

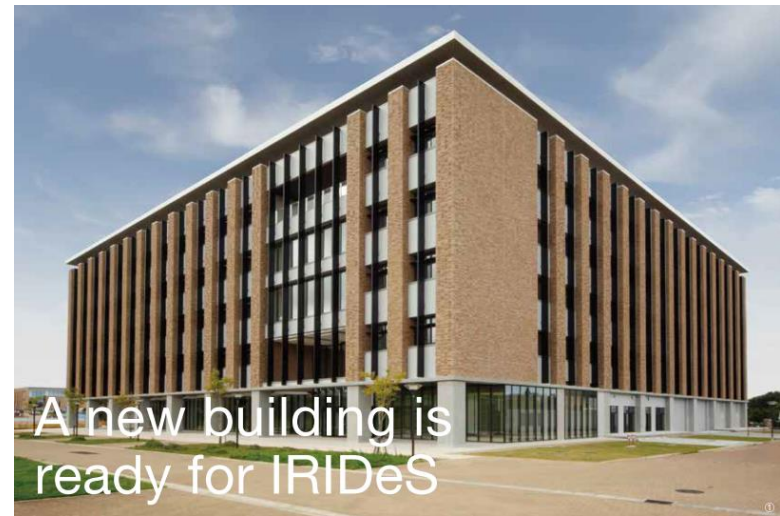
Interdisciplinary research in IRIDeS, International Research Institute of Disaster Science, Tohoku University 東北大学災害科学国際研究所の学際連携研究

Makoto OKUMURA

奥村 誠

Deputy Director,
IRIDeS, Tohoku Univ.

東北大学
災害科学国際研究所副所長



国立大学の3つの災害関係研究所

Disaster

Disaster Institute settled in Major National University

1923

Great Kanto Earthquake
関東大震災

→ The University of Tokyo
Earthquake Research Institute
(1925-) 東大地震研

1950

Typhoon Jane
ジェーン台風

→ Kyoto University
Disaster Prevention Research
Institute (1951-) 京大防災研

2011

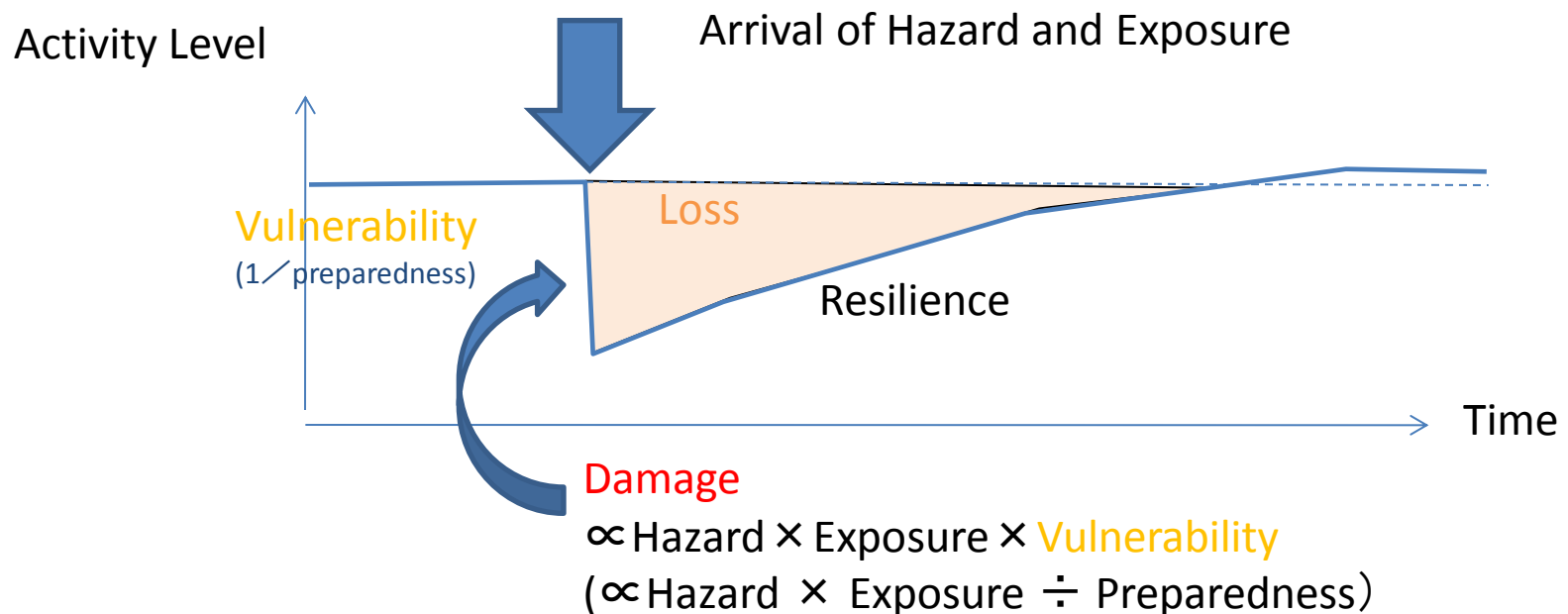
GEJE and Tsunami
東日本大震災

→ Tohoku University International
Research Institute of **Disaster
Science** (2012-) 東北大災害研

Establishment of a new research institute prepared for disasters of low frequency and high consequences. 低頻度巨大災害への備え

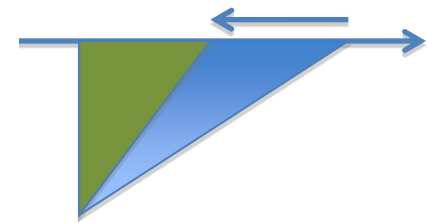
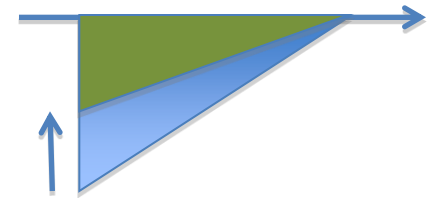
Key Concepts in Disaster Management

- Hazard Strength of natural event
- Exposure Inhabitants, industries, facilities
- Vulnerability weakness of human-social system
- Resilience Speed of bouncing back

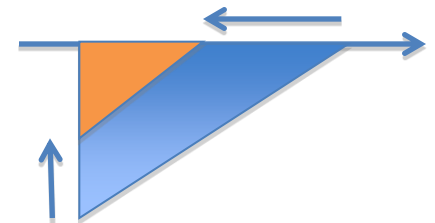


Adaptation Strategies

- We cannot control the Natural Hazards
- Decrease the vulnerability (prevention)
 - Building Facilities physically stronger
- Decrease the exposure (aversion)
 - Land-use control
 - Temporal pre-disaster evacuation
- Increase the resilience (mitigation)
 - Back-up, storage, Response
 - Insurance, special finance



Combinations



Need of Multi inter-disciplinary Approach

- Decrease the vulnerability (prevention)

- Building Facilities physically stronger

Natural Science,
Engineering

- Decrease the exposure (aversion)

- Land-use control
- Temporal pre-disaster evacuation

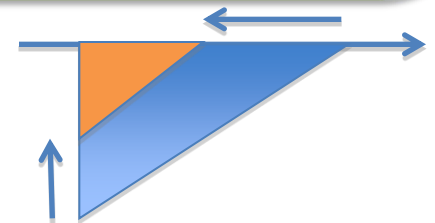
Social Science,
Behavior Science
Urban Planning

- Increase the resilience (mitigation)

- Back-up, storage, Response
- Insurance, special finance

Social Science,
Economics
Medical Science

Combinations



Interdisciplinary approach to reduce total loss from a large-scale disaster 巨大災害の長期的影響を小さくする学際的アプローチ

Activity Level
社会経済活動
の水準

Arrival of Hazard and Exposure
ハザードの襲来と暴露

直接被害
Impact

Loss損失

Resilience
回復力:レジリエンス

Time
時間

Damage, Impact
 $\propto \text{Hazard} \times \text{Exposure} \times \text{Vulnerability}$
直接被害 \propto ハザード \times 暴露 \times 脆弱性

Prevention: 防災
Decrease Vulnerability
Building Facilities
physically stronger

Aversion: 回避
Decrease Exposure
Land-use control
Quick evacuation

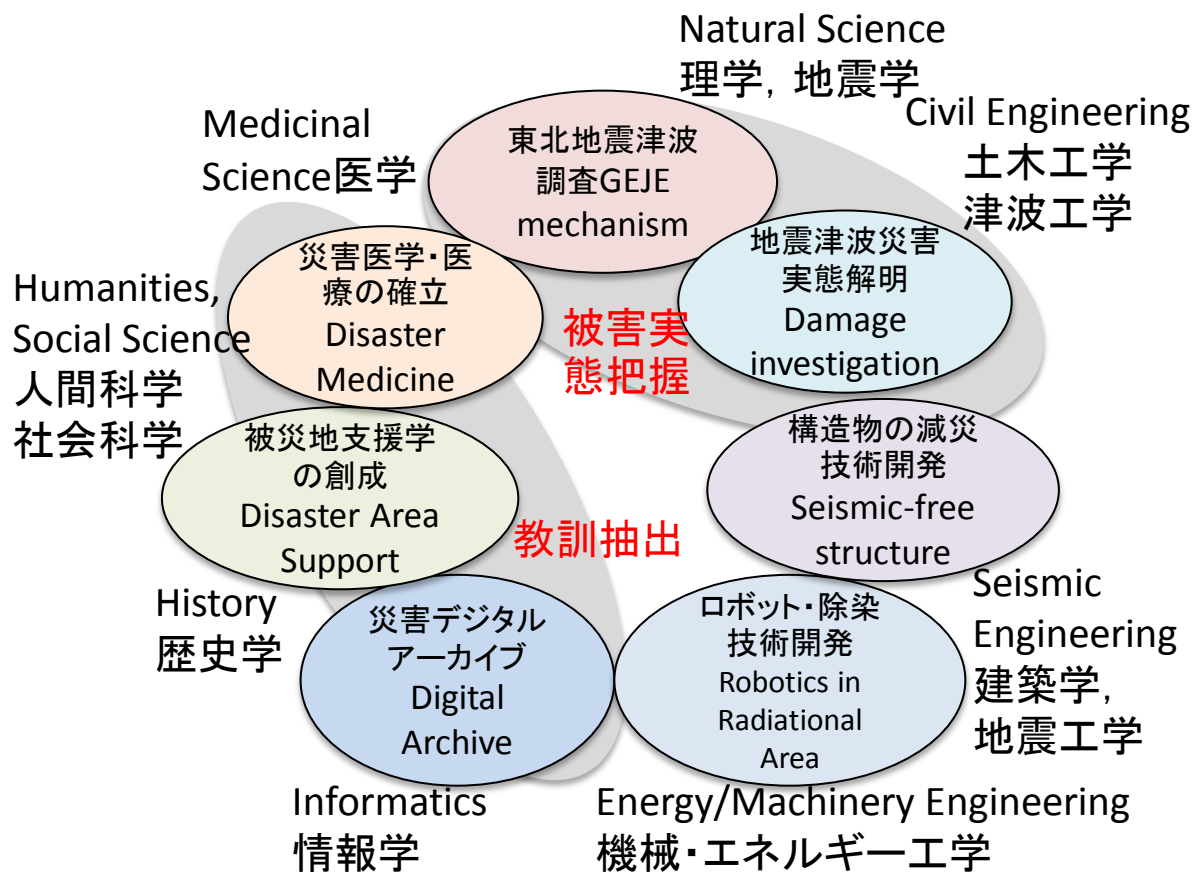
Mitigation: 減災
Increase Resilience
Back-up, storage,
Response, Insurance

自然科学・工学
Natural Science,
Engineering

行動科学、都市計画
Social Science, Behavior
Science, Urban Planning

社会科学, 災害医学
Social Science,
Economics, Medical Science

Action-based Disaster Mitigation 実践的防災学創成



既存学問分野の災害研究への応用と融合

Application of Existent Research Disciplines to establish Action-based Disaster Mitigation

Organization of IRIDeS 研究所の組織: 7部門37分野

Organization of IRIDeS



Uniqueness : Multi-interdisciplinary structure

Research area		Tohoku Univ. IRIDeS	Univ. of Tokyo E Institute	Kyoto Univ. D Institute	Niigata Univ. R Institute	Fukushima Univ. S Institute	D Institute
Hazard and Risk Evaluation Disaster Science	Earthquake, Tsunami	Hazard and Risk Assessment Natural Disaster Science	研究所全体 (4部門, 4研究 センター, 3マネ ジメントセン ター)	地震・火山研究 グループ	環境変動科学 部門 複合災害科学 部門 地域安全科学 部門		地震・火山 研究ユニット 兵庫県耐震工学 研究センター
	Volcanic						
	Wind and Rain			地盤研究 グループ 大気・水研究 グループ			水・土砂防災 研究ユニット
	Snow Storm						雪氷防災 研究センター
Human & Social Response		Human and Social Response		総合防災 研究グループ	地域安全科学 部門	研究所全体 (11研究会)	災害リスク 研究ユニット
Regional & Urban Reconst- ruction	Regional safety	Regional and Urban Reconstruction					
	Radiation Decontamination						
	Robotics						
Medical Relief		Disaster Medical Science			地域安全科学 部門		
Public Cooperation		Information management		総合防災 研究グループ		研究所全体 (11研究会)	災害リスク 研究ユニット
International Collaboration		Yes	Yes	Yes			

* Multi-interdisciplinary also includes research on different types/areas of hazards, low frequency high risk disasters

People in IRIDeS

38 Professors(permanent), 30 Professors(5 years)
39 Research assistants, 12 Bureaucratic staff.





English name

IRIDeS

Iris, Iris laevigata or Japanese Iris : Symbol of hope and nobility

Logo meaning

It is the deformed image of the Japanese character of disaster (災, wazawai) turned upside down, based on the idea of Japanese saying "Turn your misfortune to good account".

It represents our mission of learning the lessons from the 2011 Tohoku earthquake and tsunami disaster and pursuing effective disaster management to build sustainable and resilient societies. Iris is the symbol of "hope" and "dignity".



New Building of IRIDeS



The new building is located on the west side of the Aobayama campus, in a quiet location enclosed by green trees.

The five story RC building has a seismic isolation system, 72-hour emergency power generation, natural ventilation and light, a balcony preventing direct sunlight. It also has a space for conveying information to visitors, a multi-purpose hall for 150 people, seminar rooms, a lecture room, meeting rooms, a server room, and a library room.

Most of the research labs have glass walls, and each floor also features a common space to enable researchers interactions.

Impressive Interdisciplinary researches 学際研究の例



- Great East Japan Earthquake Archive Project: Michinoku-Shinrokuden –
- Collaboration among over 120 organizations from industry, government, academia and the private sector.

Documenting images of the earthquake disaster as it happened.



Photo 2: Information on various places from the "Reporting team of Michinoku now" may be viewed at the following Facebook page: <https://www.facebook.com/imawo.tsutaetai>



Kakeagare!
Japan
(Get Going!
Japan)



Elementary school pupils wearing protective hoods rush to the school building of Tamaura Middle School (Tsunami evacuation drill, Iwanuma City, 2012)

Kakeagare! Japan is a project that aims to habitualize evacuation behavior in preparation for a tsunami while tackling regional problems based on the lessons learned from the Great East Japan Earthquake. Tsunami evacuation drill programs are being planned and implemented in collaboration with industry, government and academia, including IRIDeS.

Impressive Interdisciplinary researches 学際研究の例

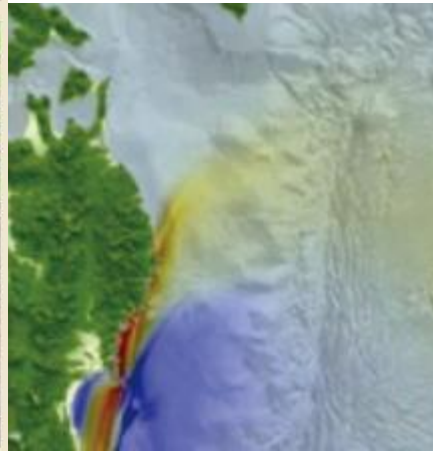
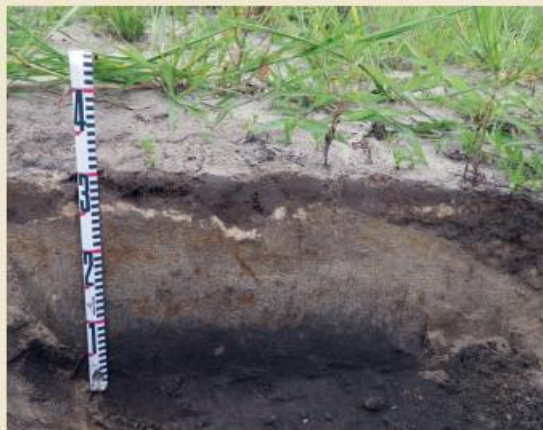
Keicho period, Oshu Tsunami Project 慶長年間奥州津波研究プロジェクト

● Map of the Iwanuma area in the Edo period



About 400 years ago, “Keicho Period Oshu Earthquake Tsunami” struck the Pacific coast of the Tohoku Region. The accurate picture of the disaster is investigated by a team from the different areas.

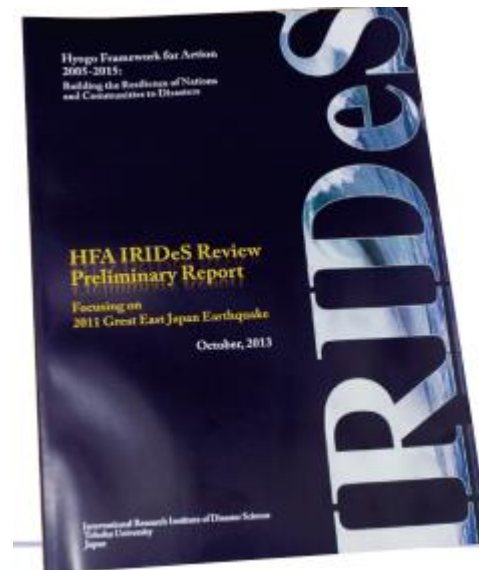
● Geological layers on the coast of the Tohoku region



- Analysis and Observations based on Hyogo Framework for Action (HFA) -

Publication of Preliminary Report outlining problems and calling for discussion.

国連防災世界会議に向けて、議論を加速させるためのHFA分析レポートの作成・発行



IRIDeS Project Research 特定プロジェクト研究

The IRIDeS promotes publicly-offered project research with collaborating organizations from many countries and with broad areas of specializations. The aims of these research projects are not only to contribute to on-going recovery/reconstruction efforts in the affected areas but also to conduct world-leading research on natural disaster science and disaster mitigation.

1～2年間の研究プロジェクトを公募し、学内の共同研究、国際連携研究、及び被災地・関連他大学との連携研究を推進しています。
公開報告会を年1回7月に実施しています。

Meeting opportunities in IRIDeS 公開型の研究会の開催

IRIDeS will hold conferences and meetings on a regular basis, in order to share and disseminate our research progress and outcomes, and to promote research collaboration and integration.

IRIDeS Friday forum

A forum of regular presentations and discussions is provided in order to share the information of research activities and collaborations at the IRIDeS. This forum also reports emergency disaster surveys.

金曜フォーラム 研究所内の研究成果を公開型で紹介・議論する催しです。

Outputs from Research Activities 研究活動成果

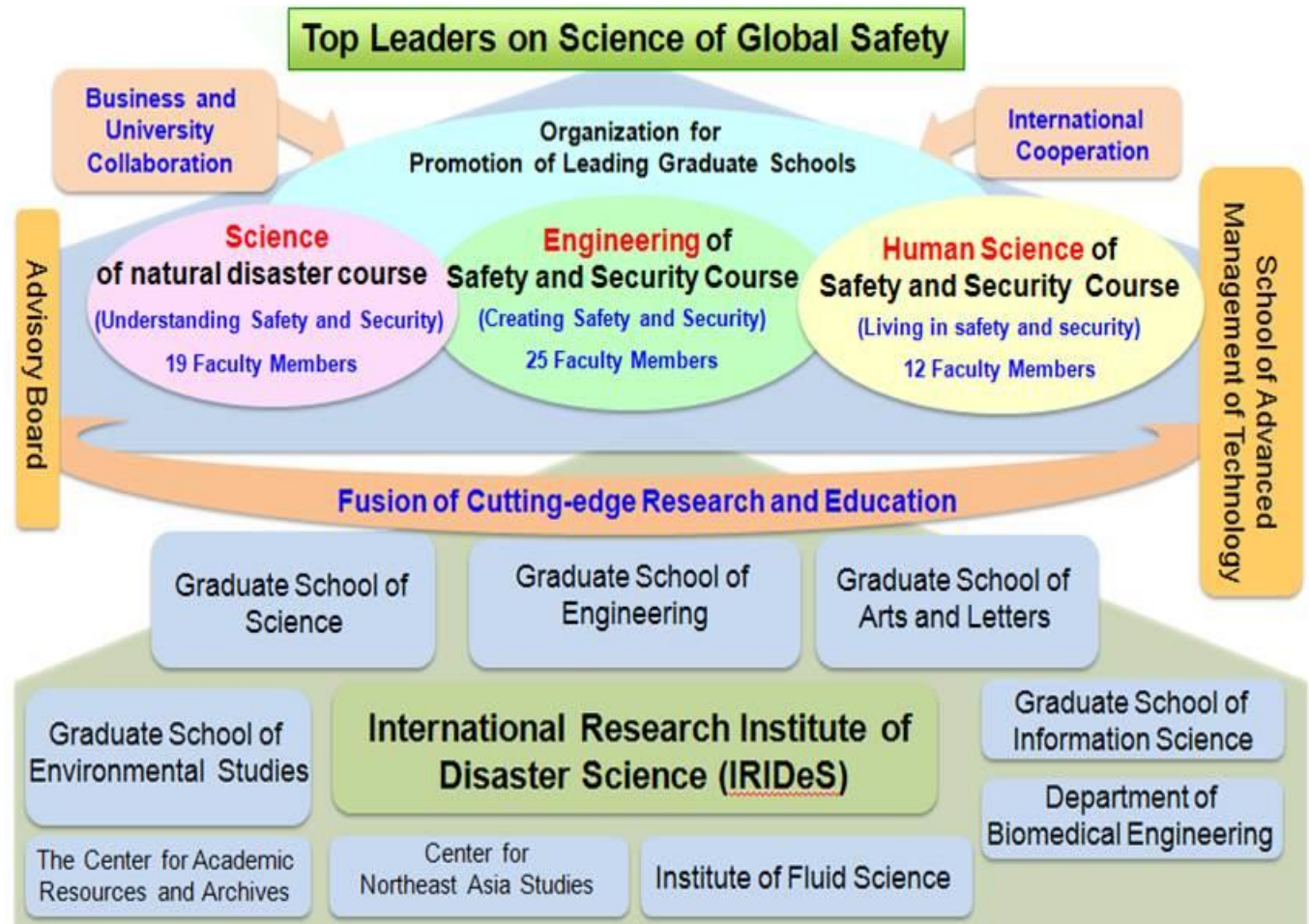
	2012FY 24年度 件数	2012FY per capita 24年度1人 当たり	2013FY 25年度件 数	2013FY per capita 25年度1人 当たり
Academic Paper as head author 筆頭論文	90	1.76	168	2.40
Academic Paper coauthor 共著論文	313	6.14	411	5.87
Books 著書	37	0.73	54	0.77
Conference Presentations 学会発表	717	14.06	796	11.37
as guest 基調講演・招待講演・特別講演	146	2.86	132	1.89
as top author 単独・筆頭発表	293	5.75	192	2.74
as co-author 共同発表	424	8.31	472	6.74
Lectures to public 一般向け講演	112	2.20	250	3.57
Reviews and Reports 総説・解説	65	1.27	79	1.13
Patents 特許・実用新案出願	1	0.02	4	0.06
Awards 受賞	16	0.31	16	0.23

Activity Reports: <http://irides.tohoku.ac.jp/topics/index.html>

- Educational program
 - Establishing a disaster management program for higher education
 - Aims to educate internationally-prominent researchers in disaster management



- Inter-graduate School Doctoral Degree Program on Science of Global Safety
- 2012-2018 supported by MEXT



- Inter-graduate School Doctoral Degree Program on Science of Global Safety

		Science of Natural Disasters Course	Safety and Security Engineering Course	Human Science Course	Quality Assurance
					Degree Examination
Doctoral Course	Doctoral Training (8 required credits)	Research Work			Proposal Defense
	C-Lab Training (1 required credit)	Specialized Seminar of Science for Natural Disasters	International Training of Action-based Disaster Mitigation	Independent Project Training	
	Multi-disciplinary Lectures	Special Studies of Action-based Disaster Mitigation -- 1 and 2, International Lectures of Action-based Disaster Mitigation (4 mandatory credits of selected subjects including Action-based Disaster Mitigation)			
Master's Course		Theory of Fluid in Earth's Interior Theory of Mega Disasters Theory of Supercrustal Environmental Change	Special Studies of Disaster Control Theory of Intellectual Property Theory of Research and Development Management	Special Studies of Social Behavior Science II Special Studies of Metrological Behavior Science	
	Master's Training (8 required credits)	Pre-Research (Overview)			QE-II
	C-Lab Training (1 required credit)	Specialized Seminar of Science for Natural Disasters	Safety Engineering Frontier Training	Metrological Behavior Science Research Seminar	QE-I
		Action-based Disaster Mitigation (8 required credits of selected subjects including 4 credits of this subjects)			Basis of Practical Science for Disaster Prevention
	Multi-disciplinary Lectures	Deep Carbon Cycle Theory Natural Disaster Generation Mechanism Sun and Earth Environment Link Theory Biosphere Damage caused by Disasters	Theory of Disaster Prevention Systems Theory of Risk Management Theory of Energy Resource Strategies Theory of Technological Society	Special Studies of Sociology I Special Studies of Social Behavior Science I Theory of Sustainable Society Japanese Social History	
	Specialized Basic Subjects (8 required elective credits)	(2 selected subjects from major course and 1 selected subject from each of the others)			Standpoint of Integrated Science
		Special Studies of Resource Geochemistry Special Studies of Seismology 1 Special Studies of Volcano Physics 1 Special Studies of Marine Physics 1	Science for Seismic Hazard Control Science for Urban Safety Operation and Maintenance Engineering Theory of Environmental Energy	Mathematical Sociometrics Mathematical Socioeconomics Theory of Project Assessment Microeconomic System Methodology	
	Fundamental Subjects (3 required credits)	Philosophy	Sociology	Historical Science	Basis of Human Science
					Core Formation of Science for Global Safety

Thank you!

URLs:

<http://irides.tohoku.ac.jp/eng/index.html>

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