidling method for developing city and transport strategies

Schedule〉

1. Problems of City and Transport Systems 1
2. Problems of City and Transport Systems 2
3. Recent Planning Strategies of City and Transport System 1
4. Recent Planning Strategies of City and Transport System 2
5. Recent Planning Strategies of City and Transport System 3
6. Recent Planning Strategies of City and Transport System 4
7. Debate by gropus on transport strategies
8. City and Regional Planning 1
9. City and Regional Planning 2
10. City and Regional Planning 3
11. City and Regional Planning 4
12. Introduction of GIS
13. Practice on GIS for City and Transportation Planning 1
14. Practice on GIS for City and Transportation Planning 2
15. Practice on GIS for City and Transportation Planning 3

Evaluation Criteria〉 Achievement level of the each target is evaluated by the submitted essays and reports. Score of 60points or over is required to clear the target. Students are required to clearr the both of targets. Total score is average of the scores of two targets.

Textbook〉 Textbook is ibtroduced in the class. Realted documents is distributed to students.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197397

Student〉 Able to be taken by student of other department

Contact〉

⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Actuator Control Theory

2 units (selection)

Masafumi Miwa · Associate Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the characteristics of actuators, the design methods of servo system.

Outline〉 The structure and function of actuators or control valves, the design of servo system, PWM control method, the practical and intelligent control algorithm are explained.

Style〉 Lecture

Keyword〉 ***actuator, servo system, control algorithm***

Relational Lecture〉 "Measurement Science and Technology"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level control engineering and related subjects.

Goal〉 To understand the design methods of servo system using actuators.

Schedule〉

1. Outline of actuators
2. Micro-drive electromotive actuators
3. Electromotive actuators
4. Novel actuators
5. Hydraulic actuators
6. Hydraulic control valves
7. Hydraulic servo system
8. Pneumatic actuators
9. Pneumatic control valves
10. Pneumatic servo system
11. PWM control method
12. Model matching methods
13. Neural controller
14. Two-degree-of-freedom control method
15. Model driven control method
16. Examination

Evaluation Criteria〉 Assignments count 30 % and examination count 70 %.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197124

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Miwa (M420, +81-88-656-7387, miw@me.tokushima-u.ac.jp) Mail

Measurement Science and Technology

2 units (selection)

Tetsuo Iwata · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering, Hiroyuki Ukida · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To understand importance of the Fourier transformation for developing various kinds of measurement techniues, measurement equipments, measurement systems.

Outline〉 Among the various measurement techniques used in the fundamental and applied research, optical measuremnt methods including their principles, methodologies, instrumentations, and evaluation methods are reviewed. In the lecture, emphasized is the importance of the concept of the Fourier transformation to understand and to deal with linear systems in the modern scientific measurement system. Practical methods of object inspections, distance measurements, and shape reconstructions using images are also lectured.

Style〉 Lecture

Keyword〉 ***measurement techniques, measurement devices, Fourier transform***

Relational Lecture〉 "Micro-Nano Engineering"(0.5), "Digital Control Theory"(0.5), "Actuator Control Theory"(0.5)

Goal〉

1. 1. To understand Fourier series and Fourier transform.
2. 2. To understand relarions among Fourier transform and measurement principles of scientific instruments.
3. 3. To understand techniques used with practicable various mearurement devices.

Schedule〉

1. Frequency response of the amplifier
2. Optical information processing
3. Fourier-transform infrared spectoroscopy
4. Subfringe interferometry
5. Computed tomography
6. Sampling theorem and quantization theorem
7. Wavelet transformation
8. Lock-in amplifier and boxcar integrator
9. Optics for microscope
10. X-ray diffration
11. Image measurement systems
12. Feature extraction from images
13. Binocular stereo method
14. Pattern projection
15. Shape from shading and texture
16. Examination

Evaluation Criteria〉 Assignments count 50% and examinations count 50%.

Textbook〉 Printed synopses are used.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197213

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Iwata (M427, +81-88-656-9743, iwata@me.tokushima-u.ac.jp) Mail
⇒ Ukida (M424, +81-88-656-9448, ukida@me.tokushima-u.ac.jp) Mail (Office Hour: 毎週金曜日 17:00~ 18:00)

Optical propertics of materials

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the princeple of optical response of atoms, melecules and crystals. To develop ability to apply such optical phenomena to applications.

Outline〉 With quantum mechanics, we lecture optical process of materials. This course will cover the following topics: optical propaties of materials for enegineering, classical electromagnetic theory and optical property, optical transitions and optical process of atoms, molecules and semiconductors.

Style〉 Lecture

Keyword〉 ***quantum mechanics, condensed matter, optical process, semiconductor***

Relational Lecture〉 "Advanced Optical and Optoelectronic Devices"(0.5), "Lecture in Optical Materials and Devices, Part 1"(0.5)

Requirement〉 Students should have fundamental knowledges of quamtum mechanics.

Goal〉

1. Students can explain the optical processes of atoms and molecules.
2. Students can explain the optical processes in semiconductors.

Schedule〉

1. Introduction
2. Optical response described by classical electro-magnetic theory
3. Schroedinger equation and wave fuction
4. Hydrogen atom model
5. spin angular momentum
6. Quantum mechanics of light
7. Transition induced by interaction between electron state and light
8. Light absorption and emittion
9. Electron transition in atoms and molecules
10. Optical spectra of atoms and molecules
11. Optical spectra of organic molecules
12. Energy bands in condensed matters
13. Optical processes in semiconductors
14. Optical spectra of impurity atoms in a crystall
15. Optical process of P-N junction
16. Final Examination

Evaluation Criteria〉 Activity: 20%, Reports: 40% and Final Exam.:40%

Textbook〉 中澤，鎌田著，光物性 · デバイス工学の基礎，培風館 1999

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197445

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp)
Mail (Office Hour: 16:05-18:00)

Advanced Lecture on Semiconductor Nanotechnology

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This class introduces basic principles of the semiconductor nanotechnology and their application to the quantum devices.

Outline〉 Basics of semiconductor physics and quantum mechanics are introduced to understand material properties of quantum confined nanostructures. Recent progress in fabrication techniques and device applications of semiconductor nanostructures (quantum wells, wires and dots) will be reviewed.

Style〉 Lecture

Keyword〉 ***quantum confined nanostructures, semiconductor nanoscience, electron devices, photonic devices***

Requirement〉 None.

Notice〉 None.

Goal〉 To understand basic properties of semiconductor nanostructures and quantum devices.

Schedule〉

1. Introduction to semiconductor nanostructures
2. Electronic states in quantum confined structures
3. Electrical properties of superlattices
4. Fabrication technique of quantum wires and wells
5. Characterization of heterointerfaces
6. Characterization of nanostructures
7. High-speed electron devices
8. Optical properties of quantum wells
9. Semiconductor laser diodes
10. Quantum effect devices
11. Fabrication technique of quantum dots
12. Quantum dot devices
13. Device application of quantum nano structures
14. Recent topics of semiconductor nanotechnology (1)
15. Recent topics of semiconductor nanotechnology (2)

Evaluation Criteria〉 Assignments count 100%

Textbook〉 None.

Reference〉 The Physics of Low-Dimensional Semiconductors, J.H. Davis, Springer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197421

Student〉 Any students can attend the class.

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

⇒ Kitada (A224, +81-88-656-7671, kitada@frc.tokushima-u.ac.jp) Mail (Office Hour: Mon. 10:00-14:00)

Web Programming

2 units (selection)

Takao Shimomura · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kenji Ikeda · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class provides the knowledge and skills necessary for efficiently developping Web applications in the Internet, and implementing the software of high quality.

Outline〉 This class introduces Web programming frameworks and Web programming techniques systematically necessary for efficiently developing Web applicatins of high quality, and then explains the development of some Web application systems as practical examples to teach the development skills such as Web design patterns.

Style〉 Lecture

Keyword〉 ***Java, Servlet, JSP, Web applications***

Fundamental Lecture〉 "Programming Methodology"(1.0), "ソフトウェア工学"(1.0)

Relational Lecture〉 "System Administration"(0.5)

Requirement〉 Students are required to hava a good understanding of undergraduate-level Java programming and related subjects.

Goal〉 To understand the system configuration of Web applications that consists clients and a server, and design flexible Web application systems

Schedule〉

1. Web application
2. HTTP/Session
3. Database
4. JSP custom tags
5. Web services
6. Applets
7. JavaScript/AJAX
8. Flash/Flex
9. Web programming frameworks
10. BioPro
11. Internationalization
12. Web programming tips
13. Web programming design patterns
14. Introduction to NisWeb system
15. NisWeb system configuration
16. Assignment

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=200973

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Shimomura (C402, +81-88-656-7503, simomura@is.tokushima-u.ac.jp)
Mail (Office Hour: Wed 15:00~ 18:00)

Cell Biotechnology

2 units (selection)

Hideaki Nagamune · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering
Toshifumi Tomoyasu · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 This class aims to expand the knowledge on cell biotechnology and improve the skill of debate through the debate dealing with cell biotechnology and its applications.

Outline〉 Debates among students dealing with the latest reports on technology and application concerned with production of useful materials, medical assay, and medical treatment using various cells are held in order to deepen the knowledge on cell biotechnology and its peripheral field. Training on skills of debate and communication is simultaneously carried out.

Style〉 Lecture

Keyword〉 ***cell, biotechnology, debate***

Relational Lecture〉 "Advanced Biochemistry"(0.8), "Molecular Biotechnology"(0.8), "Technology for Bioreaction"(0.8), "Biological macromolecular chemistry"(0.5), "Advanced enzyme engineering"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level of cell technology and related subjects

Goal〉

1. To understand the latest cell biotechnology and its application examples
2. To gain the ability of debate on technologies concerned in cell biotechnology

Schedule〉

1. Cell biotechnology on production of useful materials 1
2. Cell biotechnology on production of useful materials 2
3. Cell biotechnology on production of useful materials 3
4. Cell biotechnology on production of useful materials 4
5. Cell biotechnology on production of useful materials 5
6. Cell biotechnology on medical or industrial assay 1
7. Cell biotechnology on medical or industrial assay 2
8. Cell biotechnology on medical or industrial assay 3
9. Cell biotechnology on medical or industrial assay 4
10. Cell biotechnology on medical or industrial assay 5
11. Cell biotechnology on medical treatment 1
12. Cell biotechnology on medical treatment 2
13. Cell biotechnology on medical treatment 3
14. Cell biotechnology on medical treatment 4
15. Cell biotechnology on medical treatment 5

Evaluation Criteria〉 Assignments count 50%,Presentation count 50%

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=200974

Student〉 Able to be taken by student of other department

Contact〉

⇒ Nagamune (G707, +81-88-656-7525, nagamune@bio.tokushima-u.ac.jp)
Mail (Office Hour: Monday 16:20-17:50)

Advanced Biomaterials

2 units (selection)

Toshifumi Tomoyasu · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering
Hideaki Nagamune · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Study and investigate about the scientific background which produced the new technology.

Outline〉 Students are required to investigate how the important discovery (which acquired the Nobel Prize as an example) were established and how improved our life and research activities by these accomplishments.

Style〉 Lecture

Keyword〉 ***technology, biomaterial, research, application***

Requirement〉 Required to have a good understanding of undergraduate-level biochemistry and molecularbiology.

Goal〉

1. Understand how the important discoveries in the scientific field were performed.
2. Investigate how the important discoveries are applied to our life and research.

Schedule〉

1. Orientation
2. Discoveries concerning the role played by the chromosome in heredity. T. Morgan.
3. The production of mutations by means of X-ray irradiation. H. Muller
4. Discovery of mobile genetic elements. B. McClintock.
5. The discovery of penicillin and its curative effect in various infectious diseases. A. Fleming, E. Chain, H. Florey.
6. Discovery of tumour-inducing viruses. P. Rous.
7. Interpretation of the genetic code and its function in protein synthesis. R. Holley , H. Khorana, M. Nirenberg.
8. The discovery of restriction enzymes and their application to problems of molecular genetics. H, Smith. W, Arber.
9. Contributions concerning the determination of base sequences in nucleic acids. W. Gilbert, F. Sanger.
10. The genetic principle for generation of antibody diversity. S. Tonegawa.
11. Contributions to the developments of methods within DNA-based chemistry. K. Mullis, M. Smith.
12. Discovery concerning the genetic control of early embryonic development. L. Lewis, C. Nüsslein-Volhard, E. Wieschaus.
13. Discovery of Prions - a new biological principle of infection. S. Prusiner.
14. The development of methods for identification and structure analyses of biological macromolecules. J. Fenn, K. Tanaka, K. Wüthrich.
15. Generalization of lectures

Evaluation Criteria〉 Grades are judged about two attainment targets described above by a presentation (50 points) and a report (50 points). The student requires more than 60 points to a pass.

Textbook〉 To be introduce in the class.

Reference〉 To be introduce in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=200975

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tomoyasu (G701, +81-88-656-9213, tomoyasu@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Advanced Ecosystem Engineering Seminar

4 units (compulsory)
Teacher of course

Target〉 To improve the skill of presentation, writing, reading and discussion regarding the ecosystem engineering by reading the current paper written in English

Outline〉 Students read the current paper written in English under the supervision of faculties and present orally their contents

Style〉 Portfolio

Keyword〉 ***ecosystem engineering, peruse paper in English***

Goal〉 To obtain the fundamental knowledge regarding research theme and the presentation skill

Schedule〉 Seminar on research theme

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197142

Student〉 Able to be taken by only specified class(es)

Advanced Ecosystem Engineering Exercise

6 units (compulsory)

Teacher of course, Yoshihiko Hosoi · Professor / TOTTORI UNIVERSITY, Hirofumi Abe · Professor / Okayama University, Masateru Shimotsu · 肩書 / Bunri University
Kenji Okuno · 肩書 / Shizuoka University, Osamu Sueda · 肩書

Target〉 To learn the current issue about the ecosystem engineering in the various kinds of fields and to improve the abilities to find and solve problems related to the research theme.

Outline〉 Faculties and external experts lecture on current issues about the ecosystem engineering. In addition, an opportunity is provided to experience social/environmental activity in ecosystem engineering.

Style〉 Lecture and excercise

Keyword〉 ***ecosystem engineering***

Notice〉 Students have to take every lecture to acquire the credit of this subject.

Goal〉 To understand how to find and solve problems related to the research theme

Schedule〉

1. Guidance
2. The current issue in the ecosystem engineering(1)
3. The current issue in the ecosystem engineering(2)
4. The current issue in the ecosystem engineering(3)
5. The current issue in the ecosystem engineering(4)
6. The current issue in the ecosystem engineering(5)
7. social/environmental activity in ecosystem engineering (1): lecture
8. social/environmental activity in ecosystem engineering (2): lecture
9. social/environmental activity in ecosystem engineering (3): lecture
10. social/environmental activity in ecosystem engineering (4): lecture
11. social/environmental activity in ecosystem engineering (5): practical training
12. social/environmental activity in ecosystem engineering (6): practical training
13. social/environmental activity in ecosystem engineering (7): practical training
14. social/environmental activity in ecosystem engineering (8): practical training
15. social/environmental activity in ecosystem engineering (9): practical training

Evaluation Criteria〉 Assignment count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197138

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Matsuo (Eco404, +81-88-656-7538, matsuos@eco.tokushima-u.ac.jp) Mail

Ecosystem Engineering Laboratory

4 units (compulsory)
Teacher of course

Target〉 To perform experiments toward Master's thesis

Outline〉 Students perform experiments towards their Master's thesis under the supervision of faculties.

Style〉 Lecture and excercise

Keyword〉 ***ecosystem engineering, Master's thesis***

Goal〉 To summarize the results of experiments and to present the contents

Schedule〉 Experiments and research

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197141

Student〉 Able to be taken by only specified class(es)

Systems Innovation Engineering — Electrical and Electronic Engineering

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Theory of Complex System Engineering

2 units (selection)

Tetsushi Ueta · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering, Hiroshi Kawakami · Executive Director / The University of Tokushima

Target〉 comprehension and application of complex systems by using engineering methodlogies

Outline〉 Complex systems are defined as compound dynamical systems whose behavior and features cannot be predicted because of their nonlinearities and connecting conditions. This emergence of behavior is not possible for a single dynamcal system, therefore, connection, coupling, compounding are keywords of this theory. Emergence of rhythm in biological systems, self organization, chaotic properties in high degrees of freedom, learning and associative memory are example features of complex systems. In this lecture, based on physical systems which are ubiquitously found and treated by system engineering subjects, we study analytical methods to understand these phenomena, bifurcation theory of nonlinear and linear systems, applied extraction methods of valuable information from observed data, system design methods of compound dynamical systems.

Style〉 Lecture

Keyword〉 ***complex systems, bifurcation, chaos, nonlinear phenomena***

Fundamental Lecture〉 "Differential Equations (II)"(1.0), "Transient Analysis" (1.0), "Industrial Basic Physics"(1.0)

Relational Lecture〉 "Topics of mathematical physics"(0.5), "Advanced Electrical Control System"(0.5), "Advanced Theory of Electronic Circuits"(0.5)

Requirement〉 none

Goal〉

1. understanding of the definition and target area of complex systems
2. understanding of qualitative approach for given dynamical system
3. understanding and application of bifurcation theory

Schedule〉

1. examples of complex systems
2. relationship between bifurcation problems and complex systems
3. comptation of bifurcation parameter values
4. chaos and bifurcation phenomenon
5. chaotic itinerary
6. emergence mechanism of spatio temporal chaos and its clustering
7. phase transition and synchronization
8. spatio temporal intermittency and emergence of patterns
9. chaos neural network
10. neuronal circuits as complex systems
11. bifurcations in emergence systems
12. analysis of social systems
13. survey on complex systems
14. exercise 1
15. exercise 2
16. questions and answers

Evaluation Criteria〉 The total grade is evaluated by homework reports (70 %) and attendance of the class. (30 %)

Textbook〉 specified every class.

Reference〉 Chaotic Scenario of Complex Systems, Asakura-Shoten, 1996 (in Japanese)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197461

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ueta (AIT 507, +81-88-656-7501, tetsushi@ait.tokushima-u.ac.jp) Mail (Office Hour: Wednesday, afternoon)
⇒ Kawakami (E 棟 3 階北 C-7, +81-88-656-7465, hukugakk@honbu.tokushima-u.ac.jp) Mail

Advanced Theory of Semiconductors

2 units (selection)

Katsushi Nishino · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To understand semiconductor physics and fundamental device operations for various semiconductor devices

Outline〉 Semiconductor physics, especially behavior of carriers in semiconductor, is described. Properties of pn junction and Schottky barrier, including non-ideal case, are also lectured.

Style〉 Lecture

Keyword〉 ***semiconductor, metal-semiconductor contact, pn junction diode***

Relational Lecture〉 "Advanced Device Processing"(0.5), "Advanced Theory of Electron Devices"(0.5), "Advanced Optoelectronic Devices"(0.5)

Goal〉

1. To understand behavior of carries (such as scattering mechanisms) in semiconductor
2. To solve diffusion equations in simple conditions
3. To understand properties of pn junction and Schottky barrier

Schedule〉

1. Crystal Structure
2. Energy Bands
3. Carrier Concentration at Thermal Equilibrium
4. Carrier Transport
5. Phonon
6. High-Field Effect
7. Continuity Equations and Diffusion Equations of Carriers
8. Band Structure of Metal-Semiconductor Contact
9. Current Transport Processes of Schottky Barrier
10. Charcterization of Schottky Barrier Height
11. Ohmic Contact
12. Band Structure of pn Junction Diode
13. Capacitance-Voltage Characteristics of pn Junction Diode
14. Current-Voltage Characteristics of pn Junction Diode
15. Heterojunction
16. Examination

Evaluation Criteria〉 Report 50%, Examination 50%. More than 60% is required to pass this class.

Textbook〉 Physics of Semiconductor Devices, by S.M.Sze

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197419

Contact〉

⇒ Nishino (E 棟 2 階南 A-5, +81-88-656-7464, nishino@ee.tokushima-u.ac.jp) Mail

Advanced Electrical Control System

2 units (selection)

Takashi Yasuno · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This class introduces the basic principle of making to high performance and the intelligence in control system used for an industrial machine. And the control design of various control systems is understood.

Outline〉 The control system configuration used for the industrial machine is described, and applications of intelligent control method using fuzzy reasoning and neural net works are introduced. Moreover, Current topics of fields mentioned avobe are introduced.

Style〉 Lecture and excercise

Keyword〉 ***Motion control, Robotics, Fuzzy, Neural network, Genetic algorithm***

Relational Lecture〉 "Advanced Lecture of Intelligent Information Processing" (0.5), "Advanced Control Theory"(0.5)

Notice〉 The lecture form might be changed according to the number of attending a lecture.

Goal〉

1. The congfiguration of the control system used for an industrial machine should be understood.
2. The intelligent control method should be understood.

Schedule〉

1. Control object
2. Motion control system
3. Two degree-of-freedom control
4. Design method of feedback controller
5. Design method of feedforward controller
6. Fuzzy sets
7. Fuzzy reasoning method
8. Control sysytem application of fuzzy reasoning
9. Artificial neuron model
10. Neural network
11. Learning algorithm of neural network
12. Control system application of neural networks
13. Genetic algorithm
14. Control system application of genetic algorithm
15. Conclusions
16. Return of report or examination

Evaluation Criteria〉 Total evaluation based on Reports or examinations

Textbook〉 The print is distributed.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197311

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yasuno (E 棟 2 階北 B-5, +81-88-656-7458, yasuno@ee.tokushima-u.ac.jp) Mail (Office Hour: Monday, 15:00-17:30)

Advanced Theory of Electrical Communication

2 units (selection)

Takahiro Oie · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding analysing techniques of the communication system and multi-nodes networks.

Outline〉 This lecture is concerned with the study of concept of computer networks which realize the multi-node communication. The contents of those articles related with computer networks are presented at seminars. (Lecture style)

Style〉 Lecture

Keyword〉 ***digital communication, computer networks, network architecture***

Fundamental Lecture〉 "Communication Systems"(1.0), "Applied Communication Engineering"(1.0), "Computer Networks"(1.0)

Requirement〉 Students are required to have a good understanding of undergraduate-level communication engineering and related subjects.

Goal〉

1. Understanding the control techniques and implementation of computer network application.
2. Understanding the secure techniques of the communication system.

Schedule〉

1. Overview of digital communication
2. Mathematical preparation
3. Network architecture
4. Physical layer in fixed and wireless networks
5. Datalink layer in fixed and wireless networks
6. Network layer and routing
7. Transport layer
8. Traffic control
9. Security in fixed and wireless networks
10. Synmetric cryptography and public key cryptography
11. Session layer
12. Presentation layer
13. Application layer
14. Implementation example of application layer (HTTP, SMTP)
15. Implementation example of application layer (DNS, SNMP)
16. Wireless networks

Evaluation Criteria〉 Evaluated by presentations and submitted materials in seminars.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197365

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Oie (E-3F-C-1, +81-88-656-7479, alex@ee.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 16:20~ 17:20, Thursday 16:50~ 17:50)

Advanced Circuit Theory

2 units (selection)

Yoshifumi Nishio · Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering, Yoko Uwate · Assistant Professor / Institute of Technology and Science

Target〉 Analysis method of nonlinear circuits, and behavior of nonlinear oscillatory circuits and its applications are lectured.

Outline〉 Modeling of nonlinear devices, DC analysis and transient analysis of nonlinear circuits, and steady-state analysis are lectured. Synchronization and chaotic phenomena in nonlinear oscillatory circuits are introduced and their applications to information and communication engineering are discussed. (Style: Lecture)

Style〉 Lecture and excercise

Keyword〉 ***nonlinear circuits, circuit analysis, oscillatory circuits***

Fundamental Lecture〉 "Electrical Circuit Theory (I) and Exercise"(0.7), "Electrical Circuit Theory (II) and Exercise"(0.5), "Network Analysis"(0.3)

Relational Lecture〉 "Advanced Theory of Complex System Engineering"(0.5)

Requirement〉 Students are required to know how to analyze basic linear circuits.

Notice〉 Course is taught in English.

Goal〉

1. Understanding of analysis methods of nonlinear circuits.
2. Understanding of behavior of nonlinear circuits and its applications.

Schedule〉

1. Modeling of nonlinear devices.
2. DC analysis of nonlinear circuits by Newton method.
3. Transient analysis of nonlinear circuits.
4. Steady-state analysis of nonlinear circuits (for 4 lectures).
5. Synchronization phenomena in nonlinear oscillatory circuits (for 2 lectures).
6. Chaotic phenomena in nonlinear oscillatory circuits (for 2 lectures).
7. Engineering applications of nonlinear circuits (for 4 lectures).
8. Conclusions and final examination.

Evaluation Criteria〉 Final examination 80% and exercise 20%.

Textbook〉 None.

Reference〉

◇ Akio Ushida and Mamoru Tanaka, "Nonlinear Circuit Simulations," Corona Publishing Co.
◇ S. Smale and M.W. Hirsch, "Differential Equations, Dynamical Systems, and Linear Algebra," Academic Press.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197157

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishio (D-7, E-3F-South, +81-88-656-7470, nishio@ee.tokushima-u.ac.jp)
Mail

Human Sensing

2 units (selection)

Minoru Fukumi · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This lecture aims to understand the latest topics in a field of Intelligent systems, and to obtain advanced knowledge and technologies.

Outline〉 This lecture teaches the advanced topics in intelligent systems. The main items in this lecture are softcomputing and human sensing, including face information processing and its computer practice and biological signal processing.

Style〉 Lecture and excercise

Keyword〉 ***soft computing, human sensing, human information processing***

Goal〉

1. To understand the latest topics on Intelligent systems.
2. To learn the trend of a domestic and foreign research on related topics.

Schedule〉

1. Topics in Advanced Intelligent Systems
2. Topics in Advanced Intelligent Human Sensing
3. Topics in Brain Information Processing
4. Topics in Advanced Softcomputing techniques
5. Psychological Knowledge and Neural Network Model
6. Topics in Advanced Face Information Processing
7. Topics in Advanced Biosignal Processing
8. Topics on applications in Advanced Softcomputing techniques
9. Statistical Learning Algorithms
10. Topics in Eye Tracking and Its Applications
11. Topics in OpenCV applications
12. Topics in EMG and EEG researches
13. Exercise in Advanced Intelligent Systems
14. Exercise in Softcomputing
15. Exercise in Human Information Processing
16. Discussion

Evaluation Criteria〉 Attendance (30%), practice(10%), report (60%)

Textbook〉 no special book

Reference〉 講義 · 演習中に指定する.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197355

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Fukumi (D210, +81-88-656-7510, fukumi@is.tokushima-u.ac.jp) Mail
(Office Hour: 金曜日,15~ 18時)

Note〉 ゲストスピーカーを招聘して講義 · 演習を行う場合がある.

Photonic Device

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the principle of the current optoelectronic devices, e.g., Light Emitting Diodes, Laser Diodes and so on. To develop ability to solve various problems in optical device application.

Outline〉 This course will cover topics on current optical and optoelectronic devices. Topics treated include Light Emiiitng Diode, Laser Diode, Solar Cell, Optical Modulator and Nonlinear Optical Devices.

Style〉 Lecture

Keyword〉 ***optoelectronic device, optical device, light emitteing diode, laser diode, optical modulator, Solar cell***

Relational Lecture〉 "Optical propertics of materials"(0.5), "Lecture in Optical Materials and Devices, Part 1"(0.5)

Requirement〉 Students should have fundamental knowledges about semiconductor physics and devices for undergraduate students.

Goal〉

1. Students can explain the principle and structures for light emitting devices.
2. Students can explain the principle and structures for photodetector and solar cell.
3. Students can explain the principle of light modulators.
4. Students can explain the principle of nonlinear optical devices.

Schedule〉

1. Introduction
2. Interaction between Light and dielectric materials
3. Optical properties of semiconductors
4. Semiconductor PN-junction
5. Light emitteing diode I
6. Light emitteing diode II
7. Laser diode I
8. Laser diode II
9. Photoconductor Cells
10. pin photodiode
11. avalanche photodiode
12. Solor cell and amorphus-semiconductor optoelectronic devices
13. Optical Modulator
14. Nonlinear optical devices
15. Integrated Optical Devices
16. Final Examination

Evaluation Criteria〉 Activity: 20%, Reports: 40% and Final Exam.:40%

Textbook〉 中澤，鎌田著，光物性・デバイス工学の基礎，培風館 1999

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197440

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp) Mail (Office Hour: 16:05-18:00)

Electronic display

2 units (selection)

Shiro Suyama · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the history of developments, technical trends, and technologies of electronic display.

Outline〉 This course will cover the history of developments, technical trends, recent topics, and technologies of an electronic display. This course is related to indutories.

Style〉 Lecture

Notice〉 光の性質，光学的な現象については，既知とする．

Goal〉

1. To understand fundamental technologies of an electronic display
2. To understand fundamental technologies of devices for an electronic display
3. To understand a technical trend of an electronic display

Schedule〉

1. 電子ディスプレイの概要，最近の動向
2. 電子ディスプレイおよび画像システムの概要
3. 直視型: 陰極線管 (ブラウン管，CRT)，テレビジョン
4. 直視型: 液晶の概要と液晶ディスプレイ (LCD) の基本動作
5. 直視型: 各種の液晶ディスプレイと特性改善
6. 直視型: プラズマディスプレイ (PDP)
7. 直視型: エレクトロルミネッセンス (EL) ディスプレイ
8. 直視型: フィールドエミッションディスプレイ (FED)
9. 超大型: 投射型ディスプレイ
10. 超大型: 最新の投射型ディスプレイ，屋外用大型 LED ディスプレイ
11. 電子ディスプレイの画質と視覚特性
12. 電子ディスプレイの画質とその評価
13. 立体ディスプレイ: 概要
14. 立体ディスプレイ: 2 眼/多眼方式
15. 立体ディスプレイ: 超多眼方式などの最新の動向

Evaluation Criteria〉 Evaluation with report

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197368

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Suyama (opt409, +81-88-656-9425, suyama.shiro@opt.tokushima-u.ac.jp)
Mail (Office Hour: 17:00~ 18:00)

Nuclear Magnetic Resonance

2 units (selection)
Part-time Lecturer

Target〉 This lecture explains principles of nuclear magnetic resonance and introduces its application to solid state physics and chemistry.

Outline〉 Nuclear magnetic moment and its interaction with an external magnetic field are explained babed on quantum mechanics. Some examples of its application to solid state physics and chemistry are introduced.

Style〉 Lecture

Keyword〉 ***NMR, NMR spectrum, spin-lattice relaxation, Knight shift, chemical shift***

Schedule〉

1. Magnetic moment of nuclei and Boltzmann's distribution
2. Magnetic moment of electron
3. Method for NMR observation
4. Apparatus for NMR meassurement
5. Spin echo and NMR spectrum
6. Spin - lattice relaxation
7. NMR in metals
8. High Tc superconductors
9. NMR and NQR of High Tc superconductors
10. Chemical shift
11. Knight shift
12. NMR in chemistry
13. Magnetism and NMR
14. Superconductors and NMR - NQR
15. Super ionic conductors and NMR

Textbook〉 遍歴電子系の核磁気共鳴 (朝山邦輔著 · 裳華房)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197168

Contact〉

⇒ Takashi Ohno, A201, 656-7549

Engineering of Correlated Electron Matter

2 units (selection)

Yu Kawasaki · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 In many solid-state materials, new phenomena evolve due to strong electron interactions. In this Lecture, review will be given on these phenomena and potential applications to technology after an introductory talk on magnetism and superconductivity.

Outline〉 New types of superconducting and magnetic phenomena emerge in correlated electron matters. After an introductory talk on magnetism and superconductivity, review will be given on some advanced topic and potential application of correlated electron matters to technology focusing on spintronics or strongly correlated electronics.

Style〉 Lecture

Keyword〉 ***strongly correlated electron, magnetism, superconductivity***

Goal〉 To understand basic concept of correlated electron matter and its application

Schedule〉

1. Correlated electron matters
2. Introduction to magnetism
3. Electronic states of atoms
4. Magnetic ions in crystal
5. Magnetic interaction
6. Local-moment magnetism 1
7. Local-moment magnetism 2
8. Itinerant-electron magnetism
9. Ferromagnet and its application to technology
10. Superconducting phenomenology
11. Electron-phonon interaction
12. Magnetic flux quantum and SQUID
13. Type II superconductor
14. New type of superconductivity
15. Manganese oxide and spintronics

Evaluation Criteria〉 Reports on several subjects in lecture

Textbook〉 no specific text

Reference〉 太田恵造「磁気工学の基礎 I & II」共立全書

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197203

Topics of mathematical physics

2 units (selection)

Shigeaki Nagamachi · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 We study the quantum computing.

Outline〉 We study the elementary theory of numbers and group theory in order to understand RSA cryptography based on the difficulty of factorization for a big number. We study the theory of Hilbert spaces and their operators to understand Shor's fast factorization algorithm for quantum computers.

Goal〉 Understanding the principle of quantum computation

Schedule〉

1. Group theory 1
2. Group theory 2
3. Number theory 1
4. Number theory 2
5. RSA cryptography
6. Shor's factirization algorithm 1
7. Hilbert space
8. Operators on Hilbert space
9. Quantum mechanics 1
10. Quantum mechanics 2
11. Quantum information
12. Quantum circuits
13. Quantum Fourier transformation
14. Shor's factorization algorithm 2
15. The complexity of Shor's factorization algorithm
16. Reserve day

Textbook〉 Mika Hirvensalo, Quantum Computing, Springer (2004)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197308

Advanced Plasma Engineering

2 units (selection)

Kaoru Ohya · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The purpose of the lecture is to give an introduction to the be behavior of plasmas and its treatment.

Outline〉 The elements of plasma physics and chemistry are introduced in this lecture.

Style〉 Lecture and excercise

Keyword〉 ***plasma, nuclear fusion***

Goal〉

1. Understanding on properties of plasmas
2. Understanding on an introduction to theories of plasma physics

Schedule〉

1. Single-particle motions (1)
2. Single-particle motions (2)
3. Single-particle motions (3)
4. Plasma as fluids (1)
5. Plasma as fluids (2)
6. Waves in plasmas (1)
7. Waves in plasmas (2)
8. Waves in plasmas (3)
9. Diffusion and resistivity (1)
10. Diffusion and resistivity (2)
11. Equilibrium and stability (1)
12. Equilibrium and stability (2)
13. Introduction to controlled nuclear fusion (1)
14. Introduction to controlled nuclear fusion (2)
15. Introduction to controlled nuclear fusion (3)
16. Conclusions and future problems

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197473

Contact〉

⇒ Ohya (E 棟 2 階南 A-9, +81-88-656-7444, ohya@ee.tokushima-u.ac.jp) Mail

Advanced Theory of Electron Devices

2 units (selection)

Yasuo Ohno · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering, Jin-Ping Ao · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding of deep levels in compound semiconductor electron device performances

Outline〉 Semiconductor device physics for the analyses and design of semiconductor electron devices will be lectured. After teaching basic concepts of band diagram and fermi levels, carrier transport theory and device operation mechanisms will be presented. Various instable phenomena, which limit the device performance, will also be presented with theoretical backgrounds. The topics include, silicon, GaAs and GaN as semiconductor materials, and MOSFET. HEMT and HBT as electron devices. The lecture items are, 1 Band diagram, 2 Electron transport, 3 Short channel effects, 4 Impurity levels, 5 Deep traps, 6 Semi-insulating substrate, 7 HEMT, 8 Side-gating effect, 9 Drain-lag and DLTS, and 10 Surface states and breakdown.

Style〉 Lecture

Keyword〉 ***band diagram, HEMT***

Goal〉 Draw band diagrams including deep levels in non-thermal equilibrium

Schedule〉

1. Band Diagram
2. Thermodynamics of Electron Transport
3. Short Channel Effects
4. Impurity Levels
5. Electrical Performance of Deep Levels
6. Semi-insulating Substrate
7. Hetero Junction Transistors
8. Side-Gating Effect
9. Drain Lag and DLTS
10. Surface Statesand Breakdown Voltage
11. Discussion
12. Midterm Examination
13. Wide-Gap Semiconductors
14. AlGaN/GaN HFET
15. Discussion
16. Term Examination

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197386

Contact〉

⇒ Ohno (E 棟 2 階南 A-7, +81-88-656-7438, ohno@ee.tokushima-u.ac.jp) Mail
⇒ Ao (EE A-8, +81-88-656-7442, jpao@ee.tokushima-u.ac.jp) Mail

Note〉 This lecture will be given in English.

Advanced Device Processing

2 units (selection)

Yoshiki Naoi · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This cource will covered topics related to device processing engineering and science, in semicondctor and dielectric devices.

Outline〉 Basic subjects such as physical chemistry, vacuum engineering, surface science, crystal growth technology and mesurement methods for device evaluations will be lectured.

Style〉 Lecture

Keyword〉 ***device processing, surface physics and chemistry, vacuum engineering***

Fundamental Lecture〉 "Advanced Theory of Semiconductors"(1.0), "Advanced Theory of Integrated Circuits"(1.0)

Relational Lecture〉 "Advance Theory of Electrical and Electronic Materials"(0.5)

Requirement〉 なし.

Notice〉 なし.

Goal〉 To understand the physics of the device processing technology.

Schedule〉

1. Semiconductor and devices.
2. Property of vacuum
3. Production of vacuum
4. Pressure measurement
5. Interaction of atoms and molecules with surface
6. Vapor pressure, application to crystal growth using vacuum technology
7. Physisorption and chemisorption
8. Plasma etching
9. Chemical etching and Physical etching
10. Physics of diffraction
11. Electron optics
12. Electron spectroscopy
13. Scanning Electron Microscopy
14. Transmission Electron Microscopy
15. Atomic Force Microscopy
16. Examination

Evaluation Criteria〉 Problem Sets: 50%, Paper: 50%

Textbook〉 none - references will be cited during lectures

Reference〉 S. M. Sze, Physics of Semiconductor Devices, Second Edition (John Wiley & Sons, 1981).

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197373

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Naoi (E 棟 2 階南 A-4, +81-88-656-7447, naoi@ee.tokushima-u.ac.jp) Mail
(Office Hour: Th 5:00-6:00PM)

Note〉 This lecture will be given in English.

Advance Theory of Electrical and Electronic Materials

2 units (selection)

Kikuo Tominaga · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This cource aims to improve the ability to develop new materials by learning the fundamentals of material science and the properties of various electrical and electronic materials.

Outline〉 Material science of metals, oxide semiconductors, supercondutors, magnetic materials, dielectric materials are lectured for the students of electrical and electronic engineering. The fundamentals of these materials are explained at first as basic knowledge. Oxide semiconductors, superconductor, ferroelectric materials, ferromagntetic materials and ferrite are included. Dielectric and magnetic materials are stressed here. General outline of those materials are given at first . After that, magnetization mechanism of ferromagnetics and various properties of dielectrics are discussed mostly at the view-points of both solid state physics and applications. 1. Solid state physics of metals, 2. oxide semiconductors and transparent conductive oxides, 3.super conductors, 4. dielectrics and ferroelectric materials, 5. magnetization of the substance and magnetic domain structure, 6. ferrite and recent magnets, 7. piezoelectric materials and applications, 8. optoelectronics materials such as CCD, laser, and displays.

Style〉 Lecture and excercise

Keyword〉 ***material science, electrical and electronic engineering, dielectric material, magnetic material, semiconductor materials***

Relational Lecture〉 "Advanced Theory of Semiconductors"(0.5), "Advanced Device Processing"(0.5), "Advanced Optoelectronic Devices"(0.5)

Goal〉 Understand the fundamentals in material science for electricaal and electronic engineering.

Schedule〉

1. Solid state physics of metals
2. Solid state physics of oxide semiconductors
3. Transparent conductive oxide films
4. Physics of superconductor
5. Superconductors and their applications
6. Paradielectric materials
7. Various properties of ferroelectric materials
8. Magnetization of the substance
9. Ferromagnetic materials
10. Ferrite
11. Recent magnets(bond magnets)
12. Piezoelectric materials
13. Application of piezoelectric materials
14. Optoelectronic materials (1)(CCD, laser materials)
15. Optoelectronic materials (2)(display materials)
16. Exercise

Evaluation Criteria〉 Examination for each theme.

Textbook〉 内野研二・石井孝明「強誘電体デバイス」森北出版

Reference〉 電気電子材料 塩崎忠 共立出版,森北出版, 高木豊・沢田正三「磁性体・誘電体の物性工学」オーム社, 塩崎忠「圧電材料とその応用」シーエムシー出版

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197375

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tominaga (E 棟 2 階南 A-6, +81-88-656-7439, tominaga@ee.tokushima-u.ac.jp) Mail (Office Hour: Thursday and Friday, pm.17:00-18:30)

Note〉 This lecture is carried out by the use of power point. Prepare electronic memory for the study in home.

Advanced Optoelectronic Devices

2 units (selection)

Shiro Sakai · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding of opt-electronic devices

Outline〉 I lecture on an optical amplification and its effect on a semiconductor laser and optical properties of semiconductors. Carrier and light confinements, reflection and guided mode stripe lasers, and the quantum confinement hetero-structure lasers are explained. Reports are required in each of the step, and it is bases of final grade. Lecture schedule are follows. 1. Optical confinement and wave-guide. 2. v-b curves and effective index. 3. Einstein's relation in a semiconductor and black body radiation. 4. Semiconductor light absorption, spontaneous and stimulated emission. 5. Matrix element and density of state of a semiconductor. 6. Optical amplification and the various model calculation in a semiconductor. 7. Optical amplification and semiconductor lasers. 8. The design of a semiconductor laser. 9. The growth of a semiconductor laser. 10. Summary.

Keyword〉 ***laser, semiconductor, light confinement***

Requirement〉 Students are required to have a good understand undergraduate level physics of semiconductor.

Goal〉 To understand of the opto-electronic semiconductors

Schedule〉

1. Optical confinement and wave-guide.
2. v-b curves and effective index 1.
3. v-b curves and effective index 2.
4. Einstein's relation in a semiconductor and black body radiation.
5. Semiconductor light absorption, spontaneous and stimulated emission.
6. Matrix element and density of state of a semiconductor 1.
7. Matrix element and density of state of a semiconductor 2.
8. Optical amplification and the various model calculation in a semiconductor 1.
9. Optical amplification and the various model calculation in a semiconductor 2.
10. Optical amplification and semiconductor lasers 1.
11. Optical amplification and semiconductor lasers 2.
12. The design of a semiconductor laser 1.
13. The design of a semiconductor laser 2.
14. The growth of a semiconductor laser 1.
15. The growth of a semiconductor laser 2.
16. Summary.

Evaluation Criteria〉 Report 40, Test 60, Total 100. Above 60 pass the examination.

Textbook〉 Diode lasers and photonic integrated circuits,by L.A.Coldren, S.W. Corzine, John Wiley & sons, Inc., (1995) ISBN 0-471-11875-3

Reference〉 Hetero-struructure lasers,by H.C.Casey,Jr, M.B.Panish, Academic Press , (1978), ISBN 0-12-163101

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197442

Contact〉

⇒ Sakai (E 棟 2 階南 A-3, +81-88-656-7446, sakai@ee.tokushima-u.ac.jp)
Mail

Advanced Theory of Optelectronics

2 units (selection)

Shiro Sakai · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The purpose of this class is to understand principles of new optical devices based on optical nonlinearities.

Outline〉 Principles of optical fiber communication and new optical devices based on optical nonlinearities are introduced in this class.

Style〉 Lecture

Keyword〉 ***optical fiber, optical device, optical communications***

Goal〉

1. understand principles of optical fiber communications
2. understand optical nonlinearities
3. understand principles of nonlinear optical devices
4. understand application methods of nonlinear optical devices

Schedule〉

1. linearities of single mode optical fibers(2 weeks)
2. Soliton effects in single mode optical fibers(2 weeks)
3. optical devices (2weeks)
4. Various nonlinearities in semoconductors and their comparison.(2weeks)
5. All optical devices based on semiconductor and differential phase modulation(2weeks)
6. Limitting factors of semiconductor all-optical devices(2weeks)
7. Application to optical communications(3weeks)
8. Examination

Evaluation Criteria〉 Examinations and portfolios

Textbook〉 Printed materials

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197423

Student〉 Able to be taken by only specified class(es)

Contact〉

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Mail

Note〉 Since he is sick taking a rest, you have to check whether a course is opened.

Advanced High Voltage Engineering

2 units (selection)

Naoyuki Shimomura · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 It doesn't stay in the field of electric power engineering and the knowledge of the high voltage and large-current engineering is acquired. The latest use of the high voltage and large-current technology and the application will be learned.

Outline〉 The high-voltage engineering the large-current engineering has supported industries and the electric energy engineering and is still developing. In this lecture, the various physical phenomena involved in high voltage and large current as well as the phenomena of discharges and the characteristics of insulators are described in detail. Moreover, it lectures on the technology of the generation and the diagnostics of the high voltage and so on including the latest technology. In its applications, the new technology and application rather than the electric power system are introduced, as pulsed power and inertia confinement fusion. The current or upcoming topics such as environmental applications and medical applications will be discussed in the class.

Style〉 Lecture and excercise

Keyword〉 ***high voltage, large current, pulsed power***

Fundamental Lecture〉 "High Voltage Engineering"(1.0)

Goal〉

1. To understand fundermental phenomena of the discharge and mechanisms of the insulation
2. To understand fundamental phenomena of large current

Schedule〉

1. The recent trends of technologies on high voltage and large current
2. The pulsed power technologies
3. The applications of pulsed power
4. The recent trends of pulsed power technologies and their applications
5. The state-of-the-art technologies for pulsed power 1
6. The state-of-the-art technologies for pulsed power 2
7. The state-of-the-art technologies for pulsed power 3
8. The state-of-the-art technologies for pulsed power 4
9. The state-of-the-art technologies for pulsed power 5
10. The state-of-the-art technologies for pulsed power 6
11. The state-of-the-art technologies for pulsed power 7
12. The state-of-the-art technologies for pulsed power 8
13. The state-of-the-art technologies for pulsed power 9
14. The state-of-the-art technologies for pulsed power 10
15. Term-end exam
16. The exposition about the exam

Evaluation Criteria〉 Participation and presentation:50%; Final examination:50%

Textbook〉 None

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197232

Student〉 Able to be taken by student of other department

Contact〉

⇒ Shimomura (E 棟 2 階北 B-8, +81-88-656-7463, simomura@ee.tokushima-u.ac.jp) Mail (Office Hour: (月) 16:00 - 19:00 ※掲示板で確認されたい。)

Note〉 Language in this subject may be English.

Erectric Power System

2 units (selection)

Naoyuki Shimomura · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering
Kenji Teranishi · Assistant Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The electric power system becomes the attractive technical field recently from the viewpoints such as effective utilization of energy and emission reduction of the carbon dioxide in addition to the viewpoints such as stable supply of electric energy. In this lecture, the understanding of traditional technical contents as the power transmission and distribution of electrical energy is the objective of beginning. The second objective is the understanding of smart grid and its latest surrounding technology. The smart grid is an upcoming technology in fusing a wide range of technical fields. Also, this lecture expands knowledge about the energy transmission technology except the electric power field. The other objective is the understanding usage of electric and electronic circuit analysis program: EMTP which is more used for the analysis of electric power system.

Outline〉 From the viewpoints as the effective utilization with energy, the technical contents about the power transmission and distribution of electric energy will be described at first. The next is the learning about the smart grid. It consists of not only the learning about the smart grid but also the understanding the present state and problems of existing power-network, the trend of the dispersed power source and the characteristics and the latest trend of the energy storage equipment. Also, the energy transmission technology except the electric power fields, too, will be described. Finally, we will have a practice to use the electric and electronic circuit analysis program: EMTP, which is more used for the analysis of the electric power system. The learning is efficiently done with making reports, presentations and moreover the practice.

Keyword〉 ***electrical power engineering, transmission and distribution of electric power, smart grid***

Goal〉

1. The principle of the transmission and distribution technology can be understood for the efficient electric power transportation.
2. Smart grid and the surrounding technology can be understood
3. The electric and electronic circuit analysis program: EMTP can be used for the primary subject

Schedule〉

1. Overview and Introduction of the electric power system theory
2. The history of electric energy
3. Voltage drop of power transmission and distribution line
4. Power transmission-and-distribution line and power factor of load
5. Smart grid power system
6. Technologies to support smart grid
7. Presenting the repout about the smart grid power system: 1
8. Presenting the repout about the smart grid power system: 2
9. Presenting the repout about the smart grid power system: 3
10. Presenting the repout about the smart grid power system: 4
11. EMTP: the electric and electronic circuit analysis program
12. Report about using EMTP: 1
13. Report about using EMTP: 2
14. Report about using EMTP: 3
15. Final examination
16. Conclusions

Evaluation Criteria〉 The score is evaluated with total point of presentation:30%, report:30% and examination:40%. The evaluation of pass is more than 60% of total point.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197393

Contact〉

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Advanced Theory of Electric Power Engineering

2 units (selection)

Masatake Kawada · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering, Kensuke Kawasaki · Professor / Electric Power, Electrical and Electronic Engineering, Systems Innovation Engineering
Kiyoshi Takigawa · Associate Professor / Electric Power, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To help the students understand the principles and the trends of technologies used in electric power engineering and the related environmental aspects. To improve the oral presentation skill of students by presenting the latest transaction or journal papers in this field in English.

Outline〉 This course presents the principles and trends of technologies used in electric power engineering and the related environmental aspects. Students are required to present the latest transaction or journal papers in this field in English.

Style〉 Lecture and excercise

Keyword〉 ***electromagnetics, electrical circuits***

Relational Lecture〉 "Advanced Theory of Electromagnetic Compatibility"(0.5), "Erectric Power System"(0.5), "Advanced High Voltage Engineering"(0.5)

Requirement〉 Prerequisites: electrical power engineering, energy engineering or equivalent in undergraduate.

Goal〉

1. To understand the principles and the trends of technologies used in electric power engineering
2. To understand the environmental aspects of electric power engineering

Schedule〉

1. Principles of electric power engineering 1
2. Principles of electric power engineering 2
3. Materials in electric power engineering
4. Instrumentation in electric power engineering
5. Generators
6. Transformers
7. Switchgear
8. Cable
9. Power system
10. Power quality and electromagnetic compatibility
11. Presentation of surveyed transaction or journal papers 1
12. Presentation of surveyed transaction or journal papers 2
13. Presentation of surveyed transaction or journal papers 3
14. Presentation of surveyed transaction or journal papers 4
15. Examination
16. Return of examination and conclusion

Evaluation Criteria〉 Final examination 50%, Presentation 50% Attendance and participation in class are essential. Totally 60 % is required to have the credits

Textbook〉 D.F. Warne , Electrical Power Engineer's Handbook second edition, Newnes

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197394

Student〉 Able to be taken by only specified class(es)

Contact〉

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Note〉 Language: English

Electromechanical Systems

2 units (selection)

Ikuro Morita · Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The purpose of Electromechanical System is to understand the conceptual philosophy of new ac machine drive systems, which are found in a vast number of industries.

Outline〉 We discuss the mathematical modeling techniques of ac machines in the various reference frames, the vector control method using these modeling techniques and the sensorless control methods. Furthermore we introduce the configurations of power converter and the architectures of the control systems embedded the micro-controller LSI and DSP chips. By simulation analysis using "Mathematica" and "MATLAB" in the first half, and through the practical designs in the second half, the more theoretical and practical understandings are expected.

Style〉 Lecture and excercise

Keyword〉 ***dq transformation, synchronous motor, induction motor, vector control, sensorless control***

Relational Lecture〉 "Advanced Power Electronics"(0.3)

Requirement〉 Prerequisites (preferable) : "Eectrical machines (I),(II)" ,"Power electronics" and "Electrical machine dynamics and controls" in undergraduate.

Goal〉 To understand the conceptual philosopy of new ac machine drive control systems

Schedule〉

1. Modeling of synchronous motors.
2. Modeling of indction motors.
3. Vector control of synchronous motors.
4. Vector control of induction motors (1).
5. Vector control of induction motors (2).
6. Sensorless vector control of synchronous motors.
7. Sensorless vector control of induction motors (1).
8. Sensorless vector control of induction motors (2).
9. Inverter circuits for ac motor drives.
10. LSI for ac motor drive controls.
11. DSP for ac motor drive controls.
12. Configuration of ac motor drive controls system (1).
13. Configuration of ac motor drive controls system (2).
14. Sum-up and conclusions.
15. Final examination.
16. Review of final examination.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197374

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Morita (E 棟 2 階北 B-3, +81-88-656-7451, morita@ee.tokushima-u.ac.jp)
Mail

Advanced Power Electronics

2 units (selection)

Tokuo Ohnishi · Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering, Masahide Hojo · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To understand and learn application technologies of power conversion control circuit using switching power devices.

Outline〉 Basic power electronics covers the basic operation and its characteristics of the static power conversion circuit by using switching power devicies. In the advanced power electronics, how to generate the switching control signal for these power conversion circuit ,how to construct the control system and how to apply the power converter to many apparatus are lectured and disccused . Subjects are as follows;harmonics analysis,rotating axes transformation,instantaneous active and reactive power, PWM control methds, Sinusoidal PWM control,PFC converter,interconnected inverter,active filter,reactive power compensator, sensorless controls.

Keyword〉 ***inverter, power supply, motor drive, utility interconnection***

Fundamental Lecture〉 "Power Electronics"(1.0), "Electrical Machines (1)"(1.0), "Electrical Machines (II)"(1.0)

Relational Lecture〉 "Electrical Machine Dynamics and Controls"(0.5), "Electrical Machine Dynamics and Controls"(0.5)

Requirement〉 Prerequisites: power electronics in undergraduate

Goal〉

1. Ability of theoretical analysis
2. Understanding the control operation of application circuit
3. Understanding the control system of application circuits
4. Understanding the operation of control systems

Schedule〉

1. Harmonics analysis
2. Rotating axes transformation
3. Instantaneous active power and instantaneous reactive power
4. PWM switching methods
5. Sinusoidal PWM inverter
6. Power factor correction converter
7. Midterm test
8. Utility interconnecting inverter
9. Active power filter
10. Reactive power compensator
11. Variable speed control of DC motors
12. Variable speed control theory of AC motors
13. Variable speed control system of AC motors
14. Application of power conversion for renewable energy
15. Final test
16. Explanation of the test and check of the results

Evaluation Criteria〉 Final examination 50%, Presentation (Participation) 50%

Textbook〉 None (Prints)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197417

Contact〉

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⇒ Hojo (E 棟 2 階北 B-2, +81-88-656-7452, hojo@ee.tokushima-u.ac.jp) Mail

Advanced Control Theory

2 units (selection)

Tomohiro Kubo · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering
Hidetoshi Oya · Associate Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The purpose of this lecture is to explain the design theory of control systems based on the state space method. Furthermore, norms for signals and systems, systems analysis based on Linear Matrix Inequalities (LMIs) and robust control are outlined.

Outline〉 The state space method describes the dynamics of systems with the state equation, and it has a merit that it can deal with multi-input multi-output systems as well as single-input single-output systems. In this lecture, among the design methods belonging to the state space method, the linear-quadratic regulator is demonstrated. In addition, norms for signals and systems and calculation of norms for systems are presented. Furthermore, systems analysis for dynamical systems based on Linear Matrix Inequalities (LMIs) and the concept of robust control are outlined. (lecture style)

Style〉 Lecture

Keyword〉 ***inear-quadratic regulator, norms for signals and systems, linear matrix inequalities, robust control***

Fundamental Lecture〉 "Basic Theory of Systems"(1.0)

Relational Lecture〉 "Control Theory (II)"(0.5), "Control System Design"(0.5)

Requirement〉 Basic knowledge about the linear algebra and differential equations is required to attend this lecture.

Notice〉 Take notes carefully. Preparation and review are essential.

Goal〉

1. To understand the notion of the system structure in the state space method
2. To master the design method of the linear-quadratic regulator
3. To understand the notion of norms for signals and systems
4. To master the analysis method of dynamical systems via Linear Matrix Inequalities (LMIs)

Schedule〉

1. What is the linear-quadratic regulator?
2. Eigenvalues, eigenvectors and diagonalization of matrix
3. Quadratic form and positive definiteness of matrix
4. Controllability
5. State variable transformation and equivalence of systems
6. Linear-quadratic regulator
7. Solving Riccati equation
8. Examination for the first half
9. Norms and normed space
10. Norms for signals and systems
11. Calculation of norms for sysems
12. Norms for systems and design specifications
13. Linear Matrix Inequalities (LMIs)
14. Systems analysis via Linear Matrix Inequalities (LMIs)
15. Robust control
16. Examination for the second half

Evaluation Criteria〉 Mainly by the examination.

Textbook〉 Not used.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197313

Contact〉

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⇒ Oya (E-building (C-7), +81-88-656-7467, hide-o@ee.tokushima-u.ac.jp) Mail

Advanced Theory of Digital Transmission

2 units (selection)

Atsushi Takada · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding analyzation of digital transmission system and primary design techniques of a transmission system.

Outline〉 For understanding practical digital wireless/cable transmission systems, transmission theory on coding, digital modulation/demodulation, equalization, noise, error generation is given. Furthermore, optical fiber transmission systems are discussed. Style Lecture.

Style〉 Lecture

Keyword〉 ***digital modulation, data transmission, transmission system, optical fiber transmission***

Fundamental Lecture〉 "Communication Systems"(1.0), "Applied Communication Engineering"(1.0), "Computer Networks"(1.0)

Relational Lecture〉 "Advanced Theory of Electrical Communication"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level communication engineering and related subjects.

Goal〉

1. Understanding theory and architecture of digital transmission system and limiting factors of transmission performance.
2. Understanding the techniques designing simple digital transmission system.

Schedule〉

1. Overview of digital transmission
2. Source coding and coding noise
3. Digital multiplexing
4. Transmission code
5. Repeated transmission and code error
6. Digital modulation/demodulation
7. Shot noise and thermal noise
8. Noise and code error rate
9. Basic technology of optical transmission
10. Noise in optical transmission
11. Optical amplification
12. Wavelength division multiplexing (WDM) transmission
13. Limiting factors of WDM transmission system performance
14. Waveform equalization and error rate
15. Examination
16. Summary

Evaluation Criteria〉 reports 25%, examination 75%. Total of 60 % is required to pass the class.

Textbook〉 Prints

Reference〉

- ◇ K. Miyauchi "Communication System"(Corona Pub.) in Japanese
- ◇ I. Kobayashi ed. "Optical fiber communicaitions (1)(2)"(Corona Pub.) in Japanese

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197367

Student〉 Able to be taken by only specified class(es)

Contact〉

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Advanced Biological Engineering

2 units (selection)

Masatake Akutagawa · Associate Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding modeling and clarification of biological functions and their applications on engineering.

Outline〉 This lecture introduces fundamental technolgies to apply engineering technologies for medical field, such as, diagnoses, treatment and function substitution; growth of engineering based on biological mechanisms; functional characteristics of biological systems and their information processing basics of application for control. The topics are 1. physiological characteristics of biological system, 2. biological measurement, 3. medical equipments for diagnosis or treatment, 4. equipments for replacement or assistance of biological functions, 5. functions of nerve system, 6. applications of artificial neural networks.

Style〉 Lecture

Keyword〉 ***biomedical engineering, neural network, signal processing***

Goal〉

1. Understanding of modeling of biological neural network function and its analysis
2. Understanding of modeling of biological control system and its analysis
3. Understainding of modeling of biological sensory system

Schedule〉

1. Physiological functions of a neuron and their mathematical models
2. Modeling of neural networks
3. Functional analysis of artificial neural networks
4. Applicaions of artificial neural networks on engineering
5. Signal processing using artificial neural networks
6. Exercise in neural networks
7. Various modeling of neural networks
8. Modeling of biological control scheme
9. Analysis of biological control scheme
10. Information processing in biological visual system
11. Information processing in biological auditory system
12. Introduction of biosensors
13. Introduction of biomedical enginering 1
14. Introduction of biomedical enginering 2
15. Introduction of biomedical enginering 3

Evaluation Criteria〉 レポートと出席状況より評価する.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197319

Student〉 Able to be taken by only specified class(es)

Contact〉

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Note〉 This lecture will be given in English.

Advanced Theory of Electronic Circuits

2 units (selection)

Masaki Hashizume · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering
Hiroyuki Yotsuyanagi · Associate Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The purpose of this lecture is to understand advanced theory and the state-of-the-art technology for the IC implementation.

Outline〉 Electronic circuits have been implemented as VLSIs. This lecture introduces advanced theories and the state-of-the-art technologies for the VLSI implementation. The following are the topics: 1. Analysis and synthesis of logic circuits, 2. Design of integrated digital circuits, 3. Testing of VLSI 4. Design for testability, 5. Low power digital circuits

Style〉 Lecture and excercise

Keyword〉 ***electronic circuits, IC implementation, integrated circuits, circuit design***

Fundamental Lecture〉 "Electronic Circuits"(1.0), "Computer Circuits"(1.0)

Relational Lecture〉 "Advanced Lecture of Intelligent Information Processing" (0.5), "Advanced Theory of Integrated Circuits"(0.3)

Requirement〉 Familiarity with electric circuit and IC technology

Goal〉 To understand advanced theories and the state-of-the-art technologies for IC implementation of electronic circuits.

Schedule〉

1. Introduction of related topics
2. estimation of power consumption
3. low power design
4. testing of logic circuit
5. testing of SoC
6. design for testability for logic circuit
7. design for testability for SoC
8. Advanced topics of system LSI
9. design exercise (5wks)
10. Examination
11. The exposition about the examination

Evaluation Criteria〉 Attendance and presentation:30%; Final examination:70%

Textbook〉

◇ STARC SoC design training courses text
◇ Exercises are introduced in the class

Reference〉 introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197382

Student〉 Able to be taken by only specified class(es)

Contact〉

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⇒ Yotsuyanagi (E 棟 3 階南 D-3, +81-88-656-9183, yanagi4@ee.tokushima-u.ac.jp) Mail (Office Hour: 水・金 17:00~ 18:00)
⇒ Shimamoto (E 棟 3 階南 D-5, +81-88-656-7483, simamoto@ee.tokushima-u.ac.jp) Mail (Office Hour: 年度毎に学科の掲示，あるいは居室前の掲示を参照すること)
⇒ Song (E D-4, +81-88-656-7484, tiansong@ee.tokushima-u.ac.jp) Mail

Note〉 This lecture will be given in English.

Advanced Theory of Integrated Circuits

2 units (selection)

Shinsuke Konaka · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To understand the CMOS analog circuit designs for RF-CMOS integrated circuit applications. To understand the logic LSI design by introducing a case study of the previous development of high speed bipolar logic LSIs for a Gb/s optical Tx/Rx and a super-computers.

Outline〉 Main integrated circuit technologies are recently CMOS integrated circuits because of their low power dissipation, low voltage operation and high noise margin. Owing to the continuous scaling down, CMOS operation speed is improved to up to some GHz regions. The purposes of this lecture are to introduce CMOS analog circuit designs and a case study of the previous high speed logic LSIs for multi-Gb/s applications.

Style〉 Lecture and excercise

Keyword〉 ***analog circuits, CMOS, circuit design***

Fundamental Lecture〉 "Advanced Theory of Electron Devices"(1.0)

Relational Lecture〉 "Advanced Theory of Electronic Circuits"(0.7)

Goal〉

1. To understand MOS transistor models and device parameters for CMOS analog circuit design.
2. To understand CMOS single-ended amplifier, differential amplifier and current mirror circuits.
3. To understand high performance LSI designs by reviewing previous development samples of high speed logic LSIs

Schedule〉

1. A review of integrated circuits and basic MOS transistors
2. CMOS process flow and second-order effects of MOS transistor
3. MOS Circuit models and device parameters of MOS transistors
4. Current-voltage characteristics of MOS transistor
5. Common-source single stage MOS amplifier
6. Common-source stage with source degeneration MOS amplifier
7. Designing common-source stage MOS amplifier
8. Common-gate stage MOS amplifier
9. Common-drain stage MOS amplifier
10. Differential MOS amplifier
11. Gilbert cell circuit
12. Current mirror circuit
13. High speed logic LSI using differential circuits (development example)
14. High speed macro-cell array logic LSI (development example)
15. Example of system LSI
16. Examination

Evaluation Criteria〉 Examination is 70% and reports are 30%. The passing score is not less than 60%.

Textbook〉 Design of Analog CMOS Integrated Circuits, Behzad Razavi, McGrow-Hill, ISBN 0-07-118815-0

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197285

Contact〉

⇒ Konaka (E 棟 3 階北 C-2, +81-88-656-7469, konaka@ee.tokushima-u.ac.jp) Mail

Advanced Lecture of Intelligent Information Processing

2 units (selection)

Takashi Shimamoto · Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering
Tian Song · Associate Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understand the importance of utilizing the methodology of system LSI design to make function design, synthesis, timing design and layout design. Be able to make use of CAD tools for system LSI design

Outline〉 The methodology of system LSI design will be discussed together with some practical exercises concerning the function design, synthesis, timing design and layout design with CAD tools.

Style〉 Lecture and excercise

Keyword〉 ***system LSI, VLSI synthesis design, VLSI timing design, VLSI layout design***

Fundamental Lecture〉 "Computer Algorithm and Data Structure"(1.0)

Relational Lecture〉 "Advanced Theory of Electronic Circuits"(0.5)

Goal〉 To understand the basic problems and methodology of system LSI design. Can make use of CAD tools for system LSI design.

Schedule〉

1. Introduction of the system LSI
2. The design flow of system LSI
3. Main issues of system LSI design
4. Function design (3 weeks)
5. Synthesis design (3 weeks)
6. Timing design (3 weeks)
7. Layout design (3 weeks)
8. Examination

Evaluation Criteria〉 Unit evaluation contains examination 70% and exercise 30%.

Textbook〉

◇ STARC SoC design training courses text
◇ Exercises are introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197359

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Shimamoto (E 棟 3 階南 D-5, +81-88-656-7483, simamoto@ee.tokushima-u.ac.jp) Mail (Office Hour: 年度毎に学科の掲示，あるいは居室前の掲示を参照すること)
⇒ Song (E D-4, +81-88-656-7484, tiansong@ee.tokushima-u.ac.jp) Mail
⇒ Hashizume (E 棟 3 階南 D-2, +81-88-656-7473, tume@ee.tokushima-u.ac.jp) Mail
⇒ Yotsuyanagi (E 棟 3 階南 D-3, +81-88-656-9183, yanagi4@ee.tokushima-u.ac.jp) Mail (Office Hour: 水・金 17:00~ 18:00)

Advanced Lecture on Semiconductor Nanotechnology

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This class introduces basic principles of the semiconductor nanotechnology and their application to the quantum devices.

Outline〉 Basics of semiconductor physics and quantum mechanics are introduced to understand material properties of quantum confined nanostructures. Recent progress in fabrication techniques and device applications of semiconductor nanostructures (quantum wells, wires and dots) will be reviewed.

Style〉 Lecture

Keyword〉 ***quantum confined nanostructures, semiconductor nanoscience, electron devices, photonic devices***

Requirement〉 None.

Notice〉 None.

Goal〉 To understand basic properties of semiconductor nanostructures and quantum devices.

Schedule〉

1. Introduction to semiconductor nanostructures
2. Electronic states in quantum confined structures
3. Electrical properties of superlattices
4. Fabrication technique of quantum wires and wells
5. Characterization of heterointerfaces
6. Characterization of nanostructures
7. High-speed electron devices
8. Optical properties of quantum wells
9. Semiconductor laser diodes
10. Quantum effect devices
11. Fabrication technique of quantum dots
12. Quantum dot devices
13. Device application of quantum nano structures
14. Recent topics of semiconductor nanotechnology (1)
15. Recent topics of semiconductor nanotechnology (2)

Evaluation Criteria〉 Assignments count 100%

Textbook〉 None.

Reference〉 The Physics of Low-Dimensional Semiconductors, J.H. Davis, Springer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197421

Student〉 Any students can attend the class.

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

⇒ Kitada (A224, +81-88-656-7671, kitada@frc.tokushima-u.ac.jp) Mail (Office Hour: Mon. 10:00-14:00)

Advanced Theory of Electromagnetic Compatibility

2 units (selection)

Masatake Kawada · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To help the students understand electromangetic compatibility (EMC), measurement and analysis methods related to EMC.

Outline〉 This course presents electromagnetic compatibility (EMC), measurement and analysis methods related to EMC.

Style〉 Lecture

Keyword〉 ***electromagnetic compatibility, frequency spectrum, antenna***

Fundamental Lecture〉 "Advanced Circuit Theory"(1.0), "Advanced Theory of Electronic Circuits"(1.0), "Advanced Biological Engineering"(1.0)

Relational Lecture〉 "Erectric Power System"(0.5), "Advanced Theory of Electric Power Engineering"(0.5)

Requirement〉 Prerequisites: Electrical Circuit Theory (Electrical Circuit Theory 1 an 2, and Exercise), Electromagnetics (Electromagnetics 1 and 2, Exercise)

Goal〉

1. To understand overview of electromagnetic compatibility.
2. To understand the analysis methods related to EMC.
3. To understand the measurement methods related to EMC.

Schedule〉

1. Introduction of Electromagnetic Compatibility (EMC).
2. Common EMC Units.
3. Power Loss in Cables.
4. EMC Requirements for Electronic Systems.
5. Fundamentals of Frequency Spectrum.
6. Spectra of Digital Waveforms.
7. Spectrum Analyzers.
8. Midterm Examination.
9. Explanation for Midterm Examination.
10. Transmission Lines.
11. The Time-Domain Solution of the Transmission Lines.
12. Antenna.
13. Effects of Reflections.
14. Shielding.
15. Final Examination.
16. Explanation for Final Examination.

Evaluation Criteria〉 Assignments 20%, Midterm Examination 30%, and Final Examination 50%. Totally 60% is required to have the credits. Attendance and participation in class are essential.

Textbook〉 Clayton R. Paul, Introduction to Electromagnetic Compatibility, Wiley-Interscience

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197383

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawada (E 棟 2 階北 B-10, +81-88-656-7460, kawada@ee.tokushima-u.ac.jp) Mail (Office Hour: (水)(木) 16:00-17:00)

Note〉 Language; English

Topics in Algebra

2 units (selection)

Yoshinori Mizuno · Associate Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To learn some combinatorial techniques based on the theory of partitions.

Outline〉 A partition of a natural number n is any non-increasing sequence of natural numbers whose sum is n. For example, there are three partions of 3, because 3=2+1=1+1+1. This class introduces some combinatorial techniques and tools such as generating functions based on several topics from the theory of partitions.

Style〉 Lecture

Keyword〉 ***integer partition, generating function***

Fundamental Lecture〉 "Basic Mathematics/Calculus 1"(1.0)

Goal〉 To learn some combinatorial techniques and tools such as generating functions.

Schedule〉

1. Some terms from set theory
2. Euler's identity
3. Ferrars graph
4. Generating function
5. Euler's theorem
6. Two variable generating function
7. Euler's pentagonal number theorem
8. Congruences
9. The Rogers-Ramanujan identities I
10. Formulas of partition functions
11. q-binomial coefficients
12. q-binomial theorem
13. Jacobi's triple product identity
14. The Rogers-Ramanujan identities II
15. Applications
16. Summary

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 Integer partitions. George Andrews, Kimmo Eriksson, Cambridge University Press

Reference〉 An introduction to the theory of numbers. G. H. Hardy, E. M. Wright, Oxford University Press

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=200911

Contact〉

⇒ Mizuno (A204, +81-88-656-7542, mizuno@pm.tokushima-u.ac.jp) Mail
(Office Hour: 水曜 17:00 から 18:00)

Electrical and Electronic Engineering Seminar and Exercise

4 units (compulsory)
Teacher of course

Target〉 To get wide knowledge on your reaserach topics.

Outline〉 Students read scientific papers relating to your research and get wide knowledge on your reaserach topics.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***reading references, presentation skill, discussion***

Requirement〉 N/A

Goal〉

1. To get skills to collect scientific references and knowledge relating your research topic
2. To get skills on discussion about a scientific topic
3. To get presentation skills

Schedule〉

1. Continure the followings.
2. Select text books and/or collect references.
3. Summarize the contents of a reference and/or a text book and presnet them.
4. Discuss about the contents of the presentation.

Evaluation Criteria〉 Evaluated with portfolios and/or examinations

Textbook〉 Text books and references will be specified by your supervisors at the first class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197379

Student〉 Able to be taken by only specified class(es)

Electrical and Electronic Engineering Labolatory

6 units (compulsory)
Teacher of course

Target〉 To obtain wide knowledge on your research topics by experiments.

Outline〉 Do experiments relating your Master Degree's thesis.

Style〉 Portfolio

Keyword〉 ***research skill, acquisition of professional knowledge, presentation skill***

Requirement〉 N/A

Notice〉 N/A

Goal〉

1. To acquisite professional knowlege on your research topics by experiments
2. To get presentation skills

Schedule〉

1. Continure the followings
2. Plan your experiments and collect basic knowledge
3. Do experiments according to your plan
4. Summarize experimental results, present them and discuss about them.

Evaluation Criteria〉 Evaluation with portfolios

Textbook〉 Text bools will be introduced by your supervisor at the beginning.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197378

Student〉 Able to be taken by only specified class(es)

Systems Innovation Engineering — Information Science and Intelligent Systems

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Theory of Complex System Engineering

2 units (selection)

Tetsushi Ueta · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering, Hiroshi Kawakami · Executive Director / The University of Tokushima

Target〉 comprehension and application of complex systems by using engineering methodlogies

Outline〉 Complex systems are defined as compound dynamical systems whose behavior and features cannot be predicted because of their nonlinearities and connecting conditions. This emergence of behavior is not possible for a single dynamcal system, therefore, connection, coupling, compounding are keywords of this theory. Emergence of rhythm in biological systems, self organization, chaotic properties in high degrees of freedom, learning and associative memory are example features of complex systems. In this lecture, based on physical systems which are ubiquitously found and treated by system engineering subjects, we study analytical methods to understand these phenomena, bifurcation theory of nonlinear and linear systems, applied extraction methods of valuable information from observed data, system design methods of compound dynamical systems.

Style〉 Lecture

Keyword〉 ***complex systems, bifurcation, chaos, nonlinear phenomena***

Fundamental Lecture〉 "Differential Equations (II)"(1.0), "Transient Analysis" (1.0), "Industrial Basic Physics"(1.0)

Relational Lecture〉 "Topics of mathematical physics"(0.5), "Advanced Electrical Control System"(0.5), "Advanced Theory of Electronic Circuits"(0.5)

Requirement〉 none

Goal〉

1. understanding of the definition and target area of complex systems
2. understanding of qualitative approach for given dynamical system
3. understanding and application of bifurcation theory

Schedule〉

1. examples of complex systems
2. relationship between bifurcation problems and complex systems
3. comptation of bifurcation parameter values
4. chaos and bifurcation phenomenon
5. chaotic itinerary
6. emergence mechanism of spatio temporal chaos and its clustering
7. phase transition and synchronization
8. spatio temporal intermittency and emergence of patterns
9. chaos neural network
10. neuronal circuits as complex systems
11. bifurcations in emergence systems
12. analysis of social systems
13. survey on complex systems
14. exercise 1
15. exercise 2
16. questions and answers

Evaluation Criteria〉 The total grade is evaluated by homework reports (70 %) and attendance of the class. (30 %)

Textbook〉 specified every class.

Reference〉 Chaotic Scenario of Complex Systems, Asakura-Shoten, 1996 (in Japanese)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197461

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ueta (AIT 507, +81-88-656-7501, tetsushi@ait.tokushima-u.ac.jp) Mail (Office Hour: Wednesday, afternoon)
⇒ Kawakami (E 棟 3 階北 C-7, +81-88-656-7465, hukugakk@honbu.tokushima-u.ac.jp) Mail

Advanced Theory of Semiconductors

2 units (selection)

Katsushi Nishino · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To understand semiconductor physics and fundamental device operations for various semiconductor devices

Outline〉 Semiconductor physics, especially behavior of carriers in semiconductor, is described. Properties of pn junction and Schottky barrier, including non-ideal case, are also lectured.

Style〉 Lecture

Keyword〉 ***semiconductor, metal-semiconductor contact, pn junction diode***

Relational Lecture〉 "Advanced Device Processing"(0.5), "Advanced Theory of Electron Devices"(0.5), "Advanced Optoelectronic Devices"(0.5)

Goal〉

1. To understand behavior of carries (such as scattering mechanisms) in semiconductor
2. To solve diffusion equations in simple conditions
3. To understand properties of pn junction and Schottky barrier

Schedule〉

1. Crystal Structure
2. Energy Bands
3. Carrier Concentration at Thermal Equilibrium
4. Carrier Transport
5. Phonon
6. High-Field Effect
7. Continuity Equations and Diffusion Equations of Carriers
8. Band Structure of Metal-Semiconductor Contact
9. Current Transport Processes of Schottky Barrier
10. Charcterization of Schottky Barrier Height
11. Ohmic Contact
12. Band Structure of pn Junction Diode
13. Capacitance-Voltage Characteristics of pn Junction Diode
14. Current-Voltage Characteristics of pn Junction Diode
15. Heterojunction
16. Examination

Evaluation Criteria〉 Report 50%, Examination 50%. More than 60% is required to pass this class.

Textbook〉 Physics of Semiconductor Devices, by S.M.Sze

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197419

Contact〉

⇒ Nishino (E 棟 2 階南 A-5, +81-88-656-7464, nishino@ee.tokushima-u.ac.jp) Mail

Advanced Electrical Control System

2 units (selection)

Takashi Yasuno · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This class introduces the basic principle of making to high performance and the intelligence in control system used for an industrial machine. And the control design of various control systems is understood.

Outline〉 The control system configuration used for the industrial machine is described, and applications of intelligent control method using fuzzy reasoning and neural net works are introduced. Moreover, Current topics of fields mentioned avobe are introduced.

Style〉 Lecture and excercise

Keyword〉 ***Motion control, Robotics, Fuzzy, Neural network, Genetic algorithm***

Relational Lecture〉 "Advanced Lecture of Intelligent Information Processing" (0.5), "Advanced Control Theory"(0.5)

Notice〉 The lecture form might be changed according to the number of attending a lecture.

Goal〉

1. The congfiguration of the control system used for an industrial machine should be understood.
2. The intelligent control method should be understood.

Schedule〉

1. Control object
2. Motion control system
3. Two degree-of-freedom control
4. Design method of feedback controller
5. Design method of feedforward controller
6. Fuzzy sets
7. Fuzzy reasoning method
8. Control sysytem application of fuzzy reasoning
9. Artificial neuron model
10. Neural network
11. Learning algorithm of neural network
12. Control system application of neural networks
13. Genetic algorithm
14. Control system application of genetic algorithm
15. Conclusions
16. Return of report or examination

Evaluation Criteria〉 Total evaluation based on Reports or examinations

Textbook〉 The print is distributed.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197311

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yasuno (E 棟 2 階北 B-5, +81-88-656-7458, yasuno@ee.tokushima-u.ac.jp) Mail (Office Hour: Monday, 15:00-17:30)

Advanced Theory of Electrical Communication

2 units (selection)

Takahiro Oie · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding analysing techniques of the communication system and multi-nodes networks.

Outline〉 This lecture is concerned with the study of concept of computer networks which realize the multi-node communication. The contents of those articles related with computer networks are presented at seminars. (Lecture style)

Style〉 Lecture

Keyword〉 ***digital communication, computer networks, network architecture***

Fundamental Lecture〉 "Communication Systems"(1.0), "Applied Communication Engineering"(1.0), "Computer Networks"(1.0)

Requirement〉 Students are required to have a good understanding of undergraduate-level communication engineering and related subjects.

Goal〉

1. Understanding the control techniques and implementation of computer network application.
2. Understanding the secure techniques of the communication system.

Schedule〉

1. Overview of digital communication
2. Mathematical preparation
3. Network architecture
4. Physical layer in fixed and wireless networks
5. Datalink layer in fixed and wireless networks
6. Network layer and routing
7. Transport layer
8. Traffic control
9. Security in fixed and wireless networks
10. Synmetric cryptography and public key cryptography
11. Session layer
12. Presentation layer
13. Application layer
14. Implementation example of application layer (HTTP, SMTP)
15. Implementation example of application layer (DNS, SNMP)
16. Wireless networks

Evaluation Criteria〉 Evaluated by presentations and submitted materials in seminars.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197365

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Oie (E-3F-C-1, +81-88-656-7479, alex@ee.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 16:20~ 17:20, Thursday 16:50~ 17:50)

Advanced Circuit Theory

2 units (selection)

Yoshifumi Nishio · Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering, Yoko Uwate · Assistant Professor / Institute of Technology and Science

Target〉 Analysis method of nonlinear circuits, and behavior of nonlinear oscillatory circuits and its applications are lectured.

Outline〉 Modeling of nonlinear devices, DC analysis and transient analysis of nonlinear circuits, and steady-state analysis are lectured. Synchronization and chaotic phenomena in nonlinear oscillatory circuits are introduced and their applications to information and communication engineering are discussed. (Style: Lecture)

Style〉 Lecture and excercise

Keyword〉 ***nonlinear circuits, circuit analysis, oscillatory circuits***

Fundamental Lecture〉 "Electrical Circuit Theory (I) and Exercise"(0.7), "Electrical Circuit Theory (II) and Exercise"(0.5), "Network Analysis"(0.3)

Relational Lecture〉 "Advanced Theory of Complex System Engineering"(0.5)

Requirement〉 Students are required to know how to analyze basic linear circuits.

Notice〉 Course is taught in English.

Goal〉

1. Understanding of analysis methods of nonlinear circuits.
2. Understanding of behavior of nonlinear circuits and its applications.

Schedule〉

1. Modeling of nonlinear devices.
2. DC analysis of nonlinear circuits by Newton method.
3. Transient analysis of nonlinear circuits.
4. Steady-state analysis of nonlinear circuits (for 4 lectures).
5. Synchronization phenomena in nonlinear oscillatory circuits (for 2 lectures).
6. Chaotic phenomena in nonlinear oscillatory circuits (for 2 lectures).
7. Engineering applications of nonlinear circuits (for 4 lectures).
8. Conclusions and final examination.

Evaluation Criteria〉 Final examination 80% and exercise 20%.

Textbook〉 None.

Reference〉

◇ Akio Ushida and Mamoru Tanaka, "Nonlinear Circuit Simulations," Corona Publishing Co.
◇ S. Smale and M.W. Hirsch, "Differential Equations, Dynamical Systems, and Linear Algebra," Academic Press.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197157

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishio (D-7, E-3F-South, +81-88-656-7470, nishio@ee.tokushima-u.ac.jp) Mail

Human Sensing

2 units (selection)

Minoru Fukumi · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This lecture aims to understand the latest topics in a field of Intelligent systems, and to obtain advanced knowledge and technologies.

Outline〉 This lecture teaches the advanced topics in intelligent systems. The main items in this lecture are softcomputing and human sensing, including face information processing and its computer practice and biological signal processing.

Style〉 Lecture and excercise

Keyword〉 ***soft computing, human sensing, human information processing***

Goal〉

1. To understand the latest topics on Intelligent systems.
2. To learn the trend of a domestic and foreign research on related topics.

Schedule〉

1. Topics in Advanced Intelligent Systems
2. Topics in Advanced Intelligent Human Sensing
3. Topics in Brain Information Processing
4. Topics in Advanced Softcomputing techniques
5. Psychological Knowledge and Neural Network Model
6. Topics in Advanced Face Information Processing
7. Topics in Advanced Biosignal Processing
8. Topics on applications in Advanced Softcomputing techniques
9. Statistical Learning Algorithms
10. Topics in Eye Tracking and Its Applications
11. Topics in OpenCV applications
12. Topics in EMG and EEG researches
13. Exercise in Advanced Intelligent Systems
14. Exercise in Softcomputing
15. Exercise in Human Information Processing
16. Discussion

Evaluation Criteria〉 Attendance (30%), practice(10%), report (60%)

Textbook〉 no special book

Reference〉 講義 · 演習中に指定する.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197355

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Fukumi (D210, +81-88-656-7510, fukumi@is.tokushima-u.ac.jp) Mail
(Office Hour: 金曜日,15~ 18時)

Note〉 ゲストスピーカーを招聘して講義 · 演習を行う場合がある.

Photonic Device

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the principle of the current optoelectronic devices, e.g., Light Emitting Diodes, Laser Diodes and so on. To develop ability to solve various problems in optical device application.

Outline〉 This course will cover topics on current optical and optoelectronic devices. Topics treated include Light Emiiitng Diode, Laser Diode, Solar Cell, Optical Modulator and Nonlinear Optical Devices.

Style〉 Lecture

Keyword〉 ***optoelectronic device, optical device, light emitteing diode, laser diode, optical modulator, Solar cell***

Relational Lecture〉 "Optical propertics of materials"(0.5), "Lecture in Optical Materials and Devices, Part 1"(0.5)

Requirement〉 Students should have fundamental knowledges about semiconductor physics and devices for undergraduate students.

Goal〉

1. Students can explain the principle and structures for light emitting devices.
2. Students can explain the principle and structures for photodetector and solar cell.
3. Students can explain the principle of light modulators.
4. Students can explain the principle of nonlinear optical devices.

Schedule〉

1. Introduction
2. Interaction between Light and dielectric materials
3. Optical properties of semiconductors
4. Semiconductor PN-junction
5. Light emitteing diode I
6. Light emitteing diode II
7. Laser diode I
8. Laser diode II
9. Photoconductor Cells
10. pin photodiode
11. avalanche photodiode
12. Solor cell and amorphus-semiconductor optoelectronic devices
13. Optical Modulator
14. Nonlinear optical devices
15. Integrated Optical Devices
16. Final Examination

Evaluation Criteria〉 Activity: 20%, Reports: 40% and Final Exam.:40%

Textbook〉 中澤，鎌田著，光物性・デバイス工学の基礎，培風館 1999

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197440

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp) Mail (Office Hour: 16:05-18:00)

Electronic display

2 units (selection)

Shiro Suyama · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the history of developments, technical trends, and technologies of electronic display.

Outline〉 This course will cover the history of developments, technical trends, recent topics, and technologies of an electronic display. This course is related to indutories.

Style〉 Lecture

Notice〉 光の性質，光学的な現象については，既知とする．

Goal〉

1. To understand fundamental technologies of an electronic display
2. To understand fundamental technologies of devices for an electronic display
3. To understand a technical trend of an electronic display

Schedule〉

1. 電子ディスプレイの概要，最近の動向
2. 電子ディスプレイおよび画像システムの概要
3. 直視型: 陰極線管 (ブラウン管，CRT)，テレビジョン
4. 直視型: 液晶の概要と液晶ディスプレイ (LCD) の基本動作
5. 直視型: 各種の液晶ディスプレイと特性改善
6. 直視型: プラズマディスプレイ (PDP)
7. 直視型: エレクトロルミネッセンス (EL) ディスプレイ
8. 直視型: フィールドエミッションディスプレイ (FED)
9. 超大型: 投射型ディスプレイ
10. 超大型: 最新の投射型ディスプレイ，屋外用大型 LED ディスプレイ
11. 電子ディスプレイの画質と視覚特性
12. 電子ディスプレイの画質とその評価
13. 立体ディスプレイ: 概要
14. 立体ディスプレイ: 2 眼/多眼方式
15. 立体ディスプレイ: 超多眼方式などの最新の動向

Evaluation Criteria〉 Evaluation with report

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197368

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Suyama (opt409, +81-88-656-9425, suyama.shiro@opt.tokushima-u.ac.jp)
Mail (Office Hour: 17:00~ 18:00)

Topics of mathematical physics

2 units (selection)

Shigeaki Nagamachi · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 We study the quantum computing.

Outline〉 We study the elementary theory of numbers and group theory in order to understand RSA cryptography based on the difficulty of factorization for a big number. We study the theory of Hilbert spaces and their operators to understand Shor's fast factorization algorithm for quantum computers.

Goal〉 Understanding the principle of quantum computation

Schedule〉

1. Group theory 1
2. Group theory 2
3. Number theory 1
4. Number theory 2
5. RSA cryptography
6. Shor's factirization algorithm 1
7. Hilbert space
8. Operators on Hilbert space
9. Quantum mechanics 1
10. Quantum mechanics 2
11. Quantum information
12. Quantum circuits
13. Quantum Fourier transformation
14. Shor's factorization algorithm 2
15. The complexity of Shor's factorization algorithm
16. Reserve day

Textbook〉 Mika Hirvensalo, Quantum Computing, Springer (2004)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197307

Topics of Analysis for Mathematical Science

2 units (selection)

Atsuhito Kohda · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Mathematical theory and technique for analysis of engineering phenomena

Outline〉 Mathematical theory to analyze problems in engineering and its application, mainly theory and technique of differential equations

Style〉 Lecture

Relational Lecture〉 "Advanced applied analysis"(0.2), "Differential Equations" (0.2)

Requirement〉 If you like undergraduate-level mathematics, it will be sufficient.

Goal〉 To be familiar with mathematical theory, that helps engineering study.

Schedule〉

1. Theory of sets and maps
2. Cardinal numbers and bijection
3. Equivalence relations and cryptography
4. Linear space and tensor
5. Vector analysis and differential form
6. Cauchy's theorem and vector analysis
7. Differential form and Cauchy's theorem
8. Projective plane
9. Quadratic curves and projective plane
10. All quadratic curves are circles?
11. The index of vector fields
12. Applications of the index:fundamental theorem of algebra
13. Vector fields on the unit sphere
14. Why there is the north pole on the earth
15. Mathematics and computers
16. Summary

Webpage〉 http://math1.pm.tokushima-u.ac.jp/lecture/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197300

Contact〉

⇒ Kohda (A211, +81-88-656-7546, kohda@pm.tokushima-u.ac.jp) Mail
(Office Hour: 月曜 12:00~ 13:00)

Methods for analysis of mathematical phenomena

2 units (selection)

Hitoshi Imai · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering, Cheng-Hai Jin · Professor / International Center

Target〉 To learn the to analyze the mathematical phenomena.

Outline〉 Methods used in analysis of mathematical phenomena are introduced. Especially, those in numerical analysis are focused on.

Style〉 Lecture

Keyword〉 ***mathematics, numerical analysis***

Fundamental Lecture〉 "Numerical Analysis"(1.0)

Relational Lecture〉 "Advanced Computational Science"(0.5)

Requirement〉 Only the premise that have studied basic mathematics.

Goal〉 The adequacy of the two-dimensional boundary value problem governed by the Poisson equation can be understood by the finite difference method, etc.

Schedule〉

1. Introduction to computer
2. Common sense in numerical computation
3. High-speed computation (Parallel computing)
4. Finite difference method I
5. Finite difference method II
6. Finite difference method III
7. Finite difference method IV
8. Finite element method I
9. Finite element method II
10. Finite element method III
11. Finite element method IV
12. Boundary element method I
13. Boundary element method II
14. Boundary element method III
15. Iterative method

Evaluation Criteria〉 Evaluation by the report.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197305

Contact〉

⇒ Imai(A220, +81-88-656-7541, The inquiry by means of the cellular phone or E-mail is not acceptable) (Office Hour: Office hours: Thursday 14:00-15:00)

Quantum mechanics and advanced lecture in quantum physics

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the quantum mechanics.

Outline〉 Basics of quantum mechanics are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics***

Goal〉 To understand the outline of quantum mechanics.

Schedule〉

1. Introduction
2. Variational method
3. Lagrangian
4. Hamiltonian
5. Poisson's bracket expression
6. Quantization
7. Operator
8. Wavefunction
9. Expectation value
10. Schrödinger equation
11. Example (1) the square well potential
12. Example (2) the linear harmonic oscillator
13. Angular momentum
14. Example (3) hydrogen atom
15. Heisenberg equation
16. Field quantization

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197471

Contact〉

⇒ Yoshitaka Michihiro (A203)

Language Modeling

2 units (selection)

Kenji Kita · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Masami Shishibori · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 The course introduces some probabilistic models of natural language.

Outline〉 Due to the availability of large text corpora, probabilistic approaches to modeling natural language text have become dominant in recent years. This lecture gives an overview of probabilistic modeling of natural language, including n-gram models, hidden Markov models, probabilistic grammars, and maximum entropy models, as well as their applications to natural language processing and information retrieval.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***natural language, probabilistic model, n-gram model, probabilistic grammar***

Fundamental Lecture〉 "Automata and Formal Languages"(1.0)

Relational Lecture〉 "Natural Language Understanding"(0.5), "Advanced Machine Translation"(0.5)

Goal〉 To acquire effective techniques for modeling natural language texts using probabilistic models.

Schedule〉

1. Overview of the course
2. Modeling natural language
3. Estimation and evaluation of probabilistic models
4. N-gram model
5. Hidden Markov model
6. Maximum entropy model
7. Probabilistic grammar
8. Partitions of numbers and Young diagram
9. Symmetric group and its action on polynomials
10. Symmetric form and Young diagram
11. Bumping game
12. Sliding game
13. Product operations on Young tableaux
14. Word problem
15. Recent topics
16. Assignment

Evaluation Criteria〉 Assignment count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197220

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kita (Dr503, +81-88-656-7496, kita@is.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 12:50 - 14:20)

Note〉 Invited talk by a part-time lecturer will be given.

Autonomous Intelligent Systems

2 units (selection)

Norihiko Ono · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering, Yoshio Mogami · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 As effective design methods of autonomous intelligent systems, the reinforcement learning algorithms have received much attention that allow the systems to obtain appropriate decision policies by trial and error even in environments with delayed rewards. This class provides the basic concepts and theories concerning the algorithms as well as their application techniques.

Outline〉 While top-down approaches to intelligent systems design problems have exposed various limitations, bottom up approaches have been proposed and studied that allow intelligent systems to improve their own performance autonomously and incrementally during the course of interactions with the environments. This class covers those bottom-up approaches mainly focused upon the reinforcement learning algorithms.

Style〉 Lecture

Keyword〉 ***autonomous agents, emergent systems design, reinforcement learning, robotics, multi-agent systems***

Fundamental Lecture〉 "Intelligent Systems"(0.5), "Optimization Theory"(0.5)

Relational Lecture〉 "Advanced Machine Translation"(0.5), "Language Modeling"(0.5), "Natural Language Understanding"(0.5)

Goal〉 Recently, bottom-up approaches to the intelligent systems designs problems have been proposed based on various reinforcement learning algorithms. This class aims at the understanding of the theory of the algorithms as well as their potentials and limitations through the applications to small-scale systems design problems.

Schedule〉

1. Introduction
2. Reinforcement learning: basic concepts (1)
3. Reinforcement learning: basic concepts (2)
4. Basic reinforcement learning algorithms (1)
5. Basic reinforcement learning algorithms (2)
6. Basic reinforcement learning algorithms (3)
7. Reinforcement learning considering application to real-world tasks (1)
8. Reinforcement learning considering application to real-world tasks (2)
9. Reinforcement learning based on evolution strategies
10. Reinforcement learning based on evolutionary computation
11. Reinforcement learning based on genetic programming
12. Reinforcement learning and robotics (1)
13. Reinforcement learning and robotics (2)
14. Reinforcement learning and multi-agent systems (1)
15. Reinforcement learning and multi-agent systems (2)

Evaluation Criteria〉 Attendance (30%), report (70%)

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197293

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ono (D106, +81-88-656-7509, ono@is.tokushima-u.ac.jp) Mail (Office Hour: 金曜日 15:00~ 17:30)
⇒ Mogami (D102, +81-88-656-7505, moga@is.tokushima-u.ac.jp) Mail (Office Hour: Mon. 15:00–18:00 (Refer to the notice of the department in every year.))

Information and Communication Network

2 units (selection)

Yasutada Oohama · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering, Hitoshi Tokushige · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class provides the knowledge necessary for understanding architecture and fundamental technics of information and communication network.

Outline〉 This lecture is focused on architecture of information and communication network and its fudamental technologies. Particulary, methods of multimedia data transmitting, network architecture and network security are explained in this lecture.

Style〉 Lecture

Keyword〉 ***information and communication network, digital data transmission, network architecture, network security***

Requirement〉 特になし

Notice〉 特になし

Goal〉

1. Architecture of Information and communication network can be learned
2. Fundamental technics for Information and communication network can be learned

Schedule〉

1. Information and communication systems
2. Fundamental technologies of data transmission
3. Digital data transmission (1)
4. Digital data transmission (2)
5. Error control
6. Network architecture
7. Communication line
8. Network security
9. Cryptography Algorithm
10. Digital signature
11. Communication security
12. Authentication protocol
13. Mobile communication systems (1)
14. Mobile communication systems (2)
15. Broadcast systems
16. Assignment

Evaluation Criteria〉 Result is decided by attendance(20%) and Assignment (80%).

Textbook〉 Printed synopsises of lecture are distributed.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197290

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Oohama (C302, +81-88-656-9446, oohama@is.tokushima-u.ac.jp) Mail
⇒ Tokushige (C303, +81-88-656-9447, tokusige@is.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日，火曜日 (17:00-18:00))

Applied Image Processing

2 units (selection)

Kenji Terada · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Stephen Karungaru·Githinji · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class provides the skills and the knowledge of basic and advanced image processing in the industrial field and the robot field.

Outline〉 This class introduces the techniques and applications of image processing necessary for control system and inspection system. This class explains the hardware and software about image I/O systems, high-speed image processing methods and robot vision.

Style〉 Lecture

Keyword〉 ***image processing, pattern recognition, computer vision***

Fundamental Lecture〉 "Image Processing"(1.0), "Pattern Recognition"(1.0)

Goal〉 工業用画像処理システムを構築する際に必要な実用的な技術とロボットの視覚技術等についての知識の習得

Schedule〉

1. concept of industrial image processing
2. image acquisition system
3. principle of lens and light source device
4. hardware of image processing(1)
5. hardware of image processing(2)
6. three dimensional image feature extraction(1)
7. three dimensional image feature extraction(2)
8. shift and shape recognition(1)
9. shift and shape recognition(2)
10. inspection system(1)
11. inspection system(2)
12. robot vision
13. mobile robot
14. micro robot
15. trend of robotics
16. Report

Evaluation Criteria〉 Result is decided by attendance(20%) and reports(80%).

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197171

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Terada (Dr.802, +81-88-656-7499, terada@is.tokushima-u.ac.jp) Mail
(Office Hour: 月，水曜日 15:00~ 17:00(年度ごとに学科の掲示を参照すること))

Web Programming

2 units (selection)

Takao Shimomura · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kenji Ikeda · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class provides the knowledge and skills necessary for efficiently developping Web applications in the Internet, and implementing the software of high quality.

Outline〉 This class introduces Web programming frameworks and Web programming techniques systematically necessary for efficiently developing Web applicatins of high quality, and then explains the development of some Web application systems as practical examples to teach the development skills such as Web design patterns.

Style〉 Lecture

Keyword〉 ***Java, Servlet, JSP, Web applications***

Fundamental Lecture〉 "Programming Methodology"(1.0), "ソフトウェア工学"(1.0)

Relational Lecture〉 "System Administration"(0.5)

Requirement〉 Students are required to hava a good understanding of undergraduate-level Java programming and related subjects.

Goal〉 To understand the system configuration of Web applications that consists clients and a server, and design flexible Web application systems

Schedule〉

1. Web application
2. HTTP/Session
3. Database
4. JSP custom tags
5. Web services
6. Applets
7. JavaScript/AJAX
8. Flash/Flex
9. Web programming frameworks
10. BioPro
11. Internationalization
12. Web programming tips
13. Web programming design patterns
14. Introduction to NisWeb system
15. NisWeb system configuration
16. Assignment

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197137

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Shimomura (C402, +81-88-656-7503, simomura@is.tokushima-u.ac.jp)
Mail (Office Hour: Wed 15:00~ 18:00)

Natural Language Understanding

2 units (selection)

Jun-ichi Aoe · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Masao Fuketa · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Kazuhiro Morita · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This lecture is focused on methods of Natural Language Understanding for human-communication and intelligent text search applications. Particulary, syntax analysis algorithms and semantic analysis technics for various kinds of applications are explained in this lecture.

Outline〉 Understanding is most important technics for the human-communication and the intelligent text search. Efficiency of the technics depend on the relationsips between knowledge dictionaries and analysis algorithms. In this lecture, case-structure with semantic informations and case-analysis algorithms is explained. Moreover, the newest Natural Language Processing systems are introduced with detailed examples. Exercises include Trie structure for the semantic dictionary, understanding for formal document, and understanding for patent documents. This subject of lecture belongs to industrial field.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***dialogue understanding, intention understanding, knowledge dictionary, morphological analysis, patent document***

Fundamental Lecture〉 "自然言語処理"(1.0), "データマイニング"(1.0)

Relational Lecture〉 "Advanced Machine Translation"(0.5), "Language Modeling"(0.5)

Goal〉

1. Technics of Natural Language Understanding, Dialogue Undierstanding and Intention Understanding can be learned.
2. Key search methods in Natural Language Processing can be learned.
3. Technics of Morphological Analysis and Kana-Kanji Translation can be learned.
4. How to describe technical document and patent document based on Language Understanding can be learned.

Schedule〉

1. Introduction
2. Dialogue Understanding
3. Intention Understanding, Report
4. New Information on Composition
5. Design of Composition Structure, Report
6. Knowledge Dectionary
7. Key Search Algorithm
8. Trie Structure, Report
9. Morphological Analysis
10. Kana-Kanji Translation, Report
11. Understanding of Technical Document
12. Exercise for Understanding of Technical Document, Report
13. Understanding of Technical Document
14. Understanding of Patent Ducument
15. Exercise for Understanding of Patent Document, Report
16. Report

Evaluation Criteria〉 Result is decided by attendance(20%) and reports(80%).

Textbook〉 Printed synopsises of lecture are distributed.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197271

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Aoe (Dr604, +81-88-656-7486, aoe@is.tokushima-u.ac.jp) Mail (Office Hour: 木曜日 14:00~ 17:00(年度ごとに学科の掲示を参照すること))

Intelligent CAI

2 units (selection)

Yoneo Yano · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kazuhide Kanenishi · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Hiroaki Ogata · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Hiroyuki Mitsuhara · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Kenji Matsuura · Associate Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Teruaki Ito · Associate Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This course aims to instruct the design methods for intelligent systems from the point of view of new Ergonomics and knowledge engineering.

Outline〉 Computers are being used in Education. In this course, we will instruct about intelligent CAI (Computer Assisted Instruction). Especially, we will talk about the difference between traditional CAI and inteligent one and the applications of ICAI, and user interfaces and teaching strategies based on theories and practices.

Style〉 Lecture

Keyword〉 ***educational technology, learning science***

Fundamental Lecture〉 "Web Programming"(1.0), "Information and Communication Network"(1.0), "Autonomous Intelligent Systems"(1.0)

Relational Lecture〉 "Venture Business (D)"(0.5), "Natural Language Understanding"(0.5), "Presentation Method (D)"(0.5)

Goal〉 You will acquire how to design and implement the system of Intelligent CAI.

Schedule〉

1. Overview of Intelligent CAI, History and theories of CAI
2. Intelligent CAI
3. ITS
4. Learner model, Tutoring model, Theories of CAI
5. Web Based Learning Environment
6. Adaptive Hypermedia, Personalization
7. Game-based Learning
8. CSCL(Theories)
9. CSCL(Systems)
10. Knowledge Management, SNS and Education Support System
11. Mobile Learning Environment(Theories)
12. Mobile Learning Environment(Systems)
13. Ubiquitous Learning Environment(Theories)
14. Ubiquitous Learning Environment(Systems)
15. Summery of Educational Technologies
16. examination

Evaluation Criteria〉 We will grade based on reports (30 poitns) and examinations (70 points). But this is subject to change.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197350

Contact〉

⇒ Yano (C511, +81-88-656-7495, yano@is.tokushima-u.ac.jp) Mail (Office Hour: 火曜日 16 時 ~ 17 時, 水曜日 16 時 ~ 17 時, 金曜日 16 時 ~ 17 時)
⇒ Kanenishi (大学開放実践センター 2 階, +81-88-656-7610, marukin@cue.tokushima-u.ac.jp) Mail
⇒ Ogata (C507, +81-88-656-7498, ogata@is.tokushima-u.ac.jp) Mail (Office Hour: 月曜日 ~ 金曜日:午後 5 時 ~ 6 時)

Advanced Machine Translation

2 units (selection)

Fuji Ren · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 As a research and development field, machine translation (MT) is among the oldest among the various subdisciplines and applications of computer science to the study of natural language. This lecture aims to understand the basic MT technologies and to learn the latest MT theory and new approaches to develope MT system.

Outline〉 This lecture teaches the theory of machine translation (MT) and the technologies of MT systems. Main items in the lecture are syntax analysis, semantic analysis, knowledge processing, world knowledge model, natural-language-processing function, super-function, multilingual processing, etc.

Style〉 Lecture

Keyword〉 ***machine translation, syntax analysis, semantic analysis, super function***

Fundamental Lecture〉 "自然言語処理"(1.0)

Relational Lecture〉 "Natural Language Understanding"(0.5)

Goal〉

1. To understand the basic theory of machine translation (MT).
2. To Master the technique of developing a MT system.
3. To grasp the newest trend of machine translation research.

Schedule〉

1. Introduction
2. Machine translation system
3. Morphological analysis I
4. Morphological analysis II
5. Syntax analysis I
6. Syntax analysis II
7. Semantic analysis I
8. Semantic analysis II
9. Semantic analysis III
10. Context analysis
11. Dictionary
12. Super-Function based MT I
13. Super-Function based MT II
14. Super-Function based MT III
15. Ontology and machine translation
16. Examination

Evaluation Criteria〉 Attendance (30%), report (30%), examination (40%)

Textbook〉 no special book

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197190

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ren (C204, +81-88-656-9684, ren@is.tokushima-u.ac.jp) Mail (Office Hour: 16:00-15:00 Tuesday, 16:00-17:00 Thursday)

Seminor and Exercise in Information Science

6 units (compulsory)

Masami Shishibori · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Masahiko Sano · Associate Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Kenji Ikeda · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Yoshio Mogami · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Masao Fuketa · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Hiroaki Ogata · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Kazuhiro Morita · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Motoyuki Suzuki · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Stephen Karungaru·Githinji · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Shun Watanabe · Assistant Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Kazuyuki Matsumoto · Assistant Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Hitoshi Tokushige · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 Improve presentation skill, writing technique, discussion ability, and basic knowledge about the information technology.

Outline〉 (1) Students groups present the research theses of their research groups and basic of information related to them, (2)Each student introduces information technology and others in English, and (3) Each student presents his/her master's thesis.

Style〉 Practice, Excercise

Goal〉

1. Development of knowlege of information technology.
2. Improvement of writing skill.
3. Improvement of presentation skill.

Schedule〉

1. Orientation
2. Introduction to the research topics of each reaserach group (1)
3. Introduction to the research topics of each reaserach group (2)
4. Introduction to the research topics of each reaserach group (3)
5. Introduction to the research topics of each reaserach group (4)
6. Introduction to the research topics of each reaserach group (5)
7. Introduction to the research topics of each reaserach group (6)
8. Introduction to the research topics of each reaserach group (7)
9. Introduction to the research topics of each reaserach group (8)
10. Introduction to the research topics of each reaserach group (9)
11. Introduction to the research topics of each reaserach group (10)
12. Introduction to the research topics of each reaserach group (11)
13. Introduction to the research topics of each reaserach group (12)
14. Introduction to the research topics of each reaserach group (13)
15. Introduction to the research topics of each reaserach group (14)
16. Information technology on the reserach topics of each reaserch group (1)
17. Information technology on the reserach topics of each reaserch group (2)
18. Information technology on the reserach topics of each reaserch group (3)
19. Information technology on the reserach topics of each reaserch group (4)
20. Information technology on the reserach topics of each reaserch group (5)
21. Information technology on the reserach topics of each reaserch group (6)
22. Information technology on the reserach topics of each reaserch group (7)
23. Information technology on the reserach topics of each reaserch group (8)
24. Information technology on the reserach topics of each reaserch group (9)
25. Information technology on the reserach topics of each reaserch group (10)
26. Information technology on the reserach topics of each reaserch group (11)
27. Information technology on the reserach topics of each reaserch group (12)
28. Information technology on the reserach topics of each reaserch group (13)
29. Information technology on the reserach topics of each reaserch group (14)
30. Poster presentation of Master's thesis
31. Orientation of English presentation
32. English presentation (1)
33. English presentation (2)
34. English presentation (3)

35. English presentation (4)
36. English presentation (5)
37. English presentation (6)
38. English presentation (7)
39. English presentation (8)
40. English presentation (9)
41. English presentation (10)
42. English presentation (11)
43. English presentation (12)
44. English presentation (13)
45. English presentation (14)
46. Orientation of oral presentation of master's thesis
47. Presentation of master's thesis (1)
48. Presentation of master's thesis (2)
49. Presentation of master's thesis (3)
50. Presentation of master's thesis (4)
51. Presentation of master's thesis (5)
52. Presentation of master's thesis (6)
53. Presentation of master's thesis (7)
54. Presentation of master's thesis (8)
55. Presentation of master's thesis (9)
56. Presentation of master's thesis (10)
57. Presentation of master's thesis (11)
58. Presentation of master's thesis (12)
59. Presentation of master's thesis (13)
60. Presentation of master's thesis (14)

Evaluation Criteria〉各期毎の課題の総合点を評価とする.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197356

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tokushige (C303, +81-88-656-9447, tokusige@is.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日, 火曜日 (17:00-18:00))

Laboratory in Information Science

10 units (compulsory)
Teacher of course

Target〉 To conduct research leading to the awarding of masters degrees.

Outline〉 To conduct research in the Natural Language Understanding, Document Processing, Multimedia Information Retrieval, Image Processing, Movie Image Processing, Voice Recognition, Autonomous Agents Design, Internet Security, Intelligent Software, etc (seminars, portfolios etc).

Style〉 Lecture in combination with Portfolio

Keyword〉 ***information science, software engineering***

Notice〉 Course plan differs depending on the laboratory you choose.

Goal〉 To present the results of your research related conferences, departmental research meetings, etc.

Schedule〉

1. After the student selects the subjects, research can be carried out at the laboratory. However, the course contents are as shown below.
2. 中韓機械翻訳におけるスーパー関数の構築について
3. 音声による姓名漢字入力インタフェースに関する研究
4. WWW 画像検索システムにおける有害画像フィルタリング手法に関する研究
5. カラー画像からの標識の自動認識
6. 進化計算による多峰性関数最適化に関する研究
7. blog を対象とした探索収集に関する研究
8. Web カメラを用いた遠隔会議支援システムの開発
9. カラーヒストグラムの情報を用いたカラー画像の局所的な露出補正
10. デザインパターンに基づくリファクタリング方式の研究
11. Web ページの焦点分析技術に関する研究
12. 感情を表現する音声合成の韻律制御に関する研究
13. 時間変化を考慮した語彙と表現の傾向分析に関する研究
14. 競合的情報共有アプローチによる Web 教材オーサリングシステム
15. 感性共有に基づく協調的音楽鑑賞支援に関する研究
16. ユビキタスゲーム型英語学習環境における問題文自動生成に関する研究

Textbook〉 None

Reference〉 Using papers for each research field.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197354

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Committee Member of School Affair

Systems Innovation Engineering — Optical Systems Engineering

Syllabus of Subjects

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Requirement〉 No requierement

Notice〉 2 日間の集中講義が 2 回に分けて実施され，計 4 日間の集中講義の全時間の出席を要する.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property
2. Outline of intellectural property(Patent and Trademark)
3. Outline of intellectural property(Design and Copyright)
4. Patent, invention and invasion of patent
5. Patent, invention and invasion of patent (Case study)
6. Management of intellectural property and use
7. A way of research and development and intellectural property in a future
8. Report subjects (No.1)
9. History of system of intellectural property
10. International trend of system of intellectural property
11. Stetragy of intellectural property on development of techniques
12. Research and invasion of patent right
13. Special lecture on a use of intellectural property by a chief executive officer(1)
14. Special lecture on a use of intellectural property by a chief executive officer(2)
15. Special lecture on a use of intellectural property by a chief executive officer(3)
16. Report subjects (No.2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197348

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Chairman of School Affairs

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197406

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197199

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

Long-term Internship (M)

6 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197361

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned.
2. Understanding of the concept of business model by case study analysis are appreciated.
3. It learns forming ability of business plan through the case study on business models.

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197448

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (M)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197477

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (M)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197195

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (M)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197173

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Theory of Complex System Engineering

2 units (selection)

Tetsushi Ueta · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering, Hiroshi Kawakami · Executive Director / The University of Tokushima

Target〉 comprehension and application of complex systems by using engineering methodlogies

Outline〉 Complex systems are defined as compound dynamical systems whose behavior and features cannot be predicted because of their nonlinearities and connecting conditions. This emergence of behavior is not possible for a single dynamcal system, therefore, connection, coupling, compounding are keywords of this theory. Emergence of rhythm in biological systems, self organization, chaotic properties in high degrees of freedom, learning and associative memory are example features of complex systems. In this lecture, based on physical systems which are ubiquitously found and treated by system engineering subjects, we study analytical methods to understand these phenomena, bifurcation theory of nonlinear and linear systems, applied extraction methods of valuable information from observed data, system design methods of compound dynamical systems.

Style〉 Lecture

Keyword〉 ***complex systems, bifurcation, chaos, nonlinear phenomena***

Fundamental Lecture〉 "Differential Equations (II)"(1.0), "Transient Analysis" (1.0), "Industrial Basic Physics"(1.0)

Relational Lecture〉 "Topics of mathematical physics"(0.5), "Advanced Electrical Control System"(0.5), "Advanced Theory of Electronic Circuits"(0.5)

Requirement〉 none

Goal〉

1. understanding of the definition and target area of complex systems
2. understanding of qualitative approach for given dynamical system
3. understanding and application of bifurcation theory

Schedule〉

1. examples of complex systems
2. relationship between bifurcation problems and complex systems
3. comptation of bifurcation parameter values
4. chaos and bifurcation phenomenon
5. chaotic itinerary
6. emergence mechanism of spatio temporal chaos and its clustering
7. phase transition and synchronization
8. spatio temporal intermittency and emergence of patterns
9. chaos neural network
10. neuronal circuits as complex systems
11. bifurcations in emergence systems
12. analysis of social systems
13. survey on complex systems
14. exercise 1
15. exercise 2
16. questions and answers

Evaluation Criteria〉 The total grade is evaluated by homework reports (70 %) and attendance of the class. (30 %)

Textbook〉 specified every class.

Reference〉 Chaotic Scenario of Complex Systems, Asakura-Shoten, 1996 (in Japanese)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197461

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ueta (AIT 507, +81-88-656-7501, tetsushi@ait.tokushima-u.ac.jp) Mail (Office Hour: Wednesday, afternoon)
⇒ Kawakami (E 棟 3 階北 C-7, +81-88-656-7465, hukugakk@honbu.tokushima-u.ac.jp) Mail

Advanced Theory of Semiconductors

2 units (selection)

Katsushi Nishino · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To understand semiconductor physics and fundamental device operations for various semiconductor devices

Outline〉 Semiconductor physics, especially behavior of carriers in semiconductor, is described. Properties of pn junction and Schottky barrier, including non-ideal case, are also lectured.

Style〉 Lecture

Keyword〉 ***semiconductor, metal-semiconductor contact, pn junction diode***

Relational Lecture〉 "Advanced Device Processing"(0.5), "Advanced Theory of Electron Devices"(0.5), "Advanced Optoelectronic Devices"(0.5)

Goal〉

1. To understand behavior of carries (such as scattering mechanisms) in semiconductor
2. To solve diffusion equations in simple conditions
3. To understand properties of pn junction and Schottky barrier

Schedule〉

1. Crystal Structure
2. Energy Bands
3. Carrier Concentration at Thermal Equilibrium
4. Carrier Transport
5. Phonon
6. High-Field Effect
7. Continuity Equations and Diffusion Equations of Carriers
8. Band Structure of Metal-Semiconductor Contact
9. Current Transport Processes of Schottky Barrier
10. Charcterization of Schottky Barrier Height
11. Ohmic Contact
12. Band Structure of pn Junction Diode
13. Capacitance-Voltage Characteristics of pn Junction Diode
14. Current-Voltage Characteristics of pn Junction Diode
15. Heterojunction
16. Examination

Evaluation Criteria〉 Report 50%, Examination 50%. More than 60% is required to pass this class.

Textbook〉 Physics of Semiconductor Devices, by S.M.Sze

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197419

Contact〉

⇒ Nishino (E 棟 2 階南 A-5, +81-88-656-7464, nishino@ee.tokushima-u.ac.jp) Mail

Advanced Electrical Control System

2 units (selection)

Takashi Yasuno · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This class introduces the basic principle of making to high performance and the intelligence in control system used for an industrial machine. And the control design of various control systems is understood.

Outline〉 The control system configuration used for the industrial machine is described, and applications of intelligent control method using fuzzy reasoning and neural net works are introduced. Moreover, Current topics of fields mentioned avobe are introduced.

Style〉 Lecture and excercise

Keyword〉 ***Motion control, Robotics, Fuzzy, Neural network, Genetic algorithm***

Relational Lecture〉 "Advanced Lecture of Intelligent Information Processing" (0.5), "Advanced Control Theory"(0.5)

Notice〉 The lecture form might be changed according to the number of attending a lecture.

Goal〉

1. The congfiguration of the control system used for an industrial machine should be understood.
2. The intelligent control method should be understood.

Schedule〉

1. Control object
2. Motion control system
3. Two degree-of-freedom control
4. Design method of feedback controller
5. Design method of feedforward controller
6. Fuzzy sets
7. Fuzzy reasoning method
8. Control sysytem application of fuzzy reasoning
9. Artificial neuron model
10. Neural network
11. Learning algorithm of neural network
12. Control system application of neural networks
13. Genetic algorithm
14. Control system application of genetic algorithm
15. Conclusions
16. Return of report or examination

Evaluation Criteria〉 Total evaluation based on Reports or examinations

Textbook〉 The print is distributed.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197311

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yasuno (E 棟 2 階北 B-5, +81-88-656-7458, yasuno@ee.tokushima-u.ac.jp) Mail (Office Hour: Monday, 15:00-17:30)

Advanced Theory of Electrical Communication

2 units (selection)

Takahiro Oie · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding analysing techniques of the communication system and multi-nodes networks.

Outline〉 This lecture is concerned with the study of concept of computer networks which realize the multi-node communication. The contents of those articles related with computer networks are presented at seminars. (Lecture style)

Style〉 Lecture

Keyword〉 ***digital communication, computer networks, network architecture***

Fundamental Lecture〉 "Communication Systems"(1.0), "Applied Communication Engineering"(1.0), "Computer Networks"(1.0)

Requirement〉 Students are required to have a good understanding of undergraduate-level communication engineering and related subjects.

Goal〉

1. Understanding the control techniques and implementation of computer network application.
2. Understanding the secure techniques of the communication system.

Schedule〉

1. Overview of digital communication
2. Mathematical preparation
3. Network architecture
4. Physical layer in fixed and wireless networks
5. Datalink layer in fixed and wireless networks
6. Network layer and routing
7. Transport layer
8. Traffic control
9. Security in fixed and wireless networks
10. Synmetric cryptography and public key cryptography
11. Session layer
12. Presentation layer
13. Application layer
14. Implementation example of application layer (HTTP, SMTP)
15. Implementation example of application layer (DNS, SNMP)
16. Wireless networks

Evaluation Criteria〉 Evaluated by presentations and submitted materials in seminars.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197365

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Oie (E-3F-C-1, +81-88-656-7479, alex@ee.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 16:20~ 17:20, Thursday 16:50~ 17:50)

Advanced Circuit Theory

2 units (selection)

Yoshifumi Nishio · Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering, Yoko Uwate · Assistant Professor / Institute of Technology and Science

Target〉 Analysis method of nonlinear circuits, and behavior of nonlinear oscillatory circuits and its applications are lectured.

Outline〉 Modeling of nonlinear devices, DC analysis and transient analysis of nonlinear circuits, and steady-state analysis are lectured. Synchronization and chaotic phenomena in nonlinear oscillatory circuits are introduced and their applications to information and communication engineering are discussed. (Style: Lecture)

Style〉 Lecture and excercise

Keyword〉 ***nonlinear circuits, circuit analysis, oscillatory circuits***

Fundamental Lecture〉 "Electrical Circuit Theory (I) and Exercise"(0.7), "Electrical Circuit Theory (II) and Exercise"(0.5), "Network Analysis"(0.3)

Relational Lecture〉 "Advanced Theory of Complex System Engineering"(0.5)

Requirement〉 Students are required to know how to analyze basic linear circuits.

Notice〉 Course is taught in English.

Goal〉

1. Understanding of analysis methods of nonlinear circuits.
2. Understanding of behavior of nonlinear circuits and its applications.

Schedule〉

1. Modeling of nonlinear devices.
2. DC analysis of nonlinear circuits by Newton method.
3. Transient analysis of nonlinear circuits.
4. Steady-state analysis of nonlinear circuits (for 4 lectures).
5. Synchronization phenomena in nonlinear oscillatory circuits (for 2 lectures).
6. Chaotic phenomena in nonlinear oscillatory circuits (for 2 lectures).
7. Engineering applications of nonlinear circuits (for 4 lectures).
8. Conclusions and final examination.

Evaluation Criteria〉 Final examination 80% and exercise 20%.

Textbook〉 None.

Reference〉

◇ Akio Ushida and Mamoru Tanaka, "Nonlinear Circuit Simulations," Corona Publishing Co.
◇ S. Smale and M.W. Hirsch, "Differential Equations, Dynamical Systems, and Linear Algebra," Academic Press.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197157

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishio (D-7, E-3F-South, +81-88-656-7470, nishio@ee.tokushima-u.ac.jp) Mail

Human Sensing

2 units (selection)

Minoru Fukumi · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This lecture aims to understand the latest topics in a field of Intelligent systems, and to obtain advanced knowledge and technologies.

Outline〉 This lecture teaches the advanced topics in intelligent systems. The main items in this lecture are softcomputing and human sensing, including face information processing and its computer practice and biological signal processing.

Style〉 Lecture and excercise

Keyword〉 ***soft computing, human sensing, human information processing***

Goal〉

1. To understand the latest topics on Intelligent systems.
2. To learn the trend of a domestic and foreign research on related topics.

Schedule〉

1. Topics in Advanced Intelligent Systems
2. Topics in Advanced Intelligent Human Sensing
3. Topics in Brain Information Processing
4. Topics in Advanced Softcomputing techniques
5. Psychological Knowledge and Neural Network Model
6. Topics in Advanced Face Information Processing
7. Topics in Advanced Biosignal Processing
8. Topics on applications in Advanced Softcomputing techniques
9. Statistical Learning Algorithms
10. Topics in Eye Tracking and Its Applications
11. Topics in OpenCV applications
12. Topics in EMG and EEG researches
13. Exercise in Advanced Intelligent Systems
14. Exercise in Softcomputing
15. Exercise in Human Information Processing
16. Discussion

Evaluation Criteria〉 Attendance (30%), practice(10%), report (60%)

Textbook〉 no special book

Reference〉 講義 · 演習中に指定する.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197355

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Fukumi (D210, +81-88-656-7510, fukumi@is.tokushima-u.ac.jp) Mail
(Office Hour: 金曜日,15~ 18時)

Note〉 ゲストスピーカーを招聘して講義 · 演習を行う場合がある.

Photonic Device

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the principle of the current optoelectronic devices, e.g., Light Emitting Diodes, Laser Diodes and so on. To develop ability to solve various problems in optical device application.

Outline〉 This course will cover topics on current optical and optoelectronic devices. Topics treated include Light Emiiitng Diode, Laser Diode, Solar Cell, Optical Modulator and Nonlinear Optical Devices.

Style〉 Lecture

Keyword〉 ***optoelectronic device, optical device, light emitteing diode, laser diode, optical modulator, Solar cell***

Relational Lecture〉 "Optical propertics of materials"(0.5), "Lecture in Optical Materials and Devices, Part 1"(0.5)

Requirement〉 Students should have fundamental knowledges about semiconductor physics and devices for undergraduate students.

Goal〉

1. Students can explain the principle and structures for light emitting devices.
2. Students can explain the principle and structures for photodetector and solar cell.
3. Students can explain the principle of light modulators.
4. Students can explain the principle of nonlinear optical devices.

Schedule〉

1. Introduction
2. Interaction between Light and dielectric materials
3. Optical properties of semiconductors
4. Semiconductor PN-junction
5. Light emitteing diode I
6. Light emitteing diode II
7. Laser diode I
8. Laser diode II
9. Photoconductor Cells
10. pin photodiode
11. avalanche photodiode
12. Solor cell and amorphus-semiconductor optoelectronic devices
13. Optical Modulator
14. Nonlinear optical devices
15. Integrated Optical Devices
16. Final Examination

Evaluation Criteria〉 Activity: 20%, Reports: 40% and Final Exam.:40%

Textbook〉 中澤，鎌田著，光物性・デバイス工学の基礎，培風館 1999

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197440

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp) Mail (Office Hour: 16:05-18:00)

Electronic display

2 units (selection)

Shiro Suyama · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the history of developments, technical trends, and technologies of electronic display.

Outline〉 This course will cover the history of developments, technical trends, recent topics, and technologies of an electronic display. This course is related to indutories.

Style〉 Lecture

Notice〉 光の性質，光学的な現象については，既知とする．

Goal〉

1. To understand fundamental technologies of an electronic display
2. To understand fundamental technologies of devices for an electronic display
3. To understand a technical trend of an electronic display

Schedule〉

1. 電子ディスプレイの概要，最近の動向
2. 電子ディスプレイおよび画像システムの概要
3. 直視型: 陰極線管 (ブラウン管，CRT)，テレビジョン
4. 直視型: 液晶の概要と液晶ディスプレイ (LCD) の基本動作
5. 直視型: 各種の液晶ディスプレイと特性改善
6. 直視型: プラズマディスプレイ (PDP)
7. 直視型: エレクトロルミネッセンス (EL) ディスプレイ
8. 直視型: フィールドエミッションディスプレイ (FED)
9. 超大型: 投射型ディスプレイ
10. 超大型: 最新の投射型ディスプレイ，屋外用大型 LED ディスプレイ
11. 電子ディスプレイの画質と視覚特性
12. 電子ディスプレイの画質とその評価
13. 立体ディスプレイ: 概要
14. 立体ディスプレイ: 2 眼/多眼方式
15. 立体ディスプレイ: 超多眼方式などの最新の動向

Evaluation Criteria〉 Evaluation with report

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197368

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Suyama (opt409, +81-88-656-9425, suyama.shiro@opt.tokushima-u.ac.jp)
Mail (Office Hour: 17:00~ 18:00)

Superconductivity and superconducting materials

2 units (selection)

Yutaka Kishimoto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand basics and recent developments in superconductivity.

Outline〉 This class reviews quantum mechanics and introduces superconductivity and recent superconducting materials.

Style〉 Lecture

Keyword〉 ***superconductivity, Cooper pair, superconducting energy gap, density of states, anisotropic superconductivity***

Goal〉 To understand the outline of superconductivity.

Schedule〉

1. Introduction to superconductivity
2. Review of quantum mechanics (1), Schrödinger equation and wave function
3. Review of quantum mechanics (2), operators and expected values
4. Review of quantum mechanics (3), perturbation theory
5. Free electron model of metals
6. Phenomenological theory of superconductivity
7. To understand Meissner effect on the basis of quantum mechanics
8. Formation of Cooper pair
9. Formation of superconducting energy gap
10. Density of states, and energy gap at finite temperatures
11. Introduction to Nuclear Magnetic Resonance method
12. Frontier of superconductivity (1), strong coupling superconductor
13. Frontier of superconductivity (2), heavy Fermion superconductor
14. Frontier of superconductivity (3), copper oxide high Tc superconductor
15. Summary

Evaluation Criteria〉 Reports on several subjects in the class.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197364

Contact〉

⇒ Yutaka Kishimoto (A202)

Topics of mathematical physics

2 units (selection)

Shigeaki Nagamachi · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 We study the quantum computing.

Outline〉 We study the elementary theory of numbers and group theory in order to understand RSA cryptography based on the difficulty of factorization for a big number. We study the theory of Hilbert spaces and their operators to understand Shor's fast factorization algorithm for quantum computers.

Goal〉 Understanding the principle of quantum computation

Schedule〉

1. Group theory 1
2. Group theory 2
3. Number theory 1
4. Number theory 2
5. RSA cryptography
6. Shor's factirization algorithm 1
7. Hilbert space
8. Operators on Hilbert space
9. Quantum mechanics 1
10. Quantum mechanics 2
11. Quantum information
12. Quantum circuits
13. Quantum Fourier transformation
14. Shor's factorization algorithm 2
15. The complexity of Shor's factorization algorithm
16. Reserve day

Textbook〉 Mika Hirvensalo, Quantum Computing, Springer (2004)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197309

Methods for analysis of mathematical phenomena

2 units (selection)

Hitoshi Imai · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering, Cheng-Hai Jin · Professor / International Center

Target〉 To learn the to analyze the mathematical phenomena.

Outline〉 Methods used in analysis of mathematical phenomena are introduced. Especially, those in numerical analysis are focused on.

Style〉 Lecture

Keyword〉 ***mathematics, numerical analysis***

Fundamental Lecture〉 "Numerical Analysis"(1.0)

Relational Lecture〉 "Advanced Computational Science"(0.5)

Requirement〉 Only the premise that have studied basic mathematics.

Goal〉 The adequacy of the two-dimensional boundary value problem governed by the Poisson equation can be understood by the finite difference method, etc.

Schedule〉

1. Introduction to computer
2. Common sense in numerical computation
3. High-speed computation (Parallel computing)
4. Finite difference method I
5. Finite difference method II
6. Finite difference method III
7. Finite difference method IV
8. Finite element method I
9. Finite element method II
10. Finite element method III
11. Finite element method IV
12. Boundary element method I
13. Boundary element method II
14. Boundary element method III
15. Iterative method

Evaluation Criteria〉 Evaluation by the report.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197306

Contact〉

⇒ Imai(A220, +81-88-656-7541, The inquiry by means of the cellular phone or E-mail is not acceptable) (Office Hour: Office hours: Thursday 14:00-15:00)

Advanced Computational Science

2 units (selection)

Toshiki Takeuchi · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class provides the basic technology for numerical calculation for the differential equation.

Outline〉 The numerical calculation methods for the differential equation are introduced.

Style〉 Lecture

Keyword〉 ***numerical analysis, numerical computation, differential equation***

Fundamental Lecture〉 "Numerical Analysis"(1.0), "Basic Mathematics/微分積分学 I"(1.0), "Basic Mathematics/微分積分学 II"(1.0)

Relational Lecture〉 "Methods for analysis of mathematical phenomena"(1.0), "Numerical Analysis"(1.0)

Requirement〉 Students have to understand basic mathematics of undergraduate-level.

Goal〉 To understand principle of numerical calculation methods.

Schedule〉

1. Introduction to numerical simulation
2. Mathematical model
3. Lagrange interpolation
4. Spline interpolation
5. Least squares method
6. Finite difference method
7. Arbitrary precision formula
8. Application to ordinary differential equation
9. Application to partial differential equation
10. Gauss-Seidel method
11. Successive Over-Relaxation method
12. Explicit method
13. Implicit method
14. Crank-Nicolson method
15. Numerical instabilities

Evaluation Criteria〉 Assignments count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197212

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Takeuchi (A206, +81-88-656-7544, takeuchi@pm.tokushima-u.ac.jp) Mail
(Office Hour: 木曜日 14:00-15:00)

Optical propertics of materials

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the princeple of optical response of atoms, melecules and crystals. To develop ability to apply such optical phenomena to applications.

Outline〉 With quantum mechanics, we lecture optical process of materials. This course will cover the following topics: optical propaties of materials for enegineering, classical electromagnetic theory and optical property, optical transitions and optical process of atoms, molecules and semiconductors.

Style〉 Lecture

Keyword〉 ***quantum mechanics, condensed matter, optical process, semiconductor***

Relational Lecture〉 "Photonic Device"(0.5), "Lecture in Optical Materials and Devices, Part 1"(0.5)

Requirement〉 Students should have fundamental knowledges of quamtum mechanics.

Goal〉

1. Students can explain the optical processes of atoms and molecules.
2. Students can explain the optical processes in semiconductors.

Schedule〉

1. Introduction
2. Optical response described by classical electro-magnetic theory
3. Schroedinger equation and wave fuction
4. Hydrogen atom model
5. spin angular momentum
6. Quantum mechanics of light
7. Transition induced by interaction between electron state and light
8. Light absorption and emittion
9. Electron transition in atoms and molecules
10. Optical spectra of atoms and molecules
11. Optical spectra of organic molecules
12. Energy bands in condensed matters
13. Optical processes in semiconductors
14. Optical spectra of impurity atoms in a crystall
15. Optical process of P-N junction
16. Final Examination

Evaluation Criteria〉 Activity: 20%, Reports: 40% and Final Exam.:40%

Textbook〉 中澤，鎌田著，光物性 · デバイス工学の基礎，培風館 1999

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197446

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp)
Mail (Office Hour: 16:05-18:00)

optics of crystal

2 units (selection)

Atsushi Mori · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Lectures will be given on optics of crystals. Supplement will be given on crystallography

Outline〉 After introducing the concept of the symmetry through the lectures on crystallography, propagation of electromagnetic wave in an anisotropic medium will be explained on the basis of the Maxwell equation.

Style〉 Lecture

Keyword〉 ***crystal symmetry, anisotropy, Maxwell's equations***

Notice〉 The lecture will be given in Einglish and complemented by Japanese.

Goal〉 Fresnel's equation of wave normal

Schedule〉

1. crystallography, symmetry
2. The Maxwell equation in homogeneous case
3. The dielectric tensor of an anisotropic medium
4. The structure of a monochromatic plane wave in an anisotropic medium
5. Fresnel's formulae for propagation of light in crystal
6. Geometrical constructions for determining the velocities of propagation and the directions of vibration
7. Exercise
8. Report
9. Optical properties of uniaxial and biaxial crystals
10. Refraction in crystal
11. Measurements in crystal optics
12. Interference with crystal plates, Interference figures
13. Stress birefringence and form birefringence
14. Jones' calculus
15. Exercise
16. Report

Evaluation Criteria〉 Evalated on the basis of the reports. If marked by at least 60% he/she will be successfully passed.

Textbook〉 Born and E. Wolf, "Principles of optics" (Cambridge University Press)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197216

Contact〉

⇒ Mori (Opt.407, +81-88-656-9417, mori@opt.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワーは，学科の掲示板等をご覧下さい．)

Advanced lecture on optical communication system

2 units (selection)

Nobuo Goto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Development and furure prospect of broadband large-capacity networks are studied. In particular, photonic network and its key elements such as photonic router and switch are discussed with their principle.

Outline〉 1. Optical network, 2. Optical communication technology, 3. Development of bandwidth and speed in optical networks, 4. Network layer model and protocol, 5. Routing algorithm, 6. Router, 7. Photonic networks

Style〉 Lecture

Goal〉 1. Understanding of architecture of optical network and functions of its elements, 2. Understanding of fundamental technology in optical fiber amplifiers and wavelength division multiplexing, 3. Understanding of hierarchical model and protocol for network, 4. Understanding of functions in routers, 5. Understanding of development in photonic networks.

Schedule〉

1. Feature of optical network
2. Optical transmission system
3. Optical fiber amplifiers
4. Wavelength division multiplexing technology
5. Development of electronic devices and its rules
6. Internet and broadband networks
7. Wavelength division multiplexing and wavelength routing
8. Development of information networks
9. Hierarchical model and protocol
10. Fundamental functions of router
11. Development of high-speed routers
12. Protocol and algorithm in IP routing
13. Photonic networks
14. Photonic routing technology
15. Summary
16. Report hand in

Evaluation Criteria〉 Attitude toward lecture (40%), Report (60%). More than 60% of the total score is required.

Textbook〉 Y. Suematsu and K. Iga, Introduction to optical fiber communication, Ohm-sha, 2006

Reference〉 Y. Suematsu and K. Kobayashi, Photonics-Optical electronics and its development, Ohm-sha, 2007

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197433

Contact〉

⇒ Goto (opt408, +81-88-656-9415, goto@opt.tokushima-u.ac.jp) Mail (Office Hour: 8:30-17:00)

Macromolecular Design

2 units (selection)

Hitoshi Tanaka · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 This class introduces the generation and functionality of natural and synthetic polymers, in molecular scale, with a view to designing a functional polymer precisely.

Outline〉 Chemical macromolecular (polymer) design at an advanced level will be covered in this cource. Emphasis is on the analysis, in atomic scale, of the factors which fulfill the unique polymerizations and the speciality of polymers on the basis of the recognition of polymerization-polymer microstructure-polymer functionality relationships. Application of the analytical information to macromolecular design and recent topics in the design will also be provided in this cource.

Keyword〉 ***macromolecular design, polymer chemistry, functional polymer***

Relational Lecture〉 "Lecture in Optical Materials and Devices, Part 3"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level polymer chemistry

Goal〉

1. To understand the control of polymerization and polymer structure
2. To understand the characterization and functionality of polymer

Schedule〉

1. Introduction to macromolecular design
2. Generation and functionality of natural polymers (1)
3. Generation and functionality of natural polymers (2)
4. Generation and functionality of natural polymers (3)
5. Preparation and functionality of synthetic polymers (1): optical polymers
6. Preparation and functionality of synthetic polymers (2): optical polymers
7. Preparation and functionality of synthetic polymers (3): photo and biodegradable polymers
8. Preparation and functionality of synthetic polymers (4): photo and biodegradable polymers
9. Preparation and functionality of synthetic polymers (5): magnetic polymers
10. Preparation and functionality of synthetic polymers (6): magnetic polymers
11. Nanomaterials (1)
12. Nanomaterials (2)
13. Topics in macromolecular design (1)
14. Topics in macromolecular design (2)
15. Topics in macromolecular design (3)

Evaluation Criteria〉 Evaluation by a term paper.

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197233

Contact〉

⇒ H. Tanaka (Opti. Build. Room 211, Phone & Fax: 088-656-9420, E-mail: tanaka@opt.tokushima-u.ac.jp)

Advanced Materials Chemistry

2 units (selection)

Yoshihiko Tezuka · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 This course intends to develop the knowledge of materials in physics, chemistry, crystallography, polymer, and semiconductors, which has been acquired in undergraduate, through the rearrangement of these knowledge in terms of the electronic states, constituting atoms and molecules, and interactions between them. The objective of the course is to develop ability to understand materials from the viewpoints of various fields.

Outline〉 Structures, properties, functions and synthesis of various materials will be explained in term of chemistry to understand materials chemistry which constitutes one of the bases of materials science. Fullerenes and their derivatives will be taken up as recent topics to explain the relationship between molecular structures and physical properties.

Goal〉

1. to enable a student to develop applications of materials by the estimation of their properties from the atoms and molecules constituting them.
2. to enable a student to develop applications of materials by the estimation of their electric and electronic properties from the electronic states.

Schedule〉

1. Introduction to materials and chemistry
2. Classification of materials according to their crystalline states and molecular aggregation states
3. Crystalline materials
4. Amorphous materials (glass, silicone, metals)
5. Molecular aggregate (micelle, liquid crystalline, gels)
6. Classification of materials according to their electronic states
7. Experimental methods for the evaluation of electric properties of materials
8. Dielectric materials (1): ceramics
9. Dielectric materials (2): polymers
10. Electrochemical properties of semiconductors (1): inorganic semiconductors
11. Electrochemical properties of semiconductors (2): organic semiconductors
12. Electronic interactions between metals and semiconductors
13. Electronic interactions between semiconductors and redox species in solutions
14. Carbon materials: molecular structures and electronic states of fullerenes
15. Carbon nanotubes
16. A term examination

Evaluation Criteria〉 Reports worth a total of 50% of the course grade will be given. A term examination (50%) will be given as in-class closed-book examination.

Textbook〉 will be introduced in the lecture.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197462

Contact〉

⇒ Tezuka (Opt.307, +81-88-656-9423, ytezuka@opt.tokushima-u.ac.jp) Mail

Optical computing

2 units (selection)

Shiro Suyama · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand analog optical computing. To understand digital optical computing. To understand optelectronic computing.

Outline〉 We study fundamantal technologies of architectures, implementation, and packaging in analog and digital optical processing, and prototype system developed with these technolgies. We also study recent technologies in related photonics, electronics, and other technologies.

Style〉 Lecture

Goal〉

1. To understand optical computing
2. To create new information photonics

Schedule〉

1. Fundamentals of optical computing (1)
2. Fundamentals of optical computing (2)
3. Fundamentals of optical computing (3)
4. Light source and detector in optical computing
5. Optical modulator in optical computing
6. Analog optical computing (1)
7. Analog optical computing (2)
8. Digital optical computing (1)
9. Digital optical computing (2)
10. Optica memory
11. Optica communication
12. Recent optical computing technology (1)
13. Recent optical computing technology (3)
14. Recent optical computing technology (3)
15. Recent optical computing technology (4)

Evaluation Criteria〉 Evaluated with reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197428

Student〉 Able to be taken by only specified class(es)

Virtual Reality

2 units (selection)

Noboru Niki · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Introduction to the fundamental concepts of virtual reality.

Outline〉 Virtual Reality is a combination of human interface, graphics, sensor technology, high performance computing, and networking. It allows the user to interact with an artificial environment created by computers. Using these technologies, one has the feeling of total immersion in a new environment. Here, these technologies and several VR simulations are described.

Requirement〉 It is desired to finish a course of digital signal processing, image processing, and pattern recognition .

Notice〉 限られた時間内で講義内容を理解して課題をこなす ことは困難であるので，予習・復習をすること.

Goal〉

1. To understand fundamentals of virtual reality.
2. To understand various techniques for realizing virtual environments.

Schedule〉

1. 1. Introduction
2. Mathematical Fundamentals (Image Processing)
3. Mathematical Fundamentals (Pattern Recognition)
4. Computer Graphics
5. Three-dimensional Coordinate System
6. Geometrical Modeling
7. Hidden Line and Surface Removal Methods
8. Advanced Rendering Topics
9. Real Time Computer Graphics
10. Image Processing of Motion Pictures
11. Image Sensing Technology
12. Virtual Reality Systems
13. Augmented Reality Systems
14. Advanced Applications of Virtual Reality 1
15. Advanced Applications of Virtual Reality 2
16. Final Examination

Evaluation Criteria〉 Project Report 60%, Final Examination 40%

Textbook〉 Reference books are introduced to each topic.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197415

Three-dimensional Image Processing

2 units (selection)

Yoshiki Kawata · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Introduce the fundamental concepts of 3-D image processing.

Outline〉 This course is intended to introduce the fundamentals of three-dimensional image processing which covers basic concepts as image restoration, image segmentation, registration, shape representation, and computational geometry etc. The class begins with a brief overview of the various technologies used to analyze medical and industrial images. The focus then shifts to in-depth descriptions of individual algorithms beginning with a description of the mathematical technique of image processing. The course emphasizes the design, analysis, and implementation of algorithms in the context of 3-D medical images.

Keyword〉 ***3-D image processing, medical image analysis,*** **工業計測**

Relational Lecture〉 "Virtual Reality"(0.5)

Requirement〉 It is desired to finish a course of digital signal processing, image processing, and programming (C or C++).

Notice〉 限られた時間内で講義内容を理解して課題をこなすことは困難で あるので，予習・復習をすること.

Goal〉

1. To understand fundamentals of 3-D image processing.
2. To understand various 3-D image processing algorithms used to obtain medical and industrial fields

Schedule〉

1. Introduction to 3-D image processing
2. Signal Processing Fundamentals
3. 3-D imaging technology
4. 3-D image smoothing
5. 3-D image enhancement
6. Edge / region based segmentation
7. Deformable model segmentation
8. Graph cut segmentation
9. Geometrical properties of 3-D images- local feature of a connected component-
10. Geometrical properties of 3-D images- Calculation of the Euler number-
11. Surface/axis thinning algorithm
12. Morphology filter
13. Distance transformation
14. 3-D differential features
15. 3-D registration

Evaluation Criteria〉 Computer Project Report 100%

Textbook〉 3 , 2002

Reference〉

- ◇ Medial Imaging Signals and Systems, J.L. Prince, J.M. Links, 2006
- ◇ image Processing, Analysis, and Machin Vision, M. Sonka, V. Hlavac, R. R. Boyle, Thomson, 2008

Webpage〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197132

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197132

Contact〉

⇒ Kawata (Opt.508, +81-88-656-9431, kawata@opt.tokushima-u.ac.jp) Mail

Note〉 The computer projects should be done in C or C++.

Lecture in Optical Materials and Devices, Part 1

1 unit (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Part-time Lecturer

Target〉 To understand the current trends of the optical and/or optoelectronic materials and devices.

Outline〉 This course will cover several several topics on the current trends of the optical and/or optoelectronic materials and devices. Topics treated are focused on the latest fabrication technology and the research for the device application.

Style〉 Lecture

Keyword〉 ***semiconductor, LED, laser diode***

Relational Lecture〉 "Photonic Device"(0.5), "Optical propertics of materials"(0.5)

Requirement〉 Students must have enough knowledges of semiconductor physics comparable to contents in lectures on semiconductor physics for undergraduate students.

Goal〉

1. To understand advantages of Nitride semiconductors compared with other semiconductors.
2. To understand the outline of technologies for fabrication process of optoelectronic devices
3. To understand trends of developments and researches for optoelectronic devices

Schedule〉

1. guidance
2. semiconductor materials for optoelectronic devices
3. Advantages of Nitride semiconductor
4. Fabrication of optoelectronic devices by Nitride semiconductor
5. Principle of light emitting diode and laser diode
6. History of development for semiconductor light emitting deices
7. Trends on the development of high power light emitting diode
8. Trends on the development of UV light emitting diode
9. Trends on the development of UV and Blue laser diodes
10. Applications of light emitting diode
11. Applications of laser diode
12. 予備日

Evaluation Criteria〉 Activity and attendance 40%, reports 60%

Textbook〉 no text

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197424

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp)
Mail (Office Hour: 16:10~ 18:00)

Lecture in Optical Materials and Devices, Part 2

1 unit (selection)

Nobuo Goto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Optical devices are key elements for optical information processing systems and optical communication systems. It is important to understand the basic effects and principle used in optical wave control. In this lecture, mathematical description of optical passive devices, optical circuits, interaction between optical waves and materials, and nonlinear optical effects is discussed. Basic technology for designing of optical devices and optical circuits is described.

Outline〉 1. Optical passive circuits, 2. Interaction between optical waves and materials, 3. Control of optical waves, 4. Optical nonlinear effects

Style〉 Lecture

Keyword〉 ***optical waveguide, optical functional device, optical wave control***

Fundamental Lecture〉 "Advanced lecture on optical communication system"(1.0)

Relational Lecture〉 "Photonic Device"(0.5)

Goal〉 1. Understanding of mathematical description of materials for optical wave control, 2. Understanding of mathematical analysis of optical waves in materials, 3. Understanding of description and analysis of optical devices and circuits.

Schedule〉

1. Optical waveguide and optical wave propagation
2. Analysis of directional coupled waveguides
3. Analysis of optical passive circuits consisting of coupled waveguides
4. Analysis of Bragg reflection waveguides
5. Electro-optic effects and wave control in crystal
6. Magneto-optic effect and wave control
7. Acousto-optic effect and wave diffraction
8. Optical nonlinear effect

Evaluation Criteria〉 Attitude toward lecture (40%), Report (60%). More than 60% of the total score is required.

Textbook〉 T. Jinpo ed., Optical electronics, Ohm-sha, 1997.

Reference〉

◇ Y. Suematsu and K. Iga, Introduction to optical fiber communication, Ohm-sha, 2006.
◇ T. Kurokawa, Optical functional device, Kyoritsu, 2004.
◇ H. Nishihara, M. Haruna and T. Suhara, Optical integrated circuits, Ohm-sha, 1985.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197425

Student〉 Able to be taken by student of other faculty and university

Contact〉

⇒ Goto (opt408, +81-88-656-9415, goto@opt.tokushima-u.ac.jp) Mail (Office Hour: 8:30-17:00)

Lecture in Optical Materials and Devices, Part 3

1 unit (selection)

Hitoshi Tanaka · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Part-time Lecturer

Target〉 This class addresses the recognition of the optical materials and devices from a chemical point of view.

Outline〉 This cource will focus on the fundamentals and current topics in chemical preparaton, reaction, structure, and functionality of the optical materials and devices.

Keyword〉 ***photo-functional materials***

Relational Lecture〉 "Macromolecular Design"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level photochemistry.

Goal〉

1. To understand the exact nature of the optical properties of materials.
2. To understand the precise procedure to design and evaluate the optical materials and devices.

Schedule〉

1. Introduction to optical materials and devices for this class
2. Photo and thermal reactions
3. Photochemical process
4. Photophysicalchemistry
5. Interaction between light and media (1)
6. Interaction between light and media (2)
7. Interaction between light and media (3)
8. Final test, summary

Evaluation Criteria〉 Final test: 100%

Textbook〉 Hikarikinoubunshi no Kagaku ed. by K. Horie and H. Ushiki (Kodansha)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197427

Contact〉

⇒ H. Tanaka (Opti. Build. Room 211, Phone & Fax: 088-656-9420, E-mail: tanaka@opt.tokushima-u.ac.jp)

Lecture in Optical Information Systems, Part 1

1 unit (selection)

Shiro Suyama · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Undecided

Target〉 Introduction to recent topics on optical information processing.

Outline〉 This course introduces recent technical information on optical information processing and the required future technology.

Keyword〉 ***infomation photonics, optical computing***

Goal〉

1. To understand the recent topics of optical information systems
2. To consider a next generation of optical information systems

Schedule〉

1. History of the development of optcail information instruments
2. Recent topics of optical disk systems (1)
3. Recent topics of optical disk systems (2)
4. Recent topics of optical disk systems (3)
5. Recent topics of optical disk systems (4)
6. Recent topics of display systems (1)
7. Recent topics of display systems (2)
8. Recent topics of display systems (3)
9. Recent topics of display systems (4)
10. Recent topics of optical information systems (1)
11. Recent topics of optical information systems (2)
12. Recent topics of optical information systems (3)
13. Recent topics of optical information systems (4)
14. Next generation of optical information systems (1)
15. Next generation of optical information systems (2)

Evaluation Criteria〉 Report 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197437

Lecture in Optical Information Systems, Part 2

1 unit (selection)

Noboru Niki · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Introduction to recent topics on imaging technologies and intelligent image processing.

Outline〉 This course introduces recent technical information on imaging technologies and intelligent image processing and describes their future directions.

Keyword〉 ***imaging technologies, intelligent image processing***

Relational Lecture〉 "Three-dimensional Image Processing"(0.5), "Virtual Reality" (0.5)

Notice〉 限られた時間内で講義内容を理解して課題をこなす ことは困難であるので，予習・復習をすること.

Goal〉 To understand the recent topics on imaging technologies and intelligent image processing.

Schedule〉

1. Recent topics of three-dimensional CT technologies (1)
2. Recent topics of three-dimensional CT technologies (2)
3. Recent topics of three-dimensional CT technologies (3)
4. Recent topics of three-dimensional CT technologies (4)
5. Recent topics of three-dimensional CT technologies (5)
6. Recent topics of MR imaging technologies (1)
7. Recent topics of MR imaging technologies (2)
8. Recent topics of MR imaging technologies (3)
9. Recent topics of MR imaging technologies (4)
10. Recent topics of MR imaging technologies (5)
11. Recent topics of intelligent image processing (1)
12. Recent topics of intelligent image processing (2)
13. Recent topics of intelligent image processing (3)
14. Recent topics of intelligent image processing (4)
15. Recent topics of intelligent image processing (5)

Evaluation Criteria〉 Report 100%

Textbook〉 Reference books are introduced to each topic.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197438

lecture in optical system engineering

1 unit (selection)
Part-time Lecturer

Target〉 topics in optical technology

Outline〉 Lecure on the trend in optical technologies such as nano-technology, bio-technology, and information communication, and medical science.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197436

Practice of presentation

1 unit (selection)
Teacher of course

Target〉 Learning a skill of presentation

Outline〉 Fundamental skills for the presentation are learned such as (1) to explain the contents of research, (2) to adjust the contents with audience's level, (3) to create the original drawing, and (4)the way of answering against a question etc.

Keyword〉 ***oral presentation***

Goal〉 Learning a foudamental skill for presentation

Schedule〉

1. Presentation (1)
2. Presentation (2)
3. Presentation (3)
4. Presentation (4)
5. Presentation (5)
6. Presentation (6)
7. Presentation (7)
8. Presentation (8)
9. Presentation (9)
10. Presentation (10)
11. Presentation (11)
12. Presentation (12)
13. Presentation (13)
14. Presentation (14)
15. Presentation (15)

Evaluation Criteria〉 Presentation skill (80%), Attitude(20%)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197475

Student〉 Able to be taken by only specified class(es)

Intellectual Production Techonology Seminar

1 unit (selection)
Teacher of course

Target〉 To master skills for novel intellectual production

Outline〉 As one of technique for for novel intellectual production, practice mehods those are the combination of brainstorming and KJ mathod

Goal〉

1. To understand what is intellectual production techonology
2. To use an intellectual production techonology that is combination of brainstorming and KJ method

Schedule〉

1. neccessary
2. Hhow to practice
3. what is brainstorming
4. practice of brainstorming
5. case studies
6. what is KJ method
7. practice of KJ method
8. practice of KJ method
9. practice of KJ method
10. case studies
11. practice of KJ method
12. practice of KJ method
13. practice of KJ method
14. case studies
15. presentation
16. 予備日

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197351

Advanced Lecture on Semiconductor Nanotechnology

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This class introduces basic principles of the semiconductor nanotechnology and their application to the quantum devices.

Outline〉 Basics of semiconductor physics and quantum mechanics are introduced to understand material properties of quantum confined nanostructures. Recent progress in fabrication techniques and device applications of semiconductor nanostructures (quantum wells, wires and dots) will be reviewed.

Style〉 Lecture

Keyword〉 ***quantum confined nanostructures, semiconductor nanoscience, electron devices, photonic devices***

Requirement〉 None.

Notice〉 None.

Goal〉 To understand basic properties of semiconductor nanostructures and quantum devices.

Schedule〉

1. Introduction to semiconductor nanostructures
2. Electronic states in quantum confined structures
3. Electrical properties of superlattices
4. Fabrication technique of quantum wires and wells
5. Characterization of heterointerfaces
6. Characterization of nanostructures
7. High-speed electron devices
8. Optical properties of quantum wells
9. Semiconductor laser diodes
10. Quantum effect devices
11. Fabrication technique of quantum dots
12. Quantum dot devices
13. Device application of quantum nano structures
14. Recent topics of semiconductor nanotechnology (1)
15. Recent topics of semiconductor nanotechnology (2)

Evaluation Criteria〉 Assignments count 100%

Textbook〉 None.

Reference〉 The Physics of Low-Dimensional Semiconductors, J.H. Davis, Springer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197421

Student〉 Any students can attend the class.

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

⇒ Kitada (A224, +81-88-656-7671, kitada@frc.tokushima-u.ac.jp) Mail (Office Hour: Mon. 10:00-14:00)

Optical System Eigineering Seminar, Part 1

2 units (compulsory)
Teacher of course

Target〉 Through seminars concerning the thema of the master's thesis, to learn the wide culture and professional knowledge, to have interest in unknown arer, and to obtain ability to learn spontaneously knowledges which are lacked.

Outline〉 To discuss on the paper concering the thema of the master's thesis in a semin with proffesors, and make presentation on those contents and results under development in student's research work.

Goal〉

1. to master wide varieties in cultur in optical system engineering and ability to apply them
2. to master professional knowlegdes in optical system engineering and ability to apply them
3. to have interest in unknown area in optical system engineering and spontaneouly learn knowledges which are lacked

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197434

Optical System Eigineering Seminar, Part 2

4 units (compulsory)
Teacher of course

Target〉 Through seminars concerning the thema of the master's thesis, to learn the professional knowledges and skills, to obtain the ability to apply them , to obtain ability to learn spontaneously knowledges which are lacked, and furthermore to developm the comunication and roles in the research work, and to obtain the ability to make management in collaboration project.

Outline〉 To discuss on the paper concering the thema of the master's thesis, and make presentation in the student's research group.

Goal〉

1. to master professional knowklegdes and skills in optical system engineering and ability to apply them
2. to learn knowledges which are lacked in optical system engineering
3. to develop the communication and role in the research work and to manage the collaboration project

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197435

Optical System Engineering Laboratory

6 units (compulsory)
Teacher of course

Outline〉 Experiment concerning master's thesis.

Goal〉

1. to master knowlegdes and skills in engineering and ability to apply them
2. ability fo find problems, set up, analize, and solve
3. spontaneouly learn knowledges if lacked

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197432

Chapter 2

DOCTOR's DEGREE

Intelligent Structures and Mechanics Systems Engineering — Civil and Environmental Engineering

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)
Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Engineering of Correlated Electron Matter

2 units (selection)

Yutaka Kishimoto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Yu Kawasaki · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 In many solid-state materials, new phenomena evolve due to strong electron interactions. In this Lecture, review will be given on some advanced topics and their applications, including high temperature superconductivity, metal-insulator transition and strongly correlated electronics.

Outline〉 New types of superconducting and magnetic phenomena emerge in correlated electron matters. The term "correlated electron" represents the state of matter where many electrons are strongly interacting with each other. After an introductory talk on magnetism and superconductivity, review will be given on some advanced topics, including high temperature superconductivity, metal-insulator transition and colossalmagneto resistance. Potential application of correlated electron matters to technology is also presented focusing on spintronics or strongly correlated electronics.

Style〉 Lecture

Keyword〉 ***strongly correlated electron systems, Mott insulator, colossalmagneto resistance, high temperature superconductor***

Goal〉 To understand basic concepts of correlated electron matter and its application

Schedule〉

1. Introduction to correlated electron matters
2. Perspectives of magnetism and superconductivity in correlated electron matters
3. Electronic states of atoms and ions
4. Magnetic ions in crystal electric field
5. Introduction to superconductivity
6. How to probe rich properties in correlated electron matters
7. Mott insulator and metal-insulator transition
8. Spin, charge and orbital in transition metal oxides
9. Colossalmagneto resistance in transition metal oxides
10. Application of transition metal oxides with correlated electrons
11. High temperature superconductivity
12. Heavy-fermion superconductivity
13. Electronic states of organic conductors
14. Application of superconductors with correlated electrons
15. Towards strongly correlated electronics

Evaluation Criteria〉 Reports on several subjects in lecture

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197204

Contact〉

⇒ Kishimoto (A202, +81-88-656-7548, yutaka@pm.tokushima-u.ac.jp) Mail
(Office Hour: 金曜日 16:00-17:30)
⇒ Kawasaki (A217, +81-88-656-9878, yu@pm.tokushima-u.ac.jp) Mail

Quantum Theory of Materials

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the advanced quantum mechanics and quantum field theory.

Outline〉 Basics of advanced quantum mechanics and quantum field theory are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics, quantum field theory***

Goal〉 To understand the outline of advanced quantum mechanics and quantum field theory.

Schedule〉

1. Introduction
2. Quantum mechanics (1)
3. Quantum mechanics (2)
4. Hartree-Fock approximation
5. Koopman's theorem
6. Density functional theory
7. Kohn-Sham equation
8. Local density approximation
9. Perturbation (1)
10. Perturbation (2)
11. Quantum field theory
12. Creation operator and annihilation operator
13. Field quantization (1)
14. Field quantization (2)
15. Phonon
16. Electron gas

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197511

Contact〉

⇒ Yoshitaka Michihiro (A203)

Simulation Aided Mathematical Sciences

2 units (selection)

Hitoshi Imai · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Toshiki Takeuchi · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class provides the basic technology for advanced numerical simulation.

Outline〉 Basic technology for advanced numerical simulation is introduced.

Style〉 Lecture

Keyword〉 ***numerical simulation, advanced***

Fundamental Lecture〉 "Numerical Analysis"(1.0)

Relational Lecture〉 "Methods for analysis of mathematical phenomena"(0.5), "Advanced Computational Science"(0.5)

Requirement〉 Students have to understand basic mathematics of undergraduate-level.

Goal〉 To understand principle of Infinite-Precision Numerical Simulation.

Schedule〉

1. Introduction of computer science
2. Multiple precision arithmetic 1
3. Multiple precision arithmetic 2
4. Iteration method 1
5. Iteration method 2
6. Parallel computing 1
7. Parallel computing 2
8. Spectral method 1
9. Spectral method 2
10. Infinite-Precision Numerical Simulation 1
11. Infinite-Precision Numerical Simulation 2
12. Numerical simulation of free boundary problem 1
13. Numerical simulation of free boundary problem 2
14. Numerical simulation of inverse problem 1
15. Numerical simulation of inverse problem 2

Evaluation Criteria〉 Assignments count 100%.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197277

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Imai(A220, +81-88-656-7541, The inquiry by means of the cellular phone or E-mail is not acceptable) (Office Hour: Office hours: Thursday 14:00-15:00)

⇒ Takeuchi (A206, +81-88-656-7544, takeuchi@pm.tokushima-u.ac.jp) Mail (Office Hour: 木曜日 14:00-15:00)

Nonlinear Analysis

2 units (selection)

Nobuyoshi Fukagai · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Atsuhito Kohda · Associate Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Introduction to nonlinear functional analysis.

Outline〉 Methods of nonlinear analysis; fundatmental mathematical theories and techniques of ordinary and partial differential equations.

Style〉 Lecture

Goal〉 To be familiar with mathematical concepts, ideas and tools involved in doing nonlinear mathematics.

Schedule〉

1. Introduction
2. Mathematical modelling 1
3. Mathematical modelling 2
4. Mathematical modelling 3
5. General topology
6. Function space 1
7. Function space 2
8. Function space 3
9. Integral operator
10. Contraction mapping theorem
11. Example
12. Variational methods 1
13. Variational methods 2
14. Variational methods 3
15. Minimax principles

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197452

Contact〉
⇒ 工学部数学教室 (A棟211室，219室)

Watershed Hydrologic Engineering

2 units (selection)

Takao TAMURA · Associate Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this subject is to learn models and theories on hydrological and chemical cycles in a river watershed.

Outline〉 Watershed hydrologic system. Watershed hydrologic processes. Evaporation and transpiration processes. Lumped and distributed rainfall-runoff models. Canopy interception tank model. Heat-pulse transpiration model. Mathematical models of solute runoff process for forested watersheds. Water and solute budgets for forested watersheds. Management system of flood, water resources, and watershed environment.

Style〉 Lecture

Keyword〉 ***forested basin, hydrological cycle, solute runoff, runoff model***

Goal〉

1. Understand models and theories on hydrological cycels
2. Understand models and theories on chemical solute cycles

Schedule〉

1. Hydrologic Cycle in a River Watershed
2. Rainfall Interception Process in a Forest Watershed
3. Transpiration Process in a Forest Watershed
4. Runoff Process in a Forest Watershed
5. Modeling of Overland flow
6. Distributed Runoff Models
7. Modeling of Hydrologic Cycle in a River Watershed (1)
8. Modeling of Hydrologic Cycle in a River Watershed (2)
9. Evaluation Index of Hydrologic Cycle in a River Watershed
10. Formation Process of Streamwater Chemistry in a Forest Watershed
11. Runoff Process of Chemical Solutes in Streamwater
12. Inference of Forest Change to Streamwater Chemistry
13. Mathematical Model of Solute Runoff in Streamwater (1)
14. Mathematical Model of Solute Runoff in Streamwater (2)
15. Modeilng of Water and Solute Cycles in a River Watershed
16. Water and Solute Budgets in a River Watershed

Evaluation Criteria〉 Evaluated with the report by 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197506

Contact〉

⇒ TAMURA (A414, +81-88-656-9407, tamura@ce.tokushima-u.ac.jp) Mail
(Office Hour: 年度ごとに学科の掲示を参照すること)

Ecological Hydroengineering

2 units (selection)

Susumu Nakano · Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Mahito Kamada · Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Yoichi Kawaguchi · Associate Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Methods for conserving and improving riparian and coastal ecosystems in an actual way are developed, both from hydraulic and ecological perspectives.

Outline〉 Hydrodynamics of open-channel flow and wave in river, estuary. Mechanics of sediment transport by open-channel flow and wave. Theoretical and numerical analysis of hydro-geomorphic process. Influence of physical condition on ecological system. Interactive dynamics between hydro-geomorphic process and plant communities. Ecological assessment and restoration of riparian ecosystems. Landscape management in an ecological way.

Style〉 Lecture in combination with Portfolio, Portfolio

Keyword〉 ***ecosystem, river, estuary, watershed, landscape management***

Fundamental Lecture〉 "Advanced Environmental Ecology"(1.0), "Advanced Disaster Reduction Engineering"(1.0)

Relational Lecture〉 "Advanced mitigation engineering"(0.5), "Watershed Hydrologic Engineering"(0.5)

Requirement〉 not specified

Notice〉 not specified

Goal〉

1. Students understand mechanism and analysis technique for flow and sediment transport in the middle and upper reaches of a river.
2. Students understand analysis technique for flow and material transport in estuary, and are able to evaluate correctly the relation between physical phenomena and esturine ecosystem.
3. Students have knowledge to evaluate ecosystem value, and are able to apply for ecosystem improvement.

Schedule〉

1. Governing equation of hydro-geomorphic process
2. Numerical analysis of hydro-geomorphic process
3. Statistical analysis of hydro-geomorphic process
4. Interaction between hydro-geomorphic process and vegitation, report(1)
5. Flow analysis in estuary
6. Flow analysis in coastal zone
7. Wave analysis in coastal zone
8. Evaluation model of ecosystem in coastal zone, report(2)
9. Finding the limiting factors of ecosystem distribution
10. Mechanism for sustaining ecosystems
11. Pattern and process of ecosystem change
12. Mechanism of ecosystem alteration in relation to human activities
13. Ecological management of landscape and landscape ecology 1
14. Ecological management of landscape and landscape ecology 2
15. Ecological engineering for ecosystem management, report(3)

Evaluation Criteria〉 marks of report (1) , (2) and (3) are summed with the weights of 3 ,3 and 4, respectively, and the passing mark is 60%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197489

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nakano (A310, +81-88-656-7330, nakano@ce.tokushima-u.ac.jp) Mail
(Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと．)
⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: 年度ごとに学科の掲示を参照すること．)
⇒ Kawaguchi (308, +81-88-656-9025, kawaguchi@ce.tokushima-u.ac.jp) Mail
(Office Hour: 金曜午後)

Geoenvironmental Design Theory

2 units (selection)

Teacher of course, Hisashi Suzuki · Associate Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Jing-Cai Jiang · Associate Professor / Environmental Conservation Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The purpose of this course is to present state-of-the-art theories of geomechanics which contribute to the well-balanced development and conservation of the geoenvironment. The course consists of two main parts: stability analyses and deformation theories of earth structures.

Outline〉 In the stability analyses, theories of limit equilibrium methods, limit analysis methods and slip line methods, as well as their applications to stability, bearing capacity and earth pressure problems are addressed. In the deformation theories, the original Cam Clay Model and the latest developments in critical state soil mechanics together with finite element methods are described.

Style〉 Lecture

Keyword〉 ***stability problem, deformation problem***

Fundamental Lecture〉 "Advanced Geomechanics"(1.0), "Advanced Soil Mechanics"(1.0)

Relational Lecture〉 "Geoenvironment Control Engineering"(0.5)

Goal〉

1. To understand strength theories of earthen structures
2. To understand deformation theories of geo- materials

Schedule〉

1. Introduction of stability problems
2. Limit equilibrium method (part 1)
3. Limit equilibrium method (part 2)
4. Limit analysis (part 1)
5. Limit analysis (part 2)
6. Slip line method (part 1)
7. Slip line method (part 2)
8. Progressive failure analysis of stability problems
9. Introduction of deformation problems and growth of Cam-clay theory
10. Existence of Critical State Line
11. Existence of Roscoe Surface
12. Existence of Hvorslev Surface
13. Elasto-plastic theory of saturated clay
14. Associate flow rule for yield surface of soil
15. Equation for State Boundary Surface of Cam-clay Model

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197275

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Teacher of course
⇒ Suzuki (A403, +81-88-656-7347, suzuki@ce.tokushima-u.ac.jp) Mail (Office Hour: 毎週水曜日 昼間 16:20~ 17:50 夜間 19:40~ 21:10)
⇒ Jiang (A311, +81-88-656-7346, jiang@ce.tokushima-u.ac.jp) Mail (Office Hour: 年度ごとに学科の掲示を参照すること)

Geoenvironment Control Engineering

2 units (selection)

Katsutoshi Ueno · Associate Professor / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Akitoshi Mochizuki · Part-time Lecturer / Geotechnical and Geoenvironmental Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This unit aims to cover basic concepts and technologies related to development and control of geoenvironment and ground-structure system for protection against natural and human-caused disasters. Interactive behaviours of over and under-ground structures under earthquake conditions as well as static conditions will be addressed employing results from numerical and physical models as well as those from field-observation data.

Outline〉 i)Learn framework of experimental apparatus and instruments for in-situ investigation and so forth. Then understand their basic principle, modification and basic comcepts. ii)practice of the method how to review techincal papers

Keyword〉 ***constitutive equation, centrifuge model test, true triaxitial compression test, direct shear test***

Goal〉 To understand methodology of engineering, i.e. experiments, site investigation, and their verification by analysis, and to develope basic ability in delopment of experimental equipments and instulments.

Schedule〉

1. General
2. Aims of model test, simirality rule(1)
3. Simirality rule(2)
4. Aim and porpus of centrifuge model tests
5. Examples of centrifuge model test (1)
6. Examples of centrifuge model test (1)
7. True triaxial compression test apparatus and constitutive equation(1)
8. True triaxial compression test apparatus and constitutive equation(1)
9. True triaxial compression test apparatus and constitutive equation(1)
10. Direct shear apparatus and creep test(1)
11. Direct shear apparatus and creep test(2)
12. Preparation on English paper(1)-1
13. Preparation on English paper(1)-2
14. Preparation on English paper(2)-1
15. Preparation on English paper(2)-2

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197274

Contact〉

⇒ Undecided

⇒ Ueno (A504, +81-88-656-7342, ueno@ce.tokushima-u.ac.jp) Mail (Office Hour: 学科の掲示を参照のこと)

Urban System Analysis

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Susumu Namerikawa · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Basic theories on modeling analysis for land use, transportation and environment systems in urban and regional areas. Design, planning, construction, and management systems for regions.

Outline〉 Yamanaka: Modeling, analysis methods, design and planning method for land use, transportation, and environment systems in urban/ regional areas. Namerikawa: Analysis models, building, management and maintenance methods for infrastructure and environment systems in urban/ regional areas

Style〉 Portfolio

Keyword〉 ***landuse analysis, transport model, environment protection***

Fundamental Lecture〉 "City and Transport System Planning"(1.0), "Urban and Regional Planning"(1.0), "Project Management"(1.0)

Relational Lecture〉 "Advance Lecture of Political Simulation"(0.5), "Advanced Lecture in Social Risk Engineering"(0.5), "Social Science"(0.5)

Goal〉

1. To understand the theoryies of modeling method for the analysis of landuse, transport, environments system in urban nad regional areas.
2. To understand project management system in regional develepments.

Schedule〉

1. Discussion on chosing topics 1
2. Discussion on chosing topics 2
3. Review on related researches 1
4. Review on related researches 2
5. Review on related researches 3
6. Review on related researches 4
7. Review on related researches 5
8. Review on related researches 6
9. Case study using a analysis method 1
10. Case study using a analysis method 2
11. Case study using a analysis method 3
12. Case study using a analysis method 4
13. Case study using a analysis method 5
14. Discussion on summary of case study 1
15. Discussion on summary of case study 2

Evaluation Criteria〉 No paper is required. The portforio of learning records and submitted reports are reqiured to be evaluated.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197399

Student〉 Able to be taken by student of other department

Contact〉

⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Namerikawa (A412, +81-88-656-9877, namerikawa@ce.tokushima-u.ac.jp)
Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示を参照すること)

Wind Engineering

2 units (selection)

Fumiaki Nagao · Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Minoru Noda · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To understand the properties of strong wind, outline of structural behavior in strong wind and wind resistant design in civil engineering

Outline〉 Local strong wind; Occurrence mechanism and effect of geographic and topographic factors. Characteristics of fluctuating wind velocity. Steady and unsteady aerodynamic forces exerted on thin and bluff bodies. Aerodynamic response analyses of structures such as cables, tower-like structures, cable stayed bridges and suspension bridges. Rain-wind induced vibration. Effect of gusty wind on structural response. Wind resistant design in civil engineering; A state of the art and perspective.

Style〉 Lecture

Keyword〉 ***properties of strong wind, structural behavior in strong wind, wind resistant design***

Fundamental Lecture〉 "Advanced Structural Dynamics"(1.0), "Advanced Structural Design"(1.0)

Goal〉 To understand the outline of structural behavior in strong wind and wind resistant design in civil engineering

Schedule〉

1. Introduction
2. Occurrence mechanism of Local strong wind
3. Effect of geographic and topographic factors on Local Strong wind
4. Characteristics of fluctuating wind velocity
5. Steady aerodynamic forces exerted on thin and bluff bodies
6. Unsteady aerodynamic forces exerted on thin and bluff bodies
7. Forced vibrations of structures
8. Self-excited vibrations of structures
9. Aerodynamic response analyses of cables
10. Aerodynamic response analyses of tower-like structures
11. Aerodynamic response analyses of cable stayed bridges
12. Aerodynamic response analyses of suspension bridges
13. Effect of gusty wind on structural response
14. Wind resistant design in civil engineering
15. A state of the art and perspective

Evaluation Criteria〉 evaluated by attitude in class (50%) and reports (50%)

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197170

Contact〉

⇒ Nagao (A515, +81-88-656-9443, fumi@ce.tokushima-u.ac.jp) Mail (Office Hour: 年度ごとに学科の掲示を参照すること)
⇒ Noda (A514, +81-88-656-7323, tarda@ce.tokushima-u.ac.jp) Mail (Office Hour: 年度ごとに学科の掲示を参照すること)

Advanced Structural Analysis

2 units (selection)

Yoshifumi Nariyuki · Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Method of non-linear analysis of framed structures subjected to static and dynamic loads is studied.

Outline〉 Not only geometrical and material non-linear problems in structural analysis and analytical method of non-linear behavior of framed structures, but also computation of ultimate strength and stability of framed structures subjected to static load and dynamic load are discussed in portfolio.

Style〉 Portfolio

Keyword〉 ***structural analysis of frames, material non-linear, geometrical non-linear, ultimate strength***

Fundamental Lecture〉 "Advanced Fracture and Structural Mechanics"(0.8)

Requirement〉 Students are required to have a good understanding of structural mechanics.

Goal〉 To obtain the fundamental knowledge of non-linear analytical method of plane framed structures.

Schedule〉

1. Guidance and purpose of this subject
2. Outline of analytical method of framed structures
3. Geometrical non-linear problems 1
4. Geometrical non-linear problems 2
5. Geometrical non-linear problems 3 / Report 1
6. Material non-linear problems 1
7. Material non-linear problems 2
8. Material non-linear problems 3
9. Material non-linear problems 4
10. Material non-linear problems 5 / Report 2
11. Combined non-linear problems 1
12. Combined non-linear problems 2
13. Combined non-linear problems 3
14. Combined non-linear problems 4 / Report 3
15. Discussion on assignments

Evaluation Criteria〉 Assignments count 100%

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197422

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nariyuki (A510, +81-88-656-7326, nariyuki@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday 16:20~ 17:50)

Earthquake Resistant Design

2 units (selection)

Atsushi Mikami · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To acquire methods of solving problems in seismic design of structures

Outline〉 Choose and discuss a topic from the problems including fault characterization, site response, attenuation relations, soil-structure interaction, seismic design of buildings/bridges, etc

Style〉 Portfolio

Keyword〉 ***earthquake resistant design, earthquake ground motions, simulation of earthquake ground motions***

Relational Lecture〉 "Advanced Structural Analysis"(0.5)

Requirement〉 Non

Notice〉 Non

Goal〉 To acquire the method for resolving problems in earthquake resisting design of civil engineering structures.

Schedule〉

1. To search topics in earthquake resistant design of civil engineering structures(1-3).
2. To investigate some themes out of the topics by references(4-12).
3. To prepare and submit the reports on the themes(13-15).

Evaluation Criteria〉 Evaluate 100% by report.

Textbook〉 To be introduced in the class.

Reference〉 Proceedings of World Conference on Earthquake Engineering

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197340

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Mikami (A512, +81-88-656-9193, amikami@ce.tokushima-u.ac.jp) Mail
(Office Hour: Friday, 16:00-19:00 (or by appointment))

Advanced Materials for Civil Works

2 units (selection)

Takao Ueda · Associate Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Acquirement of recent technique on concrete enginering paticularly new concrete such as high performance concrete ,eco-concrete, etc., and maintenace engineering in civil works, in the view point of sustainable material cycling society.

Outline〉 Characteristics and performance of important materials used for civil works to construction infrastructure facilities and to manage environment. A concept of environment conscious materials and environmentally friendly concrete. Characteristics and designing method of environmentally mitigative concrete and organism adaptable concrete, such as porous concrete including many continuous voids and big holes, used for concrete structures and environmentally friendly materials to realize sustainable deveropment.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***sustainable society, material cycling society, materials for civil works***

Relational Lecture〉 "Flow Mechanism and Control for Fresh Concrete"(0.5)

Requirement〉 No requiremaent.

Notice〉 This class is consituted of some lectures, some reporting for subjects and presentation and discussion class on the reports

Goal〉

1. Understanding on a concept of sustainable material cycling society in civil works.
2. Understanding on materials having low environmental impact in civil works.

Schedule〉

1. Guidance
2. Definition of eco-concrete
3. Properties of porous concrete(1)
4. Properties of porous concrete(2)
5. Proportioning method of porous concrete
6. Application example of porous concrete
7. Properties of recycled aggregate concrete(1)
8. Properties of recycled aggregate concrete(2)
9. Landscape of concrete structures
10. Properties of concrete admixing fly ash (1)
11. Properties of concrete admixing fly ash (2)
12. Properties of concrete admixing blast furnace slag
13. Durability of concrete admixing industrial by-products
14. Durability design and life cycle design (1)
15. Durability design and life cycle design (2)

Evaluation Criteria〉 Estimation using presentation and reports.

Textbook〉 Using photo copying materials, etc.

Webpage〉 http://www.ce.tokushima-u.ac.jp/ksys/mizuguchi/

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197279

Student〉 Able to be taken by student of other department and faculty

Contact〉

⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: (Mon. 12:00-13:00, 17:00-18:00))

Flow Mechanism and Control for Fresh Concrete

2 units (selection)

Chikanori Hashimoto · Professor / Structural Engineering, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The objective of this subject is to understand the recent techonology on consistency of fresh concrete in process of mixing or flowing in the construction machine, such as concrere mixer, concrete pump or concrere agitator.

Outline〉 Mechanical behavior of concrete materials in process of mixing, conveying and compacting using the visualization technique of fresh concrete. Application of the rheology to fresh concrete. Design of self-compacting concrete and eco-concrete. Concept for construction design, which is the performance-based design. Basic concept for new types of structure such as partially prestressed concrete structures.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***visualizaion technique of fresh concrete, application of visualized analysis on fresh concrete, deformed pipe, agitator drum, diaphragm wall, consistency test, bi-axial forced mixing type mixer, vertical continuous mixer with gravity***

Requirement〉 It is necessary for students to learn the basic attainments on the concrete engineering.

Goal〉

1. The porpose is to understnad the visualization technique of fresh concrete.
2. The porpose is to understnad the application of flow analysis in process of mixing or flowing in the construction machine.

Schedule〉

1. Guidance
2. Visualizaion technique of fresh concrete (historical development).
3. Visualizaion technique of fresh concrete (materials used).
4. Visualizaion technique of fresh concrete (method of image analysis).
5. Visualizaion technique of fresh concrete (scale effect of model concrete).
6. Visualizaion technique of fresh concrete (ploblem to be solved).
7. Application of visualized analysis on fresh concrete flowing through the tapered pipe.
8. Application of visualized analysis on fresh concrete flowing through the bend pipe or bifurcated pipe.
9. Application of visualized analysis on fresh concrete discharging of agitator drum..
10. Application of visualized analysis on fresh concrete mixing in agitator drum.
11. Application of visualized analysis on fresh concrete placing for diaphragm wall.
12. Application of visualized analysis on fresh concrete flowing in the vessel of consistency test.
13. Application of visualized analysis on self-compacting concrete casting in the slab form.
14. Application of visualized analysis on fresh concrete in process of mixing in bi-axial forced mixing type mixer.
15. Application of visualized analysis on fresh concrete in process of mixing in vertical continuous mixer with gravity.
16. Preliminary

Evaluation Criteria〉 Evaluate by reports or presentations or each subject.

Textbook〉 Handout of phot copying materials for each subject.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197509

Advance Lecture of Political Simulation

2 units (selection)

Akio Kondo · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering, Yoshinobu Hirose · 肩書

Target〉 The technique of modelling of regional and environmental systems, and the concept and application method of prediction and evaluation models to political simulation are studied.

Outline〉 Not only the technique of modelling, but also the application method of prediction and evaluation models to political simulation is discussed in portfolio.

Style〉 Portfolio

Keyword〉 ***political simulation, technique of modelling, prediction and evaluation***

Requirement〉 特になし

Notice〉 特になし

Goal〉 To obtain the knowledge of the technique of modelling and application method of prediction and evaluation models, apply them to political simulation.

Schedule〉

1. Guidance and purpose of this subject
2. Systems of political simulation
3. Technique of modelling 1
4. Technique of modelling 2
5. Application of model : Prediction 1
6. Application of model : Prediction 2
7. Application of model : Evaluation of policy 1
8. Application of model : Evaluation of policy 2
9. Example of political simulation : Population policy
10. Example of political simulation : Urban transport policy
11. Example of political simulation : Landuse policy
12. Example of political simulation : Social policy
13. Example of political simulation : Environment policy
14. The technique of political simulation in the future
15. Regional policies in the 21st Century

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/kondo/top/index.htm

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197315

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日9·10校時)

Note〉 特になし

Advanced Lecture in Social Risk Engineering

2 units (selection)

Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand concept of risk, to cultivate ability of measures how to reduce , avoid, compensate for various risiks. the reducing, the evading of the risk, the compensation for it.

Outline〉 Technique of risk assessment and its comunication for various social risiks on risk manegement is lecterd.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***social risks, risk management, crisis management***

Goal〉 To obtain the knowledge of risk management and application method of various social risks.

Schedule〉

1. Guidance and purpose of this subject
2. Sources of various social risks
3. Evaluation of social risk(1)
4. Evaluation of social risk(2)
5. Risk manegement (1.risik perception)
6. Risk manegement(2.risik communication)
7. Risk manegement(3.evaluation standard)
8. Example of risik manegement(1.evacuation for natural disaster)
9. Example of risik manegement(2.evacuation for natural disaster)
10. Example of risik manegement(3.evacuation for natural disaster)
11. Example of risik manegement(4.avoidance of risik and insurerance)
12. Presentaion and discusion for social risk(1)
13. Presentaion and discusion for social risk(2)
14. Presentaion and discusion for social risk(3)
15. Summary

Evaluation Criteria〉 Assignments Count 100%

Textbook〉 To be introduced in the class

Reference〉 To be intrroduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197281

Student〉 To be limited to the students of the course

Contact〉

⇒ Murakami . (Office Hour: Monday 16:20-17:50)

Advanced mitigation engineering

2 units (selection)

Hideki Ueshima · Part-time Lecturer / 広島工業大学

Target〉 To obtain the abilities to find and solve environmental problems using for application of mitigation technique

Outline〉 To surveying of the latest news of mitigation and to understand its concept and examine the technique to mitigate the deterioration environment

Style〉 Lecture in combination with Portfolio

Keyword〉 ***district improvement plan for disaster mitigation, coastal environment***

Fundamental Lecture〉 "Advanced Lecture in Social Risk Engineering"(1.0), "Advance Lecture of Political Simulation"(1.0)

Goal〉 To design and assess the mitigation plan for deterioration coastal environment

Schedule〉

1. Guidance of this subject
2. Current topics about mitigation 1
3. Current topics about mitigation 2
4. Current topics about mitigation 3
5. Current topics about mitigation 4
6. Current topics about mitigation 5
7. Current topics about mitigation 6
8. Current topics about mitigation 7
9. Current topics about mitigation 8
10. Current topics about mitigation 9
11. Current topics about mitigation 10
12. Discussion on research theme1
13. Discussion on research theme2
14. Discussion on research theme3
15. Presentation

Evaluation Criteria〉 Assignments count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197496

Contact〉

⇒ Ueshima (+81-823-72-1901, h-ueshima@aist.go.jp) Mail

Advanced Exercise on Civil and Environmental Engineering

2 units (compulsory)
Teacher of course

Target〉 This subject is especially provided in order to deepen the study, and must be taken under the guidance of a faculty in major field of study.

Outline〉 Exercises related to research theme are performed.

Style〉 Portfolio

Keyword〉 ***exercise, civil and environmental engineering***

Goal〉 To obtain deeper knowledge regarding research theme.

Schedule〉

1. Guidance
2. Exercise
3. Report

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197225

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday 11:00~ 12:30)

Advanced Research on Civil and Environmental Engineering

2 units (compulsory)

Teachers in other colleges or departments

Target〉 To obtain broad information on recent engineering

Outline〉 To research a theme in a technology, which is different form the main technology in your field.

Style〉 Portfolio, Lecture, Lecture in combination with Portfolio

Keyword〉 ***engineering, technology, different field***

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn a recent technology, which is different from the main technology in your field.

Schedule〉 Choose a theme on technology or engineering, which is different from that in your field.

Evaluation Criteria〉 Evaluated with portfolio or examination

Textbook〉 Ask to teachers.

Reference〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197226

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kamada (A306, +81-88-656-9134, kamada@ce.tokushima-u.ac.jp) Mail
(Office Hour: Friday 11:55~ 12:50)

Intelligent Structures and Mechanics Systems Engineering — Mechanical Engineering

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)

Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名 姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Quantum Theory of Materials

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the advanced quantum mechanics and quantum field theory.

Outline〉 Basics of advanced quantum mechanics and quantum field theory are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics, quantum field theory***

Goal〉 To understand the outline of advanced quantum mechanics and quantum field theory.

Schedule〉

1. Introduction
2. Quantum mechanics (1)
3. Quantum mechanics (2)
4. Hartree-Fock approximation
5. Koopman's theorem
6. Density functional theory
7. Kohn-Sham equation
8. Local density approximation
9. Perturbation (1)
10. Perturbation (2)
11. Quantum field theory
12. Creation operator and annihilation operator
13. Field quantization (1)
14. Field quantization (2)
15. Phonon
16. Electron gas

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197510

Contact〉

⇒ Yoshitaka Michihiro (A203)

Radio Frequency Solid State Physics

2 units (selection)

Koichi Nakamura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces basis of NMR and applications to studies on superconductivity, magnetism and ionic diffusion in solid.

Outline〉 The spectrum, spin-lattice relaxation, spin-spin relaxation, chemical shift etc., which are obtained by NMR measurements, are introduced and discussed in connection with various physical properties of solids.

Keyword〉 ***nuclear magnetic resonance, superconductivity, magnetism, diffusion***

Goal〉

1. To understand basis of NMR.
2. To understand relationship between various problems in solid state physics and relaxation phenomena observed using NMR.

Schedule〉

1. Introduction
2. Spin-echo and NMR spectrum
3. Equipments
4. Dipole interaction
5. Hyperfine interaction and spectrum
6. Chemical shift
7. Quadrupole interaction and quadrupole resonance
8. Spin-lattice relaxation
9. Internal magnetic field in ferro and antiferro magnets
10. Spin-lattice relaxation in metals
11. NMR studies on superconducting state
12. NMR studies on High Tc superconductors
13. Diffusion in solid and spin-lattice relaxation
14. NMR studies on lithium ionic conductors
15. NMR studies on protonic conductors
16. Summary

Evaluation Criteria〉 Report100%

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197388

Contact〉

⇒ Nakamura (A216, koichi@pm.tokushima-u.ac.jp) Mail

Controlling Physical Properties of Crystalline Materials

2 units (selection)

Tatsuya Okada · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Geometrical theories of grain boundary character in polycrystalline materials are described. Various methods to describe textures are also introduced.

Outline〉 Various geometric theories of grain boundaries and textures are introduced.

Style〉 Portfolio

Keyword〉 ***grain boundary, geometrical theory, texture***

Fundamental Lecture〉 "Material Applications"(1.0)

Goal〉

1. CSL theory of geometrical character of grain boundaries must be understood.
2. Various methods to describe textures must be understood.

Schedule〉

1. Dislocation theory of small angle grain boundaries
2. Dislocation theory of general boundaries
3. Extension of geometrical theory to interphase interfaces
4. O-lattice theory
5. CSL theory
6. Calculation of grain boundary dislocations
7. Miller indices and stereographic projection
8. Pole figure and inverse pole figure
9. Euler angles to describe crystallographic orientation
10. Orientation distribution function
11. Experimental analysis of textures
12. Deformed textures
13. Recrystallized textures
14. Textures and physical properties 1
15. Textures and physical properties 2

Evaluation Criteria〉 Evaluation is based on term papers.

Reference〉

◇ Forwood and Clarebrough: Electron Microscopy of Interfaces in Metals and Alloys (Adam Hilger)
◇ Randle: Microstructure Determination and its Applications (The Institute of Materials)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197219

Contact〉

⇒ Okada (M616, t-okada@me.tokushima-u.ac.jp) Mail

Material Applications

2 units (selection)

Kenichi Yoshida · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Hideo Nishino · Associate Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering, Hitoshi Takagi · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class acquires importance of the material evaluation using acoustic emission method and guided wave method that are prospective as advanced material evaluation methods in more serious environment. Also it acquires the development and the prospective trend since now of the green composite materials with natural fibers and biodegradated resin as one of the advanced composites.

Outline〉 Non-destructive methods are more important in the material evaluation methods that have been performed widely since then. This class introduces the measuring fundamentals and the analysis using the acoustic emission method and guided wave detecting method, and also the characteristics and the up-to-date development trend of green composites with less environmental burden.

Style〉 Lecture

Keyword〉 ***acoustic emisson(AE), guided wave analysis, green composite***

Fundamental Lecture〉 "Material Engineering"(0.2), "Physical properties of materials"(0.2)

Requirement〉 Students are required to have a good undertanding of fundamental knowledge of materials engineering.

Goal〉

1. To make clear the deformation and fracture dynamics of advanced materials by analysis of obtained AE signals.
2. To identify verious types of defects and search for a plant life prediction using the guided wave propagating through materials.
3. To understand the high-performed and high-qualified green composite as one of the advanced materials with less environmental burden.

Schedule〉

1. Introduction of AE method
2. AE source characterization
3. AE behavior during deformation in advanced materials and its deformation mechanism
4. AE behavior due to microcracking in advanced materials and its fracture prediction technology
5. Up-to-date trend of material evaluation technology with AE method
6. Propagation theory of ultrasonics in materials with viscoelasticity, anisotropy, piezoelectricity and non-linearity
7. Propagation simulation of ultrsonics
8. Fundamentals of guided wave with SH mode plate wave
9. Guided wave to circumferencial and axial directions
10. Up-to-date research trend of guided wave
11. Concept of advanced composite materials
12. Classification of advanced composite materials and its application
13. Characteristics of advanced composite materials
14. Advanced composite materials and global environment
15. Development trend of green composite

Evaluation Criteria〉 Assignments count 100%

Textbook〉 Not used

Reference〉 Will be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197251

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yoshida (M619, +81-88-656-7358, yoshida@me.tokushima-u.ac.jp) Mail
(Office Hour: Thursday and Friday, 17:00 to 18:00)

Material and Computational Mechanics

2 units (selection)

Atsuya Oishi · Associate Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Takuo Nagamachi · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 To understand both theory and computing system for computational mechanics of solving physical phinomina for natural and artificial objects

Outline〉 From theoretical aspects deformation theory of solids, FEM and numerical methods are discussed. From aspects of computing system, algorism and high performace procedure are given of large scale computing system for designs and working of material, machine and structures, and controls.

Style〉 Lecture

Keyword〉 ***nonlinear probloem of solid mechanics, large scale system of computational mechanics***

Fundamental Lecture〉 "Solid Mechanics"(1.0)

Relational Lecture〉 "Advanced Exercise on Mechanical Engineering"(0.5), "Advanced Production Technology"(0.5)

Goal〉

1. To understand mathematical theory and physics for nonlinear problems for solid
2. To construct large scale computing system and to simulate using them and understand of their results.

Schedule〉

1. Tensor analysis
2. Weighted residual mathod and variational principles
3. Non-linear mataerial problems
4. Geomytrically non-linear problems
5. Time depending problems
6. Application to non-structual problems
7. Envirament for parallel processing
8. Algorism for parallel processing FEM analysis
9. Implementation of parallel processing FEM analysis
10. Basic theory of soft computing
11. Soft omputing for CAE
12. Implicit method for statics
13. Explicit method for dynamics
14. Constitutive equations for non-iron-metals
15. Method of high speed computing
16. Recent h igh pricision method of FEM simulations

Evaluation Criteria〉 Assignments count 100%

Textbook〉 矢川・吉村著，有限要素法，培風館

Reference〉 O．C．ツイエンキーヴィッツ，マトリックス有限要素法，培風館

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197253

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yamada .
⇒ Oishi (M622, +81-88-656-7365, oishi@me.tokushima-u.ac.jp) Mail
⇒ Nagamachi (M524, ngmch@me.tokushima-u.ac.jp) Mail (Office Hour: 毎週水曜日 17 時 ~ 18 時)

Fluid Energy Control

2 units (selection)

Junichiro Fukutomi · Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces hydrodynamic characteristics of turbomachinery, behavior of internal flow and problems with it.

Outline〉 Advanced concepts of fluid energy control and energy conversion. Performance characteristics, internal flow conditions and anomalous phenomena in fluid machinery. Performance improvement and noise reduction of turbomachinery by flow control. Utilization of renewable fluid sources such as hydro-dams, wind, wave and tides.

Keyword〉 ***energy conversion, turbomachinery, internal flow***

Fundamental Lecture〉 "Fluids Energy Conversion Engineering"(1.0)

Goal〉 To understand hydrodynamic characteristics of turbomachinery, behavior of internal flow and problems with it.

Schedule〉

1. Theory of centrifugal turbomachinery 1
2. Theory of centrifugal turbomachinery 2
3. Theory of axial turbomachinery 1
4. Theory of axial turbomachinery
5. Quasi three-deimensional flow analysis of turbomachinery
6. Turbulence modeling and numerical flow simulation 1
7. Turbulence modeling and numerical flow simulation 2
8. Mid-term test
9. Characteristics of turbocharger for automobile
10. Noise of turbomachinery 1
11. Noise of turbomachinery 2
12. Anomous phenomena of turbomachinery 1 (cavitation, water hammer)
13. Anomous phenomena of turbomachinery 2 (surging, rotating stall)
14. Application technology of natural flow energy 1 (wind turbine)
15. Application technology of natural flow energy 1 (small hydro turbine)
16. Term test

Evaluation Criteria〉 As mid-term test of 50 points and term test of 50 points, it is made to be passing over sum total of 60 points.

Textbook〉 Not used

Reference〉 Will be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197507

Contact〉

⇒ Fukutomi (M519, +81-88-656-7367, fukutomi@me.tokushima-u.ac.jp) Mail

Thermal Energy Control

2 units (selection)

Tetsuya Suekane · Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Masanori Kiyota · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Aiming at the permanent use of resources and energy, basic principles of thermal energy, heat transmission, and characteristics of energy control devices and working fluid are discussed. Various usages of thermal energy flow are analyzed with exergy method.

Outline〉 Principle and characteristic about thermal energy, the control system, practical method and efficiency evaluation of thermal energy control. Energy flow analysis with heat, physical and chemical exergy.

Keyword〉 ***thermal energy, energy conversion***

Goal〉 To use thermal energy effectively and to apply to environmental problems

Schedule〉

1. Basics and characteristic of thermal energy 1
2. Basics and characteristic of thermal energy 2
3. Basics and characteristic of thermal energy 3, report problem
4. Characteristic of thermal energy control 1
5. Characteristic of thermal energy control 2
6. Characteristic of thermal energy control 3, report problem
7. Control elements of thermal energy 1
8. Control elements of thermal energy 2
9. Control elements of thermal energy 3, report problem
10. Control units of thermal energy 1
11. Control units of thermal energy 2
12. Control units of thermal energy 3, report problem
13. Evaluation of thermal energy control 1
14. Evaluation of thermal energy control 2
15. Evaluation of thermal energy control 3, report problem
16. Final test, oral examination

Evaluation Criteria〉 Scores of reports and final oral examination are used

Textbook〉 To be introdued in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197410

Student〉 Course students only

Contact〉

⇒ Suekane (M521, suekane@me.tokushima-u.ac.jp) Mail
⇒ Kiyota (M522, kiyota@me.tokushima-u.ac.jp) Mail

Multiphase Fluids Transport

2 units (selection)
Teacher of course

Target〉 This class introduces a new technolgy of advanced heat transfer and fluid mechanics that can be used for determining the optimal design and operating conditions of nuclear and geothermal power plants and also chemical plant.

Outline〉 Fundamental concepts of multiphase mixtures,Modeling flow-pattern transitions, Gas-liquid two-phase flow under microgravity, Film formation in annular flow, Flooding phenomena, Two-phase flow in micro-channel

Style〉 Lecture

Keyword〉 ***fundamental concepts of multiphase mixtures, film formation in annular flow, flooding phenomena***

Relational Lecture〉 "Thermal Energy Control"(0.5), "Energy and Environment Engineering"(0.5), "Fluid Energy Control"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level heat transfer engineering, thermodynamics, hydrodynamics and related subjects.

Goal〉 To understand the outline of the transport phenomena in multiphase fluids

Schedule〉

1. 1. Fundamental concepts of multiphase flow
2. 2. Flow pattern map
3. 3. Pressure drop, Void fraction
4. 4. Bubble flow
5. 5. Slug flow, Froth flow
6. 6. Annular flow, Mist flow
7. 7. Film formation in annular flow(No.1)
8. 8. Film formation in annular flow(No.2)
9. 9. Gas-liquid two-phase flow under microgravity(No.1)
10. 10. Gas-liquid two-phase flow under microgravity(No.2)
11. 11. Flooding phenomena(No.1)
12. 12. Flooding phenomena(No.2)
13. 13. Flooding phenomena(No.3)
14. 14. Two-phase flow in micro-channel(No.1)
15. 15. Two-phase flow in micro-channel(No.2)
16. 16. Discussion on multiphase fluids transport

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197242

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Teacher of course

Energy and Environment Engineering

2 units (selection)

Kunihiko Ishihara · Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Masashi Ichimiya · Associate Professor / Mechanical Systems, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 Aeroacoustic represented to high speed Shinkansen is complex in its generation mechanism and is stil in investigation. This class aims to understand the theory of the generation mechanism and turbulence phenomenon underlying it.

Outline〉 Latest energy and environment problems in Japan and the world. Alternative energy sources for fossil fuels which are origins of green house effects. Fluid energy transfer machines. Systems of nuclear and sustainable energy machine. Harmony of energy consumption and environment problem. Aerodynamic response of sound and vibration, and turbulent properties of fluid machines. Lecture in combination with Portfolio.(2unit)

Style〉 Lecture in combination with Portfolio

Keyword〉 ***aeroacoustics, flow-induced vibration, viscoud fluid, turbulence***

Fundamental Lecture〉 "Applied Fluid Dynamics"(1.0), "Fluids Energy Conversion Engineering"(1.0)

Requirement〉 Students are required to have a good undertanding of fundamental knowledge of fluid mechanics.

Goal〉 This class aims to train researchers for universities and companies

Schedule〉

1. Outline of aeroacoustic
2. What is a vortex sound?
3. Basic equations of fluid dynamics and acoustics
4. Green function for free space
5. Physical meanings of monopole,dipole and quadrapole
6. Lighthill's equation and Curle's equation
7. Radiation sound from compact body
8. Summary and intermediate test
9. Viscous fluid and boundary layer
10. Laminar flow, turbulent flow and transition
11. Description of turbulence
12. Fundamental equations for turbulence
13. Wall turbulence
14. Free turbulence
15. Homogeneous and isotropic turbulence
16. Final examination

Evaluation Criteria〉 Attitude for attending class (30%) and two examinations (70%) are evaluated.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197145

Contact〉

⇒ Ishihara (M518, +81-88-656-7366, ishihara@me.tokushima-u.ac.jp) Mail
(Office Hour: 木曜日 ·17:00~ 18:00)
⇒ Ichimiya (M520, +81-88-656-7368, ichimiya@me.tokushima-u.ac.jp) Mail
(Office Hour: 毎週火曜日, 17:00~ 18:00)

Mechanical Systems Design

2 units (selection)

Junichi Hino · Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The appiled technologies of modeling, simulation, control and design methods for mechnical systems are made to master.

Outline〉 In mechanical systems, modelling and simulation by using modal analysis, semi-active and active vibration controls of mechanical systems, optimum design of active mass dampers for mechanical systems, intelligent vibration controls of mechanical systems, semi-active and active vehicle suspensions by modern control theory, and semi-active and active vehicle suspensions by intelligent methods are lectured.

Style〉 Lecture

Keyword〉 ***modal analysis, vibration control***

Requirement〉 Students are required to have a good understanding of basic applied dynamics and vibratoin control

Goal〉

1. To understand knowledge of dynamic design method of mechanical systems
2. To advance applied technologies for dynamic design method

Schedule〉

1. Modeling and simulation by modal analysis method 1
2. Modeling and simulation by modal analysis method 2
3. Modeling and simulation by modal analysis method 3
4. Modeling and simulation by modal analysis method 4
5. Active and semi-active vibration control method 1
6. Active and semi-active vibration control method 2
7. Active and semi-active vibration control method 3
8. Vibration control by active mass damper 1
9. Vibration control by active mass damper 2
10. Vibration control by intelligent control methods 1
11. Vibration control by intelligent control methods 2
12. Design of active suspension of vehicles by modern control theory 1
13. Design of active suspension of vehicles by modern control theory 2
14. Design of active and semi-active suspension of vehicles by intelligent control theory 1
15. Design of active and semi-active suspension of vehicles by intelligent control theory 2

Evaluation Criteria〉 Assignments count 100%

Textbook〉 Printed synopses are used

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197184

Student〉 工学研究科博士課程 1，2，3 年次

Contact〉

⇒ Hino (M422, +81-88-656-7384, hino@me.tokushima-u.ac.jp) Mail (Office Hour: monday 17.00-18.00)

Instrument and Control Engineering

2 units (selection)

Masafumi Miwa · Associate Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the research results using control strategies, the application to the industrial plant of control technology.

Outline〉 Computer application to factory automation, control of industrial robot, digital process control, dynamic modeling of industrial chemical plant with neural network, dynamics of pneumatic actuators, two degree of freedom control and control of pneumatic actuators using intelligence strategies are lectured.

Style〉 Lecture

Keyword〉 ***dynamic modeling, intelligent control***

Relational Lecture〉 "Mechanical Systems Design"(0.5), "Design of Dynamic Systems"(0.5)

Requirement〉 Students are required to have a good understanding of graduate-level control engineering and related subjects.

Goal〉 To understand the application to industrial plant of digital control theory,the intelligent control using actuators.

Schedule〉

1. Outline of digital control theory
2. Outline of two-degree-of-freedom control method
3. Design of two-degree-of-freedom control system
4. Model predictive control
5. Application to chemical plant control of model predictive control
6. Auto tuning PID control of chemical plant(1)
7. Auto tuning PID control of chemical plant(2)
8. Application of generalized predictive control
9. The structure and function of actuators
10. Digital control and servo mechanism
11. Recent topics of intelligent control
12. Outline of neural network
13. Neural network compensator
14. Intelligent control using actuators
15. Application to plant of control theory(1)
16. Application to plant of control theory(2)

Evaluation Criteria〉 Assignments count 100 %

Textbook〉 Printed synopses are used.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197215

Contact〉

⇒ Hashimoto .

Design of Dynamic Systems

2 units (selection)

Katsunobu Konishi · Professor / Intelligent Machines, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces automatic control and image recognition techniques that can be used for autonomous control of mechanical systems.

Outline〉 Modeling and control for mechanical systems such as actuators, robotic manipulators and aerial vehicles are introduced in the first half of this class. In the second half, image processing and image recognition techniques are introduced in order to obtain environmental information necessary for autonomous control behaviour.

Fundamental Lecture〉 "Actuator Control Theory"(1.0), "System Design"(1.0), "Image Processing"(1.0)

Relational Lecture〉 "Visual pattern processing"(0.5)

Requirement〉 Students are required to have a good understanding of undergraduate-level automatic control theory and image processing.

Goal〉

1. To understand the procedures and tools of control system design.
2. To understand the feature space analysis and object detection techniques.

Schedule〉

1. Actuator
2. Sensor
3. Equation of motion (robot arm)
4. Equation of motion (aerial vehicle)
5. Modal analysis
6. Reduced order model
7. Vibration control
8. Trajectory control
9. Intermediate examination
10. Image processing (color space)
11. Image processing (filtering)
12. Image processing (bird view observation)
13. Brightness pattern analysis
14. Feature space analysis
15. Object detection
16. Final examination

Evaluation Criteria〉 Evaluate base on two examinations and reports.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197395

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Konishi (M423, +81-88-656-7383, konishi@me.tokushima-u.ac.jp) Mail

Advanced Production Technology

2 units (selection)

Yoshihiro Tada · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduce powder processing and plasticity theory that can be used for novel material fabrication and advanced manufacturing.

Outline〉 Forming technologies for novel materials are introduced, and plasticity theories for compressive metals (porous metals) are also discussed.

Style〉 Lecture

Keyword〉 ***powder metallurgy, porous metal, plasticity theory, constitutive equation***

Requirement〉 Students are required to have a good understanding on fundamentals of metal forming technologies.

Goal〉

1. To understand advanced forming technologies including powder processings and isostatic processings.
2. To understand fundamentals of compressive plasticity theory.

Schedule〉

1. Introduction to powder metallurgy
2. powder forming processings 1
3. powder forming processings 2
4. powder forming processings 3
5. testing methods for consolidation characteristics of powder
6. consolidation characteristics of powder
7. formability of sintered preform
8. exercise
9. yield criterion of porous metal
10. plasticity theory for porous metal
11. analysis of plastic deformation of porous metal
12. consolidation criterion of powder
13. variational principle for porous metal
14. upper bound theorem for porous metal
15. conclusion
16. examination

Evaluation Criteria〉 Assignments count 70%, exercises and examinations count 30%.

Textbook〉 Printed synopsises are used.

Reference〉 Advances in Powder Forming Processes and Related Technologies, Corona Publ.Co.,ISBN4-339-04367-2

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197316

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tada (M319, +81-88-656-7381, tada@me.tokushima-u.ac.jp) Mail

Micro-Nano Engineering

2 units (selection)

Tetsuo Iwata · Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces mesurement techniques and instruments for analyzing and developing new materials.

Outline〉 Prof. Hanabusa lectures on the method of materials evaluation by means of X-ray diffraction: Principle of X-ray diffraction, macro and micro lattice strains, and residual stress measurement. Prof. Iwata reviews instrumental methods for extracting information on materials using optical and spectroscopic techniques: Scientific measurements, data processing, and instrumentation for chemical analysis.

Style〉 Portfolio

Keyword〉 ***X-ray structure analysis, scientific measurements***

Relational Lecture〉 "Materials Surface Performance Control"(0.5), "Advanced Micro-Nano Engineering"(0.5), "Instrument and Control Engineering"(0.5)

Requirement〉 Students are required to have a good understanging of undergraduate-level related subjects.

Goal〉

1. To understand x-ray diffraction method and its application for material science
2. To understand scientific measurements and instrumentation technology

Schedule〉

1. Basics of X-rays
2. Lattices and crystal structures
3. Crystal axes and reciprocal lattice
4. Scattering by an atom
5. Diffraction by small crystal
6. Kinds of residual stresses
7. X-ray stress measurement
8. Instruments for scientific measurements
9. Instrumental methods for chemical analysis
10. Microscopy and near-field optics
11. Analytical instruments 1
12. Analytical instruments 2
13. Electronics for scientific measurements
14. Data-processing method for scientific measurements
15. System design for scientific measurements
16. Report and presentation

Evaluation Criteria〉 Assinments counts 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197490

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Iwata (M427, +81-88-656-9743, iwata@me.tokushima-u.ac.jp) Mail
⇒ Hanabusa (M317, +81-88-656-7377, hanabusa@me.tokushima-u.ac.jp) Mail

Materials Surface Performance Control

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Daisuke Yonekura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 The nano processing of the material surface in the atomic and molecular level is carried out by the surface modification methods such as PVD or CVD. The material surface nano processing to manifest the new performance in the material surface and its evaluation is explain in this lecture. The development of the new functional materials and the precept to its application are given.

Outline〉 In this lecture, the surface micro processing which manifests new performance on the surface of material by processed under the atom or molecule level is explained, and its evaluation also is mentioned. How to be invested the transparency, electrical and electronic properties, photocatalytic mateirials and gas barrier by PVD or CVD methods is explained. Then, the effects of surface modification on the mechanical properties such as fatigue, friction-wear and corrosion of materials are discussed and then its evaluation is mentioned.

Style〉 Lecture

Keyword〉 ***surface modification, PVD, CVD, functional thin film, surface engineering***

Relational Lecture〉 "Advanced Micro-Nano Engineering"(0.5), "Controlling Physical Properties of Crystalline Materials"(0.5), "Micro-Nano Engineering"(0.5)

Requirement〉 特になし

Goal〉

1. Understanding of functional materials development
2. Understanding of evaluation of material surface performance
3. Understanding of nano processing
4. Understanding of mechanical properties of functional materials

Schedule〉

1. Function of material surface
2. Nano processing of material surface
3. Nano processing of material surface
4. Nano processing of material surface
5. Material surface modification by PVD and CVD
6. Material surface modification by PVD and CVD
7. Group discussion
8. Evaluation methods of material surface performance
9. Evaluation methods of material surface performance
10. Transparency
11. Electromagnetic wave shielding properties
12. Electric properties
13. Improvement of corrosive resistance
14. Improvement of friction and wear properties
15. Improvement of fatigue properties
16. Group discussion

Evaluation Criteria〉 Over 60% of group discussion, reports and Examination

Textbook〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197460

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp)
Mail

Intelligent Information Systems

2 units (selection)

Yoneo Yano · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kazuhide Kanenishi · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Hiroaki Ogata · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Teruaki Ito · Associate Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Hiroyuki Mitsuhara · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 Learning the design methods of intelligent information systems such as educational software and interactive systems.

Outline〉 Intelligent systems and their mechanics. Intelligent CAI. Intelligent interface. Micro-worlds in intelligent CAI. Learner-teacher modelling. Knowledge acquisition models. Empirical and analytical machine learning, e. g., ID3, similarity-, explanation-, and case-based learning. Genetics-based machine learning, e. g., genetic evolution and co-evolution of production systems, finite state machines, recurrent neural networks, and strategic knowledge. Concepts of collaborative interface systems based on intelligent interactions, and their implementation for design support systems.

Style〉 Lecture and excercise

Keyword〉 ***intelligent interface, intelligent educational systems, intelligent agents, CSCW, CSCL, interactive interface***

Fundamental Lecture〉 "Human Factors"(1.0)

Relational Lecture〉 "Applied Knowledge Systems"(0.5), "Autonomous Adaptive Systems Engineering"(0.5)

Goal〉 Acuisition of the design methods of educational systems and interactive systems

Schedule〉

1. Overview of Intelligent Information Systems
2. Intelligent CAI
3. Cognitive model for Learning
4. Design of ITS(Intelligent Tutoring System)
5. ILE(Interactive Learning Environment)
6. CSCL
7. Ubiquitous and Mobile Learning Environment
8. Design of Intelligent Interactive System
9. Collaborative Interface
10. Design of Intelligent Information System (1)
11. Design of Intelligent Information System (2)
12. Design of Intelligent Information System (3)
13. Design of Intelligent Information System (4)
14. Design of Intelligent Information System (5)
15. Conclusion

Evaluation Criteria〉 We will grade based on reports and interactive presentation among students.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197357

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yano (C511, +81-88-656-7495, yano@is.tokushima-u.ac.jp) Mail (Office Hour: 火曜日 16 時 ~ 17 時, 水曜日 16 時 ~ 17 時, 金曜日 16 時 ~ 17 時)
⇒ Kanenishi (大学開放実践センター 2 階, +81-88-656-7610, marukin@cue.tokushima-u.ac.jp) Mail
⇒ Ogata (C507, +81-88-656-7498, ogata@is.tokushima-u.ac.jp) Mail (Office Hour: 月曜日 ~ 金曜日:午後 5 時 ~ 6 時)
⇒ Ito (M316, +81-88-656-2150, ito@me.tokushima-u.ac.jp) Mail

Visual pattern processing

2 units (selection)

Kenji Terada · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Stephen Karungaru·Githinji · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 The basic technologies which replace the visual pattern processing function of man by computer and their applied technologies are made to master.

Outline〉 The advanced processing techniques of visual pattern, i.e., the pre-processing techniques, the feature extraction techniques, the classification techniques of visual pattern, the processing techniques of color image and their application examples are lectured.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***pattern recognition, vision, image processing***

Fundamental Lecture〉 "Applied Image Processing"(1.0)

Goal〉 Acquisition of knowledge about the processing theories of visual pattern and their various applied technologies, and the processing technologies of color image

Schedule〉

1. Concept of pattern recognition
2. Statistical pattern classification method1
3. Statistical pattern classification method 2
4. Pattern classification method by the structural analysis technique
5. Pre-processing method of visual pattern
6. Feature extraction method of visual pattern 1
7. Feature extraction method of visual pattern 2
8. Segmentation method of visual pattern 1
9. Segmentation method of visual pattern 2
10. Pattern classification method by neural network
11. Pattern classification method by GA
12. Security image processing
13. Tracking of moving object
14. Texture analysis
15. The feature extraction method of color image and its application
16. Periodic examination

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197261

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Terada (Dr.802, +81-88-656-7499, terada@is.tokushima-u.ac.jp) Mail
(Office Hour: 月，水曜日 15:00~ 17:00(年度ごとに学科の掲示を参照すること))

Advanced conversion systems of resource energy

2 units (selection)

Yoshiyuki Kidoguchi · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To learn special knowledge concerning present energy resources and energy supplying systems, to understand principle and mechanism of energy conversion, and to improve thinking faculty for application of new energy and its conversion

Outline〉 To explain effective combustion technologies, reasonable utilization of energy and application of unused energy for saving consumption of fossil fuels and primary energy on the point of saving resources, energy and preserving the environment

Style〉 Portfolio

Keyword〉 ***energy conversion, energy resources, utilization of energy, environmental protection, energy saving***

Requirement〉 None

Notice〉 None

Goal〉 To understand fundamentals of energy conversion and to consider effective utilization of energy and improvement of energy conversion technologies

Schedule〉

1. Present state of energy resources
2. Energy and environmental problem
3. Future view of energy resources
4. Fundamentals of energy conversion (1)
5. Fundamentals of energy conversion (2)
6. Principle of energy conversion (1)
7. Principle of energy conversion (2)
8. Principle of energy conversion (3)
9. Technologies of energy conversion (1)
10. Technologies of energy conversion (2)
11. Technologies of energy conversion (3)
12. Approach to effective utilization of energy (1)
13. Approach to effective utilization of energy (2)
14. Application of new energy (1)
15. Application of new energy (2)

Evaluation Criteria〉 Appraise the understanding of the content of the lecture by setting some reports

Textbook〉 None

Reference〉 None

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/miwa/index.html

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197265

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kidoguchi (Eco502, +81-88-656-9633, kidog@eco.tokushima-u.ac.jp) Mail

Note〉 Need to submit some reports

Advanced Micro-Nano Engineering

2 units (selection)
Part-time Lecturer

Target〉 This class introduces micro-nano process, especially photo-induced processes

Outline〉 Basics of micro-nano engineering for the beginners.

Requirement〉 Students are required to have a good understanding of under-graduate level physics and related subjects.

Goal〉 To obtain advanced knowledge for performing a reseach project on micro-nano engineering using a laser.

Schedule〉

1. Basics of micro-nano engineering
2. Various micro-nano process and photo-induced process
3. Laser radiation and oscillator
4. Optical components for laser systems
5. Laser induced phenomena
6. Heat conduction in laser processing
7. Laser welding
8. Laser drilling and cutting
9. Ultra-fast laser processing
10. Micro thermal process
11. Micro/nano processing in industry
12. Thermal inkjet process
13. Piezo inkjet process
14. Inkjet for biotechnology
15. Latest inkjet technology
16. Examination

Evaluation Criteria〉 Assignments counts 100%

Textbook〉 Norimitsu Hirai, Practical Laser Technology, Kyoritsu publishing ISBN4-320-08470-5 Takeshi Amari, Inkjet printer, CMC publishing ISBN4-88231-859-8 Electronic files on Web

Reference〉 Mitsuo Nakazawa, Practical Ultrafine Process and Measurement, NTS ISBN4-86043-035-2 Kenichi Iga, Basic Laser Optics, Ohm-sha ISBN4-274-02137-8 Kunihiko Sato, Yoshihiko Mukai, Masao Toyoda, Welding Engineering, Rikogaku-sha ISBN4-8445-2108-X

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197404

Advanced Exercise on Mechanical Engineering

2 units (compulsory)
All teachers

Target〉 To obtain comprehensive insight in the field of mechanical engieering.
Outline〉 Advanced excise on mechanical engineering.
Style〉 Portfolio, Lecture in combination with Portfolio
Keyword〉 ***mechanical engineering, Doctor thesis***
Requirement〉 N/A
Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197186
Student〉 Able to be taken by only specified class(es)

Advanced Research on Mechanical Engineering

2 units (compulsory)

Teachers in other colleges or departments

Target〉 To obtain broad information on recent engineering.

Outline〉 To research a theme in a technoligy, which is diffrent from the main technology in your field.

Style〉 Portfolio, Lecture in combination with Portfolio, Lecture and excercise

Keyword〉 ***engineering, technology, different field***

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn a recent technology , Which is different from the main technology in your field.

Schedule〉 Choose a theme on technology or engineering.

Evaluation Criteria〉 Evaluated with portfolio or examination.

Textbook〉 Ask to teachers.

Reference〉 Prints.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197187

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ 教務係.

Earth and Life Environmental Engineering — Chemical Science and Technology

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)

Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名 姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Molecular Design

2 units (selection)

Koichi Ute · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering

Tomohiro Hirano · Associate Professor / Physicochermistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to understand the principles of precise synthesis and polymerization reactions from the viewpoint of ligand design, asymmetric induction, etc.

Outline〉 Advanced discussion of current aspects of molecular design. Organic reaction mechanism and molecular design. Polymer synthesis, polymerization mechanism, and macromolecular design. Supramolecular chemistry. Correlation between inter-or intramolecular structure and chemical reactivity or functionality.

Style〉 Portfolio

Keyword〉 ***chain polymerization, living polymerization, stereospecific polymerization***

Fundamental Lecture〉 "Advanced Topics in Polymerization Reactions"(1.0)

Relational Lecture〉 "Functional Materials"(0.5)

Requirement〉 Requires undergraduate level knowledge of organic and polymer chemistry.

Goal〉

1. To understand the principles of precise synthesis.
2. To understand the principles of precise polymerization.

Schedule〉

1. organic radicals
2. radical structure and ESR
3. radical structure and reactivity
4. molecular design based on radical mechanism
5. synthesis of functional polymers by radical polymerization
6. polymerization with heterogeneous catalysts
7. polymerization with homogeneous catalysts
8. polymerization with transition metal catalysts - stereocontrol
9. reaction control by Lewis acids
10. stereospecific polymerization
11. reaction field and molecular design
12. molecular assembly and molecular design
13. reaction control in asymmetric field
14. application of physical gels to polymerization reaction
15. molecular design and synthesis of dendritic polymers

Evaluation Criteria〉 Assignments counts 100% mainly based on the report submitted.

Textbook〉 Printed synopses will be distributed.

Reference〉 野瀬卓平他編「大学院高分子科学」講談社

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197484

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ute (化学棟 406, +81-88-656-7402, ute@chem.tokushima-u.ac.jp) Mail
(Office Hour: Monday 15:00 - 17:00)
⇒ Hirano (G405, hirano@chem.tokushima-u.ac.jp) Mail

Advanced Molecular Transformations

2 units (selection)

Yasuhiko Kawamura · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 Let students understand the latest synthetic methodology of highly functionallized organic molecules. The method enhances both the energy and atomic efficiency.

Outline〉 This lecture shows modern synthetic methodologies, i.e. reagents, synthetic design, and synthetic processes, etc., which are situated as a basic concept of the synthesis of biologically active molecules and of high functionallized organic molecules.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***biologically active molecule, organometallic compound, microwave, green sustainable chemistry, excited state chemistry***

Fundamental Lecture〉 "Advanced Organic Chemistry"(1.0)

Relational Lecture〉 "Advanced Molecular Design"(0.5)

Requirement〉 Students should have sound knowledge of organic chemistry of the master-course level.

Goal〉

1. Understanding the synthetic method of biologically active molecules by microwave activation.
2. Understanding environmentally friendly and highly stereoselective organic syntheses by using organometallic reagents.
3. Understanding the organic reaction mechanism and basic computer chemistry.

Schedule〉

1. Introduction to the microwave chemistry
2. Microwave excitation and its application
3. Application of the microwave excitation to the molecular conversion (1)
4. Application of the microwave excitation to the molecular conversion (2):
5. Introduction of the green, homogenious organometallic catalyst to the highly selective organic synthesis
6. Application of the green, homogenious organometallic catalyst to the highly selective organic synthesis
7. Introduction of the green, solid acidic catalyst to organic synthesis
8. Application of the green, solid acidic catalyst to organic synthesis
9. Application of the green, solid catalyst to the hoghly selective oxidation reaction
10. Molecular modelling: molecular orbital theory 1
11. Molecular modelling: molecular orbital theory 2
12. Excited state chemistry 1: Interaction of organic molecules with light
13. Excited state chemistry 2: Reaction mechanisms of the photoexcited organic molecules
14. Excited state chemistry 3: Reaction mechanisms of the photoexcited organic molecules
15. Excited state chemistry 4: Application of the photoexcited molecules

Evaluation Criteria〉 Credit is given to the students who earn the total 60% up scores. The score is assigned by evaluating the reports submitted.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197465

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Chemical Process Design and Development

2 units (selection)

Shigeru Sugiyama · Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering
Ken-Ichiro Sotowa · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to introduce the basic theory of both reaction engineering and plant engineering

Outline〉 The required properties of industrial catalysts, as well as their application to industrial processes will be explained. The recent techniques to analyze the local structure of active sites will also be introduced. An emphasis is placed on the application of XPS, EXAFS and solid NMR. Portfolio style is also available.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***catalyst, NMR, EXAFS, chemical reactor, microreactor***

Fundamental Lecture〉 "Surface Science and Technology"(0.5), "Advanced Molecular Transformations"(0.4)

Relational Lecture〉 "Advanced Molecular Design"(0.3), "Materials Chemistry"(0.3)

Requirement〉 Requires undergraduate level knowledge of catalyst chemistry and reaction engineering.

Notice〉 Preparations for lessons review will be needed.

Goal〉

1. To understand the state of art of industrial catalysts and its industrial applications in the lectures from 1st to 5th and 11th to 13th.
2. To understand the advanced technique of analysing local structure of catalysts in the lectures from 6th to 10th and 14th to 15th.

Schedule〉

1. Industrial catalysts(1): State of art of reactors and catalysts
2. Industrial catalysts(2): Catalyst preparation
3. Industrial catalysts(3): Status and future of catalysts for chemicals' production
4. Industrial catalysts(4): Status and future of catalysts for environment protection
5. Industrial catalysts(5): Applcations to industrial plants, including microreactors
6. Analysis of local structure (1): XPS
7. Analysis of local structure (2): Introduction to EXAFS
8. Analysis of local structure (3): Application of EXAFS
9. Analysis of local structure (4): Introduction to solid state NMR
10. Analysis of local structure (5): Application of solid state NMR
11. Case study (1): Application of EXAFS to catalysts
12. Case study (2): Application of EXAFS to environmental protection materials
13. Case study (3): Application of solid state NMR to catalysts
14. Case study (4): Application of solid state NMR to environmental protection materials
15. Case study (5): Summary. Submission of the report on the present course will be requested.

Evaluation Criteria〉 Assignments counts 100% mainly based on the report submitted.

Textbook〉 All lecture documents will be opened through U-learning system.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197480

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Sugiyama (G309, +81-88-656-7432, sugiyama@chem.tokushima-u.ac.jp) Mail (Office Hour: 16:00-17:00 on Monday and Tuesday.)
⇒ Sotowa (Chemistry and biotechnology building, 307., +81-88-656-4440, sotowa@chem.tokushima-u.ac.jp) Mail (Office Hour: 16:00-17:00 on Monday and Tuesday.)

Functional Materials

2 units (selection)

Tomoki Yabutani · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering
Keiji Minagawa · Associate Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering
Mikito Yasuzawa · Associate Professor / Physicochemistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 To understand functions and applications of various functional materials.

Outline〉 This class introduces various materials based on functional polymers. The mechanism and design of physical and chemical functions of polymer materials are introduced in detail.

Style〉 Portfolio

Keyword〉 ***functional material, functional polymer, sensor material, soft matter, biocompatible material***

Goal〉

1. To understand properties and applications of various functional materials.
2. To understand mechanisms of functions and application method of material design.

Schedule〉

1. Introduction to Functional Materials
2. Functional Polymers as Sensor Materials
3. Preparation of Various Sensors
4. Analysis of Sensor Properties
5. Evaluation of Sensor Properties
6. Characteristics and Preparation of Soft Matter
7. Properties of Polymer Solution
8. Thermosensitive Polymer Materials
9. Rheology of Soft Matter
10. Rheological Function of Materials
11. Design and Synthesis of Biocompatible Materials
12. Evaluation of Biocompatible Materials and its Application
13. Design and Synthesis of Electroconductive Polymers
14. Evaluation of Electroconductive Polymers and its Application
15. Surface Functional Modification
16. まとめ

Evaluation Criteria〉 Evaluation of Reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197202

Contact〉

⇒ Yabutani (G605, +81-88-656-7413, yabutani@chem.tokushima-u.ac.jp) Mail
⇒ Minagawa (G612, +81-88-656-9153, minagawa@chem.tokushima-u.ac.jp) Mail
⇒ Yasuzawa (G512, +81-88-656-7421, mik@chem.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日 16:30~ 17:30)

Materials Chemistry

2 units (selection)

Yasuhiro Uosaki · Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering
Eiji Kanezaki · Professor / Physicochemistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 To understand the molecular aspects of solid-state properties and/or fluid properties of materials(Uosaki). To understand the structure and electronic states of molecular crystal including metal ions(Kanezaki).

Outline〉 Molecular, atomic and ionic aspects of experimental approach for materials chemistry are lectured on the basis of physical chemistry. In order to understand the synthesis and the characterization of inorganic, organic and inorganic-organic composite materials, recent advances in electrochemistry, quantum chemistry, thermodynamics, surface chemistry and solid state chemistry are presented in relation to the properties depending on the association-condition of materials, the catalytic function of electrode, the application of STM to developing new materials etc. Design of the desirable properties for some new materials is also discussed.

Style〉 Lecture

Keyword〉 ***material development, supercritical fluids***

Fundamental Lecture〉 "Advanced exercise on chemical science and technology" (1.0), "Advanced research on chemical science and technology"(1.0)

Relational Lecture〉 "Advanced exercise on chemical science and technology" (0.5), "Advanced research on chemical science and technology"(1.0)

Requirement〉 not particular needed

Goal〉

1. To understand the structures and properties of fluids and to develop an ability to apply supercritical fluids to environmental problems
2. ablility for discussiong properties of condensed phases from the aspect of molecules

Schedule〉

1. Structures of fluids
2. Properties of fluids
3. Physical properties of supercritical fluids (1)
4. Physical properties of supercritical fluids (2)
5. Applications of supercritical fluids
6. Nature of molecules(1)
7. Nature of molecules(2)
8. electronic states of molecules(1)
9. electronic states of molecules(2)
10. electronic states of molecules(3)
11. electronic states of molecules(4)
12. electronic states of molecules(5)
13. molecular assembly(1)
14. molecular assembly(2)
15. molecular assembly(3)
16. examination

Evaluation Criteria〉 Evaluation is made by means of examination and presentation.

Textbook〉 Will be introduced at the first lecture.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197257

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Uosaki (G510, +81-88-656-7417, uosaki@chem.tokushima-u.ac.jp) Mail (Office Hour: Monday (17:00-18:00))
⇒ Kanezaki (G516, +81-88-656-9444, kanezaki@chem.tokushima-u.ac.jp) Mail (Office Hour: 年度毎に学科の掲示を参照すること)

Surface Science and Technology

2 units (selection)

Toshihiro Moriga · Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering
Kei-ichiro Murai · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to understand the basic characteristics of surface and bulk and their differences, which are necessary in developing new material science.

Outline〉 This class will introduce surface structures and surface phenomena, governing the physical properties of cunbustion catalysts, electrode materials for fuel cell, transparent conducting materials, phosphors and oxynitrides for photocatalysts, and fundamentals of surface modifications for advanced functional materials.

Style〉 Portfolio

Keyword〉 ***bulk, surface, photocatalyst, transparent conducting oxide, solid oxide fuel cell, phosphor, X-ray photoelectron spectroscopy, X-ray absorption fine structure***

Fundamental Lecture〉 "Physical Properties of Materials"(0.2), "Materials Process Engineering"(0.2), "Material Science"(0.2), "Advanced Materials Science"(0.2)

Relational Lecture〉 "Advanced exercise on chemical science and technology" (0.5), "Advanced research on chemical science and technology"(0.5)

Requirement〉 Nothing special.

Notice〉 Reports should be submitted within two weeks after the assignment.

Goal〉 To understand the outline of materials in which their surface structures and surface phenomena are effectively used.

Schedule〉

1. Orientation
2. Recent topics on metal oxynitrides for photocatalysts -1-
3. Recent topics on metal oxynitrides for photocatalysts -2-
4. Recent topics on transparent conducting oxides thin films -1-
5. Recent topics on transparent conducting oxides thin films -2-
6. Recent topics on transparent conducting oxides thin films -3-
7. Recent topics on X-ray spectroscopy -1-
8. Recent topics on X-ray spectroscopy -2-
9. Recent topics on X-ray spectroscopy -3-
10. Recent topics on phosphors for white LEDs -1-
11. Recent topics on phosphors for white LEDs -2-
12. Recent topics on conbustion catalysts -1-
13. Recent topics on conbustion catalysts -2-
14. Recent topics on electrode materials for fuel cells -1-
15. Recent topics on electrode materials for fuel cells -2-
16. Final reports, dissertational defense

Evaluation Criteria〉 Assignment counts 100% based on the reports submitted and on the result of dissertational defense.

Textbook〉 To be announced in the class.

Reference〉 To be announced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197459

Student〉 Able to be taken by student of other department

Contact〉

⇒ Moriga (M603, +81-88-656-7423, moriga@chem.tokushima-u.ac.jp) Mail (Office Hour: Monday 4:30pm—5:30pm for 1st semester, Thursday 4:30pm—5:30pm for 2nd semester)

Transport Process Engineering

2 units (selection)

Masahiro Katoh · Associate Professor / Synthetic and Polymer Chemistry, Chemical Science and Technology, Earth and Life Environmental Engineering
Toshihide Horikawa · Associate Professor / Chemical Process Engineering, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 The purpose of this class is to understand the transport phenomena on the interface of differential phases (gas, liquid and solid) for production and environmental preservation processes.

Outline〉 Interfacial mass transfer analysis in various production and environmental processes, with an emphas is on the process systemization based on the manipulation of fluid flow near material surfaces and molecular transport in functional materials matrices. Analysis and design of chemical separation processes in terms of the molecular transport control within membranes and porous structures. Design of high functional porous micro-structured materials and spectroscopic analysis of molecular transfer phenomina in these materials.

Style〉 Portfolio

Keyword〉 ***mass transfer, separation processes***

Fundamental Lecture〉 "Advanced Separation Technology"(1.0)

Requirement〉 Nothing special

Goal〉

1. To understand transport phenomena on interface of differential phases
2. To understand analysis method of the phenomena in micro porous for separation processes

Schedule〉

1. The principle of mass transfer
2. Mass transfer on gas-liquid interface
3. Mass transfer on gas-solid interface
4. Mass transfer on solid-liquid interface
5. Mass transfer process using membrane
6. Adsorption separation processes
7. Adsorption velocity and diffusion
8. Porous materials
9. Synthesis of porous materials
10. Analysis of porous materials
11. Adsorption processes using zeolites
12. The control of molecular transfer in micro porous materials
13. High functionalized porous materials
14. Analysis of solid materials by IR spectroscopy
15. Spectroscopic analysis for phenomena in porous materials

Evaluation Criteria〉 Assignment counts 100% mainly based on the report submitted.

Textbook〉 To be announced in the class.

Reference〉 To be announced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197131

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Katoh (M304, +81-88-656-7429, katoh@chem.tokushima-u.ac.jp) Mail

Bioprocess Engineering

2 units (selection)

Katsuhiro Tamura · Professor / Physicochermistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering
Yoshihisa Suzuki · Associate Professor / Physicochermistry and Material Science, Chemical Science and Technology, Earth and Life Environmental Engineering

Target〉 This class introduces (1) effects of high-pressure gas on biological systems (Professor Tamura) and (2) basic concepts and methods of protein crystallization (Dr. Suzuki).

Outline〉 (Professor Tamura) Estimation of bioactivities of microorganisms by calorimetry and its application to ecology. Response of microorganisms to physical and chemical stresses. Behaviors of microorganisms under high pressure. Physical properties of liposomal membranes. (Dr. Suzuki) Basic concepts, methods and recent developments of protein crystallization.

Style〉 Lecture

Keyword〉 ***bioassay, biomembrane, crystal growth***

Fundamental Lecture〉 "Basic Physical Chemistry"(1.0)

Relational Lecture〉 "Advanced Physical Chemistry"(0.5)

Requirement〉 Students are required to have a good understanding of master course-level biochemical and biophysical sciences.

Goal〉

1. To understand the effects of high-pressure gas on biological systems
2. To understand the growth mechanisms of protein crystals

Schedule〉

1. History of high-pressure effects on biological sciences
2. Measurements of metabolic heats of microorganisms under high pressure (1)
3. Measurements of metabolic heats of microorganisms under high pressure (2)
4. Measurements of metabolic heats using a high-pressure gas and its applications for ecological studies
5. Disinfection technology of fluid food products using high-pressure gases
6. Deoxydation technology of fluid food products using high-pressure gases
7. Understandings of the mechanisms of anestic actions using high-pressure gases
8. Structure analysis of protein molecules and significance of protein crystallization
9. Fundamentals of crystal growth
10. Recent topics on protein crystallization
11. Nucleation of protein crystals
12. Growth of protein crystals
13. Surface morphologies of protein crystals
14. High pressure crystallization of protein molecules
15. Solubility of protein crystals

Evaluation Criteria〉 Assignment counts 100%.

Textbook〉 To be anounced in the class

Reference〉 To be anounced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197323

Contact〉

⇒ Tamura (G509, +81-88-656-7416, tamura@chem.tokushima-u.ac.jp) Mail
⇒ Suzuki (G514, +81-88-656-7415, suzuki@chem.tokushima-u.ac.jp) Mail

Advanced Lecture on Quantum Nanostructure Semiconductors

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This lecture aims at understanding basic concepts of the quantum effects of semiconductor nanostructures based on materials science and various technologies for device applications.

Outline〉 This lecture introduces characteristics of quantum structures and technologies of the device applications, based on quantum mechanics, semiconductor physics, materials science and photonics. Advanced technologies of fabrication and measurements and recent topics of the research are also introduced.

Style〉 Lecture

Goal〉 To understand materials science and application technologies of nano structure semiconductors

Schedule〉

1. Electronic states in semiconductor quantum structures
2. Electronic properties of quantum stutures
3. Optical properties of quantum stutures
4. Fabrication technologies of semiconductor nanostructures
5. Evaluation technologies of crystals
6. Evaluation technologies of nanostructures
7. Analysis of elctronic properties
8. Analysis of optical properties
9. Quantum effect devices
10. Nonlinear optical responces of semiconductors
11. Responces of optical micro cavity
12. Research progress in quantum nanostructure semiconductors
13. Ultrafast optical devices
14. Quantum information devices
15. Topics of recent advanced research (1)
16. Topics of recent advanced research (2)

Evaluation Criteria〉 Assignments

Textbook〉 None

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197512

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

Advanced exercise on chemical science and technology

2 units (compulsory)
All teachers

Target〉 To learn how to identify and solve problems in the engineering.

Outline〉 Students will conduct a research work in a field of engineering, and acquire competent knowledge of the field. Students will also learn how to find and solve an engineering problem as an independent researcher.

Keyword〉 ***research, doctor thesis***

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197161

Advanced research on chemical science and technology

2 units (compulsory)

Teachers in other colleges or departments

Target〉 To obtain broad information on recent engineering

Outline〉 To research a theme in a technology, which is different from the main technology in your field.

Style〉 Portfolio, Lecture in combination with Portfolio, Lecture and excercise

Keyword〉 ***engineering, technology, different field***

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn a recent technology, which is different from the main technology in your field

Schedule〉 Choose a theme on technology or engineering, which is different from that in your field

Evaluation Criteria〉 Evaluated with portfolio or examination

Textbook〉 Ask teachers

Reference〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197162

Student〉 Able to be taken by only specified class(es)

Earth and Life Environmental Engineering — Biological Science and Technology

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)

Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名 姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Biofunctional Design of Biomolecules

2 units (selection)

Hitoshi Hori · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering, Yoshihiro Uto · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Advanced review of concepts and strategies in biofunctional design of biomolecules based on philosophy of biomolecular mimetics.

Outline〉 生体分子ミメティックスのモレキュラー・ディスクリプター (分子要素) としての具体的な生物活性分子の分子機能設計に関わる戦略的メディシナルケミストリーの原理を学ぶ．その応用として医薬品開発の研究戦略についてケーススタディから実践力を養う．更に Evo-Devo 的視点から病気を生涯発達における事象としてダイナミックに捉え，その視点に立った次世代治療薬の設計についても討議する．

Style〉 Lecture

Keyword〉 ***biofunctional design, biomolecular mimetics, structure-activity-relationship***

Goal〉

1. Advanced medicinal-chemistry based skills for biofunctional design of biomolecules based on biomolecular mimetics.
2. Advanced drug-design skills for drug discovery based on applied medicinal chemistry.
3. Advanced biomedical ethical skills for drug discovery for human disease.

Schedule〉

1. 生体分子機能設計とは
2. 生体分子ミメティックスとそのモレキュラー・ディスクリプター (分子要素)
3. モレキュラー・ディスクリプターとしての生物活性分子の分子機能設計
4. 分子機能設計学としてのメディシナルケミストリーについて．課題レポート 1
5. メディシナルケミストリー:リード化合物の発見
6. メディシナルケミストリー:構造活性相関．課題レポート 2
7. 課題レポート 1 と 2 についての討論
8. メディシナルケミストリー:ファーマコフォアおよびファーマコフォア要素の決定
9. メディシナルケミストリー:ファーマコダイナミックスとファーマコカイネティックス
10. メディシナルケミストリー:臨床試験 課題レポート 3
11. メディシナルケミストリー:課題レポート 3 について，生命倫理を含めた討論
12. メディシナルケミストリー:ケーススタディ 1 (高脂血症薬)
13. メディシナルケミストリー:ケーススタディ 2 (癌治療薬)
14. メディシナルケミストリー:ケーススタディ 3 (次世代治療薬 "Boron Trace Drug" の夢)．課題レポート 4
15. 課題レポート 4 について，生命倫理を含めた討論
16. 総合討論とまとめ

Evaluation Criteria〉 Subject review report 1-4 counts 100%.

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197322

Contact〉

⇒ Hori (M821, +81-88-656-7514, hori@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 11:55-12:50)

Molecular Microbiology

2 units (selection)
Teacher of course

Target〉 This course will cover in depth topics related to current research in the fields of molecular microbiology especially environmental harmful microbial control field.

Outline〉 This course describes environmental harmful microbes, microbial degradation and microbial deterioration, microbial corrosion of metal. Further, new microbial control methodology and new microbial molecular design are lectured.

Style〉 Lecture

Keyword〉 ***environmental harmful microbes, microbial degradation, microbial deterioration, antimicrobial molecular design***

Fundamental Lecture〉 "Advanced Microbiological Engineering"(1.0)

Relational Lecture〉 "Biomolecular Design"(1.0)

Requirement〉 Students are required to have a good understanding of undergraduate- and postgraduate-level microbiology and organic chemistry.

Notice〉 Students will be required to read recent research articles on the topics under discussion.

Goal〉

1. To understand an outline of environmental harmful microbes.
2. To understand methodology of new microbial molecular design.

Schedule〉

1. Overview of environmental microbiology
2. Summary of environmental harmful microbiology
3. Environmental harmful microbiology: gram(+)bacteria
4. Environmental harmful microbiology: gram(-)bacteria
5. Environmental harmful microbiology: molds
6. Environmental harmful microbiology: yeasts
7. Environmental harmful microbiology: virus
8. Subject report-1
9. Overview of organic antimicrobial agents
10. Overview of inorganic antimicrobial agents
11. Overview of antibiotics
12. Subject report-2
13. Quantitative structure-activity relationship
14. Methodology of new organic antimicrobial agents
15. Methodology of new inorganic antimicrobial agents
16. Subject report-3

Evaluation Criteria〉 Subject review report 1-3 counts 100%

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197451

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ 生物事務室(M棟703)

Engineering of Genetic Information

2 units (selection)

Sumihare Noji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering, Hideyo Ohuchi · Associate Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering
Yoshinori Matsuo · Professor / Institute of Socio-Arts and Sciences

Target〉 To obtain information on recent genetic studies

Outline〉 Lectures on Advanced research on analysis of genetic information of Drosophila, mouse, and human. 2) Analysis of structure and function of the genes based on the genetic information: gene expression, loss of function and gain of function 3) Genetic engineering to create new biological functions. 4) Application of the genetic engineering to improve biological functions. 5) Advanced research on developmental and regeneration biology, focusing on limb development and regeneration. 6) Application of the developmental and regeneration biology to improve biological functions. 7) Recent topics of genetic engineering. 8) Recent topics of developmental biology and its application.

Style〉 Portfolio

Keyword〉 ***genome science, molecular biology, genetic engineering***

Relational Lecture〉 "Cell Signaling System"(0.5), "Biofunctional Engineering"(0.5), "Technology of Enzyme Functions"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉 To understand recent information on genetics

Schedule〉

1. Recent advance in genetics, insects
2. Recent advance in genetics, invertebrates
3. Recent advance in genetic engneering, invertebrates
4. Recent advance in genetics, chicken
5. Recent advance in genetic engneering, chicken
6. Recent advance in genetics, mouse
7. Recent advance in genetic engneering, mouse
8. report for evaluation
9. Recent advance in genetics, human
10. Recent advance in genetic engneering, human
11. Recent advance in genetics, plants
12. Recent advance in genetic engneering, plants
13. Recent advance in RNA engineering
14. Recent advance in detection of gene expression
15. Recent advance in recet topics 1
16. Recent advance in recet topics 2
17. Final report

Evaluation Criteria〉 Evaluate two reports (50% each)

Textbook〉 N/A

Reference〉 Handouts

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197130

Student〉 Able to be taken by student of other department

Contact〉

⇒ Noji (G803, +81-88-656-7528, noji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 15:30-17:00)

Cell Signaling System

2 units (selection)

Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 This class introduces signaling system which regulates cell functions.

Outline〉 Structure of signaling molecule and cell signaling system are introduced.

Style〉 Lecture

Keyword〉 ***growth/differentiation factor, receptor, signal transduction***

Fundamental Lecture〉 "Cell Biology"(0.5), "Biochemistry 2"(0.3), "Advanced Biochemistry"(0.3)

Relational Lecture〉 "Life Science"(0.2)

Requirement〉 Students are required to have a good understanding of undergraduate-level cell biology and biochemistry.

Goal〉

1. Understanding of regulatory mechanism of biological activity of signaling molecule
2. Understanding of function of receptor and intracellular signaling system

Schedule〉

1. Introduction of cell signaling system
2. Cell structure and function of organella
3. Post-translational modification of signaling molecule
4. Structure of processing enzyme
5. Function and regulation of processing enzyme
6. Secretion of signaling molecule
7. Structure and function of receptor
8. Protein kinase and protein phosphatase
9. Transcriptional regulation
10. Regulation of cell function by AAA protein (1)
11. Regulation of cell function by AAA protein (2)
12. Recent research on signaling molecule (1)
13. Recent research on signaling molecule (2)
14. Significance of signaling molecule as target for drug design (1)
15. Significance of signaling molecule as target for drug design (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197247

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Technology of Enzyme Functions

2 units (selection)

Yoshitoshi Nakamura · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 To understand recent progress in the research of enzyme functions

Outline〉 Genetic recombination, development and control of bioreactor for increasing enzyme functions

Style〉 Portfolio

Requirement〉 /

Goal〉 To understand recent progress in the research of genetic recombination, development and application of bioreactor for increasing enzyme functions

Schedule〉

1. Breeding and cultivation of genetic recombinant yeast having glucoamylase activity
2. Breeding and cultivation of glucoamylase-producing recombinant yeast with inactivation of MAT locus
3. Mathematical model for growth process of glucoamylase-producing recombinant yeast
4. Mathematical model for growth process of immobilized glucoamylase-producing recombinant yeast
5. Process analysis of continuous alcohol fermentation with glucoamylase-producing recombinant yeast
6. Recombinant Escherichia coli having over expression system of cloned gene for effective production of glucoamylase
7. Efficient production of recombinant protein using salt-out effect protecting against proteolytic degradation
8. Efficient production of recombinant protein using bioreactor with membrane filtration
9. Mathematical model of diauxic growth based on synthesis mechanism of inducible enzyme
10. Efficient production of inducible enzyme by exchange of substrates
11. Stability analysis of steady state in a continuous culture with diauxic growth
12. Mathematical model of immobilized cell culture with diauxic growth
13. Screening and cultivation of basidiomycete fungi having enzyme degrading undegradable aromatic compounds
14. Efficient production of enzyme degrading undegradable aromatic compounds by immobilized fungi
15. Development and application of bioreactor with enzyme degrading undegradable aromatic compounds

Evaluation Criteria〉 Report (assignments count 100%)

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197231

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nakamura (720, +81-88-656-7518, ynakamu@bio.tokushima-u.ac.jp) Mail
(Office Hour: 水曜日 17:00-18:00)

Biofunctional Engineering

2 units (selection)

Hitoshi Matsuki · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Biological membranes play an important roll in structure formation and function revelation of cells. Characteristic properties owned by lipid membranes are mainly described and the structure and function of biological membranes are reviewed.

Outline〉 This lecture describes fundamental matters concerning self-association of biomolecules such as structure of water and hydrophobic effect, properties for molecular aggregates of amphiphilic molecules, after that various structure changes for molecular aggregates formed by lipids such as phase transitions, polymorphism, non-bilayer structure and domain formation are explained. Further, significant functions revealed in biological membranes like transport phenomena and mechanisms of drug action and so on are lectured. Portfoilo lessons are also adapted depending on students.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***biological membrane, lipid, molecular aggregate, membrane structure, membrane function***

Fundamental Lecture〉 "Biochemical Thermodynamics"(1.0), "Advanced Biophysical Chemistry"(1.0)

Requirement〉 Students are required to have a good understanding of undergraduate- and postgraduate-level physical chemistry and biophysical chemistry and related subjects.

Goal〉

1. To understand the structures and nature of molecular aggregates formed by lipids, which are components of biological membranes.
2. To understand the functions revealed by biological membranes such as material transport, signal transduction and drug action.

Schedule〉

1. Structures of biological membranes (1) structure of water and hydrophobic interaction
2. Structures of biological membranes (2) self-association of amphiphilic molecules 1: monolayers
3. Structures of biological membranes (3) self-association of amphiphilic molecules 2: micelles
4. Structures of biological membranes (4) bilayer structure and phase transitions of lipid membranes
5. Structures of biological membranes (5) stability and polymorphism of lipid membranes
6. Structures of biological membranes (6) non- bilayer structure of lipid membranes
7. Structures of biological membranes (7) mixed lipid membranes and domain formation
8. Structures of biological membranes (8) fluidization and dynamics of lipid membranes
9. Structures of biological membranes (9) surface and membrane potentials
10. Functions of biological membranes (1) molecular recognition of lipid membranes
11. Functions of biological membranes (2) ion transport (passive and active transport)
12. Functions of biological membranes (3) ion channel and nerve conduction
13. Functions of biological membranes (4) mechanisms of drug action (specific binding)
14. Functions of biological membranes (5) mechanisms of drug action (non-specific binding
15. Functions of biological membranes (6) cell functions and signal transduction
16. Report preparation for structures and functions of biological membranes

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197317

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Matsuki (G607, +81-88-656-7513, matsuki@bio.tokushima-u.ac.jp) Mail
(Office Hour: Friday 16:20-17:50)

Molecular Pathogenic Microbiology

2 units (selection)

Hideaki Nagamune · Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering
Toshifumi Tomoyasu · Associate Professor / Biological Functions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 This class aims to understand the latest findings on molecular feature and application of virulence factors expressed in pathogenic microorganisms.

Outline〉 The latest findings on virulence factors concerned with infectious diseases by pathogenic microorganisms are introduced in this class. Assignments on the introduced topics are set and marked in portfolio system.

Style〉 Portfolio

Keyword〉 ***pathogenic microorganism, virulence factor, infection***

Relational Lecture〉 "Molecular Microbiology"(0.9)

Requirement〉 Students are required to have a good understanding of undergraduate-level of microbiology and related subjects

Goal〉

1. To understand the latest molecular information on virulence factors of pathogenic microorganisms
2. To understand the application technology of microbial virulence factors in molecular level

Schedule〉

1. Bacterial toxins 1:CDC pore-forming toxins
2. Bacterial toxins 2:other pore-forming toxins
3. Bacterial toxins 3:neuron-directed enzymatic toxins
4. Bacterial toxins 4:gastrointestinal tissue-directed enzymatic toxins
5. Bacterial toxins 5:translational step-directed enzymatic toxins
6. Bacterial toxins 6:superantigens
7. Plasmids carrying microbial-resistant genes
8. fungal toxins 1:small molecular toxins
9. fungal toxins 2:protein toxins
10. Other Bacterial virulence factors 1:adherence factors
11. Other Bacterial virulence factors 2:enzymes
12. Other Bacterial virulence factors 3:secretion systems
13. Viral virulence factors 1:adherence factors
14. Viral virulence factors 2:enzymes
15. Viral virulence factors 3:transcriptional factors

Evaluation Criteria〉 Assignments count 100%

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197485

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nagamune (G707, +81-88-656-7525, nagamune@bio.tokushima-u.ac.jp)
Mail (Office Hour: Monday 16:20-17:50)

Advanced Exercise on Biological Science and Technology

2 units (compulsory)
Teacher of course

Target〉 To obtain broad information in addition to information on own field

Outline〉 To learn recent biological technology and experimental techniques

Style〉 Portfolio

Keyword〉 ***biology, technology, experiment***

Relational Lecture〉 "Engineering of Genetic Information"(0.5), "Technology of Enzyme Functions"(0.5), "Cell Signaling System"(0.5)

Requirement〉 N/A

Notice〉 N/A

Goal〉 To understand recent biology and biothechnology

Schedule〉 To learn recent biotechnology under direction of a teacher working on bioengineerig

Evaluation Criteria〉 Evaluated with portfolios

Textbook〉 Not specified

Reference〉 Provided by teachers

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197333

Student〉 Able to be taken by only specified class(es)

Contact〉
⇒ Administration Office(M703)

Advanced Research on Biological Science and Technology

2 units (compulsory)

Teachers in other colleges or departments

Target〉 To obtain broad information on recent engineering

Outline〉 To research a theme in a technology, which is different form the main technology in your field.

Style〉 Portfolio, Lecture in combination with Portfolio, Lecture and excercise

Keyword〉 ***engineering, technology, different field***

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn a recent technology, which is different from the main technology in your field

Schedule〉 Choose a theme on thechnology or engineering, which is different from that in your field.

Evaluation Criteria〉 Evaluated with portfolio or examination

Textbook〉 Ask to teachers

Reference〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197334

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ 指導教員

Earth and Life Environmental Engineering — Ecosystem Engineering

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)

Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名 姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Advanced Topics in Atoms and/or Molecules Manipulation

2 units (selection)

Shuichi Hashimoto · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Shigeki Matsuo · Associate Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 New methdologies for the manipulation of the atoms and molecules in materilas will be presented and students are encouraged to gain skills to think about to solve problems in this field

Outline〉 New methodologies will be given for mamipulating atoms and molecuels, controling physical and chemical properties, and fabricating micro- and nanostructures based upon optical/laser techniques

Style〉 Portfolio

Goal〉 To acquire knowledge of the properies of materials to the level of atoms and molecules

Schedule〉

1. Photophysical processes
2. Photophysical processes
3. Photochemical processes
4. Photochemical Processes
5. Two-photon processes
6. laser trapping
7. laser trapping
8. laser ablation
9. laser ablation
10. laser micro processing
11. laser micro fabrication
12. phtonic crystals
13. laser crystallization
14. New topics
15. New topics

Evaluation Criteria〉 Assignments counts 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197221

Advanced conversion systems of resource energy

2 units (selection)

Yoshiyuki Kidoguchi · Professor / Resource Circulatory Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To learn special knowledge concerning present energy resources and energy supplying systems, to understand principle and mechanism of energy conversion, and to improve thinking faculty for application of new energy and its conversion

Outline〉 To explain effective combustion technologies, reasonable utilization of energy and application of unused energy for saving consumption of fossil fuels and primary energy on the point of saving resources, energy and preserving the environment

Style〉 Portfolio

Keyword〉 ***energy conversion, energy resources, utilization of energy, environmental protection, energy saving***

Requirement〉 None

Notice〉 None

Goal〉 To understand fundamentals of energy conversion and to consider effective utilization of energy and improvement of energy conversion technologies

Schedule〉

1. Present state of energy resources
2. Energy and environmental problem
3. Future view of energy resources
4. Fundamentals of energy conversion
5. Typical Systems of energy conversion
6. Principle of energy conversion
7. Important notices of energy conversion
8. Present Technologies of energy conversion
9. High Technologies of energy conversion
10. New technologies of energy conversion
11. Problems of energy conversion technology
12. Approach to effective utilization of energy
13. Systems of effective utilization of energy
14. Introduction of new energy
15. Application of new energy

Evaluation Criteria〉 Appraise the understanding of the content of the lecture by setting some reports

Textbook〉 None

Reference〉 None

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/miwa/index.html

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197264

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kidoguchi (Eco502, +81-88-656-9633, kidog@eco.tokushima-u.ac.jp) Mail

Note〉 Need to submit some reports

Advance Lecture of Political Simulation

2 units (selection)

Akio Kondo · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering
Masashi Okushima · Associate Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 The technique of modelling of regional and environmental systems, and the application method of prediction and evaluation models to political simulation are studied.

Outline〉 Not only the technique of modelling, but also the application method of prediction and evaluation models to political simulation is discussed in portfolio.

Style〉 Portfolio

Keyword〉 ***political simulation, technique of modelling, prediction and evaluation***

Requirement〉 特になし

Notice〉 特になし

Goal〉 To obtain the knowledge of the technique of modelling and application method of prediction and evaluation models, and to apply them to political simulation.

Schedule〉

1. Guidance and purpose of this subject
2. Systems of political simulation
3. Technique of modelling 1
4. Technique of modelling 2
5. Application of model : Prediction 1
6. Application of model : Prediction 2
7. Application of model : Evaluation of policy 1
8. Application of model : Evaluation of policy 2
9. Example of political simulation : Population policy
10. Example of political simulation : Urban transport policy
11. Example of political simulation : Landuse policy
12. Example of political simulation : Social policy
13. Example of political simulation : Environment policy
14. The technique of political simulation in the future
15. Regional policies in the 21st Century

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Webpage〉 http://www.eco.tokushima-u.ac.jp/w3/kondo/top/index.htm

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197314

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日9·10校時)

Note〉 特になし

Advanced Lecture in Social Risk Engineering

2 units (selection)

Yasunori Kozuki · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 To understand concept of risk, to cultivate ability of measures how to reduce , avoid, compensate for various risiks. the reducing, the evading of the risk, the compensation for it.

Outline〉 Technique of risk assessment and its comunication for various social risiks on risk manegement is lecterd.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***social risks, risk management, crisis management***

Goal〉 To obtain the knowledge of risk management and application method of various social risks.

Schedule〉

1. Guidance and purpose of this subject
2. Sources of various social risks
3. Evaluation of social risk(1)
4. Evaluation of social risk(2)
5. Risk manegement (1.risik perception)
6. Risk manegement(2.risik communication)
7. Risk manegement(3.evaluation standard)
8. Example of risik manegement(1.evacuation for natural disaster)
9. Example of risik manegement(2.evacuation for natural disaster)
10. Example of risik manegement(3.evacuation for natural disaster)
11. Example of risik manegement(4.avoidance of risik and insurerance)
12. Presentaion and discusion for social risk(1)
13. Presentaion and discusion for social risk(2)
14. Presentaion and discusion for social risk(3)
15. Summary

Evaluation Criteria〉 Assignments Count 100%

Textbook〉 To be introduced in the class

Reference〉 To be intrroduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197280

Student〉 To be limited to the students of the course

Contact〉

⇒ Murakami . (Office Hour: Monday 16:20-17:50)

Design for Adapting the Environment Instead of the Peop

2 units (selection)

Shoichiro Fujisawa · Professor / Social Environment Systems Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 The objective of this lecture is to consider the role of assitive technology for the persons with disabilities living in the society and to learn on the development of assistive products in the view point of human factors and outcome measure in daily living with assistive products.

Outline〉 Assistive technology for a disabled individual living in the society. Human factors and R & D of assistive devices and services. Adapting the environment instead of the disabled people. Evaluation of appropriateness of assistive technology system for a person.

Style〉 Lecture

Keyword〉 ***assistive products, outcome measure, persons with disability, research and development, ergonomics***

Goal〉 An expertise necessary to research and develop an actual assistive products is acquired. The method of outcome measure for assistive products will be mastered.

Schedule〉

1. Guidance
2. Human factors in physical view point (1)
3. Human factors in anatomical view point (2)
4. Human factors in phychological view point (3)
5. Adapting the people to the environment
6. Adapting the environment insted of the people
7. Physical impairment and daily living support
8. Sensory impairment and daily living support
9. Intellectual impairment and daily living support
10. R&D of assistive products and ergonomic approach (1)
11. R&D of assistive products and ergonomic approach (2)
12. R&D of assistive products based on daily living (1)
13. R&D of assistive products based on daily living (2)
14. Outcome measure of assistive products (1)
15. Outcome measure of assistive products (2)

Evaluation Criteria〉 Results will be evaluated through the lecture and reports submitted after each lesson.

Textbook〉 To be introduced in th class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197409

Contact〉

⇒ Fujisawa (ECO704, +81-88-656-7537, s-fuji@eco.tokushima-u.ac.jp) Mail
(Office Hour: 水曜日 18:00~ 20:00)

Engineering on Circulation of Resources

2 units (selection)

Takahiro Hirotsu · Professor / Marine Environment Science and Engineering, Ecosystem Engineering, Earth and Life Environmental Engineering

Target〉 Learning advanced technology for circulation of resouces

Outline〉 Separation and utilization of unused inorganic resources, separation of isotopes of light elements, and design and synthesis of adsorbents for separation of isotopes.

Style〉 Excercise

Keyword〉 ***recovery of resources, separation of materials, separation of isotopes***

Goal〉 understanding of an advanced technology for circulation of resources

Schedule〉

1. What are resources?
2. Types and properties of substances
3. Separation of ions: ion-exchange method 1
4. Separation of ions: ion-exchange method 2
5. Separation of ions: ion-exchange method 3
6. Separation of ions: chelate exchange 1
7. Separation of ions: chelate exchange 2
8. Separation of ion: chelate exchange 3
9. Separation of isotopes by chemical-exchange method
10. Principle of separation of lithium-isotopes
11. Principle of separation fo boron-isotopes
12. Separation of isotopes by ion-exchange method 1
13. Separation of isotopes by ion-exchange method 2
14. Separation of isotopes by ion-exchange method 3
15. Separation of isotopes by ion-exchange method 4
16. Significance of advanced separation of substances in circulation of resources

Evaluation Criteria〉 Discussion in the class and description of ideas in the report

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197268

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Hirotsu (National Institute of Advanced Industrial Science and Technology, +81-87-869-3562, takahiro-hirotsu@aist.go.jp) Mail

Advanced mitigation engineering

2 units (selection)

Hideki Ueshima · Part-time Lecturer / 広島工業大学

Target〉 To obtain the abilities to find and solve environmental problems using for application of mitigation technique

Outline〉 To surveying of the latest news of mitigation and to understand its concept and examine the technique to mitigate the deterioration environment

Style〉 Lecture in combination with Portfolio

Keyword〉 ***district improvement plan for disaster mitigation, coastal environment***

Fundamental Lecture〉 "Advanced Lecture in Social Risk Engineering"(1.0), "Advance Lecture of Political Simulation"(1.0)

Goal〉 To design and assess the mitigation plan for deterioration coastal environment

Schedule〉

1. Guidance of this subject
2. Current topics about mitigation 1
3. Current topics about mitigation 2
4. Current topics about mitigation 3
5. Current topics about mitigation 4
6. Current topics about mitigation 5
7. Current topics about mitigation 6
8. Current topics about mitigation 7
9. Current topics about mitigation 8
10. Current topics about mitigation 9
11. Current topics about mitigation 10
12. Discussion on research theme1
13. Discussion on research theme2
14. Discussion on research theme3
15. Presentation

Evaluation Criteria〉 Assignments count 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197495

Contact〉

⇒ Ueshima (+81-823-72-1901, h-ueshima@aist.go.jp) Mail

Advanced Lecture on Quantum Nanostructure Semiconductors

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This lecture aims at understanding basic concepts of the quantum effects of semiconductor nanostructures based on materials science and various technologies for device applications.

Outline〉 This lecture introduces characteristics of quantum structures and technologies of the device applications, based on quantum mechanics, semiconductor physics, materials science and photonics. Advanced technologies of fabrication and measurements and recent topics of the research are also introduced.

Style〉 Lecture

Goal〉 To understand materials science and application technologies of nano structure semiconductors

Schedule〉

1. Electronic states in semiconductor quantum structures
2. Electronic properties of quantum stutures
3. Optical properties of quantum stutures
4. Fabrication technologies of semiconductor nanostructures
5. Evaluation technologies of crystals
6. Evaluation technologies of nanostructures
7. Analysis of elctronic properties
8. Analysis of optical properties
9. Quantum effect devices
10. Nonlinear optical responces of semiconductors
11. Responces of optical micro cavity
12. Research progress in quantum nanostructure semiconductors
13. Ultrafast optical devices
14. Quantum information devices
15. Topics of recent advanced research (1)
16. Topics of recent advanced research (2)

Evaluation Criteria〉 Assignments

Textbook〉 None

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197512

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

Quantum Theory of Materials

2 units (selection)

Yoshitaka Michihiro · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This class introduces the advanced quantum mechanics and quantum field theory.

Outline〉 Basics of advanced quantum mechanics and quantum field theory are introduced.

Style〉 Lecture

Keyword〉 ***quantum mechanics, quantum field theory***

Goal〉 To understand the outline of advanced quantum mechanics and quantum field theory.

Schedule〉

1. Introduction
2. Quantum mechanics (1)
3. Quantum mechanics (2)
4. Hartree-Fock approximation
5. Koopman's theorem
6. Density functional theory
7. Kohn-Sham equation
8. Local density approximation
9. Perturbation (1)
10. Perturbation (2)
11. Quantum field theory
12. Creation operator and annihilation operator
13. Field quantization (1)
14. Field quantization (2)
15. Phonon
16. Electron gas

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=204194

Contact〉

⇒ Yoshitaka Michihiro (A203)

Nonlinear Optical Devices

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the principle, tipical structure, advantages and disadvantages of current nonlinear optical devices. To develop ability to design new devices and solve verious problems for applications.

Outline〉 Physics of second-order and third-order nonlinear optical phenomena. Principles of electro-optics. Optical nonlinearities in fibers. Photorefractive materials. Nonlinear optical media. Anisotropic nonlinear optical media. Dispersive nonlinear optic media. Coupled-wave theory. Electro-optic and acousto-optic devices. Second-order and third-order nonlinear optic devices. Photonic switches. All-optical switches. Bistable optical devices. Optical connections.

Style〉 Portfolio

Keyword〉 ***nonlinear optics, harmonic generation, nonlinear optical device, optical switch***

Relational Lecture〉 "Optical and Functional Inorganic Materials"(0.5)

Requirement〉 Student should have fundamental knowledge of electromagnetic theory, waveoptics, optical properties of materials and lasers.

Notice〉 The following plan of this course is a example. Plans may be modified depending on knowledges and experiences of studens.

Goal〉

1. Possible to explain princiles, structure and characteristics of optoelectric devices.
2. Possible to explain princiles, structure and characteristics of the second-order nonlinear optical devices.
3. Possible to explain princiles, structure and characteristics of the third-order nonlinear optical devices.

Schedule〉

1. Introduction & interview
2. nonlinear optical phenomena
3. Electrooptic effect and its applications
4. Magnetooptic effect and its applications
5. Acoustoptic effect and its applications
6. principle of second-order nonlinear effects
7. Second-order nonlinear optical materials
8. Second-order nonlinear optical devices
9. principle of third-order nonlinear effects
10. third-order nonlinear optical materials
11. Third-order nonlinear devices
12. Experiment for nonlienar optical phenomena
13. Current application of nonlinear devices
14. Photonic crystal
15. Integrated optical devices

Evaluation Criteria〉 Activity:20%, reports:40% and oral examinations:40%

Textbook〉 After interview, we will decide suitable text books.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=204193

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp)
Mail (Office Hour: 16:05-18:00)

Applied Statistical Physics

2 units (selection)

Atsushi Mori · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Learn to apply the statistical physics

Outline〉 Concerning the mechanisms and phenomena in materials processing, lectures are given in method for analyzing the results on the basis of the statistical physics.

Style〉 Lecture

Goal〉

1. points of view in statistical physics
2. applying statistical physics to the practical problem

Schedule〉

1. Thermodynamics of non-equilibrium and non-uniform systems I
2. Thermodynamics of non-equilibrium and non-uniform systems II
3. Thermodynamics of non-equilibrium and non-uniform systems III
4. Advanced statistical mechanics I
5. Advanced statistical mechanics II
6. Advanced statistical mechanics III
7. Exercise I
8. Examination I
9. Advanced statistical mechanics IV
10. Advanced statistical mechanics V
11. Advanced statistical mechanics VI
12. Transport phenomena I
13. Transport phenomena II
14. Transport phenomena III
15. Exercise II
16. Examination II

Evaluation Criteria〉 60 点以上を合格とする．

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=204195

Contact〉

⇒ Mori (Opt.407, +81-88-656-9417, mori@opt.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワーは，学科の掲示板等をご覧下さい．)

Advanced Exercise on Ecosystem Engineering

2 units (compulsory)
All teachers

Target〉 To conduct research leading to the awarding of doctoral degrees.

Outline〉 To conduct research in Conversion Systems of Resource Energy, Resources Recycling Technology, Political Simulation, Social Risk Engineering, Design for Adapting the Environment Instead of the People and Engineering on Circulation of Resources.

Style〉 Portfolio, Lecture in combination with Portfolio, Lecture and excercise

Keyword〉 ***ecosystem engineering***

Notice〉 Course plan differs depending on the laboratory you choose.

Goal〉 To present the results of your research related conferences, departmental research meetings, etc.

Schedule〉 After the student selects the subjects, research can be carried out at the laboratory.

Textbook〉 None

Reference〉 Using papers for each research field.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197139

Student〉 Able to be taken by only specified class(es)

Advanced Research on Ecosystem Engineering

2 units (compulsory)

Teachers in other colleges or departments

Target〉 To obtain broad information on recent engineering

Outline〉 To research a theme in a technology, which is different from the main technology in your field.

Keyword〉 ***engineering, technology, different field***

Goal〉 To learn a recent technology, which is different from the main technology in your field.

Schedule〉 Choose a thema on thechnology or engineering, which is different from that in your field.

Evaluation Criteria〉 Evaluated with portfolio or examination

Textbook〉 Ask to teachers

Reference〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197140

Student〉 Able to be taken by only specified class(es)

Systems Innovation Engineering — Electrical and Electronic Engineering

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)

Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Topics in algebra and analysis

2 units (selection)

Shigeaki Nagamachi · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 We will learn some important properties of a special function, which is called the Riemann zeta function. Further we will learn how to solve problems produced by this function.

Outline〉 We will learn developement of mathematical tools in order to prove some properties of the Riemann zeta function, such as the special values, Euler product and the functional equation.

Fundamental Lecture〉 "Basic Mathematics/Calculus 1"(1.0), "Basic Mathematics /Calculus 2"(1.0), "Complex Analysis"(1.0)

Relational Lecture〉 "Numerical Analysis"(0.5)

Goal〉 We will learn fundamentals of modern abstract mathematics and realize its effectiveness.

Schedule〉

1. Introduction
2. Zeta function
3. Leonhard Euler
4. Special values
5. Analytic continuation
6. Special values and analytic continuation
7. Euclid's proof
8. Fermat prime
9. Euler product
10. Prime number theorem I
11. Prime number theorem II
12. Prime number theorem III
13. Functional equation I
14. Functional equation II
15. Summation
16. Assignments

Evaluation Criteria〉 Evaluation will be based on assignments.

Reference〉 Dunham, William, "Euler: the Master of Us All", The Mathematical Association of America

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197341

Contact〉

⇒ Nagamachi (A205, +81-88-656-7554, shigeaki@pm.tokushima-u.ac.jp) Mail (Office Hour: 水曜日 15 時から 16 時)

Radio Frequency Solid State Physics

2 units (selection)

Koichi Nakamura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

⇒ Nakamura (A216, koichi@pm.tokushima-u.ac.jp) Mail

Target〉 This class introduces basis of NMR and applications to studies on superconductivity, magnetism and ionic diffusion in solid.

Outline〉 The spectrum, spin-lattice relaxation, spin-spin relaxation, chemical shift etc., which are obtained by NMR measurements, are introduced and discussed in connection with various physical properties of solids.

Keyword〉 ***nuclear magnetic resonance, nuclear magnetic moment, magnetism, diffusion, superconductor, spin-lattice relaxation, Knight shift***

Goal〉

1. To understand basis of NMR.
2. To understand relationship between various problems in solid state physics and relaxation phenomena observed using NMR.

Schedule〉

1. Introduction
2. Spin-echo and NMR spectrum
3. Equipments
4. Dipole interaction
5. Hyperfine interaction and spectrum
6. Chemical shift
7. Quadrupole interaction and quadrupole resonance
8. Spin-lattice relaxation
9. Internal magnetic field in ferro and antiferro magnets
10. Spin-lattice relaxation in metals
11. NMR studies on superconducting state
12. NMR studies on High Tc superconductors
13. Diffusion in solid and spin-lattice relaxation
14. NMR studies on lithium ionic conductors
15. NMR studies on protonic conductors
16. Summary

Evaluation Criteria〉 Report 100%

Textbook〉 遍歴電子系の核磁気共鳴 (朝山邦輔著，裳華房)

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197389

Contact〉

Engineering of Correlated Electron Matter

2 units (selection)

Yutaka Kishimoto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Yu Kawasaki · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 In many solid-state materials, new phenomena evolve due to strong electron interactions. In this Lecture, review will be given on some advanced topics and their applications, including high temperature superconductivity, metal-insulator transition and strongly correlated electronics.

Outline〉 New types of superconducting and magnetic phenomena emerge in correlated electron matters. The term "correlated electron" represents the state of matter where many electrons are strongly interacting with each other. After an introductory talk on magnetism and superconductivity, review will be given on some advanced topics, including high temperature superconductivity, metal-insulator transition and colossalmagneto resistance. Potential application of correlated electron matters to technology is also presented focusing on spintronics or strongly correlated electronics.

Style〉 Lecture

Keyword〉 ***strongly correlated electron systems, Mott insulator, colossalmagneto resistance, high temperature superconductor***

Goal〉 To understand basic concepts of correlated electron matter and its application

Schedule〉

1. Introduction to correlated electron matters
2. Perspectives of magnetism and superconductivity in correlated electron matters
3. Electronic states of atoms and ions
4. Magnetic ions in crystal electric field
5. Introduction to superconductivity
6. How to probe rich properties in correlated electron matters
7. Mott insulator and metal-insulator transition
8. Spin, charge and orbital in transition metal oxides
9. Colossalmagneto resistance in transition metal oxides
10. Application of transition metal oxides with correlated electrons
11. High temperature superconductivity
12. Heavy-fermion superconductivity
13. Electronic states of organic conductors
14. Application of superconductors with correlated electrons
15. Towards strongly correlated electronics

Evaluation Criteria〉 Reports on several subjects in lecture.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197205

Contact〉

⇒ Kishimoto (A202, +81-88-656-7548, yutaka@pm.tokushima-u.ac.jp) Mail
(Office Hour: 金曜日 16:00-17:30)
⇒ Kawasaki (A217, +81-88-656-9878, yu@pm.tokushima-u.ac.jp) Mail

Plasma Science and Technology

2 units (selection)

Kaoru Ohya · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The lecture aims to understand electronic, atomic and molecular collision processes in gases and solids and to present their various applications.

Outline〉 1) Electronic, atomic and molecular collisions in gases and solid. Plasma physics and chemistry. Surface and materials science related to plasma-solid interactions. 2) Application to material processing technologies for electronic devices. Plasma-wall interactions in controlled thermonuclear fusion devices.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***plasma, collision theory, plasma-surface interaction, plasma applications***

Goal〉

1. Understanding on collision processes in gases and solids
2. Understanding on applications to material processing technologies and plasma-wall interactions in controlled thermonuclear fusion devices.

Schedule〉

1. Introduction to collision theory
2. Interaction potential
3. Elastic collision and nuclear stopping power
4. Inelastic collision and electronic stopping power
5. Inelastic processes in gases
6. Electron and Ion transport in gases
7. Reflection and thermal re-emission from solids
8. Collision mixing and diffusions in solids
9. Physical sputtering and chemical sputtering
10. Plasma chemical vapor deposition deposition
11. Plasma-assisted etching
12. Other applications to material device processing
13. Plasma-wall interactions in nuclear fusion devices
14. Edge plasma physics
15. Hydrogen recycling and material erosion
16. Conclusions and future problems

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197474

Contact〉

⇒ Ohya (E 棟 2 階南 A-9, +81-88-656-7444, ohya@ee.tokushima-u.ac.jp) Mail

Photonic Semiconductor Device Physics

2 units (selection)

Shiro Sakai · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering, Yoshiki Naoi · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering
Katsushi Nishino · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To understand the device physics and fabrication technique of photonic semiconductor devices..

Outline〉 Interaction of photons and electrons in semiconductors, physics of superlattice semiconductors and their applications as photonic devices. Crystal growth of semiconductors and heteroepitaxy.

Style〉 Lecture

Keyword〉 ***semiconductor, photonic device***

Relational Lecture〉 "Optical and Functional Inorganic Materials"(0.5)

Goal〉

1. To understand device physics of photonic devices in terms of interaction of photons and electrons
2. To understand device physics of quantum effect devices
3. To understand crystal growth and related technologies for fabrication of photonic devices

Schedule〉

1. Introduction
2. Energy band structure of semiconductors
3. Quantum statistics of electrons in semiconductors
4. Carrier transport in semiconductors
5. Quantum devices and superlattice
6. Light absorption in semiconductors (interaction of electrons and photons)
7. Photocinductivity, photovol and photodiode
8. Physics of light emission of semiconductors
9. Radiative recombination, non-radiative recombination, stimulated emission and spontaneous emission
10. Light emitting diodes and lasers
11. Devices for optical communication
12. Crystal growth of substrates for photonic semiconductor devices
13. MOCVD and MBE
14. Fabrication of Ohmic contact
15. Nano-photonic devices and fabrication technology
16. Examination

Evaluation Criteria〉 Report 50%, Examination 50%. More than 60% is required to pass this class.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197443

Contact〉

⇒ Sakai (E 棟 2 階南 A-3, +81-88-656-7446, sakai@ee.tokushima-u.ac.jp) Mail
⇒ Naoi (E 棟 2 階南 A-4, +81-88-656-7447, naoi@ee.tokushima-u.ac.jp) Mail
(Office Hour: 年度ごとに学科の掲示を参照すること.)
⇒ Nishino (E 棟 2 階南 A-5, +81-88-656-7464, nishino@ee.tokushima-u.ac.jp) Mail

Note〉 This lecture will be given in English.

Optical and Functional Inorganic Materials

2 units (selection)

Kikuo Tominaga · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 このコースは光学的材料，機能材料のための単結晶，多結晶，アモルファス薄膜に関する材料科学の基礎について習得することを目的とする．同時に，種々の膜作製技術や材料評価技術や，結晶中の光や音響波の伝搬についても講義をする．

Outline〉 Fundamentals of crystal science is lectured at first. Optical and electronic processes in optical and functional materials such as single crystals, polycrystals or amorphous films are followed. Advanced solid state physics of semiconductors, dielectric and ferroelectric materials are included. Synthesis methods of optical and functional crystals and films, evaluation methods of film properties are also contained. Electro-optical and piezo-electrical effects and solid state physics relating with their effects, characterization of crystals, symmetry elements of crystals and material constants,optical properties of crystals, electro-optical effects and nonlinear effects, piezoelectricity, acoustic waves in crystal,interaction of phtons and phonons in crystal, synthesis methods of thin films (PVD method; electron beam evaporation, MBE, sputtering, laser ablation), film properties (charaterizations of electrical, optical and mechanical properties) are included.

Style〉 Lecture and excercise

Keyword〉 ***functional material, semiconductor device, crystal optics, thin film technology, deposition techniques of thin films***

Relational Lecture〉 "Photonic Semiconductor Device Physics"(0.5), "Nonlinear Optical Devices"(0.5)

Goal〉 Understanding of the solid state physics of piezoelectric materials and functional thin films

Schedule〉

1. Characterization of crystals
2. Symmetry elements of crystals and material constants 1
3. Symmetry elements of crystals and material constants 2
4. Optical properties of crystals 1
5. Optical properties of crystals 2
6. Electro-optical effects and nonlinear effects 1
7. Electro-optical effects and nonlinear effects 2
8. Piezoelectricity 1
9. Piezoelectricity 2
10. Acoustic waves in crystal 1
11. Acoustic waves in crystal 2
12. Interaction of phtons and phonons in crystal
13. Synthesis methods of thin films 1(PVD method; electron beam evaporation, MBE, sputtering, laser ablation)
14. Synthesis methods of thin films 2(PVD method; electron beam evaporation, MBE, sputtering, laser ablation)
15. Film properties (Charaterizations of electrical, optical and mechanical properties)
16. Exercise

Evaluation Criteria〉 Reports for each theme and examination

Textbook〉 Tomoya Ogawa:Fundamentals in Crystal Engineering, Shoukabou (in Japanese) and Shunichi Gonda, Applied Handbook of Thin Film Depositions, (NTS)(in Japanese)

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197501

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tominaga (E 棟 2 階南 A-6, +81-88-656-7439, tominaga@ee.tokushima-u.ac.jp) Mail

Note〉 This lecture will be given in English.

Nonlinear Optical Devices

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the principle, tipical structure, advantages and disadvantages of current nonlinear optical devices. To develop ability to design new devices and solve verious problems for applications.

Outline〉 Physics of second-order and third-order nonlinear optical phenomena. Principles of electro-optics. Optical nonlinearities in fibers. Photorefractive materials. Nonlinear optical media. Anisotropic nonlinear optical media. Dispersive nonlinear optic media. Coupled-wave theory. Electro-optic and acousto-optic devices. Second-order and third-order nonlinear optic devices. Photonic switches. All-optical switches. Bistable optical devices. Optical connections.

Style〉 Portfolio

Keyword〉 ***nonlinear optics, harmonic generation, nonlinear optical device, optical switch***

Relational Lecture〉 "Optical and Functional Inorganic Materials"(0.5), "Crystal Growth of Optical Materials"(0.5)

Requirement〉 Student should have fundamental knowledge of electromagnetic theory, waveoptics, optical properties of materials and lasers.

Notice〉 The following plan of this course is a example. Plans may be modified depending on knowledges and experiences of studens.

Goal〉

1. Possible to explain princiles, structure and characteristics of optoelectric devices.
2. Possible to explain princiles, structure and characteristics of the second-order nonlinear optical devices.
3. Possible to explain princiles, structure and characteristics of the third-order nonlinear optical devices.

Schedule〉

1. Introduction & interview
2. nonlinear optical phenomena
3. Electrooptic effect and its applications
4. Magnetooptic effect and its applications
5. Acoustoptic effect and its applications
6. principle of second-order nonlinear effects
7. Second-order nonlinear optical materials
8. Second-order nonlinear optical devices
9. principle of third-order nonlinear effects
10. third-order nonlinear optical materials
11. Third-order nonlinear devices
12. Experiment for nonlienar optical phenomena
13. Current application of nonlinear devices
14. Photonic crystal
15. Integrated optical devices

Evaluation Criteria〉 Activity:20%, reports:40% and oral examinations:40%

Textbook〉 After interview, we will decide suitable text books.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197454

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp) Mail (Office Hour: 16:05-18:00)

Power System Electromagnetic Compatibility

2 units (selection)

Masatake Kawada · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering
Naoyuki Shimomura · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 1. To give the students understanding of the characteristics of electromagnetic compatibility in nature. 2. To give the students understanding of the characteristics of electromagnetic field generated from power system and the effect on biological system 3. To give the students understanding of the mechanisms of electromagnetic field generated from power system, the mitigation and the detection method. . 4. To improve the presentation skill of students by presenting the latest transaction or journal papers in this filed in English.

Outline〉 Characteristics of artificial electromagnetic fields of DC, extremely low frequency (ELF) and high frequency (HF) arising from power systems are quantitatively explained as well as those of the fields from natural environments. Associate Prof. Shimomura gives lectures on how the electromagnetic fields are produced by power systems and on the management (characterization, reduction & mitigation and public education) of ELF electric and magnetic fields. Associate Prof. Kawada gives lectures on how the high frequency electromagnetic fields are produced by power systems and on the detection of VHF and UHF electromangetic waves.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***electrical power engineering, electromagnetic compatibility, bioelectromagnetics***

Relational Lecture〉 "Advanced Theory of Electric Power Control Systems"(0.5)

Requirement〉 Understanding of electromagnetic compatibility

Goal〉

1. To understand the characteristics of electromagnetic compatibility in nature.
2. To understand the characteristics of electromagnetic field generated from power system and the effect on biological system
3. To understand the mechanisms of electromagnetic field generated from power system, the mitigation and the detection method. .

Schedule〉

1. EMC in nature 1 (Electric field)
2. EMC in nature 2 (Magnetic field)
3. Characteristics of power system EMC 1 (Electric field)
4. Characteristics of power system EMC 2 (Magnetic field)
5. Characteristics of low frequency electromagnetic field generated from power system 1
6. Characteristics of low frequency electromagnetic field generated from power system 2
7. Effect of low frequency electromagnetic field generated from power system on biological system 1
8. Effect of low frequency electromagnetic field generated from power system on biological system 2
9. Mechanisms of electromagnetic field generated from power system.
10. Coupling mechanisms of electromagnetic field and biological system
11. Analysis method between electromagnetic field and biological system
12. Social effects on electromagnetic field generated from power system
13. Mechanisms of the high frequency electromagnetic field generated from power system 1
14. Mechanisms of the high frequency electromagnetic field generated from power system 2
15. Method to detect the high frequency electromagnetic field generated from power system
16. Conclusion of power system EMC

Evaluation Criteria〉 Assignment 50%, Presentation 50%. Totally 60% is required to have the credits.

Textbook〉 printed material

Reference〉

- ◇ D.F.Warne, Electrical Power Engineer's Handbook, Newnes
- ◇ J.Patrick Reilly, Applied Bioelectricity, Springer
- ◇ IEEE Trans on "Energy Conversion", "Power Delivery", "Electromagnetic Compatibility", and "Dielectrics and Electrical Insulation"

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197392

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawada (E 棟 2 階北 B-10, +81-88-656-7460, kawada@ee.tokushima-u.ac.jp) Mail (Office Hour: (水)(木) 16:00-17:00)

Note〉 Language: English

Power Energy Conversion and Control Engineering

2 units (selection)

Tokuo Ohnishi · Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To investigate and learn new energy conversion and control technologies in the fields of the electric power system and the renewable energy.

Outline〉 Power electronics technologies in utility interconnection systems such as HVDC (High-Voltage Direct-Current) transmission system, SVG (Static Var Generator), UPS (Uninterruptible Power Supply) and FACTS (Flexible AC Transmission System) and in renewable energy development system such as photovoltaic, wind and fuel cell power generation system.

Keyword〉 ***energy conversion, energy control, utility interconnection control system, renewable energy***

Fundamental Lecture〉 "Advanced Power Electronics"(0.5)

Relational Lecture〉 "Advanced Theory of Electric Power Control Systems"(0.5), "Semiconductor Device Physiscs"(0.5)

Requirement〉 Prerequisites:It is preferable to have knowledge equal with power electronics in undergraduate and advanced power electronics in masters degree course.

Goal〉

1. State of the Arts and Trends of The Utility Interconnection System using Power Electronics Technology
2. State of The Arts and Trends of The Renewable Energy Development using Power Electronics Technology

Schedule〉

1. Introduction od Power Electronics Technology in Utility Interconnection System
2. High Voltage Direct Current Transmission System
3. Flexible AC Transmission System
4. Static Var Generator
5. Unified Power Flow Controller
6. Uninteruptible Power Supply
7. INtroduction of Power Electronics Technology in Renewable Energy
8. Photovoltaic Power Generation System
9. Wind Power Generation System
10. Micro Gas Turbine System
11. Fuel Cell System
12. Charging and Discharging System for DC Battery
13. Hybrid Power Supply System
14. Distributed Generation System
15. Discussion for Reports

Evaluation Criteria〉 Report and presentation

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197418

Contact〉

⇒ Ohnishi (E 棟 2 階北 B-1, +81-88-656-7456, ohnishi@ee.tokushima-u.ac.jp) Mail

Semiconductor Device Physiscs

2 units (selection)

Yasuo Ohno · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The purpose of this lecture is to understand the background physics which governs the electrical performances of semiconductor devices.

Outline〉 The lecture gives carrier transport theory and equations based on which semiconductor electron devices including various types of transistors, high-field phenomena and short-channel effects in miniaturized transistors and deep levels which are the origin of various malfunctions in semiconductor devices.

Style〉 Lecture and excercise

Keyword〉 ***device physics, semiconductor device***

Fundamental Lecture〉 "Advanced Theory of Electron Devices"(1.0)

Relational Lecture〉 "Photonic Semiconductor Device Physics"(0.5), "Optical and Functional Inorganic Materials"(0.5)

Goal〉 Understand the carrier transport in semiconductors based on the Boltzmann transport equation. 2. Understand the velocity saturation effects and 2-dimensional field distribution effects in miniaturized transistors. 3. Understand the electrical behavior of deep traps in semiconductors based on Shockley-Reed-Hall statistics.

Schedule〉

1. デバイス物理の基本方程式
2. ボルツマン輸送方程式
3. 電子流と熱流
4. ホットキャリア効果
5. 電子ガスの粘性と MOS 表面電子移動度
6. 短チャネル効果
7. デバイス微細化の限界
8. 大規模高速システムとデバイス特性
9. 深い準位に対する SRH 統計
10. 電子トラップとホールトラップ
11. サイドゲート効果
12. 周波数分散
13. 化合物半導体とシリコンの比較
14. プロセスシミュレーション
15. デバイスシミュレーション
16. テスト

Evaluation Criteria〉 Reports for each theme and examination

Textbook〉 S. M. Sze, Kwok K. Ng, "Physics of Semiconductor Devices," 3rd Ed.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197420

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ohno (E 棟 2 階南 A-7, +81-88-656-7438, ohno@ee.tokushima-u.ac.jp) Mail

Note〉 This lecture will be given in English.

Advanced Theory of Electric Power Control Systems

2 units (selection)

Kensuke Kawasaki · Professor / Electric Power, Electrical and Electronic Engineering, Systems Innovation Engineering, Kiyoshi Takigawa · Associate Professor / Electric Power, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The purpose of this lecture is to understand the characteristic of various power generation systems and electric power systems and to master new technologies on distributed power sources and electric power systems.

Outline〉 The principle of power generation in various kinds of power generation machines, the characteristic of electric power systems and the analysis technique are introduced. Moreover, the electric power control technology for a distributed power source using an inverter, and control techniques in electric power systems connecting power generation facilities whose output change will occur, such as solar systems, are introduced.

Style〉 Portfolio

Keyword〉 ***electric power control, solar system, inverter***

Requirement〉 N/A

Goal〉

1. To master analysis technique of power generation systems
2. To master analysis techniques of electric power systems
3. To understand control mechanism of distributed power generation systems
4. To maseter analysis techniques of distributed power generation systems

Schedule〉

1. Energy transformation technique
2. Basic circuit equations for electric power systems
3. Analysis method 1 in electric power systems
4. Analysis method 2 in electric power systems
5. Analysis method 3 in electric power systems
6. Voltage and reactive power in electric power systems
7. Modeling of synchronous machines
8. Characteristics of synchronous machines
9. Modeling of distributed power generation systems
10. Stability of electric power systems
11. Control of electric power systems
12. Control of distributed power generation systems
13. Requirements for stability in distributed power generation systems
14. Advances analysis method 1 in electric power systems
15. Advances analysis method 1 in electric power systems
16. Examination

Evaluation Criteria〉 Evaluate with portfolio and examinations

Textbook〉 printed materials

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197391

Advanced Mechatronics Engineering

2 units (selection)

Ikuro Morita · Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering, Takashi Yasuno · Associate Professor / Electric Energy Engineering, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This class introduces the basic principle of the diagnosis technology and the control technique of the industrial machine system that uses an electric actuator.

Outline〉 The objective of this lecture is to give a course on the modeling methods, the sensor techniques, the signal processing methods, the intelligent control algorithms for industrial machines driven by electrical actuators. The applications of these advanced schemes are also included.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***diagnosis technology, control algorithm, intelligent***

Relational Lecture〉 "Control System Design"(0.5), "Power Energy Conversion and Control Engineering"(0.5)

Goal〉

1. The modeling, the sensor technology, and the diagnosis technology of the control system are introduced.
2. Improvement performances of control system, and Control algorithm for intelligent are introduced.

Schedule〉

1. Sensor technology for fauilure diagnosis.
2. Signal processing technology for failure diagnosis.
3. Modeling method of electrical machines.
4. Modeling method of electrical machines on faulty conditions.
5. Characteristics of electrical machnes on faulty conditions.
6. Intelligent control method
7. Fuzzy reasoning
8. Control system using fuzzy reasoning
9. Neural networks
10. Control system using neural networks
11. Motion control system
12. Two degree-of-freedom control system
13. Design method of feedback controller for disturbance suppression
14. Design method of feedforward controller for Improvement of responses
15. Responses of two degree-of-freedom control system
16. Return of report, and conclusions

Textbook〉 The print is distributed.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197503

Contact〉

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⇒ Yasuno (E 棟 2 階北 B-5, +81-88-656-7458, yasuno@ee.tokushima-u.ac.jp) Mail

Communication Systems

2 units (selection)

Atsushi Takada · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering, Takahiro Oie · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Understanding the designing and administrating scheme of wireless communication system and multi-nodes networks. And bring up faculty of designing original telecommunication system.

Outline〉 Timing detection and regeneration of a phase and a frequency using a linear filter, design of a digital PLL, digital modulation and demodulation, and multiple access technique, e. g. FDMA, TDMA, CDMA in wireless communications. Design of data transmission protocol over optical data transmission system and computer networks, network administration techniques, e. g. DNS, and implementation of application program for internetworking.(Portfolio style)

Style〉 Portfolio

Keyword〉 ***phase locked loop, optical transmission system, optical transmission system using repeater-amplifier, photonic network system, computer networks, network architecture, network management***

Fundamental Lecture〉 "Advanced Theory of Digital Transmission"(1.0), "Advanced Theory of Electrical Communication"(1.0)

Relational Lecture〉 "Photonic Semiconductor Device Physics"(0.5)

Requirement〉 Students are required to have a good understanding of communication engineering and related subjects up to master-level.

Goal〉

1. Able to design the multiple-access wireless communication system (e.g. FDMA, TDMA, CDMA).
2. Able to design the wide-area data transmission network with repeaters.
3. Able to design the network architecture which satisfies the specified demands on multi-nodes network (e.g. computer networks).

Schedule〉

1. Timing detection and regeneration of a phase
2. Phase-locked loops and its components
3. Response to linear frequency variation
4. Digital modulation and demodulation
5. Designing the optical transmission system
6. Designing the optical transmission system using repeater-amplifier
7. Photonic network system
8. Mobile communication system (FDMA, TDMA, CDMA)
9. Transmission protocol of computer networks (Ethernet, ATM)
10. Transmission protocol of computer networks (TCP, UDP)
11. Network administration technique (DNS)
12. Network administration technique (SNMP, MIB)
13. Implementation of network application
14. Designing the application protocol
15. Distributed database system
16. Designing the distributed system

Evaluation Criteria〉 Reports and presentation 100 %. More than 60 % is required to pass the class.

Textbook〉 A. Yariv, "Optical Electronics" and journal articles, etc.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197289

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ A. Takada (Bldg. E-C3,656-7465, takada@ee) (Office Hour: A. Takada: Tue. 13:30-14:30, Thu. 16:30-17:30)

⇒ Oie (E-3F-C-1, +81-88-656-7479, alex@ee.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 16:20~ 17:20, Thursday 16:50~ 17:50)

Integrated System Design

2 units (selection)

Shinsuke Konaka · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 High frequency design method and theory for GHz/Gbit high speed integrated circuits are lectured and discussed.

Outline〉 High frequency circuit design methodology using circuit simulator and 3D electromagnetic simulator is lectured by using high speed bipolar/MOS transistor parameters and high frequency circuit models of wire, poly-silicon resistor, MIM capacitor and spiral inductor.

Style〉 Lecture and excercise

Keyword〉 ***RF analog circuit design, AC device parameters, high frequency integrated circuits***

Relational Lecture〉 "Integrated System Design"(0.5)

Goal〉

1. To understand high frequency circuit models of transistor, wire, resistor, MIM capacitor and spiral inductor.
2. To understand high frequency circuit design and measurement.

Schedule〉

1. Bipolar/MOS transistor device models
2. AC equivalent circuit models of a wire, resistor, MIM capacitor and spiral inductor
3. S parameter measurements and AC device parameter extractions
4. High frequency stability design
5. Case studies of high frequency integrated circuits

Evaluation Criteria〉 Report 100%. The passing mark is not less than 60%.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197286

Contact〉

⇒ Konaka (E 棟 3 階北 C-2, +81-88-656-7469, konaka@ee.tokushima-u.ac.jp) Mail

Electronic Information System Design

2 units (selection)

Masaki Hashizume · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering
Hiroyuki Yotsuyanagi · Associate Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This class introduces the techniques and the recent topics related to the design and test of logic circuits.

Outline〉 Performance analysis methods of digital circuits in information systems, high speed logic circuit design, low power circuit design and optimized logic circuit design for high performance information system, testing and testable design of digital and analog circuits for realizing high reliable information system.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***system design for integrated circuits, testing of integrated circuits, synthesis for testability***

Fundamental Lecture〉 "Advanced Theory of Electronic Circuits"(1.0)

Relational Lecture〉 "Integrated Information System Design"(0.5), "Integrated System Design"(0.2)

Requirement〉 Familiarity with switching theory

Goal〉

1. To understand system design techniques for integrated circuits
2. To understand test technologies for integrated circuits
3. To understand design for testability techniques for integrated circuits

Schedule〉

1. compsitions of information systems
2. design process of logic circuits
3. logic synthesis for combinational circuits
4. design process of sequential circuits
5. principle of dynamic logic circuits
6. design of dynamic logic circuits
7. hardware description language
8. circuit design using HDL
9. test process of logic circuits
10. test technologies for combinational logic circuits
11. test technologies for sequential logic circuits
12. design for testability
13. test technologies using design for testability
14. techniques of design for testability
15. Built-in self test for logic circuits
16. Final examination

Evaluation Criteria〉 Participation and presentation:30%; Final examination:70%

Textbook〉 specified in the first class

Reference〉 introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197385

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Hashizume (E 棟 3 階南 D-2, +81-88-656-7473, tume@ee.tokushima-u.ac.jp) Mail
⇒ Yotsuyanagi (E 棟 3 階南 D-3, +81-88-656-9183, yanagi4@ee.tokushima-u.ac.jp) Mail (Office Hour: 水・金 17:00～ 18:00)

Note〉 This subject will be given in English.

Multimedia Communication Theory and Technology

2 units (selection)

Yasutada Oohama · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering, Hitoshi Tokushige · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class provides the knowledge necessary to understand fundamental technics for multimedia information and communication systems, such as coding method of multimedia data, information security, network security, user authentication, cryptology

Outline〉 This lecture is focused on multimedia communication theory and technology. Particulary, Internet Technology, Computer Networks, Satellite Communications, Information Security and Cryptology, Multimedhia Coding Theory and Its Applications are explained in this lecture.

Style〉 Lecture

Keyword〉 ***Internet technology, computer networks, satellite communications, information security, multimedia coding theory***

Fundamental Lecture〉 "Advanced Exercise on Intelligent Science"(1.0)

Requirement〉 特になし

Goal〉

1. fundamental technics for multimedia information and communication systems can be learned
2. Development method for multimedia information and communication systems can be learned

Schedule〉

1. Multimedia Communication Theory and Technology
2. Coding Theory for Multimedia data (1)
3. Coding Theory for Multimedia data (2)
4. Coding Theory for Multimedia data (3)
5. Digital data Transmission (1)
6. Digital data Transmission (2)
7. Cryptology (1)
8. Cryptology (2)
9. Cryptology (3)
10. Information Security
11. Network Security (1)
12. Network Security (2)
13. Contents Protection for Maltimedia Data
14. User Authentication
15. Digital Signature
16. Assignment

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 Printed synopsises of lecture are distributed.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197493

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Oohama (C302, +81-88-656-9446, oohama@is.tokushima-u.ac.jp) Mail
⇒ Tokushige (C303, +81-88-656-9447, tokusige@is.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日，火曜日 (17:00-18:00))

Integrated Information System Design

2 units (selection)

Minoru Fukumi · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Takashi Shimamoto · Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The aim of this lecture is to master the modern design technologies of very large scale integrated circuits.

Outline〉 Very large scale integrated circuit (V-LSI) design and production method. Using CAD technology, VLSI logic design, testing and fabrication are explained. Design of high-speed algorithm and parallel distributed processing system. Neural network and genetic algorithm for integrated circuit design.

Style〉 Lecture and excercise

Requirement〉 It is necessary to get the unit of the mos integrated circuits in master cource.

Notice〉 In order to get the unit of this lecture, the grduate cource students should have learned the-state-of-the-art of the modern hardware technology, especially C-MOS integrated circuits.

Goal〉 This lecture is desighned to provide engineers and scientists with an introduction to the fieled of VLSI neurocomputing.

Schedule〉

1. Embedded software architecture
2. Real-time schedure method
3. System description language
4. Application specific integrated circuits
5. Power consumption and speed of very large scale integrated circuits
6. Shared memory and communication mrthod
7. Cash memory and main memory
8. System modeling and documentation
9. Partitioning and performance
10. deta flow graph and finite state machine
11. Behavior description language and Spec C
12. Control deta-flow graph and function synthesis
13. Neural computing board diagram using EEPROM-style programmable synapses
14. Layout patern example
15. Gate-sizing wiring and timing driven
16. Boundary scan and delay estimation

Evaluation Criteria〉 Unit evaluation contains test and design of VLSI

Textbook〉 Hardware Annealing in Analog VLSI Neurocomputing, Kluer Academic Publishers

Reference〉 Electronics Circuits, written by Norio Akamatsu

Webpage〉 http://www.A3.is.tokushima-u.ac.jp

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197288

Student〉 Able to be taken by student of other department and faculty

Contact〉

⇒ Fukumi (D210, +81-88-656-7510, fukumi@is.tokushima-u.ac.jp) Mail (Office Hour: 原則として，月曜日 15 時 ~ 18 時，ただし年度により異なる場合があるので講義の際に指定する．)

⇒ Shimamoto (E 棟 3 階南 D-5, +81-88-656-7483, simamoto@ee.tokushima-u.ac.jp) Mail (Office Hour: 年度毎に学科の掲示，あるいは居室前の掲示を参照すること)

Note〉 Lecturer will show the schedule of this lecture and design technologies.

Advanced Nonlinear Circuit Technology

2 units (selection)

Yoshifumi Nishio · Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Nonlinear circuits technology is lectured.

Outline〉 Various nonlinear circuits from communication circuits such as oscillators and modulators to large scale analog circuits including neural networks are utilized in recent technology. In this course, analysis methods, design methods and simulation methods of these nonlinear circuits are lectured. Furthermore, recent development of nonlinear circuit technology is introduced and future applications are discussed. (Style: Lecture)

Style〉 Lecture and excercise

Keyword〉 ***nonlinear circuits, neural network, chaotic circuits***

Fundamental Lecture〉 "Advanced Circuit Theory"(0.7), "Advanced Theory of Complex System Engineering"(0.5)

Relational Lecture〉 "Nonlinear System Design"(0.5)

Requirement〉 Students are required to know how to analyze basic linear circuits.

Notice〉 Course is taught in English.

Goal〉

1. Understanding of importance of nonlinear circuit technology.
2. Learning of technique dealing nonlinear circuit technology.

Schedule〉

1. Nonlinear circuits in engineering systems.
2. Oscillators.
3. Communication circuits.
4. Neural networks.
5. Chaotic circuits.
6. Ultra-high speed integrated circuits.
7. Analysis of nonlinear circuits.
8. Design of nonlinear circuits.
9. Simulation methods of nonlinear circuits.
10. Recent development of nonlinear circuits (for 2 lectures).
11. Future applications of nonlinear circuits (for 3 lectures).
12. Conclusions.
13. Final examination.

Evaluation Criteria〉 Final examination 80% and exercise 20%.

Textbook〉 None.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197453

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishio (D-7, E-3F-South, +81-88-656-7470, nishio@ee.tokushima-u.ac.jp)
Mail

Control System Design

2 units (selection)

Tomohiro Kubo · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering
Hidetoshi Oya · Associate Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To learn the control theory, mainly the robust control.

Outline〉 When a control system is synthesized, it is important to take the uncertainty of the plant model and the disturbances into account. The design methods to obtain robust control systems against these effects are demonstrated.(lecture or portfolio style)

Style〉 Lecture in combination with Portfolio

Keyword〉 ***robust control***

Fundamental Lecture〉 "Advanced Control Theory"(1.0)

Relational Lecture〉 "Advanced Control Theory"(0.5)

Requirement〉 Knowledge about the control system design method based on the state space method and the transfer function method is required to attend this lecture.

Notice〉 Preparation and review are essential.

Goal〉

1. Mastering the classical robust control.
2. Mastering the H∞ control.

Schedule〉

1. What is the robust control?
2. Stability of linear systems
3. Sensitivity
4. Expression of uncertainty
5. Quadratic stabilization
6. Stability margin of LQ regulator
7. Insensitivity of LQ regulator
8. Review of the first half
9. Singular value and H∞ norm
10. Robust stabilization
11. Sensitivity reduction
12. Standard H∞ problem
13. Solution (state feedback)
14. Solution (output feedback)
15. Review of the second half
16. Grand review

Evaluation Criteria〉 Mainly by the report.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197312

Contact〉

⇒ Kubo (E 棟 3 階北 C-8, +81-88-656-7466, kubo@ee.tokushima-u.ac.jp) Mail (Office Hour: 月曜日 8:30~ 9:30, 木曜日 17:00~ 18:00)
⇒ Oya (E-building (C-7), +81-88-656-7467, hide-o@ee.tokushima-u.ac.jp) Mail

Nonlinear System Design

2 units (selection)

Hiroshi Kawakami · Executive Director / The University of Tokushima, Tetsushi Ueta · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 For various nonlinear phenomena observed in physical, chemical, and biological systems, construction methodologies of numerical models describing their dynamical behavior are discussed. Analysis and design methods are also studied.

Outline〉 Analysis and design of nonlinear dynamical systems are discussed: 1) description and characterization of dynamical systems, 2) qualitative theory of ordinary differential equations, 3) numerical method of analysis, 4) analysis of chaotic states and bifurcations 5) controlling chaos. Typical nonlinear phenomena are illustrated and analyzed by qualitative and numerical methods. Nonlinear system design problems are also discussed.

Style〉 Lecture

Keyword〉 ***nonlinear dynamical system, bifurcation, system design***

Fundamental Lecture〉 "Advanced Theory of Complex System Engineering"(1.0), "Topics of Analysis for Mathematical Science"(1.0), "Advanced Circuit Theory" (1.0)

Relational Lecture〉 "Control System Design"(0.5), "Advanced Nonlinear Circuit Technology"(0.5)

Requirement〉 None

Notice〉 A lecture "Advanced Theory of Complex System Engineering," available for the Master's course is mutually cooperated with this lecture.

Goal〉 acquisition of techniques for deriving model equations and proceeding bifurcation analyses.

Schedule〉

1. Introduction to dynamical systems
2. Fixed points, equilibria and their stability
3. Periodic solution and its stability
4. Analytic approaches for periodic solutions
5. Numerical approaches for periodic solutions
6. Local bifurcations
7. Calculation of bifurcation parameter values
8. Global bifurcations and its numerical analysis
9. Deriving model equations 1
10. Deriving model equations 2
11. Symmetry and its applications to calculations
12. Various bifurcation phenomena and chaos
13. Existence and numerical indices for chaos
14. practice 1
15. practice 2
16. answers and survey

Evaluation Criteria〉 The total grade is evaluated by homework reports (70 %) and attendance of the class. (30 %)

Textbook〉 not specified.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197456

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Kawakami (E 棟 3 階北 C-7, +81-88-656-7465, hukugakk@honbu.tokushima-u.ac.jp) Mail
⇒ Ueta (AIT 507, +81-88-656-7501, tetsushi@ait.tokushima-u.ac.jp) Mail
(Office Hour: Wednesday, afternoon)

Note〉 This lecture will be given in English.

Medical and Biological Engineering

2 units (selection)

Masatake Akutagawa · Associate Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Various applications of electronic technologies to medical fields are decsribed.

Outline〉 Fundamental approaches to apply engineering such as electronics to medical fields including diagnosis, treatment and alternative function are described in relation to life sciences such as physiology, biomechanics and so forth. Typical systems of medical instruments are introduced. The development of new technologies based on the intelligent functions of living bodies are presented. Functional characteristics of the nervous system and their application to information processing and control are discussed.

Style〉 Lecture in combination with Portfolio

Goal〉 1 Biological signal measurement 2 Biological signal processing 3 Medical systems

Schedule〉

1. Introduction of medical engineering
2. Introduction of measurement of biological signal
3. Electrical measurement methods
4. Magnetic measurement methods
5. Ultrasonic measurement methods
6. Other measurement methods
7. Biological signal processing methods
8. Examples of biological signal processing
9. Biological system identification
10. Measurement of brain functions
11. Measurement of other functions
12. Biological monitor
13. Analysis of electrical properties of tissue
14. Examples of medical diagnosis technology
15. Examples of medical treatment technology
16. Medical prosthesis technology

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197135

Contact〉

⇒ Akutagawa (工学部電気棟 3 階北 C-5, +81-88-656-7477, makutaga@ee.tokushima-u.ac.jp) Mail (Office Hour: Wed. 18:00 - 20:00, Fri. 17:00 - 18:00)

Note〉 This lecture will be given in English.

Medical Information Systems

2 units (selection)

Noboru Niki · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Yoshiki Kawata · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the fundamental concepts of digital environment for medical diagnosis. To learn the design methods of medical information systems.

Outline〉 This course introduces the design and the implementation of digital environment for medical diagnosis based on the various technologies including medical image data acquisition and retrieval, computer aided diagnosis using multimodal medical data sets.

Style〉 Portfolio

Keyword〉 ***imaging technology, computed-aided diagnosis systems, digital environment for medical diagnosis***

Relational Lecture〉 "Medical and Biological Engineering"(0.5)

Notice〉 限られた時間内で講義内容を理解して課題をこなす ことは困難であるので，予習・復習をすること.

Goal〉

1. To understand medical imaging techniques.
2. To understand various techniques of computer-aided diagnosis.
3. To understand the fundamentals of digital environment for medical diagnosis.

Schedule〉

1. Introduction
2. Imaging techniques
3. Image processing techniques
4. Pattern recognition techniques
5. Visualization techniques
6. Virtual reality/Mixed reality techniques
7. Design of computer-aided diagnosis systems
8. Implementation of computer-aided diagnosis systems
9. Design and implementation of fundamentals of digital environment for medical diagnosis and therapy
10. Design of medical information systems (1)
11. Design of medical information systems (2)
12. Design of medical information systems (3)
13. Design of medical information systems (4)
14. Design of medical information systems (5)
15. Advanced medical information systems

Evaluation Criteria〉 Report 100%

Textbook〉 Reference books are introduced to each topics.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197133

Contact〉

⇒ Niki (Opt.507, +81-88-656-9430, niki@opt.tokushima-u.ac.jp) Mail
⇒ Kawata (Opt.508, +81-88-656-9431, kawata@opt.tokushima-u.ac.jp) Mail

Advanced Lecture on Quantum Nanostructure Semiconductors

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This lecture aims at understanding basic concepts of the quantum effects of semiconductor nanostructures based on materials science and various technologies for device applications.

Outline〉 This lecture introduces characteristics of quantum structures and technologies of the device applications, based on quantum mechanics, semiconductor physics, materials science and photonics. Advanced technologies of fabrication and measurements and recent topics of the research are also introduced.

Style〉 Lecture

Goal〉 To understand materials science and application technologies of nano structure semiconductors

Schedule〉

1. Electronic states in semiconductor quantum structures
2. Electronic properties of quantum stutures
3. Optical properties of quantum stutures
4. Fabrication technologies of semiconductor nanostructures
5. Evaluation technologies of crystals
6. Evaluation technologies of nanostructures
7. Analysis of elctronic properties
8. Analysis of optical properties
9. Quantum effect devices
10. Nonlinear optical responces of semiconductors
11. Responces of optical micro cavity
12. Research progress in quantum nanostructure semiconductors
13. Ultrafast optical devices
14. Quantum information devices
15. Topics of recent advanced research (1)
16. Topics of recent advanced research (2)

Evaluation Criteria〉 Assignments

Textbook〉 None

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197512

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

Special Excercise on Electrical and Electronic Systems Innovation Engineering

2 units (compulsory)
All teachers

Target〉 To obtain wide knowledge on electric and electronic engineering and research skills.

Outline〉 To make research on your research topics with your adviser through discussions and readings of references.

Style〉 Portfolio

Keyword〉 ***research skill, acquisition of professional knowledge***

Requirement〉 none

Notice〉 none

Goal〉

1. To obtain professional knowledege on your research topics
2. To get research skills
3. To get presentation skills

Schedule〉

1. Determine your reasearch topics
2. Read references on your research topics
3. Make research
4. Presentation and discussion

Evaluation Criteria〉 Evaluation with portfolio and examination

Textbook〉 Text books will be introduced by your supervisor at the beginning of this excersise.

Reference〉 References may be introduced by your supervisor.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197376

Student〉 Able to be taken by only specified class(es)

Advanced Research on Electrical and Electronic Engineering

2 units (compulsory)
Teachers in other colleges or departments

Target〉 To obtain wide knowledge on recent engineering

Outline〉 To make research on a technology, which is different from your main research field.

Style〉 Portfolio

Keyword〉 ***engineering, technology, different field***

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn a recent technology, which is different from the main technology in your field

Schedule〉 Choose a research theme on technology or engineeing, which is different from yours.

Evaluation Criteria〉 Evaluate with a portfolio and/or examinations.

Textbook〉 Ask to teachers

Reference〉 printed materials

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197377

Student〉 Students belonging an other departments or colleges

Systems Innovation Engineering — Information Science and Intelligent Systems

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)

Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名 姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Autonomous Adaptive Systems Engineering

2 units (selection)

Norihiko Ono · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering, Yoshio Mogami · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class provides the knowledge and skills necessary for understanding the basic concepts, theories and application techniques concerning the emergent systems design methodologies for autonomous and adaptive intelligent agent systems.

Outline〉 Recently, autonomous adaptive systems have been studied that are able to improve their own performance autonomously, adaptively and incrementally during the course of interactions with the environments, and those design methodologies have been explored for the systems. This class covers the emergent design methodologies for autonomous adaptive agents and multi-agent systems, mainly based on machine learning and evolutionary computation.

Style〉 Portfolio

Keyword〉 ***autonomous adaptive systems, emergent systems design, reinforcement learning, evolutionary computation, multi-agent systems***

Fundamental Lecture〉 "Autonomous Intelligent Systems"(0.5)

Relational Lecture〉 "Applied Knowledge Systems"(0.5)

Goal〉 This class aims at the understanding of an overview of the emergent design methodologies for autonomous adaptive agents and multi- agent systems, mainly based on reinforcement learning, evolutionary computation, genetic programming, and neural networks, as well as the applicabilities and limitations of the methodologies.

Schedule〉

1. Emergent systems design methodologies
2. Foundations of emergent systems design: reinforcement learning (1)
3. Foundations of emergent systems design: reinforcement learning (2)
4. Foundations of emergent systems design: evolutionary computation (1)
5. Foundations of emergent systems design: evolutionary computation (2)
6. Foundations of emergent systems design: genetic programming
7. Foundations of emergent systems design: neural networks
8. Emergent systems design methodologies based on reinforcement learning (1)
9. Emergent systems design methodologies based on reinforcement learning (2)
10. Emergent systems design methodologies based on neuro-evolution (1)
11. Emergent systems design methodologies based on neuro-evolution (2)
12. Emergent systems design methodologies based on genetic programming
13. Emergent systems design methodologies based on co-evolution
14. Emergent systems design methodologies for multi-agent systems (1)
15. Emergent systems design methodologies for multi-agent systems (2)

Evaluation Criteria〉 Assignment count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197294

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Ono (D106, +81-88-656-7509, ono@is.tokushima-u.ac.jp) Mail (Office Hour: 金曜日 15:00~ 17:30)
⇒ Mogami (D102, +81-88-656-7505, moga@is.tokushima-u.ac.jp) Mail (Office Hour: Mon. 15:00–18:00 (Refer to the notice of the department in every year.))

Visual pattern processing

2 units (selection)

Kenji Terada · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Stephen Karungaru·Githinji · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 The basic technologies which replace the visual pattern processing function of man by computer and their applied technologies are made to master.

Outline〉 The advanced processing techniques of visual pattern, i.e., the pre-processing techniques, the feature extraction techniques, the classification techniques of visual pattern, the processing techniques of color image and their application examples are lectured.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***pattern recognition, vision, image processing***

Fundamental Lecture〉 "Applied Image Processing"(1.0)

Goal〉 Acquisition of knowledge about the processing theories of visual pattern and their various applied technologies, and the processing technologies of color image

Schedule〉

1. Concept of pattern recognition
2. Statistical pattern classification method1
3. Statistical pattern classification method 2
4. Pattern classification method by the structural analysis technique
5. Pre-processing method of visual pattern
6. Feature extraction method of visual pattern 1
7. Feature extraction method of visual pattern 2
8. Segmentation method of visual pattern 1
9. Segmentation method of visual pattern 2
10. Pattern classification method by neural network
11. Pattern classification method by GA
12. Security image processing
13. Tracking of moving object
14. Texture analysis
15. The feature extraction method of color image and its application
16. Periodic examination

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197262

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Terada (Dr.802, +81-88-656-7499, terada@is.tokushima-u.ac.jp) Mail
(Office Hour: 月，水曜日 15:00~ 17:00(年度ごとに学科の掲示を参照すること))

Multimedia Communication Theory and Technology

2 units (selection)

Yasutada Oohama · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering, Hitoshi Tokushige · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class provides the knowledge necessary to understand fundamental technics for multimedia information and communication systems, such as coding method of multimedia data, information security, network security, user authentication, cryptology

Outline〉 This lecture is focused on multimedia communication theory and technology. Particulary, Internet Technology, Computer Networks, Satellite Communications, Information Security and Cryptology, Multimedhia Coding Theory and Its Applications are explained in this lecture.

Style〉 Lecture

Keyword〉 ***Internet technology, computer networks, satellite communications, information security, multimedia coding theory***

Fundamental Lecture〉 "Advanced Exercise on Intelligent Science"(1.0)

Requirement〉 特になし

Goal〉

1. fundamental technics for multimedia information and communication systems can be learned
2. Development method for multimedia information and communication systems can be learned

Schedule〉

1. Multimedia Communication Theory and Technology
2. Coding Theory for Multimedia data (1)
3. Coding Theory for Multimedia data (2)
4. Coding Theory for Multimedia data (3)
5. Digital data Transmission (1)
6. Digital data Transmission (2)
7. Cryptology (1)
8. Cryptology (2)
9. Cryptology (3)
10. Information Security
11. Network Security (1)
12. Network Security (2)
13. Contents Protection for Maltimedia Data
14. User Authentication
15. Digital Signature
16. Assignment

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 Printed synopsises of lecture are distributed.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197492

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Oohama (C302, +81-88-656-9446, oohama@is.tokushima-u.ac.jp) Mail
⇒ Kitayama .
⇒ Tokushige (C303, +81-88-656-9447, tokusige@is.tokushima-u.ac.jp) Mail
(Office Hour: 月曜日，火曜日 (17:00-18:00))

Integrated Information System Design

2 units (selection)

Minoru Fukumi · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Takashi Shimamoto · Professor / Intelligent Networks and Computer Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 The aim of this lecture is to master the modern design technologies of very large scale integrated circuits.

Outline〉 Very large scale integrated circuit (V-LSI) design and production method. Using CAD technology, VLSI logic design, testing and fabrication are explained. Design of high-speed algorithm and parallel distributed processing system. Neural network and genetic algorithm for integrated circuit design.

Style〉 Lecture and excercise

Requirement〉 It is necessary to get the unit of the mos integrated circuits in master cource.

Notice〉 In order to get the unit of this lecture, the grduate cource students should have learned the-state-of-the-art of the modern hardware technology, especially C-MOS integrated circuits.

Goal〉 This lecture is desighned to provide engineers and scientists with an introduction to the fieled of VLSI neurocomputing.

Schedule〉

1. Embedded software architecture
2. Real-time schedure method
3. System description language
4. Application specific integrated circuits
5. Power consumption and speed of very large scale integrated circuits
6. Shared memory and communication mrthod
7. Cash memory and main memory
8. System modeling and documentation
9. Partitioning and performance
10. deta flow graph and finite state machine
11. Behavior description language and Spec C
12. Control deta-flow graph and function synthesis
13. Neural computing board diagram using EEPROM-style programmable synapses
14. Layout patern example
15. Gate-sizing wiring and timing driven
16. Boundary scan and delay estimation

Evaluation Criteria〉 Unit evaluation contains test and design of VLSI

Textbook〉 Hardware Annealing in Analog VLSI Neurocomputing, Kluer Academic Publishers

Reference〉 Electronics Circuits, written by Norio Akamatsu

Webpage〉 http://www.A3.is.tokushima-u.ac.jp

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197287

Student〉 Able to be taken by student of other department and faculty

Contact〉

⇒ Fukumi (D210, +81-88-656-7510, fukumi@is.tokushima-u.ac.jp) Mail
(Office Hour: 原則として，月曜日 15 時 ~ 18 時，ただし年度により異なる場合があるので講義の際に指定する．)

Note〉 Lecturer will show the schedule of this lecture and design technologies.

Parallel and Distributed Processing Systems

2 units (selection)

Takao Shimomura · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kenji Ikeda · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Masahiko Sano · Associate Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 This class introduces the knowledge and design skills necessary for developing parallel and distributed processing systems, and parallel and distributed algorithms.

Outline〉 Architecutres of parallel and distributed processing systems, fault tolerance of distributed control systems and the development techniques of distributed systems for Web applications.(Portfolio style).

Style〉 Lecture in combination with Portfolio

Keyword〉 ***WWW, fault tolerance, parallel and distributed processing architecture***

Fundamental Lecture〉 "Web Programming"(1.0)

Goal〉 1. To understand the architecture of parallel and distributed processing systems, decentralized adaptive control systems and their fault tolerance, and the design of distributed WWW systems.

Schedule〉

1. Parallel and distributed processing architectures
2. Memory and communicaton architectures
3. Parallel and distributed operating systems
4. .Client server model
5. Cluster computing
6. linear space and normed space
7. small gain theorem and its applications
8. decentralized systems composed of interconnected subsystems
9. stability of decentralized control systems
10. fault tolerance of decentralized control systems
11. Servlets and JavaServer Pages
12. Web application servers
13. Web application systems
14. Web programming frameworks
15. Web programming design patterns
16. Assignment

Evaluation Criteria〉 Assignment count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197488

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Shimomura (C402, +81-88-656-7503, simomura@is.tokushima-u.ac.jp)
Mail (Office Hour: Wed 15:00~ 18:00)

Applied Knowledge Systems

2 units (selection)

Jun-ichi Aoe · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kenji Kita · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Masami Shishibori · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Masao Fuketa · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Kazuhiro Morita · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 The course introduces the basic principle and theory of knowledge-based systems, including natural language processing systems, voice language processing systems, information retrieval systems.

Outline〉 Knowledge systems to natural language processing, voice language processing, information retrieval and document database. Artificial natural language processing systems, such as automatic building systems of intelligent dictionaries, text understanding and summarization systems, dialog systems, natural language interface systems, text classification systems, natural language analysis systems and knowledge-based machine translation systems.

Style〉 Portfolio

Keyword〉 ***knowledge-based system, natural language processing system, speech and language processing system, information retrieval system, machine translation system***

Fundamental Lecture〉 "Language Modeling"(1.0), "Natural Language Understanding"(1.0)

Relational Lecture〉 "Multimedia Systems and Applications"(0.5)

Goal〉 To learn various methods for constructing knowledge-based intelligent information systems.

Schedule〉

1. Natural language processing systems 1: design and retrieval methods of dictionaries
2. Natural language processing systems 2: design and implementation of parsers
3. Natural language processing systems 3: design and implementation of language understanding systems
4. Machine translation systems 1: rule-based and example-based approaches
5. Machine translation systems 2: super-function
6. Machine translation systems 3: integrated methods
7. Speech and language processing systems 1: design of language models
8. Speech and language processing systems 2: design of acoustic models
9. Speech and language processing systems 3: design of search algorithms
10. Information retrieval systems 1: document retrieval based on vector space models
11. Information retrieval systems 2: retrieval methods based on inverted index files
12. Information retrieval systems 3: design and implementation of intelligent document retrieval systems
13. Intelligent multimedia contents processing systems 1
14. Intelligent multimedia contents processing systems 2
15. Recent topics
16. Assignment

Evaluation Criteria〉 Assignment count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197152

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Aoe (Dr604, +81-88-656-7486, aoe@is.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 12:50 - 14:20)
⇒ Kita (Dr503, +81-88-656-7496, kita@is.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 12:50 - 14:20)

Intelligent Information Systems

2 units (selection)

Yoneo Yano · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kazuhide Kanenishi · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Hiroaki Ogata · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Teruaki Ito · Associate Professor / Mechanical Science, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering
Hiroyuki Mitsuhara · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 Learning the design methods of intelligent information systems such as educational software and interactive systems.

Outline〉 Intelligent systems and their mechanics. Intelligent CAI. Intelligent interface. Micro-worlds in intelligent CAI. Learner-teacher modelling. Knowledge acquisition models. Empirical and analytical machine learning, e. g., ID3, similarity-, explanation-, and case-based learning. Genetics-based machine learning, e. g., genetic evolution and co-evolution of production systems, finite state machines, recurrent neural networks, and strategic knowledge. Concepts of collaborative interface systems based on intelligent interactions, and their implementation for design support systems.

Style〉 Lecture and excercise

Keyword〉 ***intelligent interface, intelligent educational systems, intelligent agents, CSCW, CSCL, interactive interface***

Fundamental Lecture〉 "Human Factors"(1.0)

Relational Lecture〉 "Applied Knowledge Systems"(0.5), "Autonomous Adaptive Systems Engineering"(0.5)

Goal〉 Acuisition of the design methods of educational systems and interactive systems

Schedule〉

1. Overview of Intelligent CAI, History and theories of CAI
2. Intelligent CAI
3. ITS
4. Learner model, Tutoring model, Theories of CAI
5. Web Based Learning Environment
6. Adaptive Hypermedia, Personalization
7. Game-based Learning
8. CSCL(Theories)
9. CSCL(Systems)
10. Knowledge Management, SNS and Education Support System
11. Mobile Learning Environment(Theories)
12. Mobile Learning Environment(Systems)
13. Ubiquitous Learning Environment(Theories)
14. Ubiquitous Learning Environment(Systems)
15. Summery of Educational Technologies
16. examination

Evaluation Criteria〉 We will grade based on reports and interactive presentation among students.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197358

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Yano (C511, +81-88-656-7495, yano@is.tokushima-u.ac.jp) Mail (Office Hour: 火曜日 16 時 ~ 17 時, 水曜日 16 時 ~ 17 時, 金曜日 16 時 ~ 17 時)
⇒ Kanenishi (大学開放実践センター 2 階, +81-88-656-7610, marukin@cue.tokushima-u.ac.jp) Mail
⇒ Ogata (C507, +81-88-656-7498, ogata@is.tokushima-u.ac.jp) Mail (Office Hour: 月曜日 ~ 金曜日:午後 5 時 ~ 6 時)
⇒ Ito (M316, +81-88-656-2150, ito@me.tokushima-u.ac.jp) Mail

Multimedia Systems and Applications

2 units (selection)

Tetsushi Ueta · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 Multimedia has become an indispensable part of modern computer technology. This course covers the theories, models, and systems of basic and advanced methods for designing and implementing multimedia systems. Latest multimedia Web technologies and some advanced topics will also be discussed.

Outline〉 The course introduces the theories, models, and systems of basic and advanced methods for next generation digital contents processing, including (1) intelligent processing for texts, speech, images, and movies, (2) intelligent media integration, and (3) intelligent human-computer interfaces.

Style〉 Portfolio

Keyword〉 ***multimedia, digital contents, human-computer interface, media integration***

Fundamental Lecture〉 "Language Modeling"(1.0), "Applied Image Processing" (1.0)

Relational Lecture〉 "Applied Knowledge Systems"(0.5)

Goal〉 To learn advanced methods in design and implementation of next generation digital contents processing systems.

Schedule〉

1. Multimedia contents fundamentals
2. Image, video, and audio compression
3. Intelligent document processing (1)
4. Intelligent document processing (2)
5. Intelligent image and video processing (1)
6. Intelligent image and video processing (2)
7. Intelligent speech processing (1)
8. Intelligent speech processing (2)
9. Multimedia storage systems and databases (1)
10. Multimedia storage systems and databases (2)
11. Multimedia information retrieval (1)
12. Multimedia information retrieval (2)
13. Multimedia Web Technologies (1)
14. Multimedia Web Technologies (2)
15. Recent topics
16. Assignment

Evaluation Criteria〉 Assignment count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197291

Contact〉

⇒ Ueta (AIT 507, +81-88-656-7501, tetsushi@ait.tokushima-u.ac.jp) Mail
(Office Hour: Wednesday, afternoon)

Advanced Affective Computing

2 units (selection)

Fuji Ren · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering, Motoyuki Suzuki · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 To understand novel theories and algorithms of affective computing research fields, such as emotion information processing and emotion recognition.

Outline〉 First, concepts of affective computing and emotion are introduced, and basic theories and algorithms using emotion recognition and other affective computing research fields are lectured. After that, we study a detail of emotion recognition methods from various media, which is text, speech, and facial expression. Finally, emotion creating methods and expressing methods for robots are lectured.

Keyword〉 ***affective information, emotion recognition, emotion calculation, language understanding, emotion creating, emotion expressing***

Fundamental Lecture〉 "Artificial Intelligence 1"(1.0), "自然言語処理"(1.0)

Relational Lecture〉 "Advanced Machine Translation"(0.5)

Goal〉 Understanding novel theories and algorithms of affective computing research fields, such as emotion information processing and emotion recognition.

Schedule〉

1. Introduction of affective computing
2. Affective computing and emotion
3. Modeling method of emotion
4. Measuring method of emotion
5. Emotion in linguistic expression
6. Emotional corpus
7. Emotion recognition from text
8. Emotion in sound
9. Emotion recognition from speech
10. Emotion in still image and movie
11. Emotion recognition from facial expression
12. Emotion recognition from multi-modal
13. Emotion creating method for robot
14. Applications of affective computing
15. Affective communication between human and robot
16. Conclusion

Evaluation Criteria〉 Evaluation is carried out by report.

Textbook〉 なし

Reference〉 なし

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=200914

Student〉 Doctoral Course Students of Graduate School of Advanced Technology and Science

Contact〉

⇒ Ren (C204, +81-88-656-9684, ren@is.tokushima-u.ac.jp) Mail (Office Hour: 16:00-15:00 Tuesday, 16:00-17:00 Thursday)

⇒ Suzuki (C202, +81-88-656-9689, suzuki_m@is.tokushima-u.ac.jp) Mail

Advanced Exercise on Intelligent Science

2 units (compulsory)
All teachers

Target〉 To conduct research leading to the awarding of doctoral degrees.

Outline〉 To conduct research in the Natural Language Understanding, Document Processing, Multimedia Information Retrieval, Image Processing, Movie Image Processing, Voice Recognition, Autonomous Agents Design, Internet Security, Intelligent Software, etc (seminars, portfolios etc).

Style〉 Lecture in combination with Portfolio

Keyword〉 ***information science, software engineering***

Notice〉 Course plan differs depending on the laboratory you choose.

Goal〉 To present the results of your research related conferences, departmental research meetings, etc.

Schedule〉

1. After the student selects the subjects, research can be carried out at the laboratory. However, the course contents are as shown below.
2. コーパスからスーパー関数の自動抽出及び機械翻訳への応用
3. 話者認識における長 · 短期間の音声変動に関する研究
4. カットシーン間の距離分布に基づく CM 映像検出手法に関する研究
5. 進化的 RBF ネットワークによる三次元物体認識
6. リカレントニューラルネットワークの構造と重みの同時最適化のための進化計算手法に関する研究
7. メモリ展開されたコードを使う未知ウイルス解析支援システム
8. ウイルスの感染挙動と感染環境の状態を把握するための仮想ウイルス感染ネットワークに関する研究
9. PZT カメラを用いた教材コンテンツ作成のための講演者追跡システムの開発
10. 自由文からの感性情報解析技術に関する研究
11. 固有商品の好評不評情報抽出に関する研究
12. Web 上での学習活動を再現 · 共有可能にする WBL システム
13. ペン入力インタフェースにおけるジェスチャー評価実験
14. 自然言語処理技術を用いた中学理科教授学習システム
15. 脇見運転防止のための近赤外線カメラを用いた顔の向き検出
16. 単音節認識のための基本周期を用いた母音認識

Textbook〉 None

Reference〉 Using papers for each research field.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197352

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Committee Member of School Affair

Advanced Research on Intelligent Science

2 units (compulsory)

Teachers in other colleges or departments

Target〉 To obtain broad information on recent engineering

Outline〉 To research a theme in a technology, which is different form the main technology in your field.

Style〉 Portfolio, Lecture in combination with Portfolio, Lecture and excercise

Keyword〉 ***engineering, technology, different field***

Requirement〉 N/A

Notice〉 N/A

Goal〉 To learn a recent technology, which is different from the main technology in your field.

Schedule〉 Choose a theme on technology or engineering, which is different from that in your field.

Evaluation Criteria〉 Evaluated with portfolio or examination.

Textbook〉 Ask to teachers.

Reference〉 Prints

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197353

Student〉 Able to be taken by only specified class(es)

Systems Innovation Engineering — Optical Systems Engineering

Syllabus of Subjects

Human Factors

2 units (selection)

Atsuya Yoshida · Part-time Lecturer / Institute of Socio-Arts and Sciences

Target〉 The objective of this class is to provide students with sufficiently thorough appreciation of the many facets of the human factors discipline so that they may make use of it to their own doctoral works.

Outline〉 This class offers a broad and comprehensive overview of the human factors/ergonomics discipline with four areas of emphasis, (1) historical review of human factors research, (2) human physical, perceptual and cognitive capabilities and limitations, (3) application of human factors research data in design, especially in the interface design of computer-based systems, and (4) discussion about the relationship between the designed system (technology) and people.

Schedule〉

1. What is Human Factors
2. Historical Overview of Human Factors
3. Multi-Disciplinary Aspect of Human Factors
4. Health and Safty Issue of Human Factors
5. Human Psychological Capability
6. Task Analysis
7. Human Error
8. Universal Design
9. Cognitive Artifact
10. Visibility and Affordance
11. Human-Computer Interaction
12. Human Information Processing
13. Knowledge and Mental Model
14. Usability Paradigms and Principles
15. Evaluation and Testing
16. Making system that makes us smart

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197407

Life Science

2 units (selection)

Hiroshi Takagi · Part-time Lecturer / Fukui Prefectural University, Akihiko Tsuji · Professor / Biological Reactions, Biological Science and Technology, Earth and Life Environmental Engineering

Target〉 Understanding of significance of protein in biotechnology

Outline〉 Basics of structure, function and application of protein are introduced

Style〉 Lecture

Keyword〉 ***protein, enzyme, biotechnology***

Goal〉

1. Understanding of multiple functions of proteins
2. Understanding of principle of protein engineering and its application

Schedule〉

1. Introduction of life science
2. History of life science
3. Structure and function of DNA and RNA
4. mRNA is a template of protein
5. Duplication of DNA
6. Regulation of protein expression
7. Human Genetics
8. Genetic disease
9. DNA diagnosis
10. Structure and function of protein
11. Principle of gene technology (1)
12. Principle of gene technology (2)
13. Protein engineering
14. Future of life science (1)
15. Future of life science (2)
16. Preparation of report

Evaluation Criteria〉 Evaluation by report

Textbook〉 To be introduced in the class

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197329

Contact〉

⇒ Tsuji (G710, +81-88-656-7526, tsuji@bio.tokushima-u.ac.jp) Mail (Office Hour: Monday 16:20-17:50)

Social Science

2 units (selection)

yasuyoshi yokohata · Part-time Lecturer / Shikoku University

Target〉 The mutual relationship of economic activities, the structure and function of economic society, and the concept and technique of mathematical programming modelling are lectured.

Outline〉 Not only the mutual relationship of economic activities is explained from domestic and international points of view, but also the technique of case studies by application of mathematical programming models is tought using the various kinds of materials and examples.

Keyword〉 ***economic activities, structure and function, mathematical programming model***

Goal〉 To understand the mutual relationship of economic activities, empirically explain them using the mathematical programming model and evaluate the model.

Schedule〉

1. Guidance and purpose of this subject
2. Examples of economic activities 1
3. Examples of economic activities 2
4. Examples of economic activities 3
5. Change in structure of economic society 1
6. Change in structure of economic society 2
7. Function of economic society 1
8. Function of economic society 2
9. Mutual relationship of economic activities 1
10. Mutual relationship of economic activities 2
11. Concept of mathematical programming model
12. Technique of model construction
13. Modelling of economic activities 1
14. Modelling of economic activities 2
15. Evaluation of modelling

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197278

Contact〉

⇒ Kondo (ECO602, +81-88-656-7339, kondo@eco.tokushima-u.ac.jp) Mail

Science and Technology Studies

(selection)

Part-time Lecturer

Target〉 Students are expected to learn the minimum essentials of science and technology studies and their functions in contemporary society.

Outline〉 Science and technology studies deal with science and technology research and its outcomes by means of various methods of social sciences and humanities. They have emerged in 1930s when social importance of science and technology became evident. Since 1970s, the science and technology studies have developed as mission oriented learning for government policy, business administrations and civic activity. In the first half of this lecture, the outline of the science technology studies is given. The involved topics are philosophy, history, sociology, and economics of science and technology.

Style〉 Lecture

Goal〉

1. Understanding of the minimum essentials of the science and technology studies
2. Understanding of the social meaning of each student's research

Schedule〉

1. Introduction: A brief history of the science and technology studies since 1930s
2. Philosophical understanding of science: (1) From Greek Classics to German Classical Philosophy
3. Philosophical understanding of science: (2) Rise of the philosophy of science the early twentieth century
4. Historical investigation of science and technology : (1) Emergence of the modern Western science
5. Historical investigation of science and technology : (2) From the Power Revolution of the Medieval West to the modern the Industrial Revolution
6. Sociology of science and technology: (1) Normative structure and Paradigm
7. Sociology of science and technology: (2) Social constructivism and Laboratory life analysis
8. Economics and science and technology : (1) Market and planning economies
9. Economics and science and technology : (2) Innovation and economic policy
10. The 1950s model of science and technology policy in the Cold War
11. Knowledge industrial society since 1970s: (1) Environmental problem and energy problem
12. Knowledge industrial society since 1970s: (2) Computer science and Information society
13. Policy issues in the transform of industrial structure and role of university
14. Science and technology in the global economy since 1990s
15. Concluding remark: Science, technology and society in the future

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197159

Contact〉

⇒ Kawamura (410 Chem Bldg, +81-88-656-7401, kawamura@chem.tokushima-u.ac.jp) Mail

Management Theory of New Business

2 units (selection)

Vice chairperson of School Affairs Committee , Faculty of Engineering / Faculty of Engineering
First-line men with experience of practical business · Part-time Lecturer

Target〉 New business is the word which means the business to make the most of technical knowledge, technology, the new idea and which is developed creatively, and that main bearer is the enterprise called a venture. There is a purpose of this class in providing the knowledge which is necessary, and know-how and a spirit so that a taking lecture student may establish a venture business.

Outline〉 The regeneration of the Japanese society with the vitality is being asked. Government enforced "a university venture 3 years 1000 companies plan" over Heisei 14-the 16th year. Though that goal was almost attained, it is very important to promote entrepreneur education continuously from now on. Tokushima Prefecture supports this class based on the recognition done like this, and it is established.

Requirement〉 The person whom the one with the classroom is constructed by the class start time in the person who doesn't learn the unit of "Introduction to new business" in the college, and a group are organized, and it is limited to the person with the intention to make a business plan, and taking lecture is recognized.

Notice〉 Being late and a whisper in class should be prohibited strictly. Be careful over and again because it should dispose of exit and future taking lecture may not be recognized when it is wicked.

Goal〉 Learning of the necessary knowledge to establish venture business,and the ability which can make a business plan.

Schedule〉

1. Guidance
2. What is the new business?
3. Keynote lecture
4. Theory of a stand-alone version venture success
5. The law knowledge which is necessary for entrepreneur
6. Fund-raising and capital policy
7. Indirect finance
8. Direct finance
9. The basis of the company management
10. The elementary knowledge of the business accounting
11. The point of the business plan preparation
12. Management strategy and marketing
13. Product development and intellectual property
14. Business plan preparation practice
15. Examination
16. Business plan announcement meeting

Evaluation Criteria〉 It is evaluated by the presentation (40%) of the written examination (60%) and the business plan. And, the presentation of the written examination and the business plan is decided to be recognized only for the taking lecture student who attended it for 2/3 and more of the classes that it is opened.

Textbook〉 The summary is distributed every time.

Reference〉 Several are introduced in the school hours.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197405

Student〉 he person who hasn't learned the unit of the new business outline that it is opened with this learning in all the students enrolled in the graduate school yet is made the target. The number of completion people may be restricted in the method such as a lottery in case of a taking lecture applicant many. As for the details, an applicant for taking lecture is to follow those directions because the notice which showed attention in taking lecture is done.

Contact〉

⇒ Vice chairperson of School Affairs Committee , Faculty of Engineering

Note〉 The man of business that it is active in the forefront every time, and an adviser are invited as an instructor, and working knowledge is provided for theory plus practice in this class from the specialist's position. This class is the thing which is useful enough even if it is taken to the person who aims at a general enterprise and a laboratory, the employment to the self-governing body and so on.

Introduction to Intellectual Property

2 units (selection)

Tohru Sakai · Part-time Lecturer / (財)工業所有権協力センター, Mikio Yano · Part-time Lecturer, Akio Iida · Part-time Lecturer, Yasunobu Yamauchi · Part-time Lecturer
名姓 · Part-time Lecturer

Target〉 Understanding the basic systems and importance of protection and practical use of intellectural property based on some examples.

Outline〉 It is necessary for a working staff in a company, a university, etc., in a future.It is introduced the importance to protect and practical use of intellectural property at governments , industrial circles, univesities and institutes in Japan using potential on scientific techniques. This lecture is treated the basic systems of protection and practical use of intellectural property particularly based on strategy and invasion of patent in an organization such as company, university, etc.

Style〉 Lecture

Keyword〉 ***intellectual property, patent law, protect and use of intellectural property***

Relational Lecture〉 "Introduction to Intellectual Property"(0.5)

Requirement〉 No requierement

Notice〉 It is necessary to be present at two concentrated lecture.

Goal〉

1. Understanding concept of intellectural property right.
2. Undestand the Patent Act, the Trademark Act,the Design Act and the Copyright Act.
3. Understanding on basical practical use of intellectural property.

Schedule〉

1. Concept of intellectural property(Sakai)
2. Outline of intellectural property(Patent and Trademark)(Sakai)
3. Outline of intellectural property(Design and Copyright)(Sakai)
4. Patent, invention and invasion of patent (Sakai)
5. Management of intellectural property and use (Sakai)
6. A way of research and development and intellectural property in a future(Sakai)
7. The midterm examination and its comment for Target and
8. History of system of intellectural property (Osame)
9. International trend of system of intellectural property (Osame)
10. Acquisition method of intellectural property right(Fujii)
11. Use of intellectural property(Watanabe)
12. Stetragy of intellectural property on development of techniques(Y.Higuchi)
13. Effective intellectural property in development of techniques (Kubota)
14. Special lecture on a use of intellectural property by a chief executive officer(1)
15. Special lecture on a use of intellectural property by a chief executive officer(2)

Evaluation Criteria〉 Passing mark is over 60% on the examinations and the reports for each reaching level, respectively.

Textbook〉 To be used textbooks made by lecturers.

Reference〉 Nobuhiro Nakayama:Titeki Shoyuken, Nikkan Kohgyo Shinbunnsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197347

Student〉 For the course students and other graduate school students.

Contact〉

⇒ Sakai (+81-3-5600-2631,)
⇒ Yano .
⇒ Iida .
⇒ Yamauchi .
⇒ 京和 .
⇒ Mizuguchi (A501, +81-88-656-7349, mizuguch@ce.tokushima-u.ac.jp) Mail
(Office Hour: Monday,11:00-12:30, 17:00-18:00)

Advanced Lecture in Theory of Business Models

2 units (selection)
Part-time Lecturer

Target〉 There is a purpose of this class in providing the knowledge which is necessary, and know-how so that students may achieve a business model in establishing enterprises based on the lecture of "Management Theory of New Business", and in making students understood the profit generating stream by studying on the frame work of companies in several business fields.

Outline〉 Business Model is a remarkable term in modern economic and organizational theories in these days but describes a broad range of definitions. In this lecture, Business Model is defined as "System which converts technology and know how into profit for the purpose of customers' satisfaction" and aims at providing the ability for the design of profitable system, by learning cost issues in establishing business strategies of companies.

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business "

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of business model design is learned
2. Understanding of the concept of business model by case study analysis are appreciated
3. It learns forming ability of business plan through the case study on business models

Schedule〉

1. Guidance
2. Keynote lecture "Business Model Thinking"
3. Questions and answers, Discussions
4. Lecture "Theory of Business Models"
5. Lecture "Design principles of Business Models"
6. Lecture "Evaluation of Business Models"
7. Case Study "Business Model in a R&D company"
8. Case Study "Business Model in a manufacturing industrial company"
9. Case Study "Business Model in a company of service industry "
10. Case Study "Business Model in a company of information industry "
11. Business plan practice, Present situation analysis and alternatives.
12. Business plan practice, Concept ad design of business.
13. Business plan practice, Financial analysis .
14. Business plan practice, Concluding and submitting
15. Presentation(1) of Business plan practice.
16. Presentation(2) of Business plan practice, Comments and summary.

Evaluation Criteria〉 Participation in class(20%) Group work and its report(80%)

Textbook〉 Ken-ichi Amuro and Study Group of Business model "Case Book: Business Model Thinking" Bunshindo

Reference〉 Several are introduced in class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197447

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Contact〉

⇒ Tatsuya Deguchi (Wakayama University)
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp)
MAIL (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)

Note〉 This class is supported by Tokushima Prefecture Government

Long-term Internship (D)

4 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This program is provided long-term internship in the actual industrial companies and so on, doing a joint study between companies and university on practical problems proposed by the company and practical experience of management of technologies. Through the long-term internship, the program will allow students to become a engineer with a core role in researches and companies

Outline〉 Credits are acknowledged to students who experienced the internship in companies or government offices of 270 hours during three months or more and presentation to executive officer of the company. Their fulfillment is evaluated by activity reports during internship and appraisal and interviewed report from a mentor.

Goal〉 Grasping abilities for practical engineers by studying activities in company and so on.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by mentors in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197360

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Nishida (K409, +81-88-656-7630, nishida@kg.tokushima-u.ac.jp) Mail
⇒ Yamanaka (A410, +81-88-656-7350, yamanaka@ce.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワー:年度ごとに学科の掲示板を参照のこと)
⇒ Morimoto (A417, +81-88-656-7579, emi_morimoto@ce.tokushima-u.ac.jp) Mail (Office Hour: 月 ~ 木 (10 時 ~ 15 時))

Note〉 Students who resister the coop-education program for "Pai-shape" engineers with sense for management of technology, are able to have a grant-in-aid for travel and so on. Ask committee members of long-term internship in your course or coordinators of this program.

Management of Technology

2 units (selection)

Hideo Yamanaka · Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering
Emi Morimoto · Assistant Professor / Planning and Design Systems Engineering for Infrastructures, Civil and Environmental Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 About the production management of the automobile industry, it is understood variously from the point of view such as "research and development", "production management", "purchasing" and "quality control" "marketing" and "cross-cultural management".

Outline〉 It learns about the production management. This time, "the automobile industry" specially takes up the production management of "Honda Motor Co.,Ltd. (following Honda)" even of that in the case, and the class to appreciate that importance with ranking of technology in management is taken.

Style〉 Lecture

Requirement〉 Finish " Introduction to new business " or " Advanced Lecture in management Theory of new business " .

Notice〉 Face a class when a taking lecture person surely does enough preparation every time. And moreover, be the worst, but one person one time is to do some remarks every time.

Goal〉

1. The elementary knowledge of management is learned.
2. Ranking of the technology in management and that importance are appreciated.
3. It learns how to solve the various problems which always occur in the spot of the management through the case study and the business game.

Schedule〉

1. Guidance
2. Lecture "What in Management of Technology?"
3. Case report "Rsearch and development of Honda"
4. Case study "Plan an overseas factory." "A new car development order"
5. Lecture " Production management and purchasing"
6. Lecture "Quality control"
7. Case report "The production management of Honda","The supply chain management of Honda"
8. Case study "Plan an overseas factory."
9. Case report "The quality control of Honda"
10. Case study "Don't make material defects flare up again."
11. Lecture "Marketing strategy"
12. Lecture "Cross-cultural management"
13. Case report "Around the products project of Honda - the two-wheeled vehicle "
14. Case report "The path of internationalization of Honda"
15. Case report "The personnel management of Honda"
16. Summary and questions and answers

Evaluation Criteria〉 It is evaluated in the remark (20%) in class and the middle, end of a term report (80% in total).

Textbook〉 It doesn't specially use.The summary and so on is distributed every time.

Reference〉 Several are introduced in class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197198

Student〉 The person who finished "Introduction to new business" or " Advanced Lecture in management Theory of new business " in all the students enrolled in the doctor former term course. And, the number of taking lecture people is restricted to do intensive learning. (20-25 people will be made an upper limit.) It is selected with some means in case of a taking lecture person many.

Note〉 This class invites seven Honda alumnuni who did work in "research and development", "production management", "purchasing", "quality control", "marketing" , "cross-culutural management", and so on as an instructor, and it is the class to do case report. Even if it is seen nationwide, the trial done like this is very rare, and it is a precious class. And, an applicant for taking lecture is to attend it in the guidance to hold it in advance.A schedule is indicated separately.

International Advanced Technology and Science 1

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 This is an intensive course for advanced technology and science in english which is held a summer vacation in the university of Tokushima. In this course, world trends of advanced technology and science can deeply be understood. Then the specialized knowledge can be studied in english .

Outline〉 In this course, an intensive course for advanced technology and science in english should be attended in a summer vacation of the university of Tokushima. In this course, when the specialized knowledge for advanced technology and science in english can deeply be understood, the credit will be surthorized. The report and portfolion on the world advanced technology and science written in english should be submitted. The evaluation will be done based on the submitted reports and portfolio.

Goal〉

1. The advanced technology and science in the world should be studied and then world trends of technology and science would be understood.
2. The specialized contents on advanced technology and science would be understood in english and then the power of expression and presentation in english would be improved.

Evaluation Criteria〉 an enterprising behavior, protfolio and reports

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197234

Student〉 It is possible for the students of Master's course and Doctral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90hrs. should be submitted. The students should consult with charge teacher of the course.

International Advanced Technology and Science 2

2 units (selection)

Ri-ichi Murakami · Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

Target〉 In this course, the students go to the foreign university and then attend to intensive classes on advanced technology and science in english. The students also study advanced technology and science in its country and then learn the practical knowledge so that applications of science and technology are studied.

Outline〉 In this course, the students attend to intensive classes on advanced technology and science in english at the foreign university. The students also study the specialized and practical knowledge for advanced technology and science in english. The credit is authorized based on the reports and portfolio on the advanced technology and science of the foreign which are written in english.

Goal〉

1. Specialized contents of advanced technology and science would be studied and then understand the trends of thechnology and industry in the foreign.
2. Specialized contents of advanced technology and science would be understood and then the communication ability would be improved.

Evaluation Criteria〉 Enterprising behaivior, reports and portfolio.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197235

Student〉 It is possible for the students of Master's course and Doctoral course to enroll.

Contact〉

⇒ Murakami (M318, +81-88-656-7392, murakami@me.tokushima-u.ac.jp) Mail

Note〉 The portfolio for 90 hrs. should be submitted. The detail is consulted by the charge teacher.

Presentation Method (D)

2 units (selection)

Graduate School of Advanced Technology and Science

Target〉 Poster and oral presentations, and journal publications are common means of appealing the research work in various scientific and technological disciplines. It's undoubtedly important for activating the research work. The lecture is intending for students to learn most efficient way to appeal their findings and discussions in scientific community.

Outline〉 Credits are acknowledged to the students who are supervised to give conference speech by themselves and do actually the lectures.

Goal〉 The lecture is aiming at having knowledge and experience of the presentaion in international conferences.

Evaluation Criteria〉 Students' achievement is evaluated by portfolios submitted showing the progress in preparation of international conferences as well as by presentation records.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197476

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Internship (D)

2 units (selection)

Target〉 This program is provided to increase knowledge and experience in the actual industrial technology in various fields. Through the practical experience, the program will allow students to become discerning and well-balanced researchers or engineers with deeper understanding of technological societies.

Outline〉 Credits are acknowledged to students who experienced the internship in companies and/or goverment offices. Their fulfilment is evaluated by activity reports during internship.

Goal〉

1. Grasping internal systems of a company, management, action and strategy to achieve the company's goal. (2)
2. Understanding human relationship and communicative manner in a working society and a company.

Evaluation Criteria〉 Achievement is evaluated by how you tackled, activity reports, and an evaluation record submitted by supervisers in company and/or government.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197194

Student〉 Able to be taken by only specified class(es)

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Venture Business (D)

2 units (selection)

Target〉 Aims of the lecture are doing collaborative works with private enterprises and establishing venture businesses through such works.

Outline〉 The lecture is aiming at founding a venture business company as well as establishing collaborative research works with private enterprises. It's worth to apply their accomplishment to an actual society beyond the range of a laboratory work.

Goal〉 Objective of the lecture is to have experience and knowledge of collaborative works with private enterprises and to mature the works to venture businesses.

Evaluation Criteria〉 Credits are ackowledged in case of doing collaborative works with enterprises and/or maturing them to venture businesses. Handouts, reports, and presentation materials, etc. are evaluated to approve credits.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197172

Note〉 A possible student should submit portfolios which are evidenced for his/her 90 hours' extensive work. Students are advised to ask details about this lecture to their supervisers.

Radio Frequency Solid State Physics

2 units (selection)

Koichi Nakamura · Associate Professor / Production Systems Engineering, Mechanical Engineering, Intelligent Structures and Mechanics Systems Engineering

⇒ Nakamura (A216, koichi@pm.tokushima-u.ac.jp) Mail

Target〉 This class introduces basis of NMR and applications to studies on superconductivity, magnetism and ionic diffusion in solid.

Outline〉 The spectrum, spin-lattice relaxation, spin-spin relaxation, chemical shift etc., which are obtained by NMR measurements, are introduced and discussed in connection with various physical properties of solids.

Keyword〉 ***nuclear magnetic resonance, nuclear magnetic moment, magnetism, diffusion, superconductor, spin-lattice relaxation, Knight shift***

Goal〉

1. To understand basis of NMR.
2. To understand relationship between various problems in solid state physics and relaxation phenomena observed using NMR.

Schedule〉

1. Introduction
2. Spin-echo and NMR spectrum
3. Equipments
4. Dipole interaction
5. Hyperfine interaction and spectrum
6. Chemical shift
7. Quadrupole interaction and quadrupole resonance
8. Spin-lattice relaxation
9. Internal magnetic field in ferro and antiferro magnets
10. Spin-lattice relaxation in metals
11. NMR studies on superconducting state
12. NMR studies on High Tc superconductors
13. Diffusion in solid and spin-lattice relaxation
14. NMR studies on lithium ionic conductors
15. NMR studies on protonic conductors
16. Summary

Evaluation Criteria〉 Report 100%

Textbook〉 遍歴電子系の核磁気共鳴 (朝山邦輔著，裳華房)

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197390

Contact〉

Engineering of Correlated Electron Matter

2 units (selection)

Yutaka Kishimoto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Yu Kawasaki · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 In many solid-state materials, new phenomena evolve due to strong electron interactions. In this Lecture, review will be given on some advanced topics and their applications, including high temperature superconductivity, metal-insulator transition and strongly correlated electronics.

Outline〉 New types of superconducting and magnetic phenomena emerge in correlated electron matters. The term "correlated electron" represents the state of matter where many electrons are strongly interacting with each other. After an introductory talk on magnetism and superconductivity, review will be given on some advanced topics, including high temperature superconductivity, metal-insulator transition and colossalmagneto resistance. Potential application of correlated electron matters to technology is also presented focusing on spintronics or strongly correlated electronics.

Style〉 Lecture

Keyword〉 ***strongly correlated electron systems, Mott insulator, colossalmagneto resistance, high temperature superconductor***

Goal〉 To understand basic concepts of correlated electron matter and its application

Schedule〉

1. Introduction to correlated electron matters
2. Perspectives of magnetism and superconductivity in correlated electron matters
3. Electronic states of atoms and ions
4. Magnetic ions in crystal electric field
5. Introduction to superconductivity
6. How to probe rich properties in correlated electron matters
7. Mott insulator and metal-insulator transition
8. Spin, charge and orbital in transition metal oxides
9. Colossalmagneto resistance in transition metal oxides
10. Application of transition metal oxides with correlated electrons
11. High temperature superconductivity
12. Heavy-fermion superconductivity
13. Electronic states of organic conductors
14. Application of superconductors with correlated electrons
15. Towards strongly correlated electronics

Evaluation Criteria〉 Reports on several subjects in lecture

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197206

Contact〉

⇒ Kishimoto (A202, +81-88-656-7548, yutaka@pm.tokushima-u.ac.jp) Mail
(Office Hour: 金曜日 16:00-17:30)
⇒ Kawasaki (A217, +81-88-656-9878, yu@pm.tokushima-u.ac.jp) Mail

Nonlinear Optical Devices

2 units (selection)

Masanobu Haraguchi · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the principle, tipical structure, advantages and disadvantages of current nonlinear optical devices. To develop ability to design new devices and solve verious problems for applications.

Outline〉 Physics of second-order and third-order nonlinear optical phenomena. Principles of electro-optics. Optical nonlinearities in fibers. Photorefractive materials. Nonlinear optical media. Anisotropic nonlinear optical media. Dispersive nonlinear optic media. Coupled-wave theory. Electro-optic and acousto-optic devices. Second-order and third-order nonlinear optic devices. Photonic switches. All-optical switches. Bistable optical devices. Optical connections.

Style〉 Portfolio

Keyword〉 ***nonlinear optics, harmonic generation, nonlinear optical device, optical switch***

Relational Lecture〉 "Optical and Functional Inorganic Materials"(0.5)

Requirement〉 Student should have fundamental knowledge of electromagnetic theory, waveoptics, optical properties of materials and lasers.

Notice〉 The following plan of this course is a example. Plans may be modified depending on knowledges and experiences of studens.

Goal〉

1. Possible to explain princiles, structure and characteristics of optoelectric devices.
2. Possible to explain princiles, structure and characteristics of the second-order nonlinear optical devices.
3. Possible to explain princiles, structure and characteristics of the third-order nonlinear optical devices.

Schedule〉

1. Introduction & interview
2. nonlinear optical phenomena
3. Electrooptic effect and its applications
4. Magnetooptic effect and its applications
5. Acoustoptic effect and its applications
6. principle of second-order nonlinear effects
7. Second-order nonlinear optical materials
8. Second-order nonlinear optical devices
9. principle of third-order nonlinear effects
10. third-order nonlinear optical materials
11. Third-order nonlinear devices
12. Experiment for nonlienar optical phenomena
13. Current application of nonlinear devices
14. Photonic crystal
15. Integrated optical devices

Evaluation Criteria〉 Activity:20%, reports:40% and oral examinations:40%

Textbook〉 After interview, we will decide suitable text books.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197455

Contact〉

⇒ Haraguchi (Opt.209, +81-88-656-9411, haraguti@opt.tokushima-u.ac.jp)
Mail (Office Hour: 16:05-18:00)

Applied Statistical Physics

2 units (selection)

Atsushi Mori · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 Learn to apply the statistical physics

Outline〉 Concerning the mechanisms and phenomena in materials processing, lectures are given in method for analyzing the results on the basis of the statistical physics.

Style〉 Lecture

Goal〉

1. points of view in statistical physics
2. applying statistical physics to the practical problem

Schedule〉

1. Thermodynamics of non-equilibrium and non-uniform systems I
2. Thermodynamics of non-equilibrium and non-uniform systems II
3. Thermodynamics of non-equilibrium and non-uniform systems III
4. Advanced statistical mechanics I
5. Advanced statistical mechanics II
6. Advanced statistical mechanics III
7. Exercise I
8. Examination I
9. Advanced statistical mechanics IV
10. Advanced statistical mechanics V
11. Advanced statistical mechanics VI
12. Transport phenomena I
13. Transport phenomena II
14. Transport phenomena III
15. Exercise II
16. Examination II

Evaluation Criteria〉 60 点以上を合格とする．

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197154

Contact〉

⇒ Mori (Opt.407, +81-88-656-9417, mori@opt.tokushima-u.ac.jp) Mail (Office Hour: オフィスアワーは，学科の掲示板等をご覧下さい．)

Organic Photo-functional Materials

2 units (selection)

Hitoshi Tanaka · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Yoshihiko Tezuka · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 The objective of this course is to develop basic and practical knowledge of chemistry that is required to design, synthesize, and construct organic materials with desired functionality.

Outline〉 Physical and chemical properties of molecules and molecular assemblies. Molecular design for functional materials based on the molecular structure. Synthetic method for constructing desired molecular structures. Molecular design, and characteristics of organic photo-functional materials (Tanaka). Physical and chemical properties of conjugated π-electron system and its application for opto-electronic devices (Tezuka).

Style〉 Portfolio

Relational Lecture〉 "Optical and Functional Inorganic Materials"(0.5)

Goal〉

1. to enable a student to understand functionality of organic materials in terms of their molecular structures.
2. to enable a student to construct practical routes for synthesizing desired molecules.

Schedule〉

1. Introduction to organic materials
2. Atomic groups expressing photo-functionality (1)
3. Atomic groups expressing photo-functionality (2)
4. Generation of photo-functionality by molecular assembly
5. Chemical modification (1): incorporation of functional atomic groups
6. Chemical modification (2): incorporation of functional atomic groups
7. Chemical modification (3): polymerization and polymer reaction
8. Spectroscopic analysis of molecular structure
9. Introduction to π-electron conjugated molecules
10. Synthesis of π-electron conjugated molecules
11. Properties of π-electron conjugated molecules (1)
12. Properties of π-electron conjugated molecules (2)
13. Applications to organic conducting materials
14. Applications to organic electroluminescence devices
15. Applications to organic solar cells

Evaluation Criteria〉 Term papers and oral examination.

Textbook〉 Text books will be decided after interview.

Reference〉 – to be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197505

Contact〉

⇒ Tanaka (Opt.211, +81-88-656-9420, tanaka@opt.tokushima-u.ac.jp) Mail
⇒ Tezuka (Opt.307, +81-88-656-9423, ytezuka@opt.tokushima-u.ac.jp) Mail

Advanced Optical Information Systems

2 units (selection)

Shiro Suyama · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Nobuo Goto · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand an architecture, design, and device in optical information systems.

Outline〉 Information processing systems using optoelectronics devices and technologies which include lasers, light emitting diodes, spatial light modulators, nonlinear recording devices and holographic technology: holographic systems, optical computing systems, three-dimensional display systems, optical recording systems, and optical measurmeut systems. This course is performed with lecture in combination with portfolio.

Keyword〉 ***infomation photonics, optical computer, optical information processing, information optics***

Goal〉

1. To understand the availability of light in optical information system
2. To understand the relation between information photonics and other technology
3. To develop a new architectur of optical information system

Schedule〉

1. Intoroduction to optical information system
2. Optics in optical information system (1)
3. Optics in optical information system (2)
4. Light source and detector in optical information system
5. Optical modulator in optical information system (1)
6. Optical modulator in optical information system (2)
7. Analog optical information system (1)
8. Analog optical information system (2)
9. Digital optical information system (1)
10. Digital optical information system (2)
11. Optelectronic information system (1)
12. Optelectronic information system (2)
13. Information comunication technology and optical information technology
14. Biomedical optical measurement technology and optical information technology
15. Biotechnology and optical information technology
16. Examination

Evaluation Criteria〉 Report 100%

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197439

Medical Information Systems

2 units (selection)

Noboru Niki · Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering, Yoshiki Kawata · Associate Professor / Optical Materials and Devices, Optical Systems Engineering, Systems Innovation Engineering

Target〉 To understand the fundamental concepts of digital environment for medical diagnosis. To learn the design methods of medical information systems.

Outline〉 This course introduces the design and the implementation of digital environment for medical diagnosis based on the various technologies including medical image data acquisition and retrieval, computer aided diagnosis using multimodal medical data sets.

Style〉 Portfolio

Keyword〉 ***imaging technology, computed-aided diagnosis systems, digital environment for medical diagnosis***

Relational Lecture〉 "Medical and Biological Engineering"(0.5)

Notice〉 限られた時間内で講義内容を理解して課題をこなす ことは困難であるので，予習・復習をすること.

Goal〉

1. To understand medical imaging techniques.
2. To understand various techniques of computer-aided diagnosis.
3. To understand the fundamentals of digital environment for medical diagnosis.

Schedule〉

1. Introduction
2. Imaging techniques
3. Image processing techniques
4. Pattern recognition techniques
5. Visualization techniques
6. Virtual reality/Mixed reality techniques
7. Design of computer-aided diagnosis systems
8. Implementation of computer-aided diagnosis systems
9. Design and implementation of fundamentals of digital environment for medical diagnosis and therapy
10. Design of medical information systems (1)
11. Design of medical information systems (2)
12. Design of medical information systems (3)
13. Design of medical information systems (4)
14. Design of medical information systems (5)
15. Advanced medical information systems

Evaluation Criteria〉 Report 100%

Textbook〉 Reference books are introduced to each topics.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197134

Contact〉

⇒ Niki (Opt.507, +81-88-656-9430, niki@opt.tokushima-u.ac.jp) Mail
⇒ Kawata (Opt.508, +81-88-656-9431, kawata@opt.tokushima-u.ac.jp) Mail

Photonic Semiconductor Device Physics

2 units (selection)

Shiro Sakai · Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering, Yoshiki Naoi · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering
Katsushi Nishino · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 To understand the device physics and fabrication technique of photonic semiconductor devices..

Outline〉 Interaction of photons and electrons in semiconductors, physics of superlattice semiconductors and their applications as photonic devices. Crystal growth of semiconductors and heteroepitaxy.

Style〉 Lecture

Keyword〉 ***semiconductor, photonic device***

Relational Lecture〉 "Optical and Functional Inorganic Materials"(0.5)

Goal〉

1. To understand device physics of photonic devices in terms of interaction of photons and electrons
2. To understand device physics of quantum effect devices
3. To understand crystal growth and related technologies for fabrication of photonic devices

Schedule〉

1. Introduction
2. Energy band structure of semiconductors
3. Quantum statistics of electrons in semiconductors
4. Carrier transport in semiconductors
5. Quantum devices and superlattice
6. Light absorption in semiconductors (interaction of electrons and photons)
7. Photocinductivity, photovol and photodiode
8. Physics of light emission of semiconductors
9. Radiative recombination, non-radiative recombination, stimulated emission and spontaneous emission
10. Light emitting diodes and lasers
11. Devices for optical communication
12. Crystal growth of substrates for photonic semiconductor devices
13. MOCVD and MBE
14. Fabrication of Ohmic contact
15. Nano-photonic devices and fabrication technology
16. Examination

Evaluation Criteria〉 Report 50%, Examination 50%. More than 60% is required to pass this class.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197444

Contact〉

⇒ Sakai (E 棟 2 階南 A-3, +81-88-656-7446, sakai@ee.tokushima-u.ac.jp) Mail
⇒ Naoi (E 棟 2 階南 A-4, +81-88-656-7447, naoi@ee.tokushima-u.ac.jp) Mail
(Office Hour: 年度ごとに学科の掲示を参照すること.)
⇒ Nishino (E 棟 2 階南 A-5, +81-88-656-7464, nishino@ee.tokushima-u.ac.jp) Mail

Note〉 This lecture will be given in English.

Optical and Functional Inorganic Materials

2 units (selection)

Kikuo Tominaga · Associate Professor / Material and Device Science, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 This cource aims to learn the fundamentals of material science of such as single crystals, polycrystals or amorphous films for optical and functional materials. At the same time, the synthesis methods of various films, their evaluation techniques and the propagating optical beam and acoustic waves in crystals are lectured.

Outline〉 Fundamentals of crystal science is lectured at first. Optical and electronic processes in optical and functional materials such as single crystals, polycrystals or amorphous films are followed. Advanced solid state physics of semiconductors, dielectric and ferroelectric materials are included. Synthesis methods of optical and functional crystals and films, evaluation methods of film properties are also contained. Electro-optical and piezo-electrical effects and solid state physics relating with their effects, characterization of crystals, symmetry elements of crystals and material constants,optical properties of crystals, electro-optical effects and nonlinear effects, piezoelectricity, acoustic waves in crystal,interaction of phtons and phonons in crystal, synthesis methods of thin films (PVD method; electron beam evaporation, MBE, sputtering, laser ablation), film properties (charaterizations of electrical, optical and mechanical properties) are included.

Style〉 Lecture and excercise

Keyword〉 ***functional material, semiconductor device, crystal optics, thin film technology, deposition techniques of thin films***

Relational Lecture〉 "Photonic Semiconductor Device Physics"(0.5), "Nonlinear Optical Devices"(0.5)

Goal〉 Understanding of the solid state physics of piezoelectric materials and functional thin films

Schedule〉

1. Characterization of crystals
2. Symmetry elements of crystals and material constants 1
3. Symmetry elements of crystals and material constants 2
4. Optical properties of crystals 1
5. Optical properties of crystals 2
6. Electro-optical effects and nonlinear effects 1
7. Electro-optical effects and nonlinear effects 2
8. Piezoelectricity 1
9. Piezoelectricity 2
10. Acoustic waves in crystal 1
11. Acoustic waves in crystal 2
12. Interaction of phtons and phonons in crystal
13. Synthesis methods of thin films 1(PVD method; electron beam evaporation, MBE, sputtering, laser ablation)
14. Synthesis methods of thin films 2(PVD method; electron beam evaporation, MBE, sputtering, laser ablation)
15. Film properties (Charaterizations of electrical, optical and mechanical properties)
16. Exercise

Evaluation Criteria〉 Reports for each theme and examination

Textbook〉 Tomoya Ogawa:Fundamentals in Crystal Engineering, Shoukabou (in Japanese) and Shunichi Gonda, Applied Handbook of Thin Film Depositions, (NTS)(in Japanese)

Reference〉

- ◇ 荒川剛他，無機材料化学，三共出版
- ◇ 日本学術振興会透明酸化物光・電子材料第 166 委員会編，透明導電膜の技術 (改訂 2 版)，Ohmsha

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197502

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Tominaga (E 棟 2 階南 A-6, +81-88-656-7439, tominaga@ee.tokushima-u.ac.jp) Mail

Note〉 This lecture will be given in English.

Medical and Biological Engineering

2 units (selection)

Masatake Akutagawa · Associate Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

Target〉 Various applications of electronic technologies to medical fields are decsribed.

Outline〉 Fundamental approaches to apply engineering such as electronics to medical fields including diagnosis, treatment and alternative function are described in relation to life sciences such as physiology, biomechanics and so forth. Typical systems of medical instruments are introduced. The development of new technologies based on the intelligent functions of living bodies are presented. Functional characteristics of the nervous system and their application to information processing and control are discussed.

Style〉 Lecture in combination with Portfolio

Goal〉 1 Biological signal measurement 2 Biological signal processing 3 Medical systems

Schedule〉

1. Introduction of medical engineering
2. Introduction of measurement of biological signal
3. Electrical measurement methods
4. Magnetic measurement methods
5. Ultrasonic measurement methods
6. Other measurement methods
7. Biological signal processing methods
8. Examples of biological signal processing
9. Biological system identification
10. Measurement of brain functions
11. Measurement of other functions
12. Biological monitor
13. Analysis of electrical properties of tissue
14. Examples of medical diagnosis technology
15. Examples of medical treatment technology
16. Medical prosthesis technology

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197136

Contact〉

⇒ Kinouchi .

⇒ Akutagawa (工学部電気棟 3 階北 C-5, +81-88-656-7477, makutaga@ee.tokushima-u.ac.jp) Mail (Office Hour: Wed. 18:00 - 20:00, Fri. 17:00 - 18:00)

Note〉 This lecture will be given in English.

Visual pattern processing

2 units (selection)

Kenji Terada · Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Stephen Karungaru·Githinji · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 The basic technologies which replace the visual pattern processing function of man by computer and their applied technologies are made to master.

Outline〉 The advanced processing techniques of visual pattern, i.e., the pre-processing techniques, the feature extraction techniques, the classification techniques of visual pattern, the processing techniques of color image and their application examples are lectured.

Style〉 Lecture in combination with Portfolio

Keyword〉 ***pattern recognition, vision, image processing***

Fundamental Lecture〉 "Applied Image Processing"(1.0)

Goal〉 Acquisition of knowledge about the processing theories of visual pattern and their various applied technologies, and the processing technologies of color image

Schedule〉

1. Concept of pattern recognition
2. Statistical pattern classification method1
3. Statistical pattern classification method 2
4. Pattern classification method by the structural analysis technique
5. Pre-processing method of visual pattern
6. Feature extraction method of visual pattern 1
7. Feature extraction method of visual pattern 2
8. Segmentation method of visual pattern 1
9. Segmentation method of visual pattern 2
10. Pattern classification method by neural network
11. Pattern classification method by GA
12. Security image processing
13. Tracking of moving object
14. Texture analysis
15. The feature extraction method of color image and its application
16. Periodic examination

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197263

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Terada (Dr.802, +81-88-656-7499, terada@is.tokushima-u.ac.jp) Mail
(Office Hour: 月，水曜日 15:00~ 17:00(年度ごとに学科の掲示を参照すること))

Applied Knowledge Systems

2 units (selection)

Jun-ichi Aoe · Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering, Kenji Kita · Professor / Applied Information Media Engineering, Information Science and Intelligent Systems, Systems Innovation Engineering
Masami Shishibori · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering
Masao Fuketa · Associate Professor / Intelligent Systems, Information Science and Intelligent Systems, Systems Innovation Engineering
Kazuhiro Morita · Associate Professor / Information Science, Information Science and Intelligent Systems, Systems Innovation Engineering

Target〉 The course introduces the basic principle and theory of knowledge-based systems, including natural language processing systems, voice language processing systems, information retrieval systems.

Outline〉 Knowledge systems to natural language processing, voice language processing, information retrieval and document database. Artificial natural language processing systems, such as automatic building systems of intelligent dictionaries, text understanding and summarization systems, dialog systems, natural language interface systems, text classification systems, natural language analysis systems and knowledge-based machine translation systems.

Style〉 Portfolio

Keyword〉 ***knowledge-based system, natural language processing system, speech and language processing system, information retrieval system, machine translation system***

Fundamental Lecture〉 "Language Modeling"(1.0), "Natural Language Understanding"(1.0)

Relational Lecture〉 "Multimedia Systems and Applications"(0.5)

Goal〉 To learn various methods for constructing knowledge-based intelligent information systems.

Schedule〉

1. Natural language processing systems 1: design and retrieval methods of dictionaries
2. Natural language processing systems 2: design and implementation of parsers
3. Natural language processing systems 3: design and implementation of language understanding systems
4. Machine translation systems 1: rule-based and example-based approaches
5. Machine translation systems 2: super-function
6. Machine translation systems 3: integrated methods
7. Speech and language processing systems 1: design of language models
8. Speech and language processing systems 2: design of acoustic models
9. Speech and language processing systems 3: design of search algorithms
10. Information retrieval systems 1: document retrieval based on vector space models
11. Information retrieval systems 2: retrieval methods based on inverted index files
12. Information retrieval systems 3: design and implementation of intelligent document retrieval systems
13. Intelligent multimedia contents processing systems 1
14. Intelligent multimedia contents processing systems 2
15. Recent topics
16. Assignment

Evaluation Criteria〉 Assignment count 100%.

Textbook〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197153

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Aoe (Dr604, +81-88-656-7486, aoe@is.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 12:50 - 14:20)
⇒ Kita (Dr503, +81-88-656-7496, kita@is.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 12:50 - 14:20)

Advanced Lecture on Quantum Nanostructure Semiconductors

2 units (selection)

Toshiro Isu · Professor / Institute of Technology and Science, Takahiro Kitada · Associate Professor / Institute of Technology and Science

Target〉 This lecture aims at understanding basic concepts of the quantum effects of semiconductor nanostructures based on materials science and various technologies for device applications.

Outline〉 This lecture introduces characteristics of quantum structures and technologies of the device applications, based on quantum mechanics, semiconductor physics, materials science and photonics. Advanced technologies of fabrication and measurements and recent topics of the research are also introduced.

Style〉 Lecture

Goal〉 To understand materials science and application technologies of nano structure semiconductors

Schedule〉

1. Electronic states in semiconductor quantum structures
2. Electronic properties of quantum stutures
3. Optical properties of quantum stutures
4. Fabrication technologies of semiconductor nanostructures
5. Evaluation technologies of crystals
6. Evaluation technologies of nanostructures
7. Analysis of elctronic properties
8. Analysis of optical properties
9. Quantum effect devices
10. Nonlinear optical responces of semiconductors
11. Responces of optical micro cavity
12. Research progress in quantum nanostructure semiconductors
13. Ultrafast optical devices
14. Quantum information devices
15. Topics of recent advanced research (1)
16. Topics of recent advanced research (2)

Evaluation Criteria〉 Assignments

Textbook〉 None

Reference〉 To be introduced in the class

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197512

Contact〉

⇒ Isu (A224, +81-88-656-7670, t.isu@frc.tokushima-u.ac.jp) Mail (Office Hour: Tue -Thu 10:00-14:00)

Advanced Exercise on Optical System Engineering

2 units (compulsory)
All teachers

Target〉 This subject is especially provided in order to deepen the syudy, and must be taken under the guidance of a faculty in major field of study.

Outline〉 Exercises related to research theme are performed.

Style〉 Portfolio

Keyword〉 ***optical engineering***

Goal〉 To obtain deeper knowledge regarding research theme.

Schedule〉

1. Guidance
2. Exercise
3. Report

Evaluation Criteria〉 Assignments count 100%.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197430

Student〉 Able to be taken by only specified class(es)

Contact〉

⇒ Inoue (Opt.310, +81-88-656-9416, inoue@opt.tokushima-u.ac.jp) Mail

Advanced Research on Optical System Engineering

2 units (compulsory)

Teachers in other colleges or departments

Target〉 This subject is essentially provided in order to deepen the research, and must be taken under the guidance of a faculty in other field of study.

Outline〉 Exerecises related to research theme are perfomed.

Keyword〉 ***research, optical engineering***

Goal〉 To have wider knowledge regarding research theme.

Schedule〉

1. Guidance
2. Research
3. Report

Evaluation Criteria〉 Assignments count 100%.

Textbook〉 To be introduced in the class.

Reference〉 To be introduced in the class.

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=197431

Student〉 Able to be taken by only specified class(es)

Contact〉

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