



Ibaraki University

Regional Sustainability Course

Objectives

The risk of climate change or natural disasters.

Economic development in cities and a rural communities.



A secure community improvement and environmental preservation for the base of the sustainable development of ASEAN countries.

Outline and Characteristics

Education of the bird's-eye vision connecting the regional issue and global sustainability

Production of secure society, knowledge and technique of environmental preservation

- The response to a climate change and a natural disaster
- The fundamental /application subjects regarding agricultural and regional environment and related science area

PBL type education which combined the lab work and the practice seminar

Educating of the talented people who can plan up and promote the plan of a sustainable community improvement or disaster prevention which considered earth environment



Course Title	Overview of Regional Sustainability Science		
Instructor	Youji Nitta (Agriculture) , Seiji Mori (Science) and others		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year			
Remarks			
Outline	This course is designed to learn a variety of researches conducted at the frontiers of “Regional sustainability science”. By understanding a variety of academic fields such as food, energy and environment and interactions among them, students will come to take part in the process of integrating several academic disciplines.		
Keywords	Regional and global sustainability, food security, energy, environmental chemistry, climate change		
Goals	Students can obtain the overview about the issues related to local sustainability and can discuss about their opinion.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction: what are the issues for regional sustainability? 2. Food issues 1 3. Food issues 2 4. Chemistry for regional sustainability 5. Environmental chemistry 6. Energy issues 7. Climate change and economic activity 8. Discussion (all teachers) 		
Advice for Preview and Review	This lecture is held as an intensive course.		
Prerequisite	General chemistry and general biology.		
Grading Criteria	Learning results are evaluated by a report on the assigned subjects.		
Texts/References			

Course Title	Adaptation to environmental change and disaster risk (環境変動適応・防災論)		
Instructor	Makoto Tamura(ICAS), Nobuo Mimura (Engineering, ICAS) and others (田村誠、三村信男他)		
Class Number		Semester	The Latter Term
Credit(s)	2	Day/Period	Intensive
Student Year	2,3		
Remarks			
Outline	This lecture presents a perspective of climate change issue from the viewpoint of global and regional sustainability. First, it will focus on impacts of climate change, disasters, agriculture and ecosystem. Then, the concepts of countermeasures against global warming, mitigation and adaptation, and targets and options of adaptation will be introduced. Through the lecture, we will consider the relationship between climate change adaptation and disaster risk management.		
Keywords	Climate change, Mitigation, Adaption, Disaster risk management		
Goals	Students can obtain the latest knowledge and opinion how to deal with multiple risks such as climate change and disaster risk.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction 2. Mechanisms and present situation of global warming 3. Impacts of climate change 1 4. Impacts of climate change 2 5. Countermeasures for climate change: mitigation 6. Energy issues 7. Relationship between economic growth and climate change 8. Countermeasures for climate change: adaptation 9. Top-down approach for adaptation 10. Bottom-up approach for adaptation 11. Overview of disaster risk 12. Disaster risk management: Japan's case 13. Disaster risk management: ASEAN's case 14. Synergies for climate adaptation and disaster risk reduction 15. Discussion (all teachers) 		
Advice for Preview and Review	This lecture is held as an intensive course.		
Prerequisite			
Grading Criteria	Learning results are evaluated by a report on the assigned subjects.		
Texts/References			

Course Title	Regional environmental management (地域環境管理論)		
Instructor	Hiromune Yokoki(Engi) and Yuji Kuwahara (Engi) (横木裕宗、桑原祐史)		
Class Number		Semester	The Latter Term
Credit(s)	2	Day/Period	Intensive
Student Year	2,3		
Remarks			
Outline	<p>The purpose of this lecture is to understand the concept of environmental management focused on the regional scale. First, the concepts of environment management are given in the lecture. Then, some case studies related to the environmental measuring technology are presented for the following three fields: (1)coastal environment (2)land use (3)water environment</p> <p>Finally, the environmental impact assessment is introduced.</p>		
Keywords	Environmental management, Climate change, Coastal environment, Land use, Water environment		
Goals	Students can obtain the latest knowledge regarding regional environmental management throughout the lecture and discussion.		
Course Plan	<ol style="list-style-type: none"> 1.Introduction 2.Concept of environment management (1) 3.Concept of environment management (2) 4.Case study about environmental measure technology: coastal environment (1) 5.Case study about environmental measure technology: coastal environment (2) 6.Case study about environmental measure technology: coastal environment (3) 7.Case study about environmental measure technology: land use (1) 8.Case study about environmental measure technology: land use (2) 9.Case study about environmental measure technology: land use (3) 10.Case study about environmental measure technology: water environment (1) 11.Case study about environmental measure technology: water environment (2) 12.Case study about environmental measure technology: water environment (3) 13.Environmental impact assessment (1) 14.Environmental impact assessment (2) 15.Discussion (all teachers) 		
Advice for Preview and Review	This lecture is held as an intensive course.		
Prerequisite			
Grading Criteria	Learning results are evaluated by a report on the assigned subjects.		
Texts/References			

Course Title	Environmental and symbiotic sciences (環境共生論)		
Instructor	Masakazu Komatsuzaki, Hiroyuki Ohta, Nobuo Sakagami, Tomoyasu Nishizawa, Takamitsu Kohzuma and Kazuhiko Narisawa (小松崎将一、太田寛行、坂上伸生、西澤智康、高妻孝光、成澤才彦)		
Class Number		Semester	The Latter Term
Credit(s)	2	Day/Period	Intensive
Student Year	2,3		
Remarks			
Outline	The lecture contains (1) an understanding regarding the basic theory of natural environment or environmental resources in Japan and the world and (2) an understanding of the environmental problems or social trends from the viewpoint of symbiosis.		
Keywords	Nutrient cycling, Agro ecology, Soil management, Soil microbe, Climate change, Bioinorganic chemistry		
Goals	Students can obtain the latest knowledge regarding environmental and symbiotic sciences throughout the lecture and discussion.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction: What is “Environmental and symbiotic sciences” (HO) 2. Biogeochemical cycling: carbon (HO) 3. Biogeochemical cycling: nitrogen (HO) 4. Bioinorganic Chemistry (TK) 5. Marine Bioinorganic Chemistry (TK) 6. Soil distribution (NS) 7. Soil formation and plant-microbe-soil interactions (NS) 8. Plant nutrition and fertilizer: photosynthesis and respiration (TN) 9. Plant nutrition and fertilizer: transport of essential nutrient (TN) 10. Nature of the symbiotic association (KN) 11. The role of symbiotic microbes in situ (KN) 12. Soil management basics (MK) 13. Ecological aspect of agriculture management (MK) 14. Ecological aspect of food production and system (MK) 15. Discussion 		
Advice for Preview and Review	This lecture is held as an intensive course.		
Prerequisite			
Grading Criteria	Learning results are evaluated by a report on the assigned subjects.		
Texts/References			

Course Title	Environmental conservation agriculture (環境保全型農業論)		
Instructor	Kazuhiko Narisawa, Hisao Kuroda, Koshi Yoshida, Masakazu Komatsuzaki, Takeshi Ohkubo and Naomi Asagi (成澤才彦、黒田久雄、吉田貢士、小松崎将一、大久保武、浅木直美)		
Class Number		Semester	The Latter Term
Credit(s)	2	Day/Period	Intensive
Student Year	2,3		
Remarks			
Outline	The lecture contains (1) an understanding regarding the fundamental knowledge of nutrient cycling function of an agro-ecosystem in Japan and the world and (2) an understanding of the consideration to balance with environment and productivity from the viewpoint of sustaining agriculture that considered mitigation of the environmental impact.		
Keywords	Symbiosis, Eutrophication, Water management, Paddy field, Organic farming, Breeding		
Goals	Students can obtain the latest knowledge regarding environmental conservation agriculture throughout the lecture and discussion.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction: What is “ Environmental conservation agriculture ” (KN) 2. Eutrophication of a lake (HK) 3. Water quality purification of a lake (HK) 4. Design of irrigation water requirement for food production (KY) 5. Irrigation water management for environmental conservation (KY) 6. Physiological response against environmental change in animal (TO) 7. Breeding strategy toward environmental adaptation in livestock (TO) 8. Cultivation system in paddy fields 1 (NA) 9. Cultivation system in paddy fields 2 (NA) 10. Cover crops in upland fields (MK) 11. Ecological benefits of organic farming (MK) 12. A function of the symbiotic fungi in organic farming (KN) 13. Biological control of plant pathogens (KN) 14. Discussion 1 15. Discussion 2 		
Advice for Preview and Review	This lecture is held as an intensive course.		
Prerequisite			
Grading Criteria	Learning results are evaluated by a report on the assigned subjects.		
Texts/References			

Course Title	Field experimental works (フィールドワーク実習)		
Instructor	Nobuo Sakagami and Tatsuo Sato (坂上伸生、佐藤達雄)		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year	2,3		
Remarks			
Outline	This course will be held to understand regional sustainability by means of multifaceted research of sustainable agriculture. For attaining this purpose, it involves plenary lectures and field practices, laboratory works, technical tours and group discussion in regard to environmental impact and sustainability of agriculture.		
Keywords	Sustainable agriculture, Environmental Impact, Technological implementation, Organization and management		
Goals	Discussions throughout field works would be focused for raising the issues related to the agricultural practices in relation with regional sustainability and formulate the solutions for respective issue raised. The program is arranged to promote talents to find problem and discuss solution independently concerning this science field.		
Course Plan	<ol style="list-style-type: none"> 1. Sustainability and agricultural sciences 1 2. Sustainability and agricultural sciences 2 3. Field work 1 4. Field work 2 5. Field work 3 6. Particular discussion on field practices 7. General discussion on agricultural sustainability 8. General discussion on regional sustainability 		
Advice for Preview and Review	This lecture is held as an intensive course.		
Prerequisite			
Grading Criteria	Learning results are evaluated by a report on the assigned subjects.		
Texts/References			

Course Title	Seminar on regional sustainability science I (地域サステイナビリティ学ゼミナール I)		
Instructor	NITTA, Youji and others (新田洋司他)		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year	3		
Remarks			
Outline	This course is designed to learn a variety of researches conducted at the current topics of “ Biological Production Science ”. The purpose of this course is to learn the technical knowledge and idea regarding the selected subject of research.		
Keywords	Crop Science, Plant Pathology, Plant Breeding and Genetics, Horticultural Production Technology, Molecular Biology and Biochemistry, Animal Behavior, Animal Welfare		
Goals	Students can obtain the problem-solving capability about the issues related to “Biological Production Science”.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction of each laboratory 2. The seminar in the selected laboratory 3. Presentation and discussion 		
Advice for Preview and Review	<p>Based on the guidance by class and provided teacher’s list (http://ddp.agr.ibaraki.ac.jp/en/iu_agr.html#cont01), students need to make three choices of the interested research subject.</p> <p>Attendance of the lab work in the same laboratory is recommended.</p>		
Prerequisite			
Grading Criteria	Learning results are evaluated by a presentation and discussion on the assigned subjects.		
Texts/References			

Course Title	Seminar on regional sustainability science II (地域サステイナビリティ学ゼミナール II)		
Instructor	KURUSU, Yasuroh and others (久留主泰朗他)		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year	3		
Remarks			
Outline	This course is designed to learn a variety of researches conducted at the current topics of “ Bioresource Science ”. The purpose of this course is to learn the technical knowledge and idea regarding the selected subject of research.		
Keywords	Applied Biological Chemistry, Molecular Microbiology, Genetics and plant breeding, Animal Cell Engineering, Bioorganic chemistry, Bioinorganic chemistry, Natural products chemistry, Computational chemistry, Environmental Microbiology, Environmental soil science, Mycology, Chemical Ecology, Phytopathology		
Goals	Students can obtain the problem-solving capability about the issues related to “Bioresource Science”.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction of each laboratory 2. The seminar in the selected laboratory 3. Presentation and discussion 		
Advice for Preview and Review	<p>Based on the guidance by class and provided teacher’s list for the college of agriculture (http://ddp.agr.ibaraki.ac.jp/en/iu_agr.html#cont01), students need to make three choices of the interested research subject. For the college of science (Mito campus), please see the Ibaraki Univ. regional sustainability science courses homepage.</p> <p>Attendance of the lab work in the same laboratory is recommended.</p>		
Prerequisite			
Grading Criteria	Learning results are evaluated by a presentation and discussion on the assigned subjects.		
Texts/References			

Course Title	Seminar on regional sustainability science III (地域サステナビリティ学ゼミナール III)		
Instructor	Masakazu KOMATSUZAKI and others (小松崎将一他)		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year	3		
Remarks			
Outline	This course is designed to learn a variety of researches conducted at the current topics of “Environmental Science”. The purpose of this course is to learn the technical knowledge and idea regarding the selected subject of research.		
Keywords	Water Quality and Hydrology, Rural Planning, Agro-Informatics, Water Environment and Food Production, Soil physics, Sustainable Agriculture, Conservation of Water Quality, Rural Sociology, Land-Use Science, Environmental Impact Assessment		
Goals	Students can obtain the problem-solving capability about the issues related to “Environmental Science”.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction of each laboratory 2. The lab work in the selected laboratory 3. Presentation and discussion 		
Advice for Preview and Review	<p>Based on the guidance by class and provided teacher’s list (http://ddp.agr.ibaraki.ac.jp/en/iu_agr.html#cont01), students need to make three choices of the interested research subject.</p> <p>Attendance of the lab work in the same laboratory is recommended.</p>		
Prerequisite			
Grading Criteria	Learning results are evaluated by a presentation and discussion on the assigned subjects.		
Texts/References			

Course Title	Lab works in regional sustainability science I (地域サステイナビリティ学ラボワーク I)		
Instructor	新田洋司他 (NITTA, Youji and others)		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year	3		
Remarks			
Outline	This course is designed to learn a variety of researches conducted at the current topics of “ Biological Production Science ”. The purpose of this course is to learn the technique and idea regarding the selected subject of research.		
Keywords	Crop Science, Plant Pathology, Plant Breeding and Genetics, Horticultural Production Technology, Molecular Biology and Biochemistry, Animal Behavior, Animal Welfare		
Goals	Students can obtain the problem-solving capability about the issues related to “Bioresource Science”.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction of each laboratory 2. The lab work in the selected laboratory 3. Presentation and discussion 		
Advice for Preview and Review	<p>Based on the guidance by class and provided teacher’s list (http://ddp.agr.ibaraki.ac.jp/en/iu_agr.html#cont01), students need to make three choices of the interested research subject.</p> <p>Attendance of the seminar in the same laboratory is recommended.</p>		
Prerequisite			
Grading Criteria	Learning results are evaluated by a presentation and discussion on the assigned subjects.		
Texts/References			

Course Title	Lab works in regional sustainability science II (地域サステナビリティ学ラボワーク II)		
Instructor	KURUSU, Yasuroh, and others (久留主泰朗 他)		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year	3		
Remarks			
Outline	This course is designed to learn a variety of researches conducted at the current topics of “ Bioresource Science ”. The purpose of this course is to learn the technique and idea regarding the selected subject of research.		
Keywords	Applied Biological Chemistry, Molecular Microbiology, Genetics and plant breeding, Animal Cell Engineering, Bioorganic chemistry, Bioinorganic chemistry, Natural products chemistry, Computational chemistry, Environmental Microbiology, Environmental soil science, Mycology, Chemical Ecology, Phytopathology		
Goals	Students can obtain the problem-solving capability about the issues related to “Bioresource Science”.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction of each laboratory 2. The lab work in the selected laboratory 3. Presentation and discussion 		
Advice for Preview and Review	<p>Based on the guidance by class and provided teacher’s list for the college of agriculture (http://ddp.agr.ibaraki.ac.jp/en/iu_agr.html#cont01), students need to make three choices of the interested research subject. For the college of science (Mito campus), please see the Ibaraki Univ. regional sustainability science courses homepage.</p> <p>Attendance of the lab work in the same laboratory is recommended.</p>		
Prerequisite			
Grading Criteria	Learning results are evaluated by a presentation and discussion on the assigned subjects.		
Texts/References			

Course Title	Lab works on regional sustainability science III (地域サステナビリティ学ラボワーク III)		
Instructor	Masakazu KOMATSUZAKI and others (小松崎将一他)		
Class Number		Semester	The Latter Term
Credit(s)	1	Day/Period	Intensive
Student Year	3		
Remarks			
Outline	This course is designed to learn a variety of researches conducted at the current topics of “Environmental Science”. The purpose of this course is to learn the technique and idea regarding the selected subject of research.		
Keywords	Water Quality and Hydrology, Rural Planning, Agro-Informatics, Water Environment and Food Production, Soil physics, Sustainable Agriculture, Conservation of Water Quality, Rural Sociology, Land-Use Science, Environmental Impact Assessment		
Goals	Students can obtain the problem-solving capability about the issues related to “Environmental Science”.		
Course Plan	<ol style="list-style-type: none"> 1. Introduction of each laboratory 2. The lab work in the selected laboratory 3. Presentation and discussion 		
Advice for Preview and Review	<p>Based on the guidance by class and provided teacher’s list (http://ddp.agr.ibaraki.ac.jp/en/iu_agr.html#cont01), students need to make three choices of the interested research subject.</p> <p>Attendance of the lab work in the same laboratory is recommended.</p>		
Prerequisite			
Grading Criteria	Learning results are evaluated by a presentation and discussion on the assigned subjects.		
Texts/References			