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Tohoku University,
Integration of Knowledge
To Build a Society Based
on Advanced Safety and Security



**Inter-Graduate School
Doctoral Degree Program
on Science for Global Safety,
Tohoku University**



Developing global leaders who will open up new horizons

President of Tohoku University

Susumu Satomi

Upon taking office as President in April 2012, I set the two goals of “achieving world-class status and leaping ahead” and “leading the restoration of Tohoku and Japan,” and have been committed to promoting human resources development, education and research, and so forth.

The Inter-Graduate School Doctoral Degree Program on Science for Global Safety is a crucial program for achieving our goal of leading the restoration of Tohoku and Japan, as well as for developing human resources capable of playing a leadership role globally. I am determined to extend all-out support to the program, in conjunction with the International Research Institute of Disaster Science (IRIDeS), the first new research institute established for 70 years.

The program aims to develop global leaders who will boldly tackle challenges and open up new horizons. Tohoku University positions it as the most important among the initiatives that it has launched in relation to human resources development.

This is a wide-scale, multidisciplinary doctoral program, contributing to 18 majors in 10 departments, including the Graduate School of Engineering, the Graduate School of Science, the Graduate School of Arts and Letters, and the International Research Institute of Disaster Science. An interdisciplinary doctoral program in which so many departments are involved is an unprecedented educational attempt for us, and we consider this program to be a major driver of our reform of graduate school education. We will devote our utmost efforts to its success.

I sincerely expect those who have been admitted to this program to grow into global leaders who will “achieve world-class status and leap ahead” and “lead the restoration of Tohoku and Japan,” through their learning and research.

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Position and system of this graduate school program

Research in disaster prevention science starts from knowing the mechanisms of diverse risks

Program Director, Executive Vice President,
(Education, Student Support and International Exchange)

Kimio Hanawa



This program is based on the principles of Tohoku University: “Research First,” “Open Doors,” and “Practice-Oriented Research and Education,” for the purpose of developing human resources capable of leading the restoration of Tohoku and the regeneration of Japan.

On December 1, 2012, we established the Organization for Promotion of Graduate School Leadership Programs, Tohoku University, which includes a university-wide quality assurance system for the program. Its three major roles are: providing various integrated or individual means of support; selecting students enrolled in the leadership program courses; and certifying completion of the program for those who are distinguished from regular graduate-school students.

To enrich the quality of the program, all the educational resources that Tohoku University has organized will be fully utilized. For example, in cooperation with our Innovative Leaders Platform (ILP), program students are provided access to Advanced Technology Management Academy classes to support their career paths. Similarly, students are also allowed to attend designated classes of the Institute for International Advanced Research and Education.

This program constitutes a five-year curriculum covering both the master’ s and doctoral courses. Upon completion of the program, in addition to the degree of the graduate school to which each student belongs, a special degree certifying completion of the Inter-Graduate School Doctoral Degree Program on Science for Global Safety will be granted.

Moreover, this program is unique in that the Qualifying Examination (QE) may be used to fulfill the requirements of the master’ s degree after completion of the master’ s course, instead of submitting a master’ s thesis or research achievements on a specific subject for review and completing other examinations.

A program focusing on safety science is launched as the first of the leadership programs, and we aim to develop a system for the integrated operation of several programs in the future.

In addition to planning, implementing, and supporting the programs adopted by MEXT (Ministry of Education, Culture, Sports, Science and Technology - JAPAN), the Organization for the Promotion of Graduate School Leadership Programs will promote inter-graduate school education through our new doctoral programs and take leadership in reforming graduate education in Tohoku University. Our goal is to develop human resources capable of addressing the problems that face modern society from a panoramic viewpoint, beyond disciplinary boundaries and with creativity, who will become global leaders working actively in all areas of industry, academia, and government.



Inter-Graduate School Doctoral Degree

Cultivation of leaders of Science for Global Safety Protection of human life and society from global disaster

The Great East Japan Earthquake and the ensuing tsunami caused immense damage to Tohoku district regionally, socially and globally. Long-term restoration will be necessary. The social and industrial infrastructures of the affected area have not yet recovered substantially. Furthermore, a policies for the great transformation of energy, including the resumption of nuclear power plants, needs serious discussion. This program is a human resource cultivation program with continuing education through the first and second semesters of the doctoral course. Arts and sciences students who are enrolled in the graduate leadership program are educated in a team beyond the framework of their departments. We aim to produce global safety leaders who can contribute to the protection of human life, society and industry from global disasters like the Great East Japan Earthquake and tsunami, to play important roles in diverse fields, including world enterprises, international institutions and academia.



▲ Field study at the Great East Japan Earthquake site

Image of human resources to be cultivated Leaders with a sophisticated understanding of human studies and clear vision

The Great East Japan Earthquake identified a lack of societal consensus for disaster prevention means and a lack of crisis-management abilities at leadership level. With this program, we aim to produce top leaders in the global safety field who have a sophisticated understanding of international human studies, ethical viewpoints, definite vision, and the ability to execute their own ideas based on solid knowledge incorporation academia, and who are capable of coping with diverse phenomena, such as the huge earthquakes and tsunamis faced by Japan, along with climate changes, and energy issues.

Arts and sciences fusion education with participation by many departments Education led by the International Research Institute of Disaster Science (IRIDeS)

A feature of this program, and the goal of the newly established International Disaster Science Research Institute, is that interdisciplinary and advanced educational research is used to teach "Practical disaster prevention." Cultivation of human resources is performed through activities at disaster restoration sites and worldwide research, with participation by the International Disaster Science Research Institute, engineering research institutes, science research institutes, literature research institutes, and the like. Furthermore, the human resources produced include those who can cope with climate change issues, which is a theme common to human society, and who can cope with the problems associated with huge systems such as reactors, and educators and professionals who can contribute to the resolution of worldwide energy security issues.



▶ To develop top leaders of science global safety by arts and sciences fusion type education with participation by 10 departments and 18 specialties.

Program on Science for Global Safety

Education to "understanding", "creating" and "living in" safety and security Aiming at cultivation of all-round human resources called "Konpeito" model

In this program, education is provided by cooperation with researchers of science, technology and humanities and social science. The three courses of "Natural disaster science," "Safety and security engineering" and "Human science" create all-round players by equipping human resources with the following capabilities.



- A core of professional capability through honed research and applied capability for the resolution of diverse tasks.
- The ability to set and follow independent paths for task setting, problem resolution, research and development, business development, grand design, and the like.
- The ability to provide oversight, to prioritize events and to convey their own ideas accurately to others.
- The ability to develop leadership qualities in the international scene.
- Ethical views, showing leadership responsibilities.

▲ Cultivation of "hexagonal" human resources with diverse capabilities of expertise, development capability in various fields and functions necessary to support leadership.

Studying in the Center for Education and Research on Science for Global Safety as a unit beyond research courses

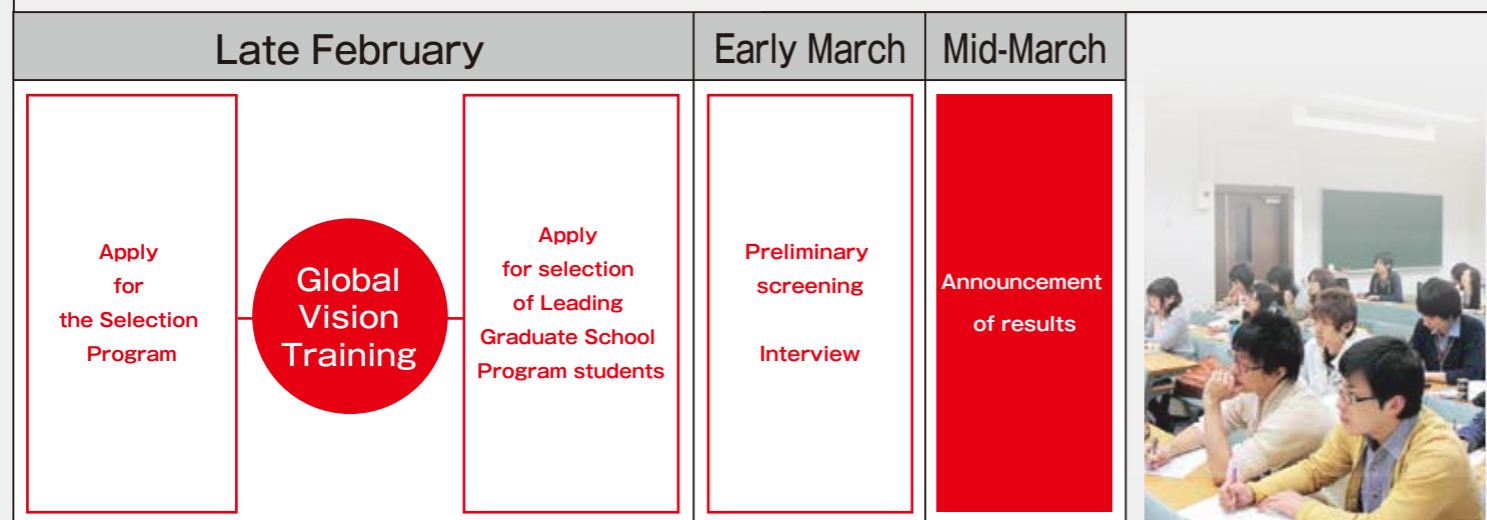
Those allowed to join the graduate school leadership program will grow to become leaders while trying to improve by learning from different field students in the Convergence Laboratory.

In this center, teaching staff from a cross-section of departments and specialties (including those from industry and government) belonging to one of three units of "Understanding Safety and Security," "Creating Safety and Security," or "Living in Safety and Security," will instruct the cross-sectional study team in the "Convergence Lab," which is formed mainly by students under the plurality of mentor systems.



How to become a Leading Graduate School Program student

Students' Voice



Shuji Yamada
M1
Humane Studies, Graduate School of Arts and Letters

Being a graduate school leadership program student in philosophy, I still often find that my fundamental way of thinking is different from that of students from other fields. I feel that filling such gaps from other fields is the biggest task and also the greatest attraction to me.

Ryuichi Kobayashi
M2
Mechanical Systems and Design, Graduate School of Engineering

Because I have just joined the Graduate School Leadership Program, I am still somewhat confused! But I can feel that this is a fantastic environment in which to start new things. I will actively try many things and make my remaining time as a graduate student fruitful.

Yasuhiro Yanagida
M1
Earth Science, Graduate School of Science

It has only been six months since the Graduate School Leadership Program started. During this short period, I have joined many training sessions and classes that I could not have experienced if I had simply been in the Graduate School of Science. I feel that exchanges with students in other research and academic fields have brought me great benefits.

What is the Leading Graduate School Program?

Aiming to develop leaders in science for global safety, in response to demands for a safe and secure society



Program Coordinator,
Graduate School of Engineering, Tohoku University

Prof. Hiroo Yugami

Leaders capable of acting globally are needed

The Great East Japan Earthquake was an unprecedented disaster with global impact. The earthquake, which was the greatest on record, and the subsequent tsunamis caused enormous damage to the Tohoku area. Two years have now passed, but the social and industrial infrastructures in the affected areas have not yet been fully restored. In addition, the associated accidents that occurred at the nuclear power plants have prompted the need for a dynamic change in Japan's energy policies and for discussions on restarting the plants.

The Great East Japan Earthquake is a disaster with a prolonged impact, causing extended instability in social, industrial, and economic activities, including infrastructures and supply chains. It is not an exaggeration to say that we are at a turning point that will determine the future of Japan. In this critical situation, Japan needs true leaders.

So, what qualities should the new leaders of Japan have? While the globalization of economies and the informalization of society are accelerating, leaders who can play active roles in the world have not truly been developed in Japan. Doctoral personnel who are ready to work in industry with a broad perspective and a humane outlook are in demand today. Traditionally, in Japan, the abilities to coordinate others well and to maintain harmony in an organization have been highly valued. But as social structures change, such abilities alone are not enough to make them function appropriately. This was revealed by the Great East Japan Earthquake and the accident at the Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station. As the world is becoming increasingly globalized, what we crucially need are leaders who are capable of articulating a vision and direction for the future, and showing us the paths to achieve them.

To enable students to have a vision for the future

In conventional doctoral courses in Japan, students are allocated to a laboratory, where they engage in their research under the instruction of a single professor. Although this system has many advantages, there is also a concern that students may be strongly influenced by the instructing professor, which may narrow their range of interest. This project, therefore, creates an environment in which students and professors can influence each other in multidisciplinary teams comprising professors from different fields. By having the students actively learn about fields other than their own specialized field, the program aims to cultivate their ability to see things from a panoramic perspective. Before screening for admission to this program, there is a Selection Program. The purpose of the Selection Program is to have the applicants understand the core concepts and ideas of the Leadership Program in advance. What is a

global leader like? What kind of person are you? And what do you want to be like five years or ten years from now? This program aims to help students draw a clear vision for the future and to confirm their intention to work globally.

The curriculum focuses on three viewpoints: "Understanding," "Creating," "Living in."

Our "science for global safety" program is an academic attempt to organize systematically various studies regarding safety, which have developed within different specialized domains, according to their spatial, temporal and social aspects from a global perspective, placing disaster prevention/mitigation for natural disasters and other risks as the central pillars.

This program is based on the three viewpoints of "Understanding safety and security," "Creating safety and security," and "Living in safety and security," supported by collaborations among researchers in science, engineering, and humanities and social sciences. These three viewpoints are crucial for building a safe society. What happened? Why did it happen? How can we prevent or control it? For example, how does the safety system in the Shinkansen bullet trains function? The Shinkansen is equipped with a system that detects seismic waves in advance and stops the train automatically. This is a result of "understanding" the mechanism of an earthquake and "creating" the technology to halt operations. Can the presence of this system alone ensure its smooth operation and make people feel secure? Whether a person feels secure or not depends on the judgment of that person. Technologies developed by engineers alone cannot make people feel secure. The knowledge to make use of such technologies in human living is necessary. Focusing on the three viewpoints of "Understanding," "Creating," and "Living in," this project aims to develop human resources that will contribute to establishing a safe and secure society. Specifically, in the three core domains of natural science (earth and planetary science, environmental studies, etc.), engineering (civil engineering, architecture and building science, mechanical engineering, etc.) and the fields of philosophy, psychology, and ethics, as well as the fields covering different core domains, we are promoting multidisciplinary education integrating science and technology centered around human beings. It is a unique advantage of the Leadership Program students that they are able to take courses in different fields while having a core specialized field. The curriculum is designed to allow even students with non-science majors to study scientific subjects comfortably.

Education with involvement of the International Research Institute of Disaster Science (IRIDeS)

The International Research Institute of Disaster Science (IRIDeS) conducts the world's leading-edge research on tsunami prevention, tsunami engineering, volcanic eruption prevention, eruption prediction, earthquake observation, earthquake prediction, active faults, abnormal weather, and hazard-resistant construction. In collaboration with the researchers engaging in these research activities, the program offers lectures/seminars regarding disaster prevention and field studies concerning natural disasters, to provide students with opportunities to obtain in-depth knowledge and experience about natural disasters and disaster prevention. This program enables students specializing in mechanical engineering or social science to have experience in the fields of natural disasters or disaster prevention, which is impossible in their regular curriculums.

Having experienced the Great East Japan Earthquake, it is the mission of Tohoku University to build a safe and secure society. We believe that developing human resources to become global leaders working for restoration from the disaster will result in a great contribution to the region.

This program invites students who are interested not only in academia but also in various businesses and international organizations, who are willing to learn about different fields, and who want to have exchanges with students in diverse fields. Join us to become a global leader capable of working to build a safe and secure society.



Understanding Safety and Security

Research in disaster prevention science starts from knowing the mechanisms of diverse risks

The first action that we should take regarding a natural disaster is to “understand” the disaster. Natural disasters that may occur on the Earth are roughly classified into meteorological disasters, which are caused by atmospheric phenomena, and seismic and volcanic disasters, which result from the earth’s internal movements. There are also disasters caused by extraterrestrial movements such as meteorite collisions. For each type of disaster, we examine what caused it, how it occurred, in what areas, what damage it brought about, and so on. Based on the findings and knowledge obtained in such examinations, we can then reconstruct technologies for disaster prevention/mitigation. For example, by what mechanism does an earthquake-created tsunami occur? It was discovered that the crustal deformation caused by the movement of an intraplate fault influences the seawater above, generating water waves. It is known that the impact of crustal deformation on the sea floor may spread from 10 km to 100 km away, and the tsunami that has just occurred may spread similarly. Thus, to clarify the details of the processes of a disaster, in-depth research based on field work (observation), experiments, analysis, and simulations (modeling) is necessary. The results of such research enable us to discuss the tendencies of natural disasters and countermeasures against them. This program, with the aim of promoting the globalization of intelligence, invites the world’s frontline researchers to provide students with opportunities to have direct access to the most advanced technologies and knowledge. At the same time, as a university located in an area affected by the Great East Japan Earthquake, I expect that the results of studies on this disaster will be broadly communicated, so as to contribute to leading the restoration of the Tohoku area and to establishing a safe and secure society.



Graduate School of Science, Tohoku University
Born in 1950. After serving as a researcher at the Research School of Earth Sciences, Australian National University, and associate professor at Ehime University, assumed his current position in 1994. Studying internal structures and evolution of the earth and planets. Program Leader of the Tohoku University 21st Century COE Program “Advanced Science and Technology for the Dynamic Earth,” which was launched in 2003.

Prof. Eiji Ohtani

Creating Safety and Security

Creating safety/security technologies to protect communities from various disasters.

The “Safety/Security Engineering” course pursues action-oriented technological contributions with the aim of practically “creating” safety. This course aims to strengthen technologies to prevent disasters and to increase disaster response abilities mainly in areas of hardware and structural measurement, such as developing embankments/breakwaters and aseismic buildings as well as non-structure. The development of hardware alone cannot address problems with effectiveness or the limitations of such things as construction costs, materials, and maintenance, and therefore cannot perfectly prevent damage from natural disasters. To make effective use of existing technologies, knowledge of regional characteristics is important. Globally recognized knowledge in disaster prevention/mitigation technologies is not always applicable to all regions. Damage from a disaster varies widely depending on such things as the natural environment, geography, soil, land formation and buildings of each area. It is therefore necessary to deploy disaster prevention technologies that fit the regional and natural characteristics and conditions, and are based on global standard know-how.

Studies from the perspective of “science for global safety” are now drawing public attention. The Great East Japan Earthquake, which affected many companies, caused confusion in the supply chains for raw materials, parts, components and sales in a wide range of industrial fields. It is therefore necessary to conduct in-depth research in view of the global impact of disasters.

Meanwhile, as part of our effort to develop global research networks, we offer a double-degree program in cooperation with the Institut National des Sciences Appliquées de Lyon (INSA-Lyon, France), one of the representative Grandes Écoles in engineering in France. The aim of this program is to help students to cultivate international, technological perspectives for nuclear power, earthquakes, and tsunamis, and to create an environment that encourages them to play a role as a member of the global academic community.



Tsunami Engineering Laboratory, Hazard and Risk Evaluation Research Division, International Research Institute of Disaster Science (IRIDeS), Tohoku University.
Professor at Graduate School of Engineering, Tohoku University Disaster Control Research Center (as Director) until March 2012. After serving as an associate professor at the Asian Institute of Technology from 1993 and a visiting professor at the Research Center for Disaster Reduction Systems, Disaster Prevention Research Institute, Kyoto University from 1997; took up his current position in 2000. At the Tsunami Engineering Laboratory; conducted research on tsunami in engineering approaches, such as earth science, disaster mitigation engineering, human behavior, and disaster information/remote sensing technologies.

Prof. Fumihiko Imamura

To cultivate new perspectives to avoid social risks

The Great East Japan Earthquake in March 2011 caused tsunamis on an enormous scale, far beyond prediction, severely affecting the entire Tohoku area. It has been pointed out that the severity of such damage from a disaster is determined not only by the physical factors of the disaster, such as an earthquake or tsunami, but also by the degree of vulnerability of the society subject to the damage. For example, the fatalities caused by the Great East Japan Earthquake were mostly from drowning due to the tsunami. Damage from the tsunami was concentrated in fishing villages, mostly affecting elderly people engaged in primary industries. In the case of the Great Hanshin-Awaji Earthquake, it was found that the areas with lower per capita income had higher death rates or more severe damage to the housing. The fact that few elderly people use the Internet also seems to have much to do with the gap in information dissemination. Based on this background, economic disparities and the digital divide have been identified, leading to concerns about inequalities in society and a further widening of disparities.



The Human Science course conducts studies promoting safe and secure living, through understanding social stratification and disparities that are widened in the aftermath of a disaster, as well as the risks that inequality brings to social systems. For technologies for disaster prevention/mitigation, not only hardware approaches but also the perspective of how human beings use the technologies in their daily lives is also important. This course will help students to find solutions for such software aspects from the complex perspective of social science, psychology, and regional/urban regeneration.

This project also offers summer school programs in collaboration with the Stanford University Center on Poverty and Inequality, with the aim of cultivating global perspectives through learning the basic concepts of social science, which are common throughout the world.



Professor in Graduate School of Arts and Letters, Tohoku University Majors in behavioral science, sociology, and social stratification. Completed the course requirements for the sociology doctoral program at the University of Tokyo Graduate School. Before taking his current position, served as an associate professor at the Faculty of Economics and Business Administration, Yokohama City University, associate professor at Graduate School of Arts and Letters, Tohoku University, and visiting scholar at the Departments of Sociology, University of Chicago and Cornell University.

Prof. Yoshimichi Sato

C-Lab

Convergence Lab.

Leader development training in line with C-Lab training

Program for developing capacities to take action, think, and communicate, in line with training on safety science

Decide C-Lab training subjects and form groups

Each team with members from different fields/majors
Standard: 4 members/team x 5 teams

Program for Adaptation to Global Diversity

Fusion of members with different academic/cultural backgrounds

- Self-evaluation of values and behavioral styles
- Developing/sharing personal visions

C-Lab training activities start

Breakthrough and Leadership Program

Behavior in a global team

During C-Lab training activities

International/domestic mini-symposiums and seminars planned and operated by students

Team Building

Methods for building a global team

Cross-Cultural Communication Program

Communications among team members with different values and experience

Report on C-Lab training activities results

Periodic meetings to exchange opinions with Leading Program Management Committee

- Presentations & discussions
- Cross-cultural negotiations



Training Program Example

Field workshop featuring restoration of disaster-affected area

(Field workshop to share experiences of disasters and discuss measures for the future among students)

Participants: 13 from Tohoku University, 19 from California Institute of Technology

Graduate school education through an international workshop, making full use of the functions of Tohoku University, which is located in a disaster-inflicted area and leads disaster-related studies

Participants visited the affected area during the daytime, and listened to stories of local residents

Human resources capable of standardizing the lessons of the Great East Japan Earthquake obtained in the field of the affected area, and deploying them globally



▲ Night Seminar (Prof. Imamura)



▲ Tour around Minamisanriku-cho



▲ Digging the 869 Jogan tsunami deposit

1st and 2nd year: Common to all courses

Category	Class subject	Remarks
Core Subjects	<ul style="list-style-type: none"> -Fundamental on Global Safety -Sociology of Disaster Prevention and Reconstruction -History of Disaster -Basic Knowledge to Understand History of Disaster -History of Disaster -Risk and Society -Inquiry into Certainty 	<ul style="list-style-type: none"> -Introduction to Life Philosophy -Life and Ethics -Origins of the Quest for Knowledge -Macro Economics -Business Management <p>Earn more than 3 credits from Core Subjects selected from the list in the left column including 1 credit of the mandatory subject.</p>
Major Subjects	Each course presents a different menu.	Earn 6 credits from the subjects listed below (*1). They must include more than 4 credits from subjects of your own major and more than 2 credits from subjects of other majors that each major specifies.
Multidisciplinary Subjects	<ul style="list-style-type: none"> -International Lecture of Global Disaster Mitigation I -International Lecture of Global Disaster Mitigation II 	Earn more than 2 credits from the subjects you selected from list in the left column.
	<ul style="list-style-type: none"> -Action-oriented Disaster Mitigation I -Action-oriented Disaster Mitigation II -Action-oriented Disaster Mitigation III -Action-oriented Disaster Mitigation IV 	<ul style="list-style-type: none"> -Action-oriented Disaster Mitigation V -Action-oriented Disaster Mitigation VI -Action-oriented Disaster Mitigation VII -Action-oriented Disaster Mitigation VIII
	<ul style="list-style-type: none"> -Practice on Global Safety I -Practice on Global Safety II -Practice on Global Safety III -Practice on Global Safety IV -Special Lecture for Top Leader (Tentative Title) 	
	<ul style="list-style-type: none"> -Advanced Lecture on Natural Hazards -Earthquakes and Volcanoes -Ecosystem and Global Environmental Change -Disaster Control System -Hydrology -Behavioral Analysis -Maintenance Engineering -Reliability Design for Safe Energy System -Robotics for safe and Dependable Society 	<ul style="list-style-type: none"> -Aerospace Society -Introduction to Environmental Studies -Strategy for energy and resources -Risk Assessment and Management -The Economics of Entrepreneurship -Project Management -Study of Social Change -Bioethics and Environmental Ethics -Sociology of Risk and Disaster Reduction -Regional Planning -Nonprofit Organizations -Aging Economy -International Business <p>Earn more than 4 credits from the subjects listed in the left column.</p>
Training Subjects	C-Lab Training <ul style="list-style-type: none"> -Natural Disaster Science Special Ethics -Project Based Learning for Frontier of Safety Engineering -Risk, Safety, Security, and Inequality 	Earn more than 2 credits from subjects you selected from the list in the left column.
	<ul style="list-style-type: none"> -Global Communication Skill Training I -Global Communication Skill Training II 	required
	<ul style="list-style-type: none"> -Internship Training -International Internship Training 	elective
Major General Subjects	<ul style="list-style-type: none"> -International Seminar of Global Disaster Mitigation I -International Seminar of Global Disaster Mitigation II 	<ul style="list-style-type: none"> -Industry-Academia Partnership Seminar I -Industry-Academia Partnership Seminar II
	Master Course Seminar	Required to pass the Master Course Seminar <p>Credit for the Master Course Seminar shall apply the credit of specific subject obtained at their own graduate schools (Graduate School of Art and Letters, Science, Engineering, Economics and Management, Information Science, Environmental Studies and Biomedical Engineering, School of Law).</p>
Related Subject of other majors	Subjects that the Curriculum Committee of the Center for Education and Research on Science for Global Safety has approved as Related Subjects of Other Majors.	

3rd, 4th, and 5th years: Common to all courses

Category	Class subject	Remarks
Core Subjects	<ul style="list-style-type: none"> -Theory of Leader (tentative name) -Lecture for Leadership -Advanced Disaster Mitigation I -Advanced Disaster Mitigation II -Advanced Disaster Mitigation III -Advanced Disaster Mitigation IV 	Earn more than 3 credits from the list in the left column including 1 credit of the mandatory subject.
	<ul style="list-style-type: none"> -Special Lecture on Earth and Planetary Dynamics -International Special Lecture on natural Disasters -Environmental Change of the Earth's Surface -Disaster Control Engineering -Advanced Earth System and Global Change -Advanced Safety Engineering of Nuclear Systems -Industrial Engineering -Project Management 	<ul style="list-style-type: none"> -R&D Management -The Economics of Entrepreneurship -Study of Social Change -Bioethics and Environmental Ethics -Sociology of Risk and Disaster Reduction <p>Earn more than 2 credits from subjects you selected from list in the left column.</p>
Major Subjects	C-Lab Training <ul style="list-style-type: none"> -Advanced Natural Disaster Science Special Training -Project-based Learning for Disaster Mitigation -Self-planned Project 	Earn more than 2 credits from subjects you selected from list in the left column.
	Global Leader Training <ul style="list-style-type: none"> -Advanced Technology Management Seminar -Overseas Training -Super Internship 	Earn more than 2 credits from subjects you selected from list in the left column.
Multidisciplinary Subjects	<ul style="list-style-type: none"> -International Seminar of Global Disaster Mitigation III -International Seminar of Global Disaster Mitigation IV 	<ul style="list-style-type: none"> -Industry-Academia Partnership Seminar III -Industry-Academia Partnership Seminar IV
	Doctor Course Seminar	Required to pass the Doctor Course Seminar <p>Credit for the Doctor Course Seminar shall apply the credit of specific subject obtained at their own graduate schools (Graduate School of Art and Letters, Science, Engineering, Economics and Management, Information Science, Environmental Studies and Biomedical Engineering, School of Law).</p>
Training Subjects	Subjects that the Curriculum Committee of the Center for Education and Research on Science for Global Safety has approved as Related Subjects of Other Majors.	

1. Credits of subjects listed in Appendix Table might be acknowledged as those of own major for completion of that major on request.

※Courses written in English, it will be opened in English. Course written in Japanese and English both, it will be opened in English if foreign students register the course.



Requisite to complete this program

Requisites for completion of the second half of doctoral study

- Students are required to acquire 3 or more credits out of the Core Subjects, 6 or more credits out of the Major Subjects, 10 or more credits out of the Multidisciplinary Subjects.
- Students are required to acquire 2 or more credits out of the Convergence Lab, 2 or more credits out of the Global Communication Skill Training.
- Students are required to acquire Master Course Seminar.
- Students are required to pass Qualifying Examination.

Requisite to complete this program

- Students are required to acquire 4 or more credits out of the Multidisciplinary Subjects.
- Students are required to acquire 2 or more credits out of the Convergence Lab, 2 or more credits out of the Global Leader Training.
- Students are required to acquire Doctor Course Seminar.
- Students are required to pass a Proposal Defense.
- Students are required to submit a doctoral thesis, pass the thesis examination and a final examination of the leading program.

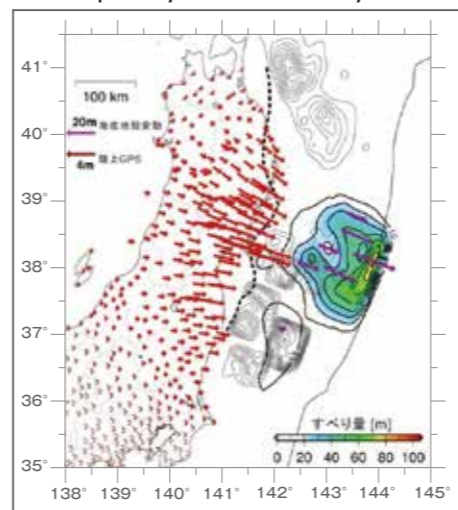
Potential career fields after completion

Producing leaders in global safety science who will contribute in various fields to protecting human life, society, and industry from global disasters

Multidisciplinary Program

In this program, students first take humanity and social science subjects such as philosophy, sociology, and history as Core Subjects, and then take various specialized subjects in three courses centered around Action-Oriented Disaster Prevention studies. The aim of the curriculum is to develop human resources equipped with innovative ideas and thoughts in both natural science and arts/social science.

Science/engineering subjects of this program are designed to be understood easily even by non-science major students who have never received an education of scientific majors. By promoting multidisciplinary education beyond the boundaries of natural, humanity, and social sciences, the program will help students establish their views of life and history, and develop flexible ideas, rich humanistic qualities, and the ability to make well-balanced judgments.



Coseismic slip distribution

(Research Center for Prediction of Earthquakes and Volcanic Eruptions, Graduate School of Science)

Understand

Introduction to Technology Policy Risk Management

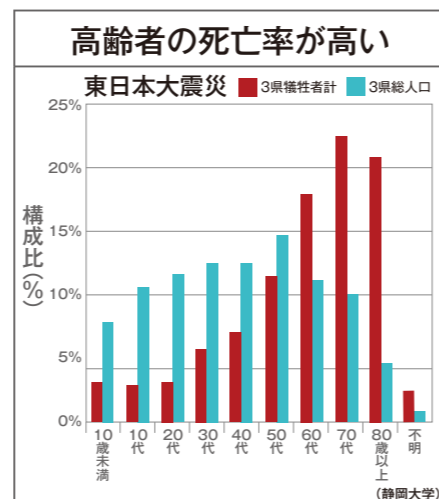
(Graduate School of Engineering / Advanced Technology Management Academy)



Create

Risk, Social Stratification, and Inequality

(Graduate School of Arts and Letters / The Stanford Center on Poverty and Inequality, Stanford University)



Live

At the time of disaster: inequality/disparities in society expand
Risks concentrate on the weak

➔ New perspectives to avoid social risks

Domestic/international collaborations for disaster prevention/mitigation

4 pillars

- **International joint research on the Great East Japan Earthquake** (Action-oriented disaster prevention study: University of London, German Aerospace Center (DLR))
- **Forming joint education programs** (INSA de Lyon, École Centrale de Lyon, University of Hawaii)
- **Joint establishing knowledge bases, such as archives** (Harvard University)
- **Partnerships with universities (Tsinghua University, University of Hawaii) in related regions** (Asia, Europe, America, Pacific rim)

Leader development system and career path building based on industry-government-academia participation

★ Personnel development with participation of industry

Excellent business people will be invited as adjunct or visiting professors to realize closely collaborated education.

Industry-academia collaborative seminars

Career education by instructors working actively on the frontlines of business

Advanced Technology Management Academy

Business education by instructors working actively on the frontlines of business

Companies participating in the industry-academia collaborative seminars

Research institutes in Japan and overseas, resources development companies, infrastructure-related companies, JAXA, etc.

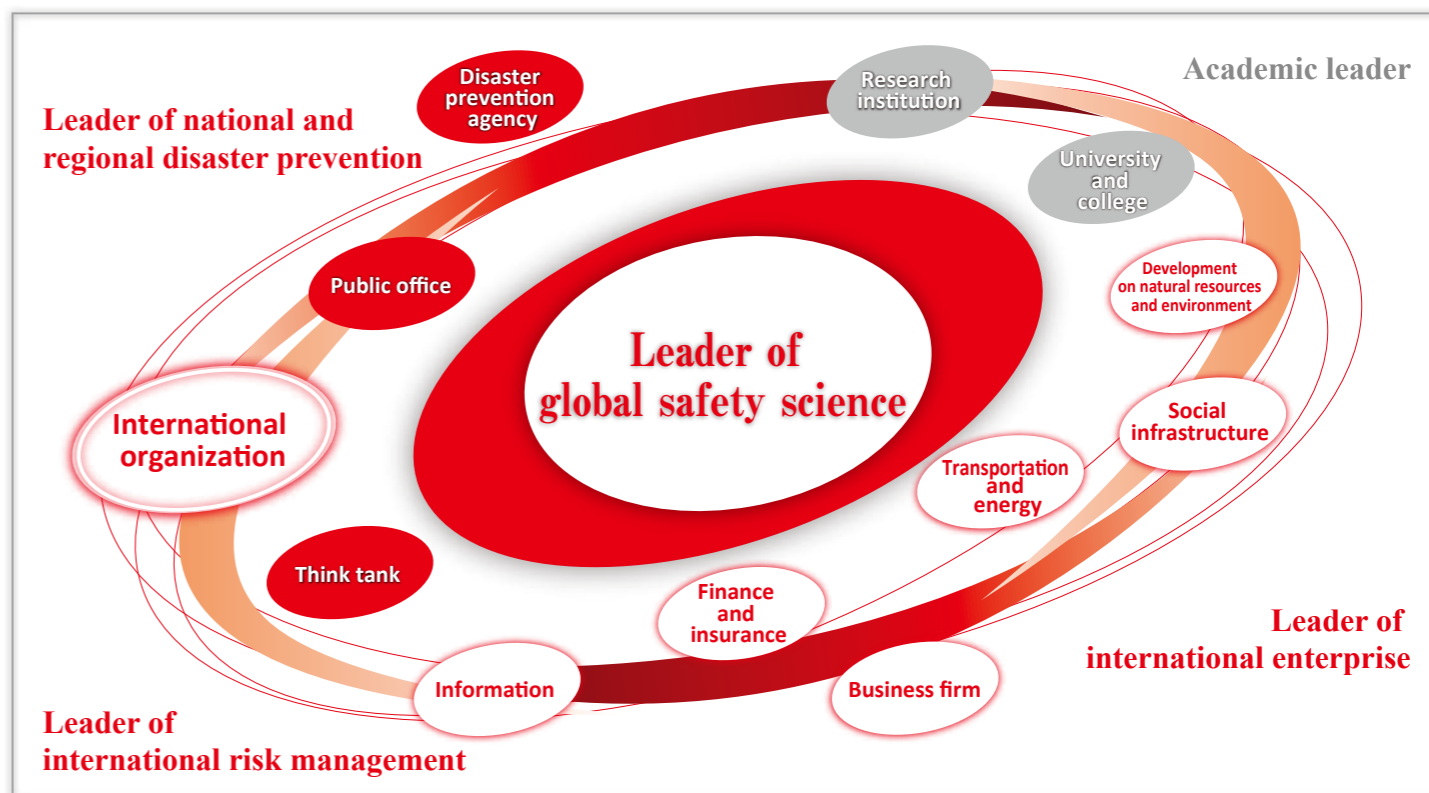
Ability to understand people, organization management, business management practice, project management (in collaboration with Innovative Leaders Platform (ILP), Tohoku University)

★ Cooperative training programs at companies and university

⇒ Attractive to both companies and students [Direct career path to companies]

Super Internship

A long-term internship that offers not just work experience but an opportunity to set a clear product target and conduct practical research and development towards reaching that target



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