Kyoto University

Human Security Engineering Education Program

5 Years Course

Integrated Engineering Course, Human Security Engineering Field
(Human Security Engineering Education Program)
Graduate School of Engineering

Human Security Engineering Advanced Course
Graduate School of Global Environmental Studies

2020

Contents

(1) What is the Human Security Engineering Education Program?

Educational objective:

Motivating creative, international and independent researchers and engineers with training in four related academic fields.

To achieve the educational objectives of the Human Security Engineering Education (HSE) Program, we provide the HSE courses of the program, the basic subjects in the four academic fields, and the overseas internship through the English language. The Graduate School of Engineering (three departments related to global engineering), the Hall of Global Environmental Research, the Graduate School of Global Environmental Studies, and the Disaster Prevention Research Institute are participating in this program and are responsible for training and research.

(2) Educational Policy

Our policy is intended for master and doctoral students to provide interdisciplinary and solid education in the core fields and four related fields (urban governance, urban infrastructure management, health risk management, and disaster risk management). The study of these topics will equip researchers and engineers with the ability to apply their knowledge in an integrated manner toward ensuring urban human security, as well as the ability to promote these technologies. Specifically, we aim to promote researchers and engineers who possess sophisticated creativity (in addition to having a wide range of knowledge, the ability to go beyond the boundaries of the existing specialized fields), internationality (the ability to present and debate research in English, perform education and research activity in foreign countries, ability to build international human networks), and independence (the ability to plan research, leadership in education and research, ability to secure research funds, and problem-solving ability in the field). To achieve the educational objectives above, we designate “Human Security Engineering” as the compulsory subject for all students and include English instruction in our courses. Additionally, to enable students at the overseas campuses to participate in the program, we will also provide intensive lectures at the sites through a remote lecturing system and e-Learning system.

(3) HSE Program Students

The master course students who entered the Graduate School of Engineering (three departments related to global engineering) and are assigned to the Integrated Engineering Course, Human Security Engineering Field (5 years course) can be admitted to HSE program.

(4) HSE Program: Subjects Available for Study

Code	Subject	Teasher(s) in Charge	Hrs/Week		Credits	Course Specification				Available for	
			1st Semester	2nd Semester		Core subject	Major subject	ORT subject	Minor subject	Master course	Doctoral course
10X301	**Human Security Engineering**	**Yoneda, Tachikawa, Tanaka(Hiro), Tatano, Matsushima, Asari**		2	2	○				Compulsory	
10X305	Lectures on Urban Governance 1(*)	Assorted Instructors	2		2		○		○		○
10X307	Lectures on Urban Governance 2(*)	Assorted Instructors		2	2		○		○		○
10X311	**Urban Infrastructure Management**	**Ohtsu and Assorted Instructors**	2		2	○	○		○	○	○
10X315	Lectures on Urban Infrastracture Management 1(*)	Assorted Instructors	2		2		○		○		○
10X317	Lectures on Urban Infrastracture Management 2(*)	Assorted Instructors		2	2		○		○		○
10X321	**Lectures on Environmental Risk Management Leader**	**Fujii, Tanaka(Hiro), Shimizu**	2		2	○	○		○	○	○
10X323	Lectures on Health Risk Management 1(*)	Assorted Instructors	2		2		○		○		○
10X325	Lectures on Health Risk Management 2(*)	Assorted Instructors		2	2		○		○		○
10X750	Management of Global Resources and Ecosystems	Funakawa, Shibata, Yamashita	2		2		○		○	○	○
10X751	Environmental Ethics and Environmental Education	Asari, Singer	2		2		○		○	○	○
10X333	**Disaster Risk Management**	**Tatano, Yokomatsu, Samaddar**	2		2	○	○		○	○	○
10X335	Lectures on Disaster Risk Management 1(*)	Assorted Instructors	2		2		○		○		○
10X337	Lectures on Disaster Risk Management 2(*)	Assorted Instructors		2	2		○		○		○
10X339	Internship for Human Security Engineering (Short)		(2)	(2)	2			○		○	○
10X341	Advanced Capstone Project (Long)		(8)	(8)	8			○		○	○
10X351	Human Security Engineering Seminar A		(4)	(4)	4			○		Compulsory	
10X352	Human Security Engineering Seminar B		(4)	(4)	4			○		Compulsory	
10W001	Infrastructural Structure Engineering	Assorted Instructors		2	2		○		○	○	○
10F065	Hydraulic Engineering for Infrastructure Development and Management	Hosoda, Toda, Gotoh, Tachikawa, Ichikawa, Khayyer, Kim,Otoda		2	2		○		○	○	○
10F067	Structural Stability	Sugiura, Kitane	2		2		○		○	○	○
10F068	Material and Structural System & Management	Kawano, Hattori, Yamamoto	2		2		○		○	○	○
10F011	Computational Fluid Dynamics	Ushijima, Gotoh, Khayyer, Toriu		2	2		○		○	○	○
10F261	Earthquake Engineering/Lifeline Engineering	Kiyono, Igarashi	2		2		○		○	○	○
10F100	Applied Hydrology	Hori, Sumi, Tanaka(Shige), Takemon, Tanaka(Ken), Kantoush	2		2		○		○	○	○
10F103	Case Studies Harmonizing Disaster Management and Environment Conservation	Takara, Nakagawa(Hajime), Mori, Sayama, Yamaguchi, Kanatoush	2		2		○		○	○	○
10F106	Integrated Disasters and Resources Management in Watersheds	Fujita, Hiraishi, Yoneyama, Kawaike, Takebayashi, Tsutsumi, Baba		2	2		○		○	○	○

Code	Subject	Teasher(s) in Charge	Hrs/Week		Credits	Course Specification				Available for	
			1st Semester	2nd Semester		Core subject	Major subject	ORT subject	Minor subject	Master course	Doctoral course
10K016	Computational Geotechnics	Uzuoka, Kimoto, Sawaamura		2	2		○		○	○	○
10F238	Geo-Risk Management	Ohtsu	2		2		○		○	○	○
10F405	Fundamental Geofront Engineering	Mimura, Kimura, Higo	2		2		○		○	○	○
10F203	Public Finance	Matsushima	2		2		○		○	○	○
10F223	Risk Management Theory	Cruz, Yokomatsu		2	2		○		○	○	○
10F439	Environmental Risk Analysis	Yoneda, Takano, Matsuda, Shimada, Matsui	2		2		○		○	○	○
10F441	Water Quality Engineering	Tanaka(Hiro), Nishimura, Hidaka, Nakada	2		2		○		○	○	○
10F234	Water Sanitary Engineering	Itoh, Echigo	2		2		○		○	○	○
10F454	Systems Approach on Sound Material Cycles Society	Sakai, Hirai	2		2		○		○	○	○
10F446	Atmospheric and Global Environmental Engineering, Adv.	Fujimori(Shin)	2		2		○		○	○	○
10A632	Urban Metabolism Engineering	Takaoka, Oshita, Fujimori(Taka)	2		2		○		○	○	○
10F456	New Environmental Engineering I, Advanced(Environmental Engineering for Asia)	Shimizu, Tanaka(Hiro), Fujii	2		2		○		○	○	○
10F458	New Environmental Engineering II, Advanced(Environmental Engineering for Asia)	Takaoka, Fujii, Ueda, Fujimori(Shin), Oshita		2	2		○		○	○	○
10F470	Advanced Enivironmental Engineering Lab.	Itoh, Yoneda, Takaoka, Echigo, Yasojima		2	2		○		○	○	○
10F113	Global Survivability Studies	Takara, Kiyono, Fujii, Sayama, Shimizu	2		2		○		○	○	○
10i049	Project Management in Engineering	Matsumoto, Ashida, Maeda, Yorozu, Kaneko, Lintuluoto,	2		2		○		○	○	○
10i059	Exercise on Project Management in Engineering	Yorozu, Maeda, Kaneko, Lintuluoto		2	2		○		○	○	○
	Research Paper(Master)	Assorted Instructors						○		Compulsory	
	Research Paper(Doctoral)	Assorted Instructors						○			Compulsory

Note:

1) All lectures are conducted in English. The outline of main subject is described in p.7-15 and the detail of each subject is shown in the website: http://www.t.kyoto-u.ac.jp/syllabus-gs/

2) Prepare the course plan of the subjects by the following procedure and submit the plan to your main supervisor to obtain their approval at school entry. Although the course plan can be modified when proceeding to the next grade, the approvals to the supervisor(s) must be obtained. The supervisor cannot modify the additional conditions.

3) The other subjects not included in the above table may be considered as corresponding and equivalent to minor subjects under the instruction of your supervisor(s). The Japanese classes are not approved credits for the accreditation.

4) (*)Subjects are custom-made. If you wish to take (*)subjects, you must submit an “Auditing Request Form for HSE Custom-made lecture” per subject to the C Cluster Office. The form is available at the C Cluster Office.

(5) Program Accreditation

Subject	Number of Credits Required for Completion	
	Master course	Doctoral Course
Core subject	4 or more	4 or more
Major subject	0 or more	0 or more
Minor subject	0 or more	0 or more
Seminar, ORT subject	10 or more	10 or more
Other subject	To be taken obtaining the approval of the supervisor as needed	
Total	30 or more	40 or more

Note:

1) 40 credits required for completion of this course includes 30 credits required for completion of the master course.
2) Students must get 2 credits of compulsory core subject “Human Security Engineering” during master course.
3) If you get more than 30 credits in master program, you can transfer extra credits (max 4 credits) to PhD program with application to administrative office at the beginning of PhD program.
4) Students who proceed to doctoral course must complete the master course and pass the entrance examination for doctoral course.
5) In order to complete this course, students must fulfill the number of credits required for each subject category and the total number of credits required for completion.

(6) Course Descriptions for Human Security Engineering Education Program

Please refer to the electric syllabus at "Syllabus 2014, Graduate School of Engineering Kyoto University" for detail information.

Human Security Engineering [Compulsory Core subject]

YONEDA Minoru, TACHIKAWA Yasuto, TANAKA Hiroaki, MATSUSHIMA Kakuya, TATANO Hirokazu , ASARI Misuzu.

Second semester: Wednesday, 16:30–18:00

This course will provide a comprehensive overview of human security engineering, a system of technologies for designing and managing cities that enable inhabitants to live under better public health conditions, and also to live free from potential threats of large-scale disasters and environmental destruction. The Millennium Development Goals will be evaluated from the viewpoints of four existing fields: urban governance, urban infrastructure management, health risk management, and disaster risk management. Furthermore, we will provide lectures that explore the relationships between the four existing fields.

Lectures on Urban Governance 1

Assorted Instructors

Custom-made Lecture

This class will cover the hot topics on urban governance within human security engineering. Instructors will present current literature and expect students to develop arguments.

Lectures on Urban Governance 2

Assorted Instructors

Custom-made Lecture

In this class, research topics related to urban governance within human security engineering will be assigned to students to enable them to solve human security problems. The students are required to review the latest or important fundamental papers, including related areas, and debate ideas with their teachers.

Urban Infrastructure Management [Core subject]

TACHIKAWA Yasuto and Assorted Instructors

First semester: Monday, 13:00–14:30

This course aims to provide interdisciplinary knowledge on how urban infrastructure is managed, not only from an economic perspective but also in accordance with human security engineering. The lectures will consist of the following topics: (1) Urban Infrastructure Asset Management, (2) Urban Environment Accounting System, (3) Urban Energy Supply Management, (4) Urban Food/Water Supply Management, and (5) Urban Transport/Logistics Management.

Lectures on Urban Infrastructure Management 1

Assorted Instructors

Custom-made Lecture

This class aims to deepen the understanding on urban infrastructure management, especially related to human security engineering. The class will present and discuss hot topics and related literatures on urban infrastructure management.

Lectures on Urban Infrastructure Management 2

Assorted Instructors

Custom-made Lecture

In this class, the Assorted Instructors will provide lectures on the current situation and future prospect of the challenges of urban infrastructure management related to urban human security engineering. The aim of this class is to develop advanced and practical research capability of the students. To achieve this, they will be assigned with research subjects and will present and discuss their findings.

Lecture on Environmental Risk Management Leader [Core subject]

FUJII Shigeo, SHIMIZU Yoshihisa, TANAKA Hiroaki

First semester: Thursday, 16:30–18:00

In this class, we will give lectures on the theories of risk analysis, risk identification, risk assessment, risk evaluation, and risk reduction for human health and ecology. The main purpose of this lecture is to provide the students with the basic knowledge required of environmental leaders who can solve environmental issues practically as they occur in developing countries. We will review several international environmental projects as case studies.

Lectures on Health Risk Management 1

Assorted Instructors

Custom-made Lecture

This class will provide an overview of health risk management, especially as they relate to human security engineering. The class will present and discuss the hot topics and related literatures on health risk management.

Lectures on Health Risk Management 2

Assorted Instructors

Custom-made Lecture

This class will provide lectures on the current situation and future challenges of human health risk management from the viewpoint of urban human security engineering. The aim of this class is to develop the student’s research capability. Students will be assigned academic and practical research subjects, and will then present and discuss their findings.

Management of Global Resources and Ecosystems

FUNAKAWA Shinya, SHIBATA Shozo, YAMASHITA Yo

First semester: Friday, 10:30–12:00

Natural resources can be recycled sustainably by maintaining the environment. Ecosystems can be kept healthy so that organisms can reproduce effectively. This class outlines the characteristics of material circulation in various ecosystems and the link mechanism between ecosystems. We will also consider methods for using natural resources in harmony with ecosystems, after reviewing examples of deteriorated ecosystems and their rehabilitation throughout the world.

Environmental Ethics and Environmental Education

Misuzu ASARI, Jane SINGER

First semester: Tuesday, 16:30–18:00

Ethical approaches and informed decision making are essential for solving environmental problems, especially to facilitate consensus building among conflicting stakeholders. This course covers prominent schools of thought in the field of environmental ethics, applied ethics in environmental stewardship, and basic principles of environmental education.

Disaster Risk Management [Core subject]

TATANO Hirokazu, YOKOMATSU Muneta

First semester: Wednesday, 14:45–16:15

Natural disasters have low frequencies but high impacts. It is very important to make an integrated risk management plan that consists of various countermeasures such as prevention, mitigation, transfer, and preparedness. This class will present economic approaches to natural disaster risk management and designing appropriate countermeasures.

Lectures on Disaster Risk Management 1

Assorted Instructors

Custom-made Lecture

This class aims provide an overview of disaster risk management, with an emphasis on human security problems. The class will present and discuss hot topics and related literatures on disaster risk management.

Lectures on Disaster Risk Management 2

Assorted Instructors

Custom-made Lecture

This class will provide lectures on the current situation and future challenges of disaster risk management from the viewpoint of urban human security engineering. The aim of this class is to develop advanced and practical research capability of the students. To achieve this, they will be assigned with research subjects and will present and discuss their findings.

Internship for Human Security Engineering

Contact your supervisor(s) to inquire

The internship aims to develop practical capabilities to secure urban human security, in addition to acquiring expert knowledge and the ability to develop new research fields by carrying out research activity related to human security engineering and presenting research results at international conferences. Specific examples include participating in internships domestically or abroad at companies or research institutes which conduct the operation of international projects, conducting field surveys, and attending academic conferences.

Advanced Capstone Project

Contact your supervisor(s) to inquire

This class aims to develop the abilities of international collaboration, field investigation, and on-site planning/problem solving through long-term investigation/research activities related to human security engineering with thorough hands-on policy in foreign countries. Specific examples include field research at overseas centers and participation in international projects overseas. As a rule, participants will stay in the field for 2 months or more.

Human Security Engineering Seminar A, B

In the style of seminar, each student is given a theme for research related to human security problem to be solved by engineering methods, and the understanding on such a problems will be deepen from a specialized viewpoint of each student. Each student will get individual guidance by the supervisor about the method of the study on the problem or the collection method of the related information. Reports and presentation will be assigned after discussion with the supervisor.

Infrastructural Structure Engineering

Structural engineering problems related to planning, design, construction and maintenance of the infrastructures are discussed. Topics concerning structural engineering and management are widelly taken up including latest advanced knowledge and technology, future view and/or international topics. Special lectures by extramural lecturers are carried out if necessary.

Hydraulic Engineering for Infrastructure Development and Management

This lecture picks up various water-related problems and provides their explanation and solution methodology related to hydrodynamic and hydrological infrastructure improvements, maintenance, disaster prevention against flood and damage of water environment, interweaving several leading-edge cases in the real world. Turbulent flow and CFD, sediment transport system and design/planning of hydraulic structure are described on the basis of the integrated management of river-and-coast systems with sediment control and these relationship with infrastructure improvement. Perspective from the viewpoint of public environmental infrastructure on water environment is presented.

Structural Stability

Fundamental concept of static and dynamic stability of large-scale structures such as bridges is to be introduced in addition to the way to keep/improve their safety and to evaluate their performance. Basic concept of structural stability and its application and technical subjects to improve safety will be lectured systematically. Furthermore, the practical solutions to the subjects are to be introduced to assure the safety of structures.

Material and Structural System & Management

With regard to the maintenance of concrete structures, the deterioration prediction procedures in material and structural properties are discussed based on durability and deterioration processes of concrete structures. Repair materials and methods are also introduced. Note: strengthening materials and methods are discussed in Concrete Structural Engineering, provided in the second semester. In the later half of this lecture, structures are focused as groups rather than an individual structure to understand the difference between asset management and maintenance. By taking into consideration the economic aspect and human resources aspect as well as the physical aspect, the flow of the asset management for structures' groups with view points of the life cycle cost and the budget is provided.

Computational Fluid Dynamics

Computational Fluid Dynamics (CFD) is largely developed according to the progress of computer technology in recent years. It is the powerful and effective technique to predict the various fluid phenomena, which show the complicated behaviors due to the non-linearity and other conditions. This course provides the dynamics of fluids and eddies as well as the discretization and numerical techniques, such as finite difference, finite volume and particle methods.

Earthquake Engineering/Lifeline Engineering

・Principles of seismic design of structures
・Seismic performance of concrete and steel structures
・Seimisc response contorl and seismic retrofit of structures

Applied Hydrology

Applied and integrated approach to the problems closely related to the water circulation system, such as floods, droughts, water contamination, ecological change, and social change is introduced mainly from the hydrological viewpoint with reference to water quantity, quality, ecological and socio-economic aspects. In the course, several actual water problems are taken up and solving process of each problem which comprises of problem-identification and formulation, impact assessment, countermeasures design and performance evaluation is learned through the lectures' description and also investigation and discussion among the students.

Case Studies Harmonizing Disaster Management and Environment Conservation

Environmental impacts by infrastructure for disaster prevention and mitigation are discussed. Introducing various examples of natural disasters, degradation of the environment, and harmonizing disaster management and environmental conservation in the world, this classroom carries on a dialogue about effective measures for reducing negative environmental impacts and serious disasters.

Integrated Disasters and Resources Management in Watersheds

Mechanism and countermeasures of sediment disasters, flood disasters, urban flood disasters and coastal disasters are explained. An integrated watershed management of these disasters and water/sediment resources is also introduced. This lecture will be open at Katsura Campus, Ujigawa Open Laboratory, Shirahama Oceanographic Observatory and Hodaka Sedimentation Observatory. Students attending this lecture must take one of the intensive experiment/field study courses offered in Ujigawa Open Laboratory and these observatories.

Computational Geotechnics

The course provides students with the numerical modeling of soils to predict the behavior such as consolidation and chemical transport in porous media. The course will cover reviews of the constitutive models of geomaterials, and the development of fully coupled finite element formulation for solid-fluid two phase materials. Students are required to develop a finite element code for solving boundary valueproblems. At the end of the term, students are required to give a presentation of the results.

Fundamental Geofront Engineering

This lecture aims to learn a practical knowledge associated with mechanical and hydraulic problems in rock masses to realize environment-friendly development of underground space through exercise in modelling and analytical study of rock mass.

Public Finance

The concept of public finance will be taught based upon the framework of Macro Economics.

Risk Management Theory

The aim of the class is to provide the basic knowledge of risk management methods for various types of risks such as natural disaster, environment and natural resources in urban and rural areas. Students will learn the decision making principle under risks in Economics and asset pricing methods in Financial Engineering as well as have exercises of application on public project problems.

Environmental Risk Analysis

Paying attention to the environment of children in particular, students themselves study, make presentation, and debate about the environmental risk. Students learn the backgound, the actual situation, and the theory

for quantitative risk analysis through practice of investigation and discusion by themselves.

Water Quality Engineering

・Water quality indexes, and evaluation and analysis of water pollution
・Water and wastewater treatment
・Evaluation and analysis of water pollution
・Resource recovery and system

Water Sanitary Engineering

The ultimate goal of this course is to understand "Sanitary Engineering" quantitatively. Students will learn methods to quantify chemical and microbial risk in drinking water and realize concept and methods of risk management and control.

Systems Approach on Sound Material Cycles Society

It has become a major political/ social issue to establish a Sound Material-Cycle Society in order to save the earth resources and energy and to preserve environmental conservation. This course mainly covers the following topics: 1) History, current status, and future prospect of waste issues and establishment of a sound material-cycles society. 2) Basic concepts and current conditions/ challenges of the following items: The Basic Law for Establishing the Material Cycles Society and the Basic Plan for accomplishing it; Containers and Packaging Recycling Law; Home Appliance Recycling Law; End-of-Life Vehicle Recycling Law and others. 3) Basic concept and application of material flow analysis and life cycle assessment; these tools are important to grasp the whole flow of each recycling, resource use, product consumption, recycle and disposal of waste electrical and electronic equipment, for which it is required to take Clean Cycle & Control concepts in relation to chemical substances. Along with above topics, source origin, behavior, and decomposition of persistent organic pollutants, which should be inevitably linked to the realization of a Sound Material-Cycle Society, will also be discussed in the class.

Atmospheric and Global Environmental Engineering, Adv.

The contents of the lecture are as follows. (1) History of Global Warming problem, Radiative forcing, Greenhouse gas emission, Carbon cycle, Mechanism of Climate Change, Mitigation measures, Social and Natural impact of Climate change (2) Mechanism of formation of Photochemical oxidant and Acid rain, Global scale transportation of atmospheric pollutants, Deposition and its impact of air pollutants, control measure of air pollution.

Urban Metabolism Engineering

Much energy and resources are consumed to maintain various activities in urban city. As the result, various environmental loads such as exhaust gas, wastewater and waste generate and should be reduced to levels natural environment can accept .To establish sustainable urban metabolism, concept, elements, control,

optimization and management of urban metabolism are explained.

1. Introduction 1 Concept of urban metabolism and its system are explained
2. Elements of urban metabolic system
3. Control, optimization and management of urban metabolic system and environmental equipment
4. Design of sewage treatment system in urban area
5. Feedback and summary

New Environmental Engineering I

SHIMIZU Yoshihisa, TANAKA Hiroaki, FUJII Shigeo

First semester: Monday, 16:30–18:00

This course provides various kinds of engineering issues related to the water environment in English, which cover fundamental knowledge, the latest technologies and regional application examples. These lectures, English presentations by students, and discussions enhance English capability and internationality of students.

The course is conducted in simultaneous distance-learning from Kyoto University, or from remote lecture stations in University of Malaya, and Tsinghua University of China. For the distance-learning, a hybrid system is used, which consists of prerecorded lecture VIDEO, VCS (Video conference system) and SS (slide sharing system).

New Environmental Engineering II

TAKAOKA Masaki, FUJII Shigeo, UEDA kayo, FUJIMORI Shinichiro, OSHITA Kazuyuki

Second semester: Monday, 16:30–18:00

This course provides various kinds of engineering issues related to atmospheric environment and solid wastes management in English, which cover fundamental knowledge, the latest technologies and regional application examples. These lectures, English presentations by students, and discussions enhance English capability and internationality of students. The course is conducted in simultaneous distance-learning from Kyoto University, or from remote lecture stations in University of Malaya, and Tsinghua University. For the distance-learning, a hybrid system is used, which consists of prerecorded lecture VIDEO, VCS (Video conference system) and SS (slide sharing system). The students are requested to give a short presentation in English in the end of the lecture course. This course may improve students' English skill and international senses through these lectures, presentations, and discussions.

Advanced Enivironmental Engineering Lab.

Analytical methods to characterize environmental samples are learnt through practical training including site visit to other research institute or analytical company. Also, integration of environmental information using GIS is also mastered.

Global Survivability Studies

・large-scale natural disasters

・unexpected human disasters and accidents

・regional environmental changes such as environmental degradation and infectious diseases

・issues regarding food security

Introduction to Advanced Material Science and Technology

Relay Lecture

1st term: Friday, 4th-5th

The various technologies used in the field of material science serve as bases for so-called "high technologies", and, in turn, the high technologies develop material science. These relate to each other very closely and contribute to the development of modern industries. In this class, recent progresses in material science are briefly introduced, along with selected current topics on new biomaterials, nuclear engineering materials, new metal materials and natural raw materials. The methods of material analysis and future developments in material science are also discussed.

Advanced Modern Science Technology

Relay Lecture

2nd term: Thu 5th

New materials are necessary for the advancement of high technologies, but in order to develop these new materials for practical applications, a number of problems must be solved. In this course, the problems encountered in the fields of chemical engineering, electrical / electronic engineering, mechanical engineering and civil engineering are discussed. Discussions are also held on natural resources, and how computers are being used in the development of new materials. Lectures are given in English.

(7) Example Course Plans

Course Specification	Code	Subject	First 2 years (Master course)		Latter 3 years (Doctoral course)	
			1st Semester	2nd Semester	1st Semester	2nd Semester
Compulsory Core subject	10X301	Human Security Engineering		2		
Core subject	10X311	Urban Infrastructure Management	2			
	10X321	Lectures on Environmental Risk Management Leader	2			
	10X333	Disaster Risk Management			2	
ORT subject	10X339	Internship for Human Security Engineering (Short)	2			
ORT subject	10X341	Advanced Capstone Project (Long)			8	
Compulsory ORT subject	10X351	Human Security Engineering Seminar A	4			
Compulsory ORT subject	10X352	Human Security Engineering Seminar B	4			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject			2			
Major/minor subject				2		
Major/minor subject				2		

Course Specification	Mater course	Doctoral course	Total
Core subject	4	2	**6**
ORT subject	10	8	**18**
Major/minor subject	22	0	**22**
total	36	10	**46**

(8) ORT subjects

"Internship for Human Security Engineering" (short-term internship: 2 credits) and "Advanced Capstone Projects" (long-term internship: 8 credits) are available for ORT subjects in HSE Program. To conduct each ORT subject, you would contact your supervisor(s) to inquire and make plans for internships with your supervisor's advice and suggestion.

1) Internship for Human Security Engineering

Internship for Human Security Engineering normally requires 2 weeks (practically 10 days) of on-site training or on-the-research training. Examples of these internship activities as follows:

(a) Presentation at international conference followed by information collection relevant to your doctoral research at laboratories of foreign universities and authorities.
(Including online conference or online research activities as an exception in the new coronavirus pandemic)
(b) Normal internship activities at private companies to study the state of the cutting-edge technologies or practical business.
(Including online internship as an exception in the new coronavirus pandemic)

2) Advanced Capstone Projects

Advanced Capstone Projects require more than 2 months (practically five-seventh 60days) on-site or research training.

Examples as follows:

(a) Fieldwork at overseas base for your doctoral research.
(b) Working as a visiting researcher at agencies/organizations related to Human Security Engineering.

NOTICE OF INTERNSHIP

1) Contact your supervisor and make plans for internship with your supervisor's advice.
Your internship needs your supervisor's approval.
2) Submit the Notice (HSE-004, or HSE-005) and the Internship Pledge (HSE-028) to HSE Center (kyomu_gcoe@hse.gcoe.kyoto-u.ac.jp) **before** starting an internship.
You could access our website (http://hse.gcoe.kyoto-u.ac.jp) and download these template files.
3) Submit the report on internship (Binding form: HSE-013/014 and Report form: HSE-015) to your supervisor and HSE Center **after completing all internships**.
You could access our website (http://hse.gcoe.kyoto-u.ac.jp) and download these template files.

- ✓ You can combine several internships into one. The total length of internships should sum up to 2 weeks or 2 months.
- ✓ As ORT subjects are all-year ones, you must register them at the beginning of the first semester and can get the credit at annual end-of-classes.
- ✓ Students who entered Kyoto Univ. in October can't register ORT subjects in October, but can start an internship. They should register ORT subjects next April.
- ✓ Students who want to extend internship to the next year should register internship subject at the beginning of the first semester once more.

(9) Portfolio

Kyoto University Human Security Engineering Education Program Portfolio (HSE-003) is submitted to your supervisor and used for the discussion and confirmation of your future course plan just with your supervisor.

Its only first page (with your supervisor's signature)(PDF file) is submitted to HSE Center (kyomu_gcoe@hse.gcoe.kyoto-u.ac.jp)

(10) Registration

Student can select the subjects from the table (page 2) (without (*) subjects) and register them on KULASIS (Kyoto University Student Affairs Information System) (https://student.iimc.kyoto-u.ac.jp/)
(See also http://www.z.k.kyoto-u.ac.jp/freshman-guide/kulasis)

If you wish to take (*)subjects (page 2), you must submit an "Auditing Request Form for HSE Custom-made lecture" per subject to the C Cluster Office. The form is available at the C Cluster Office.

(11) Contact

Education Coordinator of Human Security Engineering Education Program (HSE)
Associate Professor Yoko SHIMADA
C1-3-464, Katsura Campus C Cluster

Secretary of Human Security Engineering Education Program (HSE)
Chikako TOMISHIMA
C1-3-182, Katsura Campus C Cluster

E-mail: kyomu_gcoe@hse.gcoe.kyoto-u.ac.jp
Website: http://hse.gcoe.kyoto-u.ac.jp

Kyoto University Human Security Engineering Education Program Portfolio
（人間安全保障工学分野ポートフォリオ）

Date of Entrance 入学年月	Affiliation 所属専攻	Student ID 学生番号	Nationality 国籍
Entered in . .20			

Name 氏名	Laboratory 研究室名	Supervisor 主指導教員
	TEL (Ext.):	

Present address 現住所		TEL (Fixed)	
		TEL (Cell)	
		E-mail	

(1) Course Plan for the HSE Program（履修計画）

Core Specification	Subject Code 科目コード	Subject Name 科目名	Credits 単位数	Academic year 履修学年	Semester	
					1st	2nd
Compulsory Core Subject		Human Security Engineering （人間安全保障工学概論）	2	2020		○
Core Subject						
ORT						

Supervisor's signature _____
（主指導教員印またはサイン）

(2) Reason for application for the HSE Program

(3) Master course

①Master's research plan

Title _____

Research summary/plan

② Position of the master's research theme filled in this application in Human Security Engineering

③ HSE Program and Research Condition/Outcome

Fill out the subjects, which you have taken, and your master's research result/outcome (published papers etc.) in each semester.

2020 Second Semester

2021 First Semester

2021 Second Semester

2022 First Semester

(4) Doctoral course

①Doctoral research plan

Title _____

Research summary/plan

②Position of the doctoral research theme filled in this application in Human Security Engineering

③HSE Program and Research Condition/Outcome

Fill out the subjects, which you have taken, and your doctoral research result/outcome (published papers etc.) in each semester.

2022 Second Semester

2023 First Semester

2023 Second Semester

2024 First Semester

2024 Second Semester

2025 First Semester

（HSE-028）

誓　約　書

Internship Pledge

人間安全保障工学分野　分野長 殿

人間安全保障工学分野の講義の一環としてインターンシップあるいは研究調査のため海外渡航する場合は、出国から帰国までの期間中における事故・疾病等については、私自らの責任として対処することを誓約します。

平成　　年　　月　　日

（渡航者）

所　属　専　攻 ______________________________.

住　　　　　所 ______________________________.

氏　　　　　名 ______________________㊞______.

印またはサイン