

# International Joint Graduate Program in Resilience and Safety Studies

Tohoku University

2020 version  
20200407 updated

## 1. Master's Curricula 博士前期課程・修士課程

### (1) Core Foundation Subjects 基幹基礎科目

Term	Subject	Teacher in charge	Credits
Spring Fall	Basics of Disaster and Safety Sciences I, II 災害科学・安全学基礎 I, II	Prof. Tomoki Nakaya (Environment) and RSS Professors.	1+1

**Day/ Time/ Venue :** INTENSIVE. Details are to be announced later.

#### [Outline]

For creating advanced skills and building capacities needed to counter global issues, it is important to study fundamental topics relevant to disaster and safety, as well as agriculture, medical, culture and environmental sciences. In this foundation core subject, we give a lot of lectures from faculty members who belong to various departments in the international joint graduate program. How we manage and control such global and international issues will be learned and discussed from the aspects of sustainability and resilience. The lectures include the fundamentals and practical case studies related to international joint research and program on agriculture, medical, international cultural and environmental sciences.

Introduction: 1) About the international joint graduate program, 2) About the basics on disaster and safety sciences, and 3) About the sustainability and resilience.

Intensive lectures: Fundamentals and practical case studies on the program, from four departments of agriculture, medical, international cultural and environmental sciences.

There are two parts in spring and fall semesters (each 1 credit) by intensive course.

#### [Evaluation]

Attendance, Interactive mini post-report, Attitude in group work and/or debate.

**(2) Trans-disciplinary Subjects 学際基幹科目**

Term	Subject	Teacher in charge	Credits
Fall	Health Resilience in Aging Society 高齢化社会における健康レジリエンス	Prof. Shinichi Egawa (Prof. Kenichi Meguro) (Medicine)	2

**Day/ Time/ Venue** : Mon.17:15-18:45,4F of Seiryō Total Research Bldg(C12). Institute of Development, Aging and Cancer, Seiryō 星稜キャンパス加齢医学研究所 プロジェクト棟(C12) 4F

**[Outline]**

To understand the basic concept and scope of issues on social support for the health of aging population and health resilience, based on geriatric behavioral neurology.

Attainment Targets are to understand :

- Basic concept for behavioral neurology
- Basic concept for bio-psycho-social viewpoint and bioethics on the social support for elderly and health resilience
- Social support system and Quality of Life for the handicapped and elderly and health resilience
- Dementia and dementing diseases, not only for medical aspects, but also psycho-social and economic aspects and health resilience.

**[Content]**

- 9-Nov: Key concepts and actions related with Earthquake for the elderly, Local response following the Great East Japan Earthquake 2011 “The Get Ready Pyramid (Prof. Meguro)
- 16-Nov: Social problem and judgement, Judgement as a brain function (Prof. Meguro)
- 30-Nov: Main causes of requiring care and cognitive impairments, Relationships between physical dysfunctions and cognitive impairments in elderly people (Dr. Kasai) (Prof. Meguro)
- 7-Dec: End of life and decision making for elderly people, Decision making regarding treatment in the end of life care (Assist. Prof. Koto, Prof. Meguro)
- 14-Dec: Long - Term Care Insurance system in Japan, Background and concept, Care services and institutional care (Assist. Prof. Takada, Prof. Meguro)
- 21-Dec: Dignity and quality of life/ Historical perspectives (Dr. Nakatsuka)
- 18-Jan: Rehabilitation, exercise and preventive intervention for elderly (Assist. Prof. Kumai, Prof. Meguro)
- 25-Jan: Mindfulness (Prof. Meguro)
- 1-Feb: Geriatric medical care and psychiatry (Prof. Meguro)
- 8-Feb: Adequate amount of nutrition for the healthy life, protein, calories (Prof. Meguro)
- 15-Feb: Summary (Prof. Meguro)

**[Evaluation]**

Attendance and reports: Evaluation will be done at the end of term

Term	Subject	Teacher in charge	Credits
Fall	Health and Social Resilience for Large-Scale Disasters 巨大災害に対する健康と社会のレジリエンス	Prof. Shinichi EGAWA et al. (Medicine)	2
<p><b>Day / Time / Venue</b> : Wed. 17:15-18:45, School of Medicine, Seminar Room 2, Education and Research Foundation Building(B06) 2F, Seiryō 星稜キャンパス医学系研究科 教育研究基盤支援棟(B06) 2F 第2セミナー室</p>			
<p><b>[Outline]</b></p> <p>In disaster, many lives are in danger and huge amount of health crisis will threaten human security, i.e. freedom from fear, freedom from want and freedom of life with dignity. Sendai Framework for Disaster Risk Reduction 2015-2030 is the ongoing international framework. Sendai Framework focuses on “health” more than previous frameworks. Multi hazard approach and physical and mental health damage in disaster are key words. This course is aiming to clarify the current situation and gaps in medical and public health preparedness, response, recovery and reconstruction in disaster. The attainment target:</p> <ul style="list-style-type: none"> <li>• The participants will be able to;</li> <li>• Describe the difference of hazards and disasters.</li> <li>• Explain and use the common terminology of disaster medicine and public health.</li> <li>• Explain the health damage in disaster.</li> <li>• Describe about the SPHERE Project and Psychological First Aid (PFA).</li> <li>• Describe about the medical, public health and welfare response system in disaster.</li> <li>• Describe about the humanitarian aids in disaster and the roles of United Nation’s organizations including WHO.</li> <li>• Describes the current gaps between Sendai Framework and the realities.</li> <li>• Describe about the business continuity plan and the support receiving capacity of the hospital.</li> <li>• Describe about the relationship between disaster and radiation medicine, maternal and child health, public health, infectious disease, medical informatics and comprehensive health care.</li> <li>• Describe about the process of education and training of disaster medicine, public health and welfare</li> </ul> <p><b>[Content]</b></p> <ul style="list-style-type: none"> <li>● Oct. 7: Registration, Introduction, Learning process and Terminology (Prof. Egawa)</li> <li>● Oct. 14: The medical and public health response in Great East Japan Earthquake (Prof. Egawa)</li> <li>● Oct. 21: Disasters in Asia (Prof. Egawa)</li> <li>● Oct. 28: Nuclear and radiological disaster and medical response (Prof. Yoshio Hosoi)</li> <li>● Nov. 4: Sendai Framework for Disaster Risk Reduction (Prof. Egawa)</li> <li>● Nov. 11: Man-made disasters (Prof. Egawa)</li> <li>● Nov. 18: SPHERE Project and Psychological First Aid (Prof. Egawa)</li> <li>● Nov. 25: Business Continuity Plan of the Hospital (Prof. Egawa)</li> <li>● Dec. 2: Disaster and infectious disease. (Prof. Eiichi Kodama)</li> <li>● Dec. 9: Support receiving capacity. (Prof. Hiroyuki Sasaki)</li> <li>● Dec. 16: Disaster and mental health (Prof. Hiroaki Tomita)</li> <li>● Dec. 23: Disaster and public health (Prof. Shinichi Kuriyama)</li> <li>● Jan. 6: Disaster and comprehensive health care (Prof. Ken Osaka)</li> <li>● Jan. 13: Disaster and Medical Information (Prof. Susumu Fujii)</li> <li>● Jan. 20: Maternal and child health in disaster (Prof. Masatoshi Saito)</li> <li>● Jan 27: Prepared community HUG® (Prof. Egawa)</li> </ul> <p><b>[Evaluation]</b></p> <p>Attendance, Interactive mini post-test, Attitude in group work and/or debate.</p>			

Term	Subject	Teacher in charge	Credits
Spring	Human Security and Global Health ヒューマンセキュリティとグローバルヘルス	Prof. Shinichi Egawa, Prof. Hitoshi Oshitani et al. (Medicine)	2
<b>Day / Time / Venue</b> : Fri.16:20-17:50,Medicine, Education and Research Base Support Building 2 <sup>nd</sup> Floor, Seminar Room 2, Seiryō Campus. B06. 星稜キャンパス医学系研究科 第2セミナー室 (医学部教育研究支援棟2階)			
<p><b>[Outline]</b></p> <p>In order to realize the Human Security, i.e. freedom from fear, freedom from want and freedom to live with dignity, students will learn its general concept, history, the current situation and related frameworks and understand the current situation of global health, role of health cluster and discuss on the problem solution.</p> <p>The attainment target: The participants will be able to;</p> <ul style="list-style-type: none"> <li>• Describe the concept, history and related international frameworks of human security.</li> <li>• Explain and use the common terminology of human security and global health.</li> <li>• Find the problems that threaten health and human security, and plan the research projects for solution.</li> <li>• Describe the current situation and gaps of infectious disease, non-communicable disease, mother and child health, aging that global health is facing to.</li> <li>• Describe the cluster approach and the roles and coordination of clusters.</li> </ul> <p><b>[Content]</b></p> <ul style="list-style-type: none"> <li>• Introduction and guidance. General concept and the history of human security (Oshitani, Egawa)</li> <li>• Human security and global health governance 1 (Oshitani)</li> <li>• Human security and global health governance 2 (Oshitani)</li> <li>• Sustainable Development Goals 1 (Egawa)</li> <li>• Universal Health Coverage 1 (Egawa)</li> <li>• Universal Health Coverage 2 (Egawa)</li> <li>• Vulnerable population and human security (Egawa)</li> <li>• One Health. (Kamigaki)</li> <li>• HIV/AIDS and Human security (Tsuchiya)</li> <li>• Environmental health and human security (Akaike)</li> <li>• Global situation of non-communicable disease (Tsuchiya)</li> <li>• Working toward improving maternal and child health (Goto, FMU)</li> <li>• Sustainable Development Goals 2 (Egawa)</li> <li>• Infectious disease and human security (Kodama)</li> <li>• Nutrition and human security (Egawa)</li> </ul> <p><b>[Evaluation]</b></p> <p>Attendance, Interactive mini post-test, Attitude in group work and/or debate.</p>			

Term	Subject	Teacher in charge	Credits
Spring	International Development Studies 国際開発学	Prof. Katsuhito Fuyuki, Assoc. Prof. Nina Takashino and Assist. Prof. KEENI MINAKSHI (Agriculture)	2
<b>Day/ Time/ Venue</b> : Tue.14:40-16:10, Multidisciplinary Research Laboratory for Agricultural Science(K01) N212, Aobayama-New campus, 青葉山新キャンパス農学系総合研究棟 (K01) N212			
<p><b>[Outline]</b>  This subject is a seminar held in every spring semester. Main objective of this subject is to develop understanding of the agricultural transformation in developing Asia under the impacts of rapid economic growth, industrialization, urbanization, global warming, and globalization. We will study economic, agricultural, and rural development using textbooks. Every student is requested to give a presentation in the class once or twice per semester. When a student is appointed as a reporter, he or she must prepare a handout of report based on the assigned chapter of adopted textbook and its related papers. Students are expected to deepen their understanding on the difference of the social systems or institutions among countries and/or areas. Taking account into such diversified characteristics of economy and agriculture in developing Asian countries, students are expected to concert alternative models and policies as well as to review the general models and policies of development.</p> <p><b>[Evaluation]</b>  Presentation of textbook 50%, presentation of homework 30%, and discussion 20%</p>			

Term	Subject	Teacher in charge	Credits
Fall	Food Economics 食料経済学	Assoc Prof. Keiichi Ishii (Agriculture)	2
<b>Day / Time / Venue :</b> Tue. 14:40-16:10, Multidisciplinary Research Laboratory for Agricultural Science(K01) N212, Aobayama-New Campus 青葉山新キャンパス農学系総合研究棟 (K01) N212			
<p><b>[Outline]</b></p> <p>This course will examine problems concerning agricultural and food production and a variety of policy design from economic perspectives. Policy design for agricultural production and food security, structural change of food production and trends in food consumption, agricultural modernization and structural changes, policy issues on food safety and quality, agriculture and the environment are main topics. After the presentation on agriculture and food production in Japan and the discussion on related policy issues, we will share the current situation and problem of agriculture, food production and consumption in the countries of participants.</p> <p>Students will come to understand current situation and problems on agriculture and food sector in different countries through comparative approach.</p> <p><b>[Content]</b></p> <ol style="list-style-type: none"> <li>1) Introduction -Comparative approach for agricultural and food economy-</li> <li>2) Policy design for agricultural production and food security</li> <li>3) Structural change of food production and trends in food consumption</li> <li>4) Agricultural modernization and structural changes</li> <li>5) Agricultural policies in Japan after the World War 2</li> <li>6) Agricultural production and poverty reduction</li> <li>7) International trade in food and agricultural products</li> <li>8) Policy issues on food safety and quality</li> <li>9) Agriculture and the environment</li> <li>10) Food and agricultural issues and policies in the World - Presentations given by participants in the class 1 -</li> <li>11) Food and agricultural issues and policies in the World - Presentations given by participants in the class 2 -</li> <li>12) Food and agricultural issues and policies in the World - Presentations given by participants in the class 3 -</li> <li>13) Food and agricultural issues and policies in the World - Presentations given by participants in the class 4 -</li> <li>14) Food and agricultural issues and policies in the World - Presentations given by participants in the class 5 -</li> <li>15) Discussion and understanding from the viewpoint of comparative approach</li> </ol> <p><b>[Evaluation]</b></p> <p>Assessment will be based on; class attendance, presentations, in-class participation, and a term paper.</p>			

Term	Subject	Teacher in charge	Credits
Fall	Environmental Resilience and Sustainability 環境レジリエンスと持続可能性	Assoc. Prof. Toshiaki Aoki Assist. Prof. Kazuaki Okubo (Intl. Cultural Studies)	2
<b>Day / Time / Venue</b> : Fri. 10:30-12:00 International Cultural Studies(A08) 1F113, Kawauchi 川内キャンパス国際文化研究科棟(A08)1F 113講義室			
<p data-bbox="124 450 248 483"><b>[Outline]</b></p> <p data-bbox="124 495 1474 824">We are facing various regional issues, including environmental, economic, aging and declining population and others, associated with sustainable regional development. Applying systematic analytical methodologies is useful to address regional issues and ensure environmental resilience. This course covers methodologies for analyzing environmental and economic problems to support the design of a sustainable development plan. Students learn the basic techniques of mathematical modeling, including microeconomics, convex optimization, and other approaches. Application examples are drawn from transportation systems, regional development, environmental and resource management, and other elements.</p> <p data-bbox="124 846 261 880"><b>[Content]</b></p> <ol data-bbox="124 891 863 1641" style="list-style-type: none"> <li>1. Orientation</li> <li>2. Consumer behavior (1)</li> <li>3. Consumer behavior (2)</li> <li>4. Consumer behavior (3)</li> <li>5. Uncertainty</li> <li>6. Game Theory (1)</li> <li>7. Game Theory (2)</li> <li>8. Producer behavior (1)</li> <li>9. Producer behavior (2)</li> <li>10. Produce behavior (3)</li> <li>11. Perfect Competition</li> <li>12. General Equilibrium and Welfare</li> <li>13. Market Failure (1): Asymmetric Information</li> <li>14. Market Failure (2): Externalities and Public Goods</li> <li>15. Final Examination</li> </ol> <p data-bbox="124 1704 296 1738"><b>[Evaluation]</b></p> <p data-bbox="124 1749 1299 1821">Requirements for grading (other than attending lectures) are submitting reports and giving presentations.</p>			

Term	Subject	Teacher in charge	Credits
Spring	Global Governance and Safety グローバルガバナンスと安全	Prof. Tomoki OKAWARA (Intl. Cultural Studies)	2
<b>Day / Time / Venue :</b> Wed.13:00-14:30, International Cultural Studies(A08) 1F109, Kawauchi 川内キャンパス国際文化研究科棟(A08)1F 109講義室)			
<p><b>[Outline]</b>  Since 1990s, in particular, we have encountered global migration and diaspora movements. Global migration and diasporas cause nativism, rise of anti-immigration party in host countries, when host societies feel threatened by such people for the social security, labor markets, public budgets and so on. In this class, students will understand (1) the definition of global migration and diasporas, (2) global migration and diaspora crisis in the contemporary world from the basics by articles reading, critical reviews and group discussions, and then choose (3) case studies for this subject which they will submit them as their final report.</p> <p><b>[Content]</b></p> <ol style="list-style-type: none"> <li>1.Research studies of migration, refugees and diasporas 1</li> <li>2.Research studies of migration, refugees and diasporas 2</li> <li>3.Discussion</li> <li>4.The global migration crisis: the crisis defined 1</li> <li>5.The global migration crisis: the crisis defined 2</li> <li>6.The global migration crisis: the crisis defined 3</li> <li>7.Discussion</li> <li>8.International migration following environmental and geopolitical shocks 1</li> <li>9.International migration following environmental and geopolitical shocks 2</li> <li>10.International migration following environmental and geopolitical shocks 3</li> <li>11.Discussion</li> <li>12.Case studies 1</li> <li>13.Case studies 2</li> <li>14.Discussion</li> <li>15.General discussion</li> </ol> <p><b>[Evaluation]</b>  The final report (60%) and class participation (40%)</p>			



Term	Subject	Teacher in charge	Credits
Fall	Environmental Resilience and Energy Security 環境とエネルギーの安全保障問題	Prof. Jusen Asuka (Environment)	2
<b>Day / Time / Venue :</b> Tue.13:00-14:30, Kawakita Joint Building(A07),Kawauchi 川内キャンパス川北合同研究棟(A07)			
<p><b>[Outline]</b> On the one hand, there is a newly examined problem of environmental security, such as global warming, but on the other hand, traditional energy security and environmental problems still show its importance. This subject will examine the environmental/energy issues around the world from the socioeconomic perspectives. Lecture will be taken seminar form and positive participation of all students is expected. In the class, we discuss the challenges each country faces both to mitigate and to adopt to the problems. In addition, we try to understand that the idea of the security has changed over the course of time through the concrete examples in the world.</p> <p><b>[Content]</b> 1.Introduction ( Status quo of the energy and environment) 2.Introduction ( Status quo of the climate change) 3.Introduction ( Relationship between environment and energy) 4.Presentation by the student 5.Presentation by the student 6.Presentation by the student 7.Presentation by the student 8.Presentation by the student 9.Presentation by the student 10.Presentation by the student 11.Presentation by the student 12.Presentation by the student 13.Presentation by the student 14.Presentation by the student</p> <p><b>[Evaluation]</b> Presentation and participation to the discussion</p>			

Term	Subject	Teacher in Charge	Credits
Spring	Energy and Resource Resilience Strategies 国際資源エネルギー戦略論	Assoc. Prof, Gregory P. Trencher Assoc. Prof, Guido Grause (Environment)	2

**Day / Time / Venue** : Tue.8:50-10:20, Graduate School of Environmental Studies(J22)  
4F Lecture Room 1, Aobayama-New Campus 青葉山新キャンパス環境科学研究科本館(J22)4F講義室1

**[Outline]**

What should be done in order to attain a sustainable world? To achieve this it is essential that future leaders can grasp the current situation of energy and resources, and think about the outlook for the future with a global perspective. In this class students will learn to identify and systematically evaluate the advantages and disadvantages of the development and consumption of energy and resources such as fossil fuels, nuclear, hydrogen, energy recovery from waste, and the recycling of metals, plastic and other valuable materials in addition to emerging technologies.

**[Contents]**

Week 1: Sustainability and planetary boundaries  
Week 2: Footprints and resource depletion  
Week 3: Fossil fuels  
Week 4: Biotic resources and land use  
Week 5: Biopolymers  
Week 6: Abiotic resources  
Week 7: Circular economy I  
Week 8: Circular economy II  
Week 9: Coal electricity in Japan I  
Week 10: Coal electricity in Japan II  
Week 11: Activity: Mapping out lock-in in energy and socio-technical systems  
Week 12: Strategies to Diffuse Fuel Cell Vehicles in Japan  
Week 13: Strategies to Diffuse Fuel Cell Vehicles in California  
Week 14: Activity: Strategies to accelerate Fuel Cell Vehicle diffusion  
Week 15: Final presentation

**[Evaluation]**

Attendance - 20%, Final presentation - 40%, Group research report - 40%

Term	Subject	Teacher in Charge	Credits
Fall	Hydrology 水循環システム論	Assoc. Prof. Daisuke Komori Prof. So Kazama (Engineering)	2

**Day / Time / Venue :** Thu. 14:40-16:10, Graduate School of Environmental Studies(J22), 4F Lecture Room 2, Aobayama-New Campus, 青葉山新キャンパス環境科学研究科本館(J22)4F講義室2

**[Outline]**

Hydrology is the science, which deals with the waters of the earth, their occurrence, circulation and distribution on the planet, their physical and chemical properties and their interactions with the physical and biological environment, including their responses to human activity.

Hydrology is a subject of great importance for people and their environment. Practical applications of hydrology are found in such tasks as the design and operation of hydraulic structures, water supply, wastewater treatment and disposal, irrigation, drainage, hydropower generation, flood control, navigation, erosion and sediment control, salinity control, pollution abatement, recreational use of water, and fish and wildlife protection. Hydrology is further defined more strictly as the study of the hydrological cycle, that is, the endless circulation of water between the earth and its atmosphere.

This lecture focuses to study hydrology for analyzing the problems by changes in the distribution, circulation, or temperature of the earth's waters, and to provide guidance for the planning and management of watershed environment. Finally, we will have discussions about human security on watershed environment and water.

**[Contents]**

#01 Outline of course, Brief introduction

-- 1st part: Physical water processes --

#02 Atmospheric processes

#03 Rainfall and evapotranspiration

#04 Surface and subsurface flow

-- 2nd part: General water resources --

#05 Storage and dams

#06 Ecology and Water

#07 Watershed management

-- 3rd part: Social science aspect of water --

#08 Water Law (River Law in Japan) and water policy

#09 Watershed environment

#10 Virtual Water

#11 Water conflict

#12 World disasters and Human Security

-----  
#13 Final Presentation

#14 Final Presentation

#15 Final Presentation

**[Evaluation]**

2 assignments and presentation are evaluated for grade.

Term	Subject	Teacher in Charge	Credits
Fall	Disaster Control System 防災システム論	Prof. Fumihiko Imamura (Engineering)	2
<b>Day / Time / Venue :</b> *Currently being updated. Details are to be announced later. (At last year, it was held at Fri. 14:40-16:10, Civil Engineering and Architecture Education and Research Building 2F 203, Aobayama Campus)			
<p><b>[Outline]</b></p> <p>We will organize the circumstances, actualities and tasks of disaster prevention measures centering on natural disasters in our country and lecture on systems and disaster prevention information that respond to individual disaster events. In addition, we will introduce disaster size comparison, disaster statistics, disaster prevention map and so on, to build a practical disaster prevention system.</p> <p>Background of disaster prevention measures and reality / tasks</p> <p>Characteristics of natural disasters and countermeasures in our country - Natural environment and disasters, before hour · during · post hoc</p> <p>Disaster response system - initial structure, emergency response, restoration / reconstruction, self-help assistance aid</p> <p><b>[Contents]</b></p> <ol style="list-style-type: none"> <li>1. Introduction of Disaster Reduction System</li> <li>2. Natural disaster and countermeasure in Japan</li> <li>3. Earthquake and geo-disaster</li> <li>4. Tsunami and flood</li> <li>5. Soil and water disaster</li> <li>6. Disaster response system and plan</li> <li>7. Disaster information and transfer system</li> <li>8. Information and recognition</li> <li>9. Issues on disaster information</li> <li>10. Identification of each disaster</li> <li>11. DIG (Disaster Imagination Game) and community map for disaster prevention</li> <li>12. Main disasters in terms of information</li> <li>13. Presentation and discussion for each selected subject</li> </ol> <p><b>[Evaluation]</b></p> <p>Report and presentation, final examination</p>			

(3) International Practical 国際実践科目

Term	Subject	Teacher in charge	Credits
Spring Fall	Practical on Global Leader Development I , II グローバルリーダー実践演習 I , II	Prof. Tomoki Nakaya (Environment)	1+1

**Day / Time / Venue :** INTENSIVE, Details are to be announced later.

**[Outline]**

To achieve the skills and abilities of global leader in the various kinds of activities, practical experiences and the training are necessary through the active learning type lecture and discussion.

In this subject, students have to join the meetings in International Environmental Leadership Program (IELP) , which is the special program in Graduate School of Environmental Studies, for several times to discuss about the international and global issues, and manage the classes themselves for imaging the advanced society in near future.

We also provide lectures for the improvement of English writing ability by academic learning.

IELP meeting participation:

About the skill of international leadership,

About the basics on international collaborative research

About the sustainability of development. IELP meeting will be scheduled two or three times in a semester as an intensive style.

Special lectures: Invited speakers give some special lectures about fundamentals and practical case studies on the program and IELP.

Academic learning: Lectures relating to the skills of academic English writing.

This subject is composed of two parts in spring and fall semester as an intensive course. (1 credit each)

**[Evaluation]**

Attendance, Interactive mini post-test, Attitude in group work and/or debate.

**(4) Practicum 研修科目**

<b>Term</b>	<b>Subject</b>	<b>Teacher in charge</b>	<b>Credits</b>
Intensive	Disaster and Safety Science Master's Practicum 災害科学・安全学実践研修	RSS Professors	2

**Day / Time / Venue :** INTENSIVE, Details are to be announced later.

**[Outline]**

In this subject, students are to be dispatched to the Summer / Winter school, seminar, workshop or other activities organized by affiliated university of this program, and tackle with various projects through Problem-based Learning so that they can develop their own abilities of finding resolutions for the certain problems or hurdles confronted by.

One of the major objectives of this subject is to raise diversified international perspectives and developing students themselves through discussions, cooperation and friendly competitions with a lot of other students from different countries.

This subject has been designed as a sort of preliminary international activities before 6-month oversea research practicum, "Doctoral Seminar".

Students will participate in one of the activities held by affiliated Universities as below;

- UNU-EHS
- UNU-IAS, Harvard University
- Tsinghua University, KAIST or Pohang University of Science and Technology (as a part of "Regional Environment and Sustainable Development" (RESO) activities)
- Others

**[Evaluation]**

Attendance and Report.

## 2. Doctoral Curricula 医学履修課程・博士後期課程

### (1) Core Development Subject 基幹発展科目

Term	Subject	Teacher in charge	Credits
Intensive	Disaster and Safety Sciences Development Seminar 災害科学・安全学発展講義	Prof. Tomoki Nakaya (Environment) Prof Osamu Murao (IRIDeS)	2

**Day / Time / Venue** : INTENSIVE, Details are to be announced later.

#### [Outline]

Students participate in Summer School organized by APRU.

Students are expected to deepen their knowledge in Disaster and Safety Sciences, and acquire further practical experience through fieldwork activities.

<Summer School organized by APRU>

The Tohoku region was devastated by the Great East Japan Earthquake and Tsunami in 2011. Tohoku University has played an important role in the recovery from this disaster and has provided enormous support to the local government and communities. The experience and knowledge gained in the course of this work must be shared around the world and passed on to the next generation.

The Association of Pacific Rim Universities (APRU) is a network of 50 premier research universities from 16 economies around the Pacific Rim. The APRU and IRIDeS jointly initiated the Multi-Hazards (MH) Program in 2013 with the aims of harnessing the collective capabilities of APRU universities for cutting-edge research on disaster risk reduction (DRR) as well as contributing to international policy making processes on DRR. The Summer School is one of the key activities under the MH Program.

This summer school is designed to learn from the experience of the recovery efforts by local government, NGO as well as academia, and include the lectures not only from the natural science aspect but also the social science aspect to enable the participants to understand the diversified elements of disaster risk reduction (DRR). Nearly 40 students and faculty participate in the summer school from the APRU member universities and others every year.

The major objectives of the summer school are to:

- Understand the mechanism of the international DRR strategy
- Learn from the experience and recovery process from the 2011 Great East Japan Earthquake and Tsunami
- Learn from various DRR projects that have been implemented in the Tohoku region and overseas
- Discuss the role of science and technology as well as universities in the implementation of the Sendai Framework for Disaster Risk Reduction

#### [Evaluation]

Attendance and report.

**(2) Trans-disciplinary Development Subjects 学際発展科目**

Term	Subject	Teacher in charge	Credits
Fall	Advanced Lecture on Health Resilience in Aging Society 高齢化社会における健康レジリエンス特論	Prof. Shinichi Egawa (Prof. Kenichi Meguro) (Medicine)	2

**Day / Time / Venue :** Mon.17:15-18:45, 4F of Seiryō Total Research Bldg(C12). Institute of Development, Aging and Cancer, Seiryō 星稜キャンパス加齢医学研究所 プロジェクト棟(C12) 4F

**[Outline]**

To understand the basic concept and scope of issues on social support for the health of aging population and health resilience, based on geriatric behavioral neurology.

To plan a research agenda related to the human security and aging based on the topics provided.

The attainment target:

- To understand the basic concept for behavioral neurology
- To understand the basic concept for bio-psycho-social viewpoint and bioethics on the social support for elderly and health resilience
- To understand the social support system and Quality of Life for the handicapped and elderly and health resilience
- To understand the dementia and dementing diseases, not only for medical aspects, but also psycho-social and economic aspects and health resilience

**[Content]**

- 9-Nov: Key concepts and actions related with Earthquake for the elderly, Local response following the Great East Japan Earthquake 2011 “The Get Ready Pyramid (Prof. Meguro)
- 16-Nov: Social problem and judgement, Judgement as a brain function (Prof. Meguro)
- 30-Nov: Main causes of requiring care and cognitive impairments, Relationships between physical dysfunctions and cognitive impairments in elderly people (Dr. Kasai) (Prof. Meguro)
- 7-Dec: End of life and decision making for elderly people, Decision making regarding treatment in the end of life care (Assist. Prof. Koto, Prof. Meguro)
- 14-Dec: Long - Term Care Insurance system in Japan, Background and concept, Care services and institutional care (Assist. Prof. Takada, Prof. Meguro)
- 21-Dec: Dignity and quality of life/ Historical perspectives (Dr. Nakatsuka)
- 18-Jan: Rehabilitation, exercise and preventive intervention for elderly (Assist. Prof. Kumai, Prof. Meguro)
- 25-Jan: Mindfulness (Prof. Meguro)
- 1-Feb: Geriatric medical care and psychiatry (Prof. Meguro)
- 8-Feb: Adequate amount of nutrition for the healthy life, protein, calories (Prof. Meguro)
- 15-Feb: Summary (Prof. Meguro)

**[Evaluation]**

Attendance, reports and research agenda: Evaluation will be done at the end of term.



Term	Subject	Teacher in charge	Credits
Fall	Advanced Lecture on Health and Social Resilience for Large-Scale Disasters 巨大災害に対する健康と社会のレジリエンス特論	Prof. Shinichi EGAWA et al. (Medicine)	2

**Day / Time / Venue :** Wed. 17:15-18:45, School of Medicine, Seminar Room 2, Education and Research Foundation Building(B06) 2F, Seiryō  
星稜キャンパス医学系研究科 教育研究基盤支援棟(B06) 2F 第2セミナー室

### [Outline]

In disaster, many lives are in danger and huge amount of health crisis will threaten human security, i.e. freedom from fear, freedom from want and freedom of life with dignity. Sendai Framework for Disaster Risk Reduction 2015-2030 is the ongoing international framework. Sendai Framework focuses on “health” more than previous frameworks. Multi hazard approach and physical and mental health damage in disaster are key words. This course is aiming to clarify the current situation and gaps in medical and public health preparedness, response, recovery and reconstruction in disaster. To plan a research agenda related to the human security and disaster medicine based on the topics provided.

The attainment target:

The participants will be able to;

- Describe the difference of hazards and disasters.
- Explain and use the common terminology of disaster medicine and public health.
- Explain the health damage in disaster.
- Describe about the SPHERE Project and Psychological First Aid (PFA).
- Describe about the medical, public health and welfare response system in disaster.
- Describe about the humanitarian aids in disaster and the roles of United Nation’s organizations including WHO.
- Describes the current gaps between Sendai Framework and the realities.
- Describe about the business continuity plan and the support receiving capacity of the hospital.
- Describe about the relationship between disaster and radiation medicine, maternal and child health, public health, infectious disease, medical informatics and comprehensive health care.
- Describe about the process of education and training of disaster medicine, public health and welfare
- Identify the gaps and plan a scientific research agenda related with disaster medicine.

### [Content]

- Oct. 7: Registration, Introduction, Learning process and Terminology (Prof. Egawa)
- Oct. 14: The medical and public health response in Great East Japan Earthquake (Prof. Egawa)
- Oct. 21: Disasters in Asia (Prof. Egawa)
- Oct. 28: Nuclear and radiological disaster and medical response (Prof. Yoshio Hosoi)
- Nov. 4: Sendai Framework for Disaster Risk Reduction (Prof. Egawa)
- Nov. 11: Man-made disasters (Prof. Egawa)
- Nov. 18: SPHERE Project and Psychological First Aid (Prof. Egawa)
- Nov. 25: Business Continuity Plan of the Hospital (Prof. Egawa)
- Dec. 2: Disaster and infectious disease. (Prof. Eiichi Kodama)
- Dec. 9: Support receiving capacity. (Prof. Hiroyuki Sasaki)
- Dec. 16: Disaster and mental health (Prof. Hiroaki Tomita)
- Dec. 23: Disaster and public health (Prof. Shinichi Kuriyama)
- Jan. 6: Disaster and comprehensive health care (Prof. Ken Osaka)
- Jan. 13: Disaster and Medical Information (Prof. Susumu Fujii)
- Jan. 20: Maternal and child health in disaster (Prof. Masatoshi Saito)
- Jan 27: Prepared community HUG® (Prof. Egawa)

### [Evaluation]

Attendance, Interactive mini post-test, Attitude in group work and/or debate.

Research agenda at the end of the term. The format for agenda will be provided at the Introduction.

Term	Subject	Teacher in charge	Credits
Spring	Advanced Lecture on Human Security and Global Health ヒューマンセキュリティとグローバルヘルス特論	Prof. Shinichi Egawa, Prof. Hitoshi Oshitani et al. (Medicine)	2

**Day / Time / Venue :** Fri.16:20-17:50, Medicine, Education and Research Base Support Building 2nd Floor, Seminar Room 2, Seiryō Campus. B06. 星稜キャンパス医学系研究科 第2セミナー室 (医学部教育研究支援棟2階)

#### [Outline]

In order to realize the Human Security, i.e. freedom from fear, freedom from want and freedom to live with dignity, students will learn its general concept, history, the current situation and related frameworks and understand the current situation of global health, role of health cluster and discuss on the problem solution. To plan a research agenda related to the human security and global health based on the topics provided.

The attainment target:

The participants will be able to;

- Describe the concept, history and related international frameworks of human security.
- Explain and use the common terminology of human security and global health.
- Find the problems that threaten health and human security, and plan the research projects for solution.
- Describe the current situation and gaps of infectious disease, non-communicable disease, mother and child health, aging that global health is facing to.
- Describe the cluster approach and the roles and coordination of clusters.
- Identify the gaps and plan a scientific research agenda related with global health.

#### [Content]

- Introduction and guidance. General concept and the history of human security (Oshitani, Egawa)
- Human security and global health governance 1 (Oshitani)
- Human security and global health governance 2 (Oshitani)
- Sustainable Development Goals 1 (Egawa)
- Universal Health Coverage 1 (Egawa)
- Universal Health Coverage 2 (Egawa)
- Vulnerable population and human security (Egawa)
- One Health. (Kamigaki)
- HIV/AIDS and Human security (Tsuchiya)
- Environmental health and human security (Akaike)
- Global situation of non-communicable disease (Tsuchiya)
- Working toward improving maternal and child health (Goto, FMU)
- Sustainable Development Goals 2 (Egawa)
- Infectious disease and human security (Kodama)
- Nutrition and human security (Egawa)

#### [Evaluation]

Attendance, Interactive mini post-test, Attitude in group work and/or debate.

Research agenda (End of the term)

Term	Subject	Teacher in charge	Credits
Spring	Advanced Lecture on International Development Studies 応用国際開発学	Prof. Katsuhito Fuyuki, Assoc. Prof. Nina Takashino and Assist. Prof. KEENI MINAKSHI (Agriculture)	2
<b>Day / Time / Venue</b> : Tue.14:40-16:10, Multidisciplinary Research Laboratory for Agricultural Science(K01) N212, Aobayama-New campus, 青葉山新キャンパス農学系総合研究棟 (K01) N212			
<p><b>[Outline]</b></p> <p>Main objective of this subject is to understand some issues on international development and also learning methods of analysis on these issues. Every student is requested to give a presentation on international development in the class once or twice per semester. When a student is appointed as a reporter, he or she must prepare a handout of report based on his or her own research topics and their related papers. Every students must summarize existing studies on their own research topics to clarify importance of them. Therefore, please read recent papers on your own research topics. Presentation is welcomed to have use of slides written by, for instance, Power-point program.</p> <p><b>[Evaluation]</b></p> <p>Presentation of textbook 50%, presentation of homework 30%, and discussion 20%</p>			

Term	Subject	Teacher in charge	Credits
Fall	Advanced Lecture on Food Economics 応用食料経済学	Assoc Prof. Keiichi Ishii (Agriculture)	2

**Day / Time / Venue** : Tue. 14:40-16:10, Multidisciplinary Research Laboratory for Agricultural Science(K01) N212, Aobayama-New Campus 青葉山新キャンパス農学系総合研究棟 (K01) N212

**[Outline]**

This course will examine problems concerning agricultural and food production and a variety of policy design from economic perspectives. Policy design for agricultural production and food security, structural change of food production and trends in food consumption, agricultural modernization and structural changes, policy issues on food safety and quality, agriculture and the environment are main topics. After the presentation on agriculture and food production in Japan and the discussion on related policy issues, we will share the current situation and problem of agriculture, food production and consumption in the countries of participants.

A term paper will be also required.

**[Content]**

- 1) Introduction -Comparative approach for agricultural and food economy-
- 2) Policy design for agricultural production and food security
- 3) Structural change of food production and trends in food consumption
- 4) Agricultural modernization and structural changes
- 5) Agricultural policies in Japan after the World War 2
- 6) Agricultural production and poverty reduction
- 7) International trade in food and agricultural products
- 8) Policy issues on food safety and quality
- 9) Agriculture and the environment
- 10) Food and agricultural issues and policies in the World - Presentations given by participants in the class 1 -
- 11) Food and agricultural issues and policies in the World - Presentations given by participants in the class 2 -
- 12) Food and agricultural issues and policies in the World - Presentations given by participants in the class 3 -
- 13) Food and agricultural issues and policies in the World - Presentations given by participants in the class 4 -
- 14) Food and agricultural issues and policies in the World - Presentations given by participants in the class 5 -
- 15) Discussion and understanding from the viewpoint of comparative approach

**[Evaluation]**

Assessment will be based on; class attendance, presentations, in-class participation, and a term paper.

Term	Subject	Teacher in charge	Credits
Fall	Advanced Lecture on Environmental Resilience and Sustainability 環境レジリエンスと持続可能性特論	Assoc. Prof. Toshiaki Aoki Assist. Prof. Kazuaki Okubo (Intl. Cultural Studies)	2
<b>Day/ Time/ Venue</b> : Fri. 10:30-12:00, International Cultural Studies(A08) 1F113, Kawauchi 川内キャンパス国際文化研究科棟(A08)1F 113講義室			
<p><b>【Outline】</b> This course covers advanced mathematical modeling methodologies to help students analyze and understand various regional issues related to environmental resilience and sustainable development. Students learn the techniques of mathematical modeling for planning, including microeconomics, convex optimization, and other approaches through examples from transportation systems, regional development, environmental and resource management, and other elements.</p> <p><b>【Content】</b></p> <ol style="list-style-type: none"> <li>1. Orientation</li> <li>2. Consumer behavior (1)</li> <li>3. Consumer behavior (2)</li> <li>4. Consumer behavior (3)</li> <li>5. Uncertainty</li> <li>6. Game Theory (1)</li> <li>7. Game Theory (2)</li> <li>8. Producer behavior (1)</li> <li>9. Producer behavior (2)</li> <li>10. Produce behavior (3)</li> <li>11. Perfect Competition</li> <li>12. General Equilibrium and Welfare</li> <li>13. Market Failure (1): Asymmetric Information</li> <li>14. Market Failure (2): Externalities and Public Goods</li> <li>15. Final Examination</li> </ol> <p><b>【Evaluation】</b> Requirements for grading (other than attending lectures) are submitting reports and giving presentations.</p>			

Term	Subject	Teacher in charge	Credits
Spring	Advanced Lecture on Global Governance and Safety グローバルガバナンスと安全特論	Prof. Tomoki OKAWARA (Intl. Cultural Studies)	2
<b>Day / Time / Venue</b> : Wed.13:00-14:30,School of International Cultural Studies 1F Room 109 川内キャンパス国際文化研究科棟(A08)1F 109講義室			
<p data-bbox="113 456 1479 506"><b>[Outline]</b></p> <p data-bbox="113 506 1479 831">Since 1990s, in particular, we have encountered global migration and diaspora movements. Global migration and diasporas cause nativism, rise of anti-immigration party in host countries, when host societies feel threatened by such people for the social security, labor markets, public budgets and so on. In this class, students will understand (1) the definition of global migration and diasporas, (2) global migration and diaspora crisis in the contemporary world from the basics by articles reading, critical reviews and group discussions, and then choose (3) case studies for this subject which they will submit them as their final report. Global migration and human security are to be considered.</p> <p data-bbox="113 898 1479 947"><b>[Content]</b></p> <ol data-bbox="113 947 1479 1850" style="list-style-type: none"> <li>1.Research studies of migration, refugees and diasporas 1</li> <li>2.Research studies of migration, refugees and diasporas 2</li> <li>3.Discussion</li> <li>4.The global migration crisis: the crisis defined 1</li> <li>5.The global migration crisis: the crisis defined 2</li> <li>6.The global migration crisis: the crisis defined 3</li> <li>7.Discussion</li> <li>8.International migration following environmental and geopolitical shocks 1</li> <li>9.International migration following environmental and geopolitical shocks 2</li> <li>10.International migration following environmental and geopolitical shocks 3</li> <li>11.Discussion</li> <li>12.Case studies 1</li> <li>13.Case studies 2</li> <li>14.Discussion</li> <li>15.General discussion</li> </ol> <p data-bbox="113 1917 1479 1966"><b>【Evaluation】</b></p> <p data-bbox="113 1966 1479 2047">The final report (60%) and class participation (40%)</p>			

Term	Subject	Teacher in charge	Credits
Fall	Advanced Lecture on Environmental Resilience and Energy Security 環境とエネルギーの安全保障問題特論	Prof. Jusen Asuka (Environment)	2
<b>Day / Time / Venue :</b> Tue.13:00-14:30, Kawakita Joint Building(A07),Kawauchi 川内キャンパス川北合同研究棟(A07)			
<p data-bbox="124 510 252 544"><b>[Outline]</b></p> <p data-bbox="124 555 1471 880">On the one hand, there is a newly examined problem of environmental security, such as global warming, but on the other hand, traditional energy security and environmental problems still show its importance. This subject will examine the environmental/energy issues around the world from the socioeconomic perspectives. Lecture will be taken seminar form and positive participation of all students is expected. In the class, we discuss the challenges each country faces both to mitigate and to adopt to the problems. In addition, we try to understand that the idea of the security has changed over the course of time through the concrete examples in the world.</p> <p data-bbox="124 925 260 958"><b>[Content]</b></p> <ol data-bbox="124 969 954 1686" style="list-style-type: none"> <li>1.Introduction ( Status quo of the energy and environment)</li> <li>2.Introduction ( Status quo of the climate change)</li> <li>3.Introduction ( Relationship between environment and energy)</li> <li>4.Presentation by the student</li> <li>5.Presentation by the student</li> <li>6.Presentation by the student</li> <li>7.Presentation by the student</li> <li>8.Presentation by the student</li> <li>9.Presentation by the student</li> <li>10.Presentation by the student</li> <li>11.Presentation by the student</li> <li>12.Presentation by the student</li> <li>13.Presentation by the student</li> <li>14.Presentation by the student</li> </ol> <p data-bbox="124 1720 300 1753"><b>[Evaluation]</b></p> <p data-bbox="124 1765 754 1798">Presentation and participation to the discussion.</p>			

Term	Subject	Teacher in Charge	Credits
Spring	Advanced Lecture on Energy and Resource Resilience Strategies 国際資源エネルギー戦略論特論	Assoc. Prof, Gregory P. Trencher Assoc. Prof, Guido Grause (Environment)	2
<b>Day / Time / Venue</b> : Spring Tue.8:50-10:20, Graduate School of Environmental Studies(J22) 4F Lecture Room 1, Aobayama-New Campus 青葉山新キャンパス環境科学研究科本館(J22)4F講義室1			
<p><b>[Outline]</b></p> <p>What should be done in order to attain a sustainable world? To achieve this it is essential that future leaders can grasp the current situation of energy and resources, and think about the outlook for the future with a global perspective. In this class advanced class, doctoral students will integrate their research skills to identify and systematically evaluate the advantages and disadvantages of the development and consumption of energy and resources such as fossil fuels, nuclear, hydrogen, energy recovery from waste, and the recycling of metals, plastic and other valuable materials in addition to emerging technologies. Assessments will include an oral presentation and a research document.</p> <p><b>[Contents]</b></p> <p>Week 1: Sustainability and planetary boundaries  Week 2: Footprints and resource depletion  Week 3: Fossil fuels  Week 4: Biotic resources and land use  Week 5: Biopolymers  Week 6: Abiotic resources  Week 7: Circular economy I  Week 8: Circular economy II  Week 9: Coal electricity in Japan I  Week 10: Coal electricity in Japan II  Week 11: Activity: Mapping out lock-in in energy and socio-technical systems  Week 12: Strategies to Diffuse Fuel Cell Vehicles in Japan  Week 13: Strategies to Diffuse Fuel Cell Vehicles in California  Week 14: Activity: Strategies to accelerate Fuel Cell Vehicle diffusion  Week 15: Final presentation</p> <p><b>[Evaluation]</b></p> <p>Attendance - 20%, Final presentation - 40%, Group research report - 40%</p>			



Term	Subject	Teacher in Charge	Credits
Fall	Advanced Lecture on Hydrology 水循環システム論特論	Prof. So Kazama Assoc.Prof. Daisuke Komori (Engineering)	2

**Day / Time / Venue :** Thu. 14:40-16:10, Graduate School of Environmental Studies(J22), 4F Lecture Room 2, Aobayama-New Campus, 青葉山新キャンパス環境科学研究科本館(J22)4F講義室2

#### [Outline]

This course is for deepening your knowledge on water resources with some examples and requests some literature reviews, field surveys, lab experiments, building program codes and so forth for sensing hydrological processes. These practices are carried out with teachers in charge of this course selecting some problems relating with your dissertation as possible because water is highly related with disasters, environments, and human activities.

Grades are estimated by attendance, quizzes, and examinations (incl reports and essays). Hydrology requires daily experiences of water both in and outside the classroom. These experiences will be the preparation of this class and be helpful for understanding of hydrology and water resources.

#### [Contents]

#01 Outline of course, Brief introduction

-- 1st part: Physical water processes --

#02 Atmospheric processes

#03 Rainfall and evapotranspiration

#04 Surface and subsurface flow

-- 2nd part: General water resources --

#05 Storage and dams

#06 Ecology and Water

#07 Watershed management

-- 3rd part: Social science aspect of water --

#08 Water Law (River Law in Japan) and water policy

#09 Watershed environment

#10 Virtual Water

#11 Water conflict

#12 World disasters and Human Security

-----  
#13 Final Presentation

#14 Final Presentation

#15 Final Presentation

#### [Evaluation]

2 assignments and presentation are evaluated for grade.

Term	Subject	Teacher in Charge	Credits
Spring	Advanced Lecture on Disaster Control System 防災システム論特論	Prof. Fumihiko Imamura (Engineering)	2

**Day / Time / Venue :** INTENSIVE(Summer). Details are to be announced later.

**[Outline]**

It aims to acquire basic skills to conduct leading-edge research and master application skills. The contents and trends of research in this field are taken up, lectures are given on the outline, basic theory and subjects, and lectures Understanding the rationality of research and the importance of ingenuity through research and tasks so that a research plan based on the point pointing orientation can be established.

**[Evaluation]**

Report and presentation

**(3) Practicum**

<b>Term</b>	<b>Subject</b>	<b>Teacher in charge</b>	<b>Credits</b>
Intensive	Doctoral Seminar 博士海外研修	RSS Professors	8

**Day / Time / Venue :**

**[Outline]**

It is essential for doctoral students to take doctoral seminar as an overseas joint research and study. The duration of this seminar is more than 6 months that can be all right as summation for several times. Students join the doctoral seminar at the affiliated Universities in the program and communicate with the supervisor and the research supervisor in actual place overseas. The result of this doctoral seminar has to be reported and presented after completing the seminar.

Through long term stay abroad researching with fellows and supervisors, we expect students to acquire, develop and radicate essential practical abilities of being a researcher on the world.

To develop further diversified international perspectives

To improve the ability to disseminate research outcomes

To deepen face to face cooperation and collaboration skills with various people.

A part of expenses in overseas joint research can be supported in this program.