[Title]			[Instructor]		
Advanced Structural Engineering			Junji Yoshida / Miyoshi Okamura		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418012	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Thu.／I	Japanese

[Outline and purpose]

This class consists of third parts.
In the first part, continuum mechanics of solid is studied in detail and advanced topics of structural mechanics such as Timoshenko beam is also discussed.
In the second part, structural design as a problem-solving method and the process of problem solving are discussed.
In the third part, design of complex systems are discussed

[Objectives]

1. To understand the meaning of stress, strain and elasticity in general 3D deformation.
2. To understand the relation between structural design and problem solving.
3. To understand the concept of design of complex systems.

[Requirements]

1. groundings in differential and integral calculus

[Evaluation]

assignment：80%
active attendance at class：20%

[Textbooks]

[References]

1. 小形正男：キーポイント多変数の微分積分，岩波書店，1996（in Japanese）.
2. 蔵本由紀：非線形科学、集英社新書、2007 年（in Japanese）.
3. J. D. Bransford and B. S. Stein：The Ideal Problem Solver, W. H. Freeman and Company, 1993.

[Schedule]

1. Force and stress [by J. Yoshida]
2. Equilibrium of continuum [by J. Yoshida]
3. deformation and strain [by J. Yoshida]
4. Elasticity [by J. Yoshida]
5. Timoshenko beam [by J. Yoshida]
6. Structural design and problem solving [by M. Okamura]
7. Identification and definition of a problem [by M. Okamura]
8. Planning of alternative solutions [by M. Okamura]
9. Complex system and dynamic equilibrium [by M. Okamura]
10. entropy and variational principle [by M. Okamura]
11. Optimum design [by M. Okamura]
12. 1/*f* Fluctuation [by M. Okamura]
13. Fractal [by M. Okamura]
14. Case-study on problem solving [by M. Okamura]
15. Review and summery [by M. Okamura]

[Title]			[Instructor]		
Advanced Geotechnical Engineering			Satoshi Goto/Kohei Araki		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418032	2	Natural, Biotic and Social Environment Engineering	1st Semester	Fri.／II	Japanese

[Outline and purpose]

This class will provide the various geotechnical hazards of low lands, plateau, hill-lands and mountains learning the geology, geomorphology, soil mechanics and geotechnical engineering. Volcanic geotechnical hazards are also explained.

[Objectives]

To understand the various geotechnical hazards by the theory of geology, geomorphology, soil mechanics and geotechnical engineering.

[Requirements]

A grounding in basic theories of soil mechanics and geotechnical engineering

[Evaluation]

Report: 100%

[Textbooks]

Handouts

[References]

[Schedule]

1. Introduction
2. Basic theory of geology
3. Basic theory of geomorphology
4. Low land formation
5. Low land and geotechnical hazards
6. Liquefaction hazards
7. Prediction and criteria of liquefaction
8. Liquefaction countermeasures
9. Plateau formation
10. Plateau and geotechnical hazards
11. Hill-lands and mountains formation
12. Mass movement by rain-fall
13. Mass movement by earthquake
14. Volcanic geotechnical hazards
15. Summary

[Title]			[Instructor]		
Advanced Analysis of Concrete			Shigehiko Saito		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418052	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Fri.／I	Japanese

[Outline and purpose]

This class will provide the advanced numerical approaches for predicting the failure behaviors of reinforced concrete structures. The basic theory of the nonlinear finite element method is discussed and the details of material models for concrete and steel reinforcement are given for analyzing the fracture mechanisms of concrete structures.

[Objectives]

To understand the failure behavior of reinforced concrete structures by using the advanced numerical techniques.

[Requirements]

A grounding in basic theories of structural and material mechanics.

[Evaluation]

final report: 100%

[Textbooks]

[References]

T. J. R. Hughes: The Finite Element Method: Linear Static and Dynamic Finite Element Analysis, Dover Publications, 2000

[Schedule]

16. Introduction
17. Basic theory of a finite element method
18. Truss and beam elements
19. 2-dimensional plane elements
20. Solve finite element equations
21. Material models for concrete
22. Material models for reinforcing steel
23. Material nonlinear analysis
24. Flexural and shear failure of reinforced concrete structures
25. Seismic responses of concrete structures
26. Durability analysis of reinforced concrete structures
27. Practical training using the finite element code: set of input data
28. Practical training using the finite element code: execution of analysis
29. Practical training using the finite element code: analyzing the numerical results
30. Summary

[Title]			[Instructor]		
Advanced Crisis Management			Takeyasu Suzuki /Tadashi Suetsugi / Yasunori Hada/Takashi Miyamoto		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418062	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Fri.／III	Japanese

[Outline and purpose]

The aim of this course is to learn knowledge on crisis management required in all business activities in the real world. As Crisis management is not only knowledge but also practical response capacity, discussion with teachers and students, and discussion based exercises are done for learning basis on crisis management.

[Objectives]

1. to acquire fundamental knowledge on crisis management
2. to understand basis on BCP (Business Continuity Plan) and to illustrate it
3. to understand crisis communication and to illustrate it

[Requirements]

Nothing in particular

[Evaluation]

Report: 50 %
Presentation: 50%

[Textbooks]

[References]

[Schedule]

1. Introduction
2. Cases on crisis management
3. Disaster management and crisis management
4. Civil protection and crisis management
5. Crisis management on public authority
6. Crisis management on private company
7. Business Continuity Plan (BCP)
8. Crisis communication
9. Information management
10. Discussion based exercise on BCP
11. Discussion based exercise on crisis communication
12. Summary

[Title]			[Instructor]		
Urban and Regional Designing			Isao Oyama / Nobuyuki Ishii / Shinichi Muto		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418082	2	Natural, Biotic and Social Environment Engineering	1st Semester	Tue.／I	English／Japanese

[Outline and purpose]

For the urban and regional design, it is required not only to pursue economical and functional efficiency and superficial improvement but also to consider the environment, the life, the history, the culture, and the sustainability comprehensively.

Examples of practical urban and regional design are studied from the view of a professional planner and designer, and a thinking process of the planning and design is simulated.

[Objectives]

1. to understand social institutions focusing on the city planning
2. to understand new community development methods such as collaboration with residents
3. to study examples of the city planning and the urban design
4. to practice the city planning and the urban design for an existing city

[Requirements]

understanding of undergraduate level City Planning, Landscape Design and Engineering and Traffic Planning

[Evaluation]

report : 50%
presentation : 50%
Each instructor will give a different subject, which weighs one third of the evaluation.

[Textbooks]

It will be instructed in a lecture if necessary.

[References]

It will be instructed in a lecture if necessary.

[Schedule]

Foundations of Urban Design : 'Shimin Kodou Machizukuri' or City Development in collaboration with citizens
1. and 2. examples of urban design / enforcement of the "Landscape Act" / change of the "City Planning Act"
3. and 4. reviewing literatures on examples of urban design in collaboration with residents / writing a report / discussion

Practice of Urban Design : Landscape Destruction and Landscape Planning
Each lecture consists of presentation and discussion. The theme may be adjusted or modified depending on characteristics of participants.
5. present state of landscape destruction
6. the "Landscape Act" and the "Landscape Planning"
7. relation between landscape and the "City Planning Act" and the "Building Standards Act"
8. examples of landscape control by the "District Planning"
9. effective measures against landscape destruction in case of Kofu

Methods of Urban Design : Methods for Solving Urban Problems
10. fundamental knowledge of the public economics
11. theory and practice of the cost-benefit analysis
12. theory and practice of the prediction of transportation demand
13. institutions for transportation projects
14. study, presentation and discussion of concrete city problems

[Title]			[Instructor]		
Advanced Hydraulics and Hydrology II			Yasushi Sakamoto / Keiichi Masutani / Hiroshi Ishidaira / Yutaka ichikawa		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418104	2	Natural,Biotic and Social Environment Engineering	1st Semester	Thu.／I	English／Japanese

[Outline and purpose]

The aim of the lecture is to learn mechanism and modeling of water flows. The lecture starts from describing basic equations of fluid motion, followed by 1-dimensional water flow equations and storage type water dynamics modeling. The lecture deals with not only theoretical description of water flow modeling but also its numerical solution technique. The topics treated in the lecture are crucial for understanding water flows and river basin environmental science. The lecture is mainly given in Japanese while English is also used when needed.

[Objectives]

1. To understand basic equations of fluid motion and their derivation.
2. To understand 1-dimensional open channel flow equations and their derivation.
3. To understand kinematic wave model equations and their derivation.
4. To understand storage type water dynamics model and their derivation.
5. To understand basic of numerical solution technique for water flow models.

[Requirements]

Basic knowledge on hydraulics, hydrology and calculus.

[Evaluation]

Report: 40%
Final exam: 40%
Attendance and Attitude: 20%

[Textbooks]

[References]

[Schedule]

1. Introduction
2. Basic equations of fluid motion
3. Basic equations of material transport
4. Runoff process and water quality
5. Vertical movement of soil water and solute transport
6. Groundwater flow and solute transport
7. River flow process
8. Evapotranspiration: theory
9. Evapotranspiration: model
10. River basin hydrological model: conceptual model and lumped model
11. River basin hydrological model: distributed model
12. Modeling of water use and water control
13. Water resources in Japan
14. Water resources in the world
15. Summary

[Title]			[Instructor]		
Advanced Environmental Sanitary Engineering			Hidehiro Kaneko / Keiko Hirayama		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418122	2	Natural, Biotic and Social Environment Engineering	1st Semester	Thu.／I	English

[Outline and purpose]

This class consists of two parts.

In the first part, water demand and river water quality issues are discussed. Students learn statistical methods to investigate time trends in water demand and river water quality. Practice using real data is also done.

In the second part, waste management is discussed. After learning the basic concept and methods for proper waste management, discussions about up-to-date issues are made.

[Objectives]

1. To obtain the practical ability of applying statistical analysis for assessing time trends.
2. To obtain the basic knowledge of waste management and the ability to consider the proper waste management using obtained knowledge.

[Requirements]

Basic knowledge about water & wastewater engineering and statistics is required.

[Evaluation]

Report (50%), Presentation (50%)

[Textbooks]

No textbook is required.
Handouts necessary for the class are distributed

[References]

Nothing special.

[Schedule]

Part 1
1. History of Sewage
1) Sewage management policy in Japan
2) Sewage system in Yamanashi and Kofu
2.Analysis of water demand and water quality
1) Time trend of water usage
2) Characterization of water quality indexes by correlation
3) Categorization of sampling stations
4) Time trend of water quality variation

Part 2
1.Fundementals of Waste Management
1) Basic concept for waste management
2) Waste treatment methods
3) Future of waste management
2. Topics of the Day
This part is based on the presentation/discussion by students

[Title]			[Instructor]		
Remote Sensing and GIS II			Keiichi Masutani / Hiroshi Ishidaira/ Jun Magome		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418194	1	Natural,Biotic and Social Environment Engineering	2nd Semester	Fri.／I	English／ Japanese

[Outline and purpose]

This course provides basic theories and techniques to analyze environmental information, including remote sensing, GIS.
Japanese and oversea students study together through work group on some topics. English is potentially used.

[Objectives]

To understand the principles of remote sensing and GIS.
To understand the potential use of remote sensing and GIS on environmental analysis.

[Requirements]

Basic skills of computing.

[Evaluation]

1. Report: 20%
2. Attendance and Attitude: 50%
3. Summary report: 30%

[Textbooks]

Using original documents.

[References]

[Schedule]

1. Introduction
2. Basic concept of remote sensing
3. Basic theory of remote sensing
4. Exercise (1): handling of satellite images
5. Correction of satellite images
6. Exercise (2): geometric correction
7. Remote sensing for land
8. Exercise (3): normalized difference vegetation index (NDVI) and land-cover classification
9. Basic concept of GIS
10. Structure and preparation of GIS data
11. Exercise (4): visualization of GIS data
12. Spatial information analysis method
13. Exercise (5): spatial analyses with GIS
14. Exercise (6): spatial analyses with GIS
15. Summary

[Title]			[Instructor]		
Advanced Analysis of Urban Human Environment			Kuniaki Sasaki		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418332	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Thu.／II	English／Japanese

[Outline and purpose]

This class is opened for understanding how to evaluate the Environment Plan of a city. The topics are especially about the issues of the public involvement process on the practical examples.

[Objectives]

To understand what is the role and desirable management of public involvement in the implementation of infrastructure plan, through the pragmatic application of public involvement.

[Requirements]

Background of public involvement and infrastructure planning

[Evaluation]

Examination and Presentation of the assignment

[Textbooks]

[References]

藤井聡, 土木計画学　公共選択の社会科学, 学芸出版社, ISBN:978-4-7615-3166-9

[Schedule]

1. Public for urban/ region and Intercity road Planing.

2. The state of the each student.

3. Public for urban/ region and Intercity road Planing.

4. Social is the network with the shopping and would be the based on the reconstruction of Bridge and Tunnne.

[Title]			[Instructor]		
Advanced Plant Molecular Cell Biology			Shunji Suzuki		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418372	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Tue.／II	Japanese

[Outline and purpose]

This class is opened to understand plant biology, physiology, and biotechnology. This means the understanding genetics, gene expression, stress response, and development in plant. Finally, the strategies to solve the problems in agriculture using plant biotechnology are figured.

[Objectives]

1. To understand the plant biotechnology.
2. To solve the problems in agriculture worldwide.

[Requirements]

Background of molecular biology

[Evaluation]

Examinations:40%
Presentation%
The percentage of attendance: 20%

[Textbooks]

None

[References]

L.テイツ, E.ザイガー, 植物生理学（第 3 版）, 培風館, ISBN:4563077844
B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, Molecular Biology of the Cell, 4th Edition, Garland Pub, ISBN:0815332181

[Schedule]

1. Plant cell structure and organelle
2. Cell wall
3. Cell cycle
4. Signal transduction
5. Plant hormones
6. Photosynthesis and respiration
7. Carbohydrate metabolism
8. Response to plant pathogens
9. Response to abiotic and biotic stresses
10. Molecular breeding
11. Genetic engineering
12. Genetic modified plants
13. Problems of plant biotechnology
14. Recent technology in plant biotechnology
15. Final examination

[Title]			[Instructor]		
Faculty Functional Microbe Resources Engineering			Fujitoshi Yanagida / Munekazu Kishimoto		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418380	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Wed.／I	Japanese

[Outline and purpose]

Lactic acid bacteria are not only used to ferment and process food, they also play an important role in the intestinal tracts of humans and animals. Recently, numerous studies on lactic acid bacteria have been carried out, and practical knowledge has continued to accumulate. As molecular genetic studies on lactic acid bacteria have progressed, interest in the physiological function of lactic acid bacteria on human health has increased. The aim of this class is to introduce the physiological function of lactic acid bacteria and fermented foods.

[Objectives]

To reconfirm basic knowledge of microbiology
To understand the physiological function of lactic acid bacteria and fermented foods.

[Requirements]

Basic knowledge of microbiology and biochemistry are needed.

[Evaluation]

Attendance:30%
Report:40%
Presentation:30%

[Textbooks]

No specific text.

[References]

None

[Schedule]

1. Classification and identification of lactic acid bacteria.
Definition of lactic acid bacteria. Isolation and culture method.
Classification of lactic acid bacteria species.
2. Cytology of lactic acid bacteria.
Cellular structure and constituent of lactic acid bacteria
3-4.Biochemistry of lactic acid bacteria.
Metabolism of lactic acid bacteria(homo-type, hetero-type)
5-6. Utilization of lactic acid bacteria.
Antibacterial substance(bacteriocin)
7-8.Fermented foods and their physiological effects
Yogurt, Cheese, Pickle, Soy sauce, Fermented soy foods, Alcohol beverages
9-10. Classification and identification of yeast.
Classification of yeast species. Identification of wine yeast strains.
11-12. Fermentation biochemistry.
Sugar degradation pathways. Metabolism of nitrogen compounds.
13-15. Genetic techniques for the improvement wine yeast strains.
Mutagenesis and selection. Hybridization. Gene cloning and transformation.

[Title]			[Instructor]		
Analysis of Functional Substance in Food			Tohru Okuda / Masashi Hisamoto		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418390	2	Natural, Biotic and Social Environment Engineering	1st Semester	Tue.／II	Japanese

[Outline and purpose]

This class deals with methodology on extraction, purification, analysis of functional substances from natural product such as plant, including its genes, metabolic pathway, denaturing during processing.

[Objectives]

Acquisition of logical explanation techniques

[Requirements]

Biochemistry and chemistry, biology, and physics in University

[Evaluation]

Understanding, positiveness, logical thinking, and explanation ability

[Textbooks]

Not specify

[References]

Not specify

[Schedule]

1. Extraction of compounds
2. Separation techniques
3. Analysis of metabolic pathway
4. Synthesis pathway and their genes
5. Utilization for production
6. Stability of products
7. From papers (reading methods)
8. From papers (interpretation)
9. Utilization of statistics (approval)
10. Utilization of statistics (PCA)
11. Utilization of statistics (other methods)
12. Trouble Shootings
13. Reproductivity
14. Searching new methods
15. Comprehensive analysis

[Title]			[Instructor]		
Environmental Materials Chemistry			Masaharu Komiyama		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418602	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Tue.／II	English／Japanese

[Outline and purpose]

Viewing chemistry as a means of material synthesis and preparation, we investigate the design of materials such as the one that is easy to recycle without environmental burden or with catalytic functions that improve environment in a recycling-based society. In addition, considering the fact that many naturally occurring phenomena take place at material interfaces, the role of physical chemistry at interfaces in understanding material transformation and recycling will be stressed. The present course also clarifies the conversion and circulation of materials as well as energy at interfaces at the molecular science level.

[Objectives]

Understand the manufacturing process and the functions of materials in daily use, as well as natural phenomena in terms of chemistry. Recognize their roles and merits and demerits in the recycling-based society. Acquire an ability to suggest and propose schemes that contribute building a better recycling-based society.

[Requirements]

Knowledge on the basics of organic chemistry, inorganic chemistry and physical chemistry at undergraduate level.

[Evaluation]

Exams: midterm 50 %, final 50 %

[Textbooks]

TBA

[References]

TBA

[Schedule]

1st week: physical chemistry
2nd week: organic chemistry
3rd week: polymer chemistry
4th week: polymer materials
5th -7th week: design of polymer materials
8th week: midterm exam
9th week: inorganic chemistry
10th week: surface chemistry
11th week: catalytic chemistry
12th week: inorganic materials
13th -14th week: design of inorganic materials
15th week: final exam

[Title]			[Instructor]		
Environmental Modeling and Simulations			Satoshi Takeuchi / Kazuho Ito / Yoichi Shimazaki		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418622	2	Natural, Biotic and Social Environment Engineering	1st Semester	Thu.／II	Japanese

[Outline and purpose]

Complex systems like the nature or human societies exist as a dynamic system. By extracting characteristic features of the system, environmental modeling and programing are carried out. To understand the behaviors and reliabilities of the systems, sensitivity analyses are introduced. Computer simulations are employed to predict and evaluate the systems which change as time elapses.

[Objectives]

Understanding the environmental modeling of the nature or human societies by the use of the mathematical and scientific methods.
Analyzing characteristic behaviors of the system from the view point of the system dynamics.

[Requirements]

Fundamental knowledge on Linear algebra and Differential equations.

[Evaluation]

Programing/Report: 100%

[Textbooks]

[References]

[Schedule]

●System simulations
Understanding dynamic systems: linear growth and decay, exponential growth and decay, Logistic function, overshoot and collapse, oscillation. Programming dynamic systems by the use of STELLA software.

●Numerical analyses of Partial differential equations
Modeling phenomena in environmental sciences by partial differential equations. Understanding spectral method to solve the equations numerically. Implementing the numerical scheme with MATLAB programing.

●Energy system models
Understanding the energy system models: MARKAL model based on a linear programming technique and CASCADE (Computer Aided Simulation for Cogeneration Assessment and Design).

[Title]			[Instructor]		
Advanced Biology and Ecology			Tetsu Hirata / Tomoya Iwata		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418632	2	Natural, Biotic and Social Environment Engineering	1st Semester	Mon.／III	English／Japanese

[Outline and purpose]

Theoretical analysis of organism from individual to biosphere level for the precise understanding of life

[Objectives]

1. to understand life, organism, ecosystem
2. to apply these understanding to actual environment and society

[Requirements]

A fundamental knowledge of biology/ecology

[Evaluation]

Report:50%
Presentation:50%

[Textbooks]

[References]

[Schedule]

1. Introduction/orientation
2-14. Guidance of each instructor
15. Presentation

[Title]			[Instructor]		
Evolutionary Theory of Life			Taku Misonou / Junichi Miyazaki		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418642	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Tue.／V	Japanese/English

[Outline and purpose]

First, this class provides information of evolutionary aspects and phenomena to learn and discuss about historical and modern evolutionary concepts and theories. Next, this class also provides examples and resultant achievement of evolutionary studies to learn recent evolutionary methodology at morphological, ecological, and molecular levels. Finally, this class provides application of evolutionary studies to conserve endangered organisms and biodiversity and improvement of habitat environments and also to understand the behavior of human being and their society.

[Objectives]

1) To understand concept, theory, and mechanism of evolution
2) To understand how to study evolution (methodology)
3) To have an evolutionary point of view on various scientific phenomena.

[Requirements]

Knowledge of basic biology, interest in evolution

[Evaluation]

Examination 50%
Report 50%

[Textbooks]

Handouts

[References]

1.白山義久編, 無脊椎動物の多様性と系統, 華堂, ISBN:478535289
2.コルバート・モラレス・ミンコフ著, 田隅本生訳, 脊椎動物の進化, 築地書館, ISBN:4806712957
3.福田芳生著, 古生態図集・海の無脊椎動物, 川島書店, ISBN:4761005963
4.地球大進化 1~6, NHK 出版, ISBN:4140808616
5.リチャード・ドーキンス著, 利己的な遺伝子, 紀伊國屋書店, ISBN:4314010030

[Schedule]

1. Guidance
2~8. Morphological and Ecological Evolution of Organisms
9~15. Evolution at the Molecular Level

[Title]			[Instructor]		
Advanced Environmetnal Governance			Kiseong Kim / Susumu Kitagawa		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418652	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Thu.／II	Japanese

[Outline and purpose]

This course provides an introduction to environmental governance from the perspective of environmental politics and environmental economics. Students will be expected to understand the main topics of environmental governance and to be able to apply them to existing environmental policy debates. Students with a general interest in environmental affairs and approaches to achieving sustainable development should find this course to be of value.

[Objectives]

1. To understand the main topics of environmental governance.
2. To be able to apply the theories of environmental governance to actually existing environmental problems.

[Requirements]

Basic knowledge of environmental politics and environmental economics

[Evaluation]

Participation 50%
Final paper 50%

[Textbooks]

John Dryzek, *The Politics of the Earth*, Oxford: Oxford University Press, 2005.
William M. Lafferty, *Governance for Sustainable Development*, Northampton: Edward Elgar, 2004.
Andrew J. Jordan and Andrea Lenschow, *Innovation in Environmental Policy? : Integrating the Environment for Sustainability*, Cheltenham: Edward Elgar, 2008.
John R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World*, New York: W.W. Norton and Company, 2000.

[References]

Students will be given a reading list in the beginning of the course.

[Schedule]

1. Introduction (Kim)
2. Sustainable development (Kim)
3. Ecological modernization (Kim)
4. Administrative rationalism (Kim)
5. Democratic pragmatism (Kim)
6. Economic rationalism (Kim)
7. Environmental policy integration (Kim)
8. Sustainable development strategy (Kim)
9. Environmental policy instruments: Command and control (Kitagawa)
10. Environmental policy instruments: Environmental taxes (Kitagawa)
11. Environmental policy instruments: Tradable permit schemes (Kitagawa)
12. Environmental policy instruments: Voluntary approaches (Kitagawa)
13. Environmental policy history (Kitagawa)
14. Case study: Climate Policy (Kitagawa)
15. Case study: Waste Policy (Kitagawa)

[Title]			[Instructor]		
Policy Evaluation			Tomoko Takahashi / Keiji Kadono		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418662	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Mon.／III	English／Japanese

[Outline and purpose]

This course provides an introduction to policy evaluation from the systematic process for assessing the design, implementation and outcomes of public policies.

[Objectives]

· Understand the policy-making process
· Develop a familiarity with the rational policy analysis process.
· Understand how and why public policies need to be analyzed and evaluated.
· Improve existing study, research, writing, and presentation skills.

[Requirements]

Readings: Students should get into the habit of reading a daily newspaper and/or weekly news magazines.
Discussion Participation: Students will be required to participate regularly in the course discussion.

[Evaluation]

Report or Exams: midterm 50 %, final 50 %

[Textbooks]

Jorn Rattso, *Fiscal Federalism and State-Local Finance*, Edward Elgar.

[References]

[Schedule]

1 Introduction to Public Policy-Making and Evaluation
2 The Structure of Policy-Making in Japanese Government
3 Public Policy-Making: Problem Identification and Agenda-Setting
4 The Relationship of Science and Technology with Society
5 Science and Technology System
6 Science and Technology Indicators, and Scientometrics
7 Science and technology Foresight, and Science and Technology Trends
8 Science of Science, Technology and Innovation Policy
9. Public finance(Spending)
10. Public finance(Tax)
11. Public finance(Budget)
12. Public finance(Bond)
13. Public finance(Social Insurance)
14. Public finance(Inter-Governmental Relations)
15. Case study(Public Investment)

[Title]			[Instructor]		
Ecosocial Design			Taku Misonou		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418692	2	Natural, Biotic and Social Environment Engineering	1st Semester	Tue.／V	English／Japanese

[Outline and purpose]

An approach to construct Eco-City through an interdisciplinary discussion. An ideal city design will be pursued from various fields of science.

[Objectives]

To understand the multiple approach to the city-design from various sciences.

[Requirements]

Flexibility to accept multiple disciplines of various fields of science.

[Evaluation]

Report:50%
Presentation:50%

[Textbooks]

[References]

[Schedule]

1.Introduction/orientation
2-14. Guidance of each instructor
15. Presentation

[Title]			[Instructor]		
Analytical and Computational Approach to Complex Systems			Hiroyasu Toyoki / Hiroyuki Shima		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418742	2	Natural, Biotic and Social Environment Engineering	1st Semester	Tue.／IV	Japanese

[Outline and purpose]

The 1st part (Date 1-8) is devoted to the lecture of static and dynamic structures of general complex systems consisting of many interacting components. This part covers modeling methodology and numerical simulations of complex systems, as well as showing their applicability to social phenomena.

The 2nd part (Date 9-15) presents the bird-eye view of the state-of-the-art developments in the fields of synchronization and complex network theory. The key concepts, criticality and universality, which both are relevant to broad classes of complex systems, will be emphasized.

[Objectives]

- To master the mathematical analysis and numerical simulations of non-equilibrium statistical systems.
- To integrate various scientific disciplines from a viewpoint of complex systems.
- To comprehend the nonlinear nature of metrology and the resulting difficulties in future prospect of climate.

[Requirements]

Understandings of undergraduate physics
Basic skills for calculus

[Evaluation]

Examination and homework : 50%
Attitude toward learning : 50%

[Textbooks]

Not specified

[References]

Not specified

[Schedule]

1. Harmonic oscillation and energy dissipation
2. Stability of nonlinear mechanical systems
3. Numerical methods for dynamical systems
4. Limit cycle and bifurcation
5. Measuring chaos
6. Coupled nonliner oscillators
7. Modeling social dilemma
8. Modeling public goods problems
9. Pattern formation in nature
10. Chaos
11. Fractal
12. Self-organization
13. Complex network
14. Synchronization
15. Dissipative structure theory

[Title]			[Instructor]		
Advanced Lecture on Atmospheric Sciences			Kiyoshi Matsumoto / Hiroshi Kobayashi		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418752	2	Natural, Biotic and Social Environment Engineering	2nd Semester	Mon.／V	Japanese

[Outline and purpose]

This class provides information of physical, chemical and biogeochemical processes in the atmosphere to understand their roles in the earth system and their impacts on global environmental changes.

[Objectives]

・To understand the theories of atmospheric radiation, aerosol and cloud physics, atmospheric chemistry, climate system, and geochemical cycles.
・ To apply these theories to discuss the dynamic structure of earth's environment

[Requirements]

Basic knowledge of meteorology and atmospheric chemistry

[Evaluation]

Presentation and discussion: 100%

[Textbooks]

Not specified

[References]

Not specified

[Schedule]

1. Introduction to atmospheric physics
2. Aerosol physics
3. Cloud physics
4. Atmospheric radiation I
5. Atmospheric radiation II
6. Introduction to climate system
7. Climate system and earth's environment
8. Introduction to atmospheric chemistry
9. Chemistry of trace gases
10. Variability of reactive gases
11. Aerosol chemistry
12. Atmospheric deposition
13. Atmosphere-Hydrosphere-Biosphere-Geosphere Interaction
14. Geochemical cycle and earth's environment
15. Atmosphere and earth's environment

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering I			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418900 A	2	Natural, Biotic and Social Environment Engineering Dept. of Civil and Environmental Engineering	Full year	Wed.／IV	English

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering I			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418900 B	2	Natural, Biotic and Social Environment Engineering Dept. of Environmental Technology and Biotechnology	Full year	Wed.／IV	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering I			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418900 C	2	Natural, Biotic and Social Environment Engineering Dept. of Ecosocial System Evaluation	Full year	Wed.／IV	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering I			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418900 D	2	Natural, Biotic and Social Environment Engineering Dept. of Civil and Environmental Engineering	Full year	Wed.／IV	English

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to a group of academic supervisors, discussion and guidance based on it. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering I			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418900 E	2	Natural, Biotic and Social Environment Engineering Dept. of Environmental Technology and Biotechnology	Full year	Wed.／IV	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering I			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418900 F	2	Natural, Biotic and Social Environment Engineering Dept. of Ecosocial System Evaluation	Full year	Wed.／IV	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering II			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418910 A	2	Natural, Biotic and Social Environment Engineering Dept. of Civil and Environmental Engineering	Full year	Wed.／V	English

[Outline and purpose]

Result that latest literature and study relating research subject are investigated and studied is reported at seminar style. The target is to understand most advanced level of research subject and secure the high level capacity of research for innovation and research development by exceeding its level. To accomplish it, report and discussion of successive research, conduct of research and inspection of result are carried out with a group of academic supervisors. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To understand the most advanced level of research subject and to secure the high level capacity of research for innovation and research development by exceeding its level

[Requirements]

To secure the research capacity to collect, understand and evaluate academic paper in order to know the level of most advanced research (in Japan and foreign country)

[Evaluation]

Effect was evaluated comprehensively for understanding of most advanced level at research field and improvement of capacity by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature relating research subject are introduced at any time

[References]

Literature relating research subject are introduced at any time

[Schedule]

Serious and strict advise will be done at seminar style in order to gain the knowledge concerning research subject and improve research capacity

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering II			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418910 B	2	Natural, Biotic and Social Environment Engineering Dept. of Environmental Technology and Biotechnology	Full year	Wed.／V	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering II			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418910 C	2	Natural, Biotic and Social Environment Engineering Dept. of Ecosocial System Evaluation	Full year	Wed.／V	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering II			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418910 D	2	Natural, Biotic and Social Environment Engineering Dept. of Civil and Environmental Engineering	Full year	Wed.／V	English

[Outline and purpose]

Result that latest literature and study relating research subject are investigated and studied is reported at seminar style. The target is to understand most advanced level of research subject and secure the high level capacity of research for innovation and research development by exceeding its level. To accomplish it, report and discussion of successive research, conduct of research and inspection of result are carried out with a group of academic supervisors. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To understand the most advanced level of research subject and to secure the high level capacity of research for innovation and research development by exceeding its level

[Requirements]

To secure the research capacity to collect, understand and evaluate academic paper in order to know the level of most advanced research (in Japan and foreign country)

[Evaluation]

Effect was evaluated comprehensively for understanding of most advanced level at research field and improvement of capacity by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature relating research subject are introduced at any time

[References]

Literature relating research subject are introduced at any time

[Schedule]

Serious and strict advise will be done at seminar style in order to gain the knowledge concerning research subject and improve research capacity

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering II			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418910 E	2	Natural, Biotic and Social Environment Engineering Dept. of Environmental Technology and Biotechnology	Full year	Wed.／V	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research

[Title]			[Instructor]		
Seminar on Natural, Biotic and Social Environment Engineering II			Each academic supervisor		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
418910 F	2	Natural, Biotic and Social Environment Engineering Dept. of Ecosocial System Evaluation	Full year	Wed.／V	English／Japanese

[Outline and purpose]

Result that basic literature relating research subject are investigated and studied is reported at seminar style. The purpose of seminar is to make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research through study on basic knowledge of research subject, successive report to advising teacher group, discussion and guidance based on it. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.

[Objectives]

To make sure the viewpoint concerning significance, role, ultimate target, methodology et al. of research to progress research

[Requirements]

To learn the capacity of investigation and collection of literature as following : to know the field of book (in Japan or foreign country) written literature and study case relating research, to know the academic conference that research was presented and to know researcher or research center that research was conducted.

[Evaluation]

Effect was evaluated comprehensively for improvement of capacity toward making sure the viewpoint for research by considering successive report of study and discussion based on it : 100%

[Textbooks]

Literature and study relating research subject are introduced at any time

[References]

Literature and study relating research subject are introduced at any time

[Schedule]

Report from student and discussion are conducted at seminar style according to the progress of research