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Report on 2011-2012 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"

January 2013

International Centre for Water Hazard and Risk Management
under the auspices of UNESCO (ICHARM)
Public Works Research Institute(PWRI)

United Nations
Educational, Scientific and
Cultural Organization

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By
International Centre for Water Hazard and Risk Management
under the auspices of UNESCO (ICHARM)

ICHARM conducted a one-year Master's program entitled the "Water-related Disaster Management Course of Disaster Management Policy Program" from 2 October 2011 to 15 September 2012 in collaboration with JICA and GRIPS. The nineteen students were mainly technical officials, engineers or researchers in the field of river management or water-related disasters in developing countries.

This course aims to foster solution-oriented practitioners with solid theoretical and engineering bases who can serve for planning and practices of flood management within the framework of integrated river basin management at all levels from nations to localities.

In the first half of the course, the students mainly attended lectures and exercises; in the second half, they worked on their individual studies, this enabling them to prepare and complete their master's theses and to visit numerous locations across Japan over the course of several field trips in order to learn about up-to-date flood control countermeasures in action.

This report details the course activities and the achievements thereof and aims to contribute improvements in the next year.

Key Words: Training, Master's program, Disaster prevention, Flood disaster

Contents of Report on 2011-2012 M.Sc. program, “Water-related Disaster Management Course of Disaster Management Policy Program”

- Table of Contents -

- Annexes -

<Opening Ceremony (October 7)> (Positions are as of the time the picture was taken.)

Congratulatory address by Director Sato, JICA Tsukuba

Congratulatory address by Prof. Okazaki

Congratulatory address by Chief Executive Uomoto, PWRI

Address by a participant representative Mr. Barun

Group photo after opening ceremony

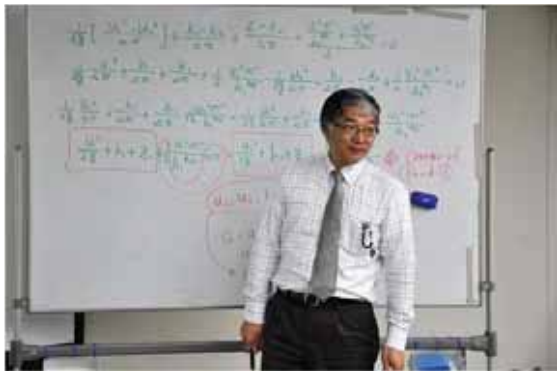
<Lecture & Exercise>

Prof. Takeuchi

Asso. Prof. Yorozuya

Prof. Huang

Prof. Fukuoka



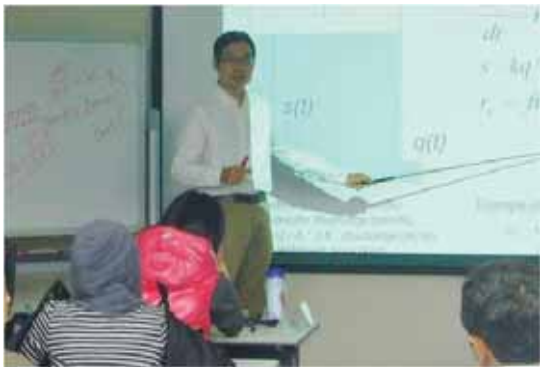
Prof. Watanabe

Prof. Egashira

Prof. Jayawardena

Prof. Tanaka

Asso. Prof. Fukami



Asso. Prof. Sayama

Prof. Ikeya

Prof. Matsumoto

Photo 3

Prof. Morichi

Prof. Okazaki

Photo 4

<Field Trips>
(October 27, Ara River)

Super levee at Shinden

Old Iwabuchi Gate and Flood Mark

Disaster management room

Arakawa Museum of Aqua “amoa”

Explanation at dry riverbed

Ukima Disaster Prevention Station

(October 28, Kanto Regional Development Bureau of MLIT, Metropolitan Area Outer Underground Discharge Channel)

Lecture in Disaster Management Room

Group photo

Explanation on Metropolitan Area Outer Underground Discharge Channel

Surge chamber in Metropolitan Area Outer Underground Discharge Channel

(November 10, Watarase Retarding Basin, Kurihashi of Kuki City)

Lecture at Tonegawa-Joryu River Office

Tone River Information Board (Kurihashi Station)

Flood marks on utility poles
"Marugoto machigoto Hazard Maps

Tone River water levels display tower at Kurihashi Branch Office

Explanation of retarding basins
at Watarase branch office

Observation tower

Group photo with office personnel

Photo 7

(November 22, Shirako River Reservoir Cluster, Shakujii River)

Intakes of holding ponds below Bikuni Bridge, Shirako River

Inside holding ponds

Shaft construction site

River improvements in heavily populated area

Group photo with office personnel

Photo 8

(December 9, Tsurumi River Area)

Lecture by Prof. Imbe

Explanation at Tsurumi River Information Center

Distant view of retarding basin

Kirigaoka Retarding Pond

Onda River Retarding Basin

Explanation by Prof. Emeritus Takahashi at his place

Group photo with Prof. Imbe and office personnel

(March 14, Hii River Area)

Explanation at Ohashigawa Community Center

Hii River Diversion Channel construction site

Explanation in Obara Dam Control Room

Obara Dam

(March 15, Ota River Area)

Takase Weir

Erosion control weir in Hiroshima

Gion and Oshiba Water Gates

Motoyasu River Terrace

(March 16, Disaster Reduction and Human Renovation Institution, Yamato River Area)

Explanation at Institute

Explanation of Kamenose landslide measures

Interior of water drainage tunnel

Group photo

(May 19, 61st Tone River Flood Fighting Drill)

(May 21, Dam and Erosion Prevention Projects)

Kawaji and Ikari Dam connection tunnel

Kawaji Dam

Explanation in front of Ashio Check Dam

Matsuki mountainside construction project

Group photo at Akagane Shinsui Park with Pakistan Flood Workshop participants

(May 22, Tone Great Weir)

Distant view of weir from office rooftop

Distant side view of land from office rooftop

Inside the control room

Tone Great Weir

(September 7, Shingu City Office, Kumano River Area, Ise City Ominato Promotion Committee)

Applause upon entering the city office

Lecture at the city office

Explanation at Tanaga Road Station

Explanation at emergency housing

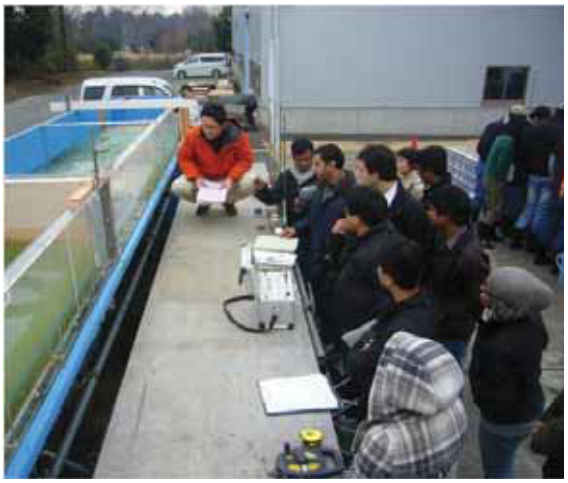
Explanation of the Kumano River improvement project

Special embankment

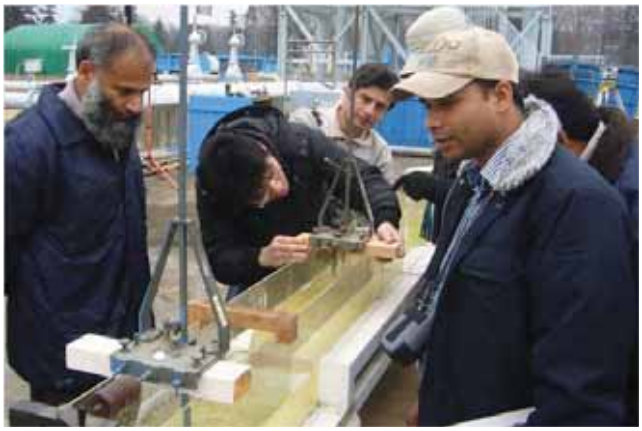
Explanation from the Chairman of the Ise City Ominato Promotion Committee

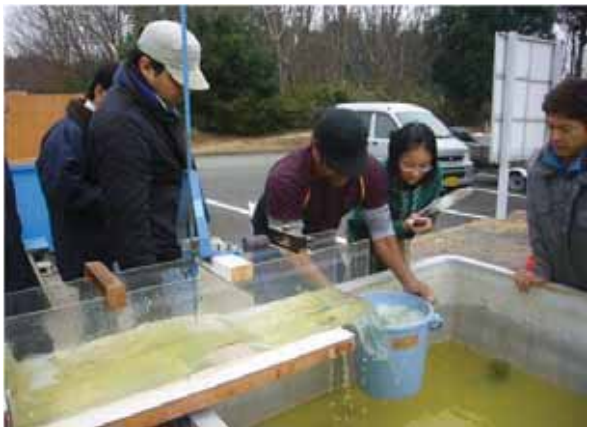
<Hydrology Exercises>
(February 14, Tsukuba City)

Explanation of the experiment



Explanation from Asso. Prof. Yorozuya





Conducting the experiment

(May 22, Taisho Bridge, Shibukawa City)

Conducting the experiment

<Master's Thesis>

Practice on Project Cycle Management

Final Presentation (August 10)

14th International Summer Symposium (September 5)

<Others>

Tea ceremony at ICHARM

Commemorative photo underneath cherry tree at PWRI

< Closing Ceremony (September 13)>

Conferment of JICA Certificate

Conferment of ICHARM Award (Mr. Hassan)

Best Paper Award presentation (Ms. Zhu Bing)

Best Paper Award presentation (Mr. Arslan Usman)

Group photo

<Graduation Ceremony (September 14)>

Photo 21

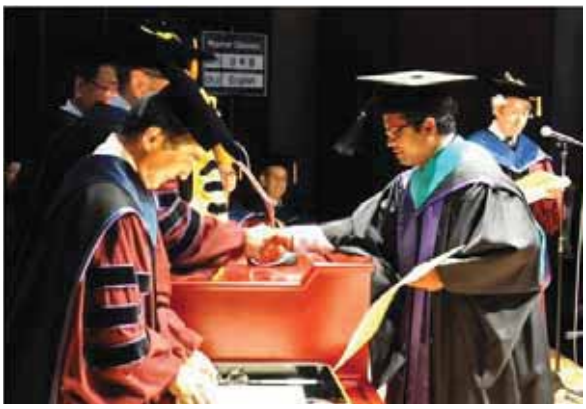







Photo 22

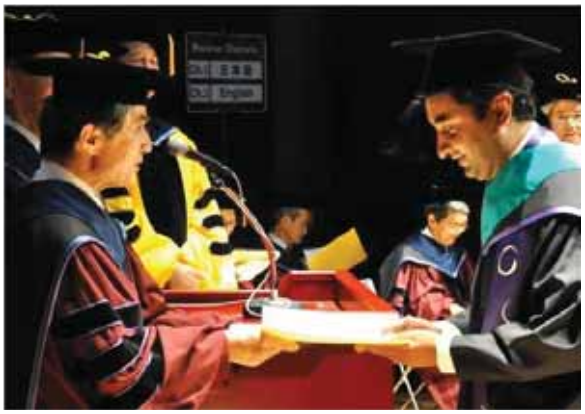
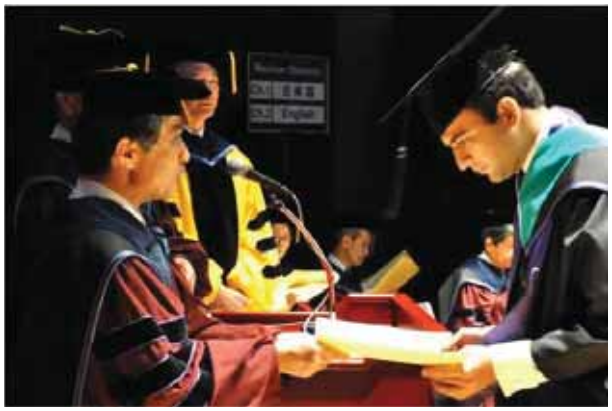







Photo 23

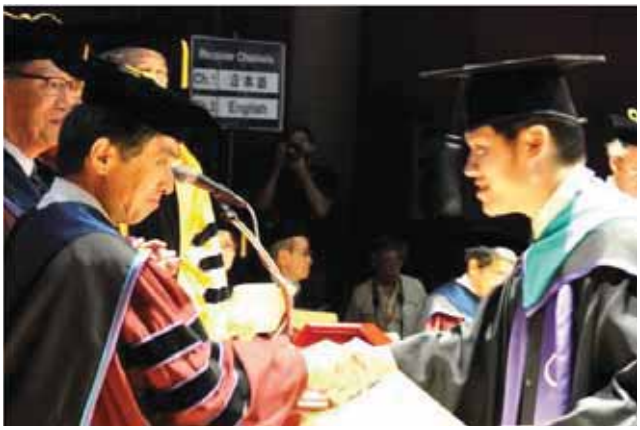


Photo 24

Chapter 1: Background and Objectives of this Course

1.1 Background of this Course

Natural disasters cause human tragedy and economic loss, and hamper the development of the countries where they occur. In particular, due to recent urbanization in developing countries, there is a tendency for the poor to be forced to settle in buildings and areas that are vulnerable to natural disasters. This significantly increases vulnerability to natural disasters in developing countries.

During natural disasters, particularly the mitigation of water-related damage from floods and droughts is a major challenge that needs to be overcome through the cooperation of the international community in order to ensure development of sustainable human societies and alleviation of poverty. Such devastating disasters have not only been statistically increasing, but also expanding especially in Asia and Africa (Figure 1-1). According to a UN population projection (UN World Urbanization Prospects 2005), urban population will continue growing in size and proportion across the world, and most of the growth will be seen in developing countries. For example, between 2000 and 2030, the urban population in Asia and Africa is projected to increase rapidly, growing from 1.36 to 2.64 billion and 294 to 742 million, respectively (Figure 1-2). Projections show that, even in the next 10 years, rapid population growth will occur in major waterfront cities in Asia, e.g. Dhaka (Bangladesh), Mumbai (India) and Jakarta (Indonesia). If appropriate measures are not taken to protect these cities, their vulnerability to major water-related disasters, such as floods, storms and tsunamis, is likely to become increasingly high (Figure 1-3).

Asia alone accounts for over 80% of worldwide fatalities due to water-related disasters (Figure 1-4). Looking ahead, it is predicted that precipitation and its patterns of distribution will change due to climate change, and this may exacerbate the intensity and frequency of water-related disasters. Sea level is expected to rise worldwide due to global warming, which in turn will worsen exposure of coastal areas, delta areas in the lower reaches of rivers, and small islands.

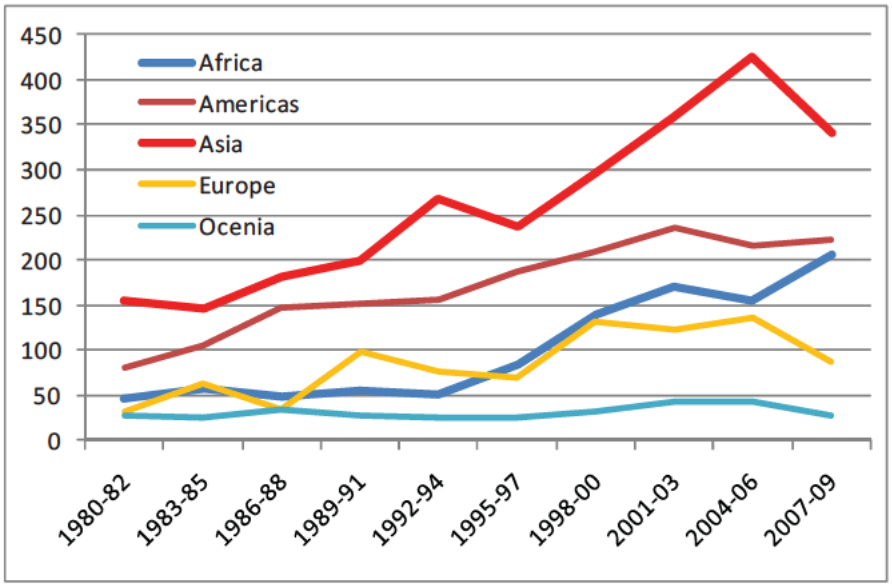


Figure 1-1 Annual variation in the number of water-related disasters by region
(Prepared by ICHARM based on CRED EM-DAT)

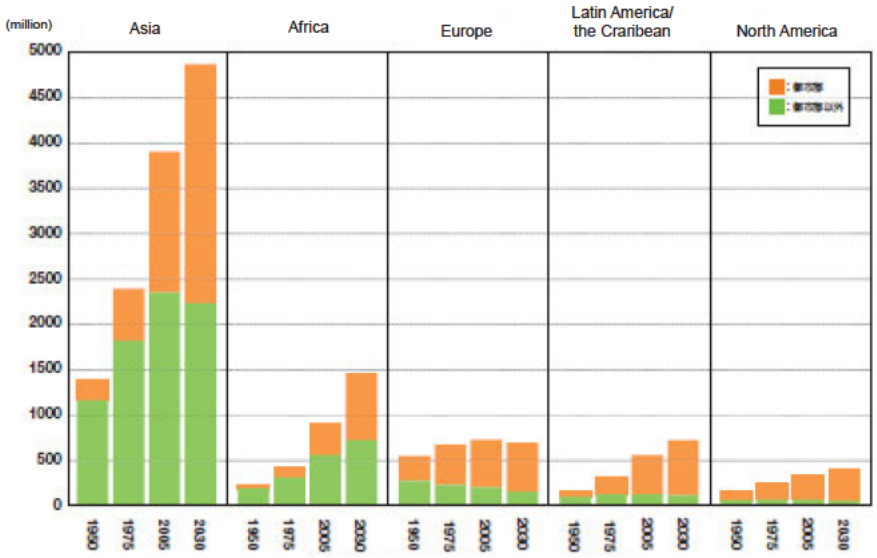


Figure 1-2 Demographic change in urban and non-urban areas by region

(Prepared by ICHARM based on World Urbanization Prospects:
2005 Revision by the Population Division, Department of Economic and Social Affairs, UN)

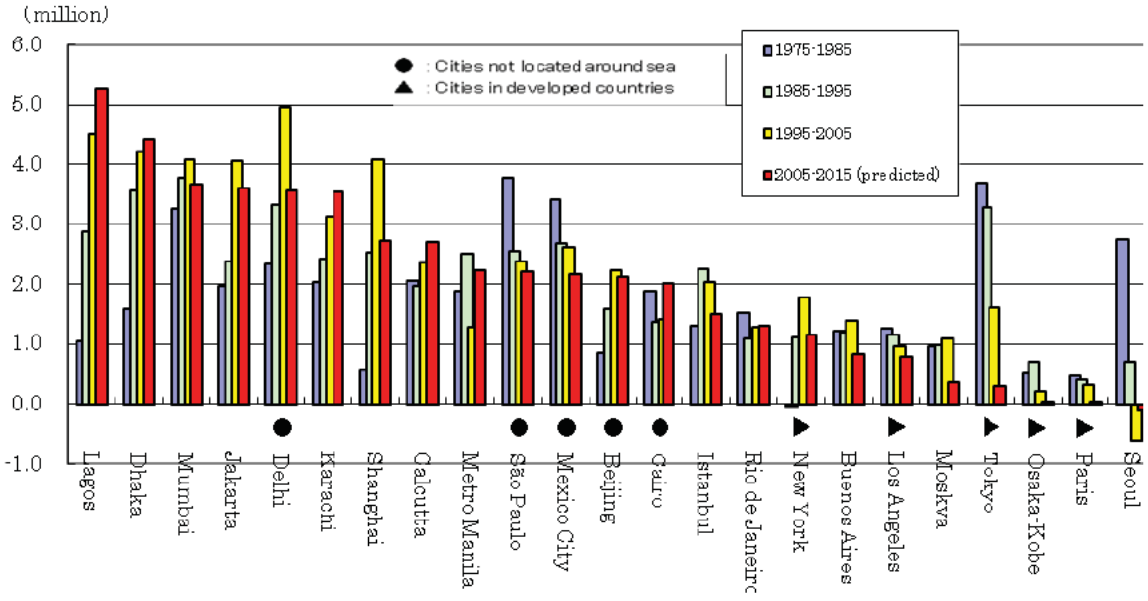


Figure 1-3 Demographic changes in major cities worldwide between 1975 and 2015

((Prepared by ICHARM based on World Urbanization Prospects:
2005 Revision by the Population Division, Department of Economic and Social Affairs, UN)

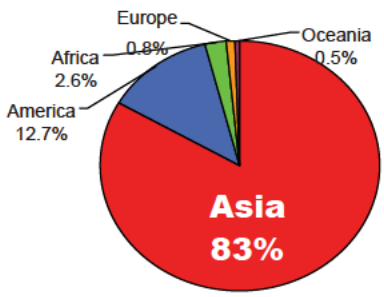


Figure 1-4

Distribution of fatalities due to water-related disasters (1980-2006)

(Prepared by ICHARM based on CRED EM-DAT)

In order to reduce the impact of natural disasters, well-balanced risk management before, during, and after disasters must be established in a multi-disciplinary manner, covering measures that involve infrastructure such as dams and levees, measures that involve non-infrastructure such as flood warning systems, risk-map/hazard-map and social psychology. To meet this need, disaster management experts must be created through professional education and training so that they can develop appropriate disaster management policies and techniques based on local conditions and needs, and exchange various information with local residents in order to raise awareness of disaster prevention in local communities.

Given these circumstances, in order to enhance the capabilities of experts in developing countries to cope with water-related disasters, ICHARM, the National Graduate Institute for Policy Studies (GRIPS), and the Japan International Cooperation Agency (JICA) jointly launched a master's degree program called the "Water-related Disaster Management Course of Disaster Management Policy Program" (afterwards referred to as "the course") in 2007. The JICA training name was "TRAINING FOR EXPERT ON FLOOD-RELATED DISASTER MITIGATION." This year marked the fifth time this course was held.

The United Nations designate 2005-2014 as the Decade for Education and Sustainable Development, under the initiative of the United Nations Educational Scientific and Cultural Organization (UNESCO). The course is exactly in step with the spirit of that Decade. ICHARM is honored to be one of the organizers, especially in consideration of the fact that the center was established under the auspices of UNESCO.

1.2 Objectives of this Course

Against this background, we have set the final goals and objectives of the course to be as follows.

<Overall Goal>

The damage of water-related disasters is reduced by planning and implementing the countermeasures of water-related disasters in their countries.

<Program Objective>

The participant's capacity to practically manage the problems and issues concerning water-related disasters is developed for contributing to mitigation of water-related disasters in their countries.

1.3 Outputs of this Course

Students acquire the following skills and knowledge by studying on this course.

Participants are expected to achieve the following outputs;

(1) To be able to explain basic concept and theory on generation process of water-related disasters, water-related hazard risk evaluation, disaster risk management policy and technologies.

(2) To be able to explain basic concept and theory on flood countermeasures including landslide and debris flow.

(3) To formulate the countermeasures to solve the problems and issues concerning water-related disasters in their countries by applying techniques and knowledge acquired through the program.

1.4 Features of this Course

The course is characterized by the three following points:

I. "Problem Solving-Oriented" course

In order to manage major disasters, it is essential to develop disaster management capabilities at the level of the organization as well as the abilities of the individuals within that organization, since there is always a limit on what each individual can achieve.

JICA training programs in recent years have shifted their focus to "problem solving-oriented training" which aims to improve the ability of organizations to deal with relevant problems and situations. This shift of course emphasis is based on the idea that such training delivers a dual benefit. First, the training will be more effective and efficient for each student if they first identify water issues specific to their countries and then proactively study in order to solve them. Moreover, it will produce results which are effective for solving the issues faced by the respective students' organizations.

Based on this course philosophy, this course is designed not to be one in which students are, in some way, forced to study but one in which they think independently and find solutions to issues that are of interest to them. One of the requirements for graduation from this course is to write a master's thesis on an issue which each student identifies and to which they find their own solution. Such assignments help students develop the ability to formulate integrated flood mitigation plans, and help them address other issues at home.

II. "Practical" rather than "Theoretical"

To make the course solution-oriented, lectures and exercises which are practical rather than theoretical are provided on the course in order to enable students to work effectively in actual situations. For this reason, field trips are an essential part of the course.

III. 1 year master's course

This master's course is intended for personnel currently working in administrative organizations. For this reason, it is designed to let them earn a master's degree within a single year rather than the usual two years so that they do not have to be absent from work for an excessively long period.

1.5 Qualification for this Course

There are two methods for attendance of this course. In the first, trainees of the JICA training program "TRAINING FOR EXPERT ON FLOOD-RELATED DISASTER MITIGATION", who were recruited and selected by overseas JICA offices, participate as GRIPS students. In the second, students apply directly and are accepted for GRIPS. For the former, the overseas JICA offices in each country determine course participation once they have checked and understood the needs of participation with the relevant organizations in that country in advance, which means that students from countries for which participation has not been determined are unable to participate.

1.5.1 Application as JICA Trainee

According to the preliminary participation needs survey, the candidate countries, eligible organizations, and requirements for applicants were as follows.

Candidate Countries:

Philippines, Bangladesh, Nepal, Indonesia, Laos, China, Mongolia, Pakistan, Sri Lanka, Republic of the Fiji Islands, Barbados, Brazil, Guyana, Tunisia, Republic of Moldova, Viet Nam

Eligible/Target Organization:

Governmental organizations concerning river management or water-related disasters

Nominee Qualifications:

Applicants should;

(1) be nominated by their governments.
(2) be technical officials, engineers or researchers who have three (3) or more year of experience in the field of flood management in governmental organizations.
(* Basically, researcher in the University (ex: professor, etc.) are excluded.)
(3) be university graduates in civil engineering, water resource management, or disaster mitigation, etc. or have an equivalent academic background.
(4) have working knowledge of civil engineering, especially of hydraulics and hydrology.
(5) be familiar with mathematics such as differentiation and integration techniques.
(6) be able to write research reports on the individual study in English.
(7) be proficient in MS Word, Excel and Power Point.
(8) have a competent command of spoken and written English which is equivalence to TOEFL CBT 213/iBT79, IELTS 6.0 or more (This program includes active participation in discussions and development of the action plan and Master thesis, thus requires high competence of English ability both in conversation and composition. Please attach an official certificate for English ability such as TOEFL, TOEIC etc.)
(9) be in good health, both physically and mentally, to participate in the program in Japan.
(10) be over twenty-two (22) and under forty (40) years of age.
(11) not be serving any form of military service.

1.5.2 Direct Application to GRIPS

Requirements for direct application to GRIPS were as follows.

To be eligible for admission to this master's program, an applicant

1) must hold a bachelor's degree or its equivalent from a recognized/accredited university of the highest standard in the field of civil engineering, water resource management, or disaster mitigation.
2) must have working knowledge of civil engineering, especially of hydraulics and hydrology.
3) must be familiar with mathematics such as differentiation and integration techniques.
4) must satisfy the English language requirements with a minimum TOEFL score of Internet-Based Test (iBT) 79 (Paper-Based Test 550) , IELTS 6.0 or its equivalent.
5) must be in good health.

1.5.3 Final Decision on Acceptance of Students

Nineteen students were accepted into the program through the program steering committee, which consists from the following members:

- Prof. Kenji Okazaki, GRIPS [Director of the program]
- Senior Prof. Shigeru Morichi, GRIPS
- Prof. Hideo Fukui, GRIPS
- Special Prof. Hiroshi Ikeya, GRIPS
- Prof. Fumio Takeda, GRIPS
- Dr. Shoichi Ando, Director, International Institute of Seismology and Earthquake Engineering (IISEE), Building Research Institute (BRI)
- Dr. Toshiaki Yokoi, Chief Research Scientist, IISEE, BRI
- Dr. Kuniyoshi Takeuchi, Director, ICHARM
- Dr. Shigenobu Tanaka, Deputy Director, ICHARM

As a result of deliberations among program committee members, a total of 19 students, the largest number ever, were selected. Annex 1-1 shows the list of students. Please note that for this academic year, the 19 students will be participating as JICA trainees. In addition, the following three people from Pakistan participated as part of the "Strategic Strengthening of Flood Warning and Management Capacity of Pakistan" project that UNESCO and ICHARM are taking the lead in promoting following the disastrous 2010 floods in Pakistan.

- Mr. RANA MUHAMMAD ATIF, Pakistan Meteorological Department
- Mr. MUHAMMAD ALEEM UL HASSAN RAMAY, Pakistan Meteorological Department
- Mr. AHMAD ALI GUL, Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)

1.6 Organization of Course Teaching Personnel

The course uses the following organizational structure for teaching personnel. Please note that all instructors were appointed as collaborative faculty by GRIPS.

International Centre for Water Hazard and Risk Management (ICHARM), PWRI

Collaborating Professor (Director)	Kuniyoshi Takeuchi
Collaborating Professor (Research and Training Advisor)	Jayawardena Amithirigala
Collaborating Professor (Deputy Director)	Shigenobu Tanaka
Collaborating Professor (Chief Researcher)	Yeh Jen-Feng (from April 2012)
Collaborating Associate Professor (Chief Researcher)	Kazuhiko Fukami
Collaborating Associate Professor (Researcher)	Atsuhiro Yorozuya
Collaborating Associate Professor (Researcher)	Takahiro Sayama

In accordance with the research themes of the students, ICHARM researchers in the relevant fields provided instructions whenever necessary.

Chapter 2: Course Content

2.1 Course Schedule

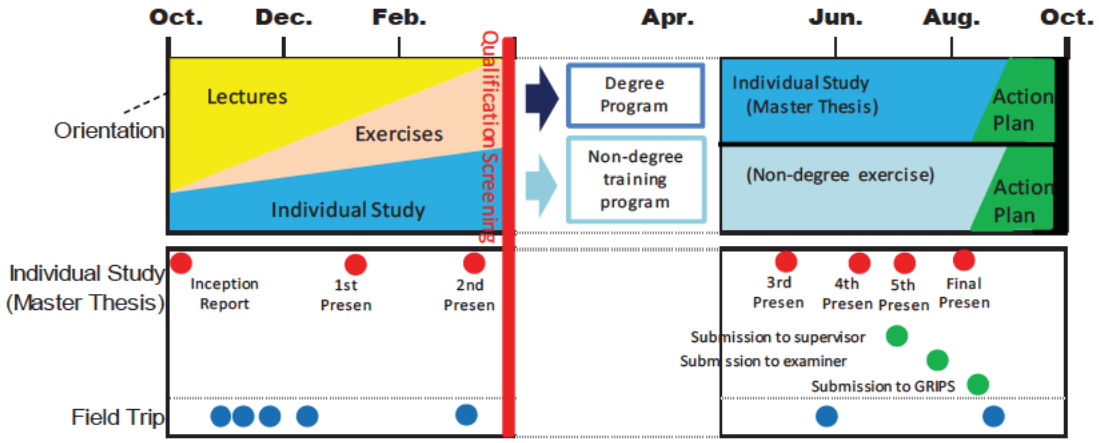


Figure 2-1 Conceptual figure of course schedule

The course was conducted over a period of around one year, from October 2, 2011 (date of arrival in Japan) to September 15, 2012 (departure date). The opening ceremony at GRIPS was held on October 3, 2011, and the graduation ceremony on September 14, 2012.

Figure 2-1 shows a course schedule.

The first half of the course (October to March) consists mainly of "Lectures" (11 subjects) and "Exercises" (6 subjects). Several field trips are also conducted throughout the year to enhance the students' understanding of the content of the lectures. In addition, in order to provide opportunities for students to learn about the latest knowledge and trends regarding water-related disasters, students are required to attend some ICHARM R&D Seminars held with invited experts.

In late March the Qualification Screening was held, in which ICHARM faculty determined whether students had the levels of knowledge required to write a master's thesis.

In the second half of the course (April to September), students conducted Individual Study (1 subject), consulting with their supervisors (ICHARM researchers, etc.) as they proceeded to complete their master's theses. To check progress on master's theses, individual students are given opportunities of Interim Presentations of around ten minutes about once every one to two months. In these presentations, students receive advice from other students and supervisors as necessary. After submitting their master's theses, students, who are accepted through the JICA recruitment procedure, start creating Action Plans for activities that they will perform after they return to their home countries.

In addition, Homeroom including the ICHARM director is held every month so that the director can listen to students' opinions regarding making improvements to their general daily lives, lectures and exercises, and master's thesis procedures.

Table 2-1 Main schedule for year

Date		Event
2011	3rd	Entrance Guidance & Orientation at GRIPS
October	7th	Ph.D. & M.Sc. Joint Opening Ceremony at ICHARM
	12th	Joint lectures with students of DMP earthquake/Tsunami Course
		Site visit of PWRI experimental facilities
	18th	Presentation on Inception Report
	19th -25th	Individual discussion with ICHARM researchers
	27th	Site Visit (1) River in Japan (Ara River)
	28th	Site Visit (2) Flood Information (MLIT Kanto Regional Office) & Metropolitan Area Outer Underground Discharge Channel
November	1st	Lecture & Site visit at JAXA
	10th	Site Visit (3) Kuki City & Watarase Retarding Basin
	22nd	Site Visit (4) River improvement in urban area (Tokyo Shirako River)
December	9th	Site Visit (5) Integrated flood management (Tsurumi River)
	13th	ICHARM R&D Seminar by Prof. Koike & Prof. Asaeda
2012	10th - 12th	Exercise on Project Cycle Management (PCM)
January	16th	1st Interim Presentation
	23rd -2nd	Lectures at GRIPS
February	3rd – 4th	Site Visit (6) Northern Part of Kyusyu Region
	14th	Hydraulic Experiment
March	9th	2nd Interim Presentation
	14th – 16th	Site Visit (7) Chugoku & Kinki Region (Hii River, Ota River, Kamenose Landslide, etc.)
April		
	24th	3rd Interim Presentation
May		
	18th	Lecture & Site visit at Japan Meteorological Agency
	19th	Site Visit (8) Flood Fighting Drill in Tone River (Kurihashi)
	21st	Site Visit (9) Dam & Sabo Project (Ikari Dam & Kawaji Dam, Ashio Sabo)
	22nd	Hydraulic Experiment using ADCP in Tone River
June	1st	4th Interim Presentation
	11th	ICHARM R&D Seminar by Mr. Eisa Bozorgzadeh and Dr. Saied Yosefi
July	6th	Deadline of submission of the 1st draft thesis
	10th	5th Interim Presentation
	27th	Deadline of submission of the 2nd draft thesis
August	10th	Final Presentation at ICHARM
	16th	Deadline of submission of the complete draft thesis
	27th	Submission of Master Thesis to GRIPS
September	6th	JSCE Annual Meeting at Nagoya Univ.
	7th -8th	Site Visit (10) Shingu City and Ise City
	11th	ICHARM R&D Seminar by Mr. Imbe (ARSIT)
	12th	Presentation on Action Plan
	13th	Closing Ceremony at JICA
	14th	Graduation Ceremony at GRIPS

2.2 Course Curriculum

2.2.1 Lectures and Exercises

The course is oriented towards problem solving and focuses on application to actual tasks. Therefore, in addition to basic studies on water hazard risk management, it is characterized by heavy emphasis on studies and exercises involving actual applications.

Table 2-2 shows the list of course classes. Overall, the course consists of 18 subjects in three categories: I. Required Course, II. Recommended Course and III. Elective Course. In the main, lecture-oriented courses are Recommended Course, and exercise-oriented courses are Elective Course.

Each subject consists of 15 periods. All the Recommended Course are compulsory (two credits), all the Elective Course are optional (one credit), and the Individual Study requires ten credits. To be awarded a master's degree, students must earn at least 30 credits, 16 credits of which must be from Recommended Course. Students are awarded a master's degree on "Disaster Management" after having earned the necessary credits and passing the thesis review. Students are not necessarily required to complete all subjects to earn the necessary credits, but the students on this course took all subjects.

Table 2-3 shows how each subject corresponds to the course output described in 1.3.

Annex 2-2 lists the curriculum for each course, and Annex 2-3 gives the syllabus for each subject.

2.2.2 Lecturers

The lecturers for this course include not only ICHARM researchers but also many professionals invited from PWRI, National Institute for Land and Infrastructure Management (NILIM) and universities, so that students can learn the latest information. As shown in Table 2-4, there were 12 lecturers from universities, 16 from incorporated government agencies/foundations/securities research institutes, etc., 7 from the Cabinet Office/PWRI/NILIM, and 15 from ICHARM, for a total of 50 lecturers both in-house and invited.

With respect to the implementation of lectures, exercises, and individual studies on this course, the ICHARM staff and responsible lecturers are also contracted to act as GRIPS coordinating instructors, providing guidance.

2.2.3 Field Trips and Lectures conducted by officials related to Disaster Prevention Administration

In this course, in order that students can learn by observing the actual conditions relating to Japan's flood countermeasures, in addition to lectures and exercises at ICHARM, there are field trips to reservoirs, diversion channels, dams, and landslide prevention sites. Students also visit Regional Bureaus of the Ministry of Land, Infrastructure, Transport and Tourism and local government offices to listen to lectures given by disaster prevention officials whose work involves direct interaction with local residents. These officials give explanations of the flood information transmission systems and flood hazard maps used in Japan so that students can enhance their understanding of the problems actually encountered by Japanese disaster prevention authorities. Table 2-5 shows the list of field trip sites.

The field trip sites were carefully selected so that students can actually observe the flood prevention facilities described in lectures and see representative flood prevention facilities in Japan. To ensure that they are not simply enjoyed in the manner of leisure excursions, students are required to submit reports after field trips so as to enhance their understanding of the relevant issues. Annex 2-4 shows the itineraries of the field trips.

Table 2-2 List of courses

Category	Course No.	Course Title	Instructor	Term	Credit	
I Required Courses	DMP480E	Individual Study		Winter through Summer	10	
II Recommended Course	DMP200E	Disaster Mitigation Policy	Morichi	Winter	2	
	DMP201E	Disaster Risk Management	Okazaki	Winter	2	
	DMP280E	Basic Hydrology	Jayawardena	Fall through Winter	2	
	DMP281E	Hydraulics	Huang	Fall through Winter	2	
	DMP282E	Basic Concepts of Integrated Flood Risk Management(IFRM)	Takeuchi	Fall through Winter	2	
	DMP287E	Urban Flood Management and Flood Hazard Mapping	Tanaka	Fall through Spring	2	
	DMP380E	Advanced Hydrology	Jayawardena	Fall through Winter	2	
	DMP381E	Flood Hydraulics and Sediment Transport	Fukuoka	Fall through Winter	2	
	DMP382E	Mechanics of Sediment Transportation and Channel Changes	Egashira	Fall through Winter	2	16
	DMP383E	Sustainable Reservoir Development & Management	Matsumoto	Fall through Winter	2	
	DMP384E	Control Measures for Landslide & Debris Flow	Ikeya	Fall through Winter	2	
III Elective Courses	DMP180E	Computer Programming	Sayama	Fall through Winter	1	30
	DMP288E	Practices in Hydraulics	Yorozuya	Fall through Spring	1	
	DMP286E	Practice on Local Disaster Management Plan	Tanaka	Fall through Spring	1	
	DMP385E	Practice on Advanced Hydrology	Jayawardena	Fall through Spring	1	
	DMP386E	Practice on Flood Hazard Modeling & Flood Forecasting	Fukami	Fall through Spring	1	
	DMP390E	Site Visit of Water-related Disaster Management Practice in Japan	Tanaka	Fall through Summer	1	
		Selected Topics in Policy Studies I -IV*				

Notes:

1. This table applies to students in the Disaster Management Policy Program (Water-related Disaster Management).

2. Graduation Requirements: Students must complete a minimum of 30 credits, 16 of which must come from Category II.

3. Courses offered in the Program are subject to change.

4. *Course Number, Instructor, and Term for the course will be announced later when the course is offered.

Table 2-3 Subjects contributing to outputs

Outputs	Subjects
1. To be able to explain basic concept and theory on generation process of water-related disasters, water-related hazard risk evaluation, disaster risk management policy and technologies.	Basic Hydrology
	Advanced Hydrology
	Hydraulics
	Flood hydraulics and sediment transport
	Mechanics of sediment transportation and river changes
	Sustainable reservoir development & management
	Control measures for landslide & debris flow
	Computer Programming
	Practice on Flood Hazard Modeling & Flood Forecasting
2. To be able to explain basic concept and theory on flood countermeasures including landslide and debris flow.	Disaster management policy
	Disaster risk management
	Basic concepts of IFRM: Integrated Flood Risk Management
	Urban Flood Management and Flood Hazard Mapping
3. To formulate the countermeasures to solve the problems and issues concerning water-related disasters in their countries by applying techniques and knowledge acquired through the program.	Individual study Action Plan

Table 2-4 List of Lecturers (positions as of that time)

Lecturer	Affiliation	Lecture
University		
Prof. Shigeru Morichi	GRIPS	Disaster Mitigation Policy
Prof. Muneo Hori	University of Tokyo	Disaster Mitigation Policy
Asso. Prof. Kazushi Sano	Nagaoka Univ. of Technology	Disaster Mitigation Policy
Prof. Kenji Okazaki	GRIPS	Disaster Risk Management
Prof. Guangwei Huang	Sophia University	Hydraulics
Prof. Taikan Oki	University of Tokyo	Basic Concepts of IFRM
Prof. Shigeko Haruyama	Mie University	Urban Flood Management and Flood Hazard Mapping
Prof. Haruo Hayashi	Disaster Prevention Research Institute, Kyoto University	Urban Flood Management and Flood Hazard Mapping
Prof. Shoji Fukuoka	Chuo University	Flood Hydraulics and Sediment Transport
Prof. Yasuharu Watanabe	Kitami Institute of Technology	Flood Hydraulics and Sediment Transport
Prof. Tetsuya Sumi	Kyoto University	Sustainable Reservoir Development & Management
Prof. Katsuo Sasahara	Kochi University	Control Measures for Landslide & Debris Flow
Private sectors, and others		
Dr. Hiroshi Oyama	Institution For Transport Policy Studies	Disaster Mitigation Policy
Dr. Misako Kachi	Japan Aerospace Exploration Agency (JAXA)	Basic Hydrology
Dr. Takuji Kubota	Japan Aerospace Exploration Agency (JAXA)	Basic Hydrology
Mr. Masayuki Watanabe	Institute for International Development, Disaster Prevention and Peace Inc.	Basic Concepts of IFRM
Mr. Masahiro Imbe	Association for Rainwater Storage and Infiltration Technology	Urban Flood Management and Flood Hazard Mapping
Prof. Shinji Egashira	NEWJEC Inc.	Mechanics of Sediment Transportation and River Changes
Dr. Tadahiko Sakamoto	Japan Commission on Large Dams	Sustainable Reservoir Development & Management
Prof. Norihisa Matsumoto	Japan Dam Engineering Center	Sustainable Reservoir Development & Management
Dr. Josuke Kashiwai	Japan Dam Engineering Center	Sustainable Reservoir Development & Management
Dr. Hiroshi Ikeya	Sabo Technical Center	Control Measures for Landslide & Debris Flow
Dr. Yoshihumi Hara	Japan Sabo Association	Control Measures for Landslide & Debris Flow
Dr. Kazuyuki Takanashi	Asia Air Survey Co., Ltd.	Control Measures for Landslide & Debris Flow
Dr. Ryosuke Tsunaki	Sabo Technical Center	Control Measures for Landslide &

		Debris Flow
Dr. Kazunori Fujisawa	Nippon Expressway Company	Control Measures for Landslide & Debris Flow
Ms. Keiko Kita	GLM Institute	Practice on Local Disaster Management Plan
Ms. Fumiko Iseki	GLM Institute	Practice on Local Disaster Management Plan
Cabinet Office, NILIM, PWRI		
Mr. Shigeo Ochi	Cabinet Office	Disaster Risk Management
Mr. Tomoya Nagai	Cabinet Office	Disaster Risk Management
Dr. Shigeki Unjo	National Institute for Land and Infrastructure Management (NILIM)	Disaster Mitigation Policy
Dr. Kunihiko Amano	National Institute for Land and Infrastructure Management (NILIM)	Sustainable Reservoir Development & Management
Dr. Nobutomo Osanai	Public Works research Institute (PWRI)	Control Measures for Landslide & Debris Flow
Prof. Yoshikazu Yamaguchi	Public Works research Institute (PWRI)	Sustainable Reservoir Development & Management
Dr. Hitoshi Umino	Public Works research Institute (PWRI)	Sustainable Reservoir Development & Management

ICHARM	
Prof. Kuniyoshi Takeuchi	Basic Concepts of IFRM, Master's Thesis
Prof. Shigenobu Tanaka	Urban Flood Management and Flood Hazard Mapping, Practice on Local Disaster Management Plan, Master's Thesis
Prof. Amithirigala JAYAWARDENA	Basic Hydrology, Advanced Hydrology, Practice on Advanced Hydrology, Master's Thesis
Asso. Prof. Kazuhiko Fukami	Practice on Flood Hazard Modeling & Flood Forecasting, Master's Thesis
Mr. Minoru Kamoto	Master's Thesis
Asso. Prof. Takahiro Sayama	Computer Programming, Practice on Flood Hazard Modeling & Flood Forecasting, Master's Thesis
Mr. Seishi Nabesaka	Practice on Flood Hazard Modeling & Flood Forecasting,
Dr. Atsuhiro Yorozuya	Practice on Hydraulics, Master's Thesis
Dr. Kwak Young Joo	Practice on Local Disaster Management Plan, Master's Thesis
Dr. Akira Hasegawa	Computer Programming, Master's Thesis
Dr. Tomoki Ushiyama	Computer Programming, Master's Thesis
Dr. Ai Sugiura	Practice on Flood Hazard Modeling & Flood Forecasting, Master's Thesis
Dr. Mamoru Miyamoto	Practice on Flood Hazard Modeling & Flood Forecasting, Master's Thesis
Mr. Susumi Fujioka	Practice on Flood Hazard Modeling & Flood Forecasting
Dr. Megumi Sugimoto	Master's Thesis

Table 2-5 List of field trip sites

Date	Location	Details	Cooperating Office
2011 October 27th	Ara River Downstream	Diversion channel (open channel), Ara River lock gate, Super Levee, Disaster Management Room, Dry riverbed use, Ukima Disaster Management Station	Arakawa-Karyu (Ara River Downstream) River Office, MLIT
October 28th	Kanto Regional Development Office	Lecture on flood information transmission systems and flood forecasting, Visit to flood forecast room	Rivers Dept., Kanto Regional Development Bureau, MLIT
	Metropolitan Area Outer Underground Discharge Channel	Diversion channel (closed channel)	Edogawa River Office, MLIT
November 10th	Tone River (Kurihashi, Kuki City)	Flood hazard map, Flood marks on utility poles ("Marugoto-machigoto Hazard Maps"), Flood level display tower, Provision of river information at Kurihashi Station Breach point by Typhoon Kathleen	Tonegawa-Joryu (Tone River Upstream) River Office, MLIT
	Watarase River Downstream	Watarase River retarding basin	
November 22nd	Shirako River Shakujii River	Flood control measures for small- to medium-sized rivers in heavily populated major cities • Shirako River reservoir cluster • Shirako River/Shakujii River improvements	Bureau of Construction, Tokyo Metropolitan Gov.
December 9th	Tsurumi River	Tsurumi River retarding basin, Kirigaoka retarding pond, Onmawashi underground reservoir cluster Private home storage and infiltration facilities	Keihin River Office, MLIT
2012 March 14th	Hii River	Ohashigawa Community Center, Hii River diversion channel construction site, Obara Dam	Izumo River Office, MLIT
March 15th	Ota River	Takase Weir, erosion control facilities, Gion water gate, Motoyasu River terrace	Ota River Office, MLIT
March 16th	Disaster Reduction and Human Renovation Institution	Disaster recovery and restoration	-
	Yamato River	Kamenose landslide	Yamato River Office, MLIT
May 18th	Meteorological Agency	Lecture: "Climate prediction tasks in Japan and flood forecasting for specified rivers"	Meteorological Agency
May 19th	Tone River	Attended the "61st Tone River Flood Fighting Drill"	Kanto Regional Development Bureau, MLIT
May 21st	Kinu River Upstream	Kawaji Dam/Ikari Dam integrated project	Kinugawa Integrated Dam Control Office, MLIT
	Watarase River Upstream	Ashio check dam project	Watarase River Office, MLIT
May 22nd	Tone River	Tone Great Weir	Japan Water Agency Tone Water Transfer Canal System Reconstruction and Management Office
September 6th	Kumano River	Support projects for affected persons	Shingu City, Wakayama Pref.
		Special dike (polder)	Kinan Rivers Office, MLIT
September 7th	Miya River Downstream	Local disaster prevention initiatives (Disaster maps, etc.)	Ominato Promotion Committee, Ise City

2.2.4 Studying and Living Environment

As is usual in universities, lesson time is divided into credits of 90 minutes. Table 2-6 shows the daily timetable. Students stay at JICA Tsukuba (Kouyadai, Tsukuba, Ibaraki) and commute to classes on the JICA bus.

Table 2-6 Daily timetable

1st period	9:00-10:30
2nd period	10:45-12:15
3rd period	13:15-14:45
4th period	15:00-16:30

As was the case last year, in the first half of the course from October to March there is an “Nicchoku” (officer-of-the-day) system, with the students participating in turn; the student assigned as the Nicchoku for the day performs tasks such as taking attendance, cleaning whiteboards after classes, making sure doors and windows are locked and lights are turned off, and writing a simple report on the day’s results on a “Nicchoku Sheet” (one page of A4 sized paper). In the second half of the course, from April to September, which mainly consists of individual study, students take turns on a weekly basis, checking attendance and producing a weekly summary report.

2.3 Master’s Thesis

As mentioned above, this course is characterized by its “Problem Solving-Oriented” nature, which aims to allow students think and solve problems rather than forcing them to study. In accordance with this objective, students are required, for their master’s thesis on this course, to study themes related to solving problems in their own countries. We hope to develop people with the ability to create comprehensive plans for the reduction of damage from water-related disasters and to promote problem solving in the home countries of our students when they return there.

Therefore, immediately after the course starts, we held an “Inception Report” presentation in which students explained the water related problems in their home countries, gave information concerning the areas in which they were planning to study for their master’s theses, and described the tasks required for the performance of projects. Following this, ICHARM supervisors and students discussed themes for study, and students started working on their own study themes from late March 2012, at which time they had completed most of their lectures and exercises. The deadline for submitting master’s theses was late August 2012, and submission was followed by acceptance examinations in GRIPS to determine whether master’s degrees could be awarded.

Chapter 3: 2011-2012 Activity Report

Group photo taken at the front gate of the National Graduate Institute for Policy Studies
(September, 14, 2012)

(See photographs at the beginning of this report.)

ICHARM implemented the Water-related Disaster Management Course of Disaster Management Policy Program (JICA training name “TRAINING FOR EXPERT ON FLOOD-RELATED DISASTER MITIGATION”) over a period of around one year from October 2, 2011 to September 15, 2012 as a joint program with the Japan International Cooperation Agency (JICA) and the National Graduate Institute for Policy Studies (GRIPS).

The goal of this course is to foster solution-oriented practitioners who have solid theoretical and engineering foundations and are capable of planning and practicing flood management within the framework of integrated river basin management at all levels from national to local.

The course has several specific features, as follows. Students can earn a master’s degree in one year. The training is oriented toward problem solving in order to improve the students’ ability to propose solutions to actual problems in their home countries. The course focuses on actual tasks rather than theory.

There were 19 students this year: two from Bangladesh, two from China, one from Fiji, two from Indonesia, two from Nepal, six from Pakistan, one from Sri Lanka, one from the Philippines, one from Tunisia, and one from Vietnam. These 19 students all successfully passed their thesis examinations, earned their master’s degrees (in Disaster Management), and returned to their home countries.

The course formally started on October 3, 2011 with an Entrance Ceremony held by GRIPS at the GRIPS building (Roppongi, Tokyo).

On October 7, PWRI executives (Chief Executive Uomoto, Deputy Chief Executive Oishi, Executive Director for Geology Wakisaka), ICHARM faculty (ICHARM Director Takeuchi, Deputy Director Tanaka, Chief Researcher Kamoto), JICA Tsukuba personnel (Director Sato, Mr. Yuasa, Training Coordinator

Araki), and Professor Okazaki from GRIPS attended the Opening Ceremony at PWRI, where Mr. Barun Kumar Karna from Nepal, the acting student representative, read a statement of principle.

The first half of this one year course consisted mainly of lectures and exercises related to water-related disasters, and in the second half, students spent a long period working on their individual studies. The students also went on field trips in order to learn from the actual locations where Japan's flood countermeasures are implemented.

The instructors on the course included not only researchers at ICHARM but also those at PWRI, NILIM, and universities in Japan involved in leading edge research in various fields of study connected with water-related disasters.

<Lectures/Exercises (October to December)> (positions as of that time)

First, Professor Kuniyoshi Takeuchi (ICHARM), Professor Taikan Oki (University of Tokyo), and President Masayuki Watanabe (Institute for International Development) gave lectures under the title "Basic Concepts of Integrated Flood Risk Management (IFRM)," enabling students to learn the fundamentals of flood disaster management and global warming, which are required knowledge for studying water disaster measures in a master's degree course.

During the same period, Associate Professor Atsuhiro Yorozuya (ICHARM) provided exercises in "Practices in Hydraulics" for students to review calculus, which is required knowledge for this course, and Professor Huang Guangwei (Sophia University) provided lectures on "Hydraulics" for students to review the basics of hydraulics.

In addition, Professor Shoji Fukuoka (Chuo University) and Professor Yasuharu Watanabe (Kitami Institute of Technology) gave lectures under the title "Flood Hydraulics and Sediment Transport" teaching the basic principles of flood flow and sediment transport. These lectures were followed by "Mechanics of Sediment Transportation and River Changes" lectures, by Professor Shinji Egashira (NEWJEC Inc.).

Professor Jayawardena Amithirigala (ICHARM) conducted "Basic Hydrology" and "Advanced Hydrology" lectures and exercises from October to early March, giving extensive coverage, both qualitatively and quantitatively, of methods for handling the various hydrological data which forms the fundamental data of flood prevention. In addition, to present the latest knowledge on rainfall measurement, Associate Professor Kazuhiko Fukami (ICHARM) lectured on remote sensing, while Senior Engineer Dr. Misako Kachi and Researcher Dr. Takuji Kubota (both from the Space Applications Mission Directorate of JAXA, the Japan Aerospace Exploration Agency) lectured on satellite measurement of rainfall.

ICHARM researchers started offering various exercises in November.

In the "Practice on Flood Hazard Modeling & Flood Forecasting" exercises, Associate Professor Kazuhiko Fukami, along with Researcher Seishi Nabesaka, Research Specialist Ai Sugiura, Research Specialist Mamoru Miyamoto, and Researcher Susumu Fujioka, taught students about IFAS, the Integrated Flood Analysis System application method being developed by ICHARM, by conducting practical exercises. Later, Associate Professor Takahiro Sayama lectured on the RRI (rainfall runoff inundation) model to allow students to better understand the systems of rainfall and flooding.

In the "Computer Programming" exercises, Associate Professor Sayama, Research Specialist Tomoki

Ushiyama, and Research Specialist Akira Hasegawa provided instruction on numerical solutions using FORTRAN.

<Lectures/Exercises (January to May)> (positions as of that time)

The “Urban Flood Management and Flood Hazard Mapping” class, which started in January, was conducted as a series of more practical applied lectures. For this subject, Professor Shigenobu Tanaka (ICHARM) gave lectures on Japan’s disaster prevention systems and river information systems, Professor Haruo Hayashi (Kyoto University) on disaster psychology, and Professor Shigeko Haruyama (Mie University) on geomorphology, an important topic for understanding flooding areas.

In “Practice on Local Disaster Management Plans,” students learned about using GIS software from Researcher Kwak Youngjoo (ICHARM).

Also, intensive lectures were offered at GRIPS school buildings (Roppongi, Minato-ku, Tokyo) for two weeks between January 23 and February 4. These lectures included “Disaster Mitigation Policy” and “Disaster Risk Management” by Professor Shigeru Morichi (GRIPS) and Professor Kenji Okazaki (GRIPS). Students also attended special lectures in the Cabinet Office and visited Kita Kyusyu as observation tours.

From February to March, lectures were held on “Sustainable Reservoir Development & Management” and “Control Measures for Landslides & Debris Flow” to allow students to understand the roles of dams and erosion control (*sabo*) as major structural measures in Japan. In the “Sustainable Reservoir Development & Management” lectures, Professor Norihisa Matsumoto (Japan Dam Engineering Center), as well as Chairman Tadahiko Sakamoto (Japan Commission on Large Dams), Director Tatsuo Omachi (Japan Dam Engineering Center), Professor Tetsuya Sumi (Kyoto University), Team leader Kunihiko Amano (NILIM), Chief Researcher Josuke Kashiwai (Japan Dam Engineering Center), and Professor Yoshikazu Yamaguchi and Senior Researcher Hitoshi Umino (both from the Public Works Research Institute) gave lectures on the latest trends and technologies for dams.

In “Control Measures for Landslides & Debris Flow,” Professor Hiroshi Ikeya (Director, Sabo Technical Center) as well as Professor Katsuo Sasahara (Kochi University), Permanent Councilor Yoshifumi Hara (Japan Sabo Association), Ryosuke Tsunaki (Sabo Technical Center), Manager Kazunori Fujisawa (Nippon Expressway Research Institute Company Ltd.), Lecturer Kazuyuki Takanashi (Consultant, Asia Air Survey Co., Ltd.), and Group Leader Nobutomo Osanai (PWRI) gave lectures on the latest trends and technologies for erosion control.

In “Practices in Hydraulics,” the students divided into groups to carry out hydraulics experiments at a hydraulics laboratory in Tsukuba City (Pacific Consultants Co., Ltd. Tsukuba Technical Research Center in Tsukuriya, Tsukuba City) to learn the basics of hydraulics first-hand. In addition, on May 22, they visited Taisho Bridge on the Tone River (Shibukawa City, Gunma Prefecture) to carry out flow volume measurement exercises using ADCP (Acoustic Doppler Current Profilers) devices with the cooperation of Suimon Kankyo Co., Ltd.

< Field trips and exercises >

With the support of local offices of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

and local governments, there were field trips to various flood control facilities in Japan enabling students to acquire clues to solving the problems presented by water-related disasters in their various countries.

On October 27, 2011, once the students had spent some time learning about the rivers of Japan, we visited the lower reaches of the Ara River with the cooperation of the MLIT's Arakawa-Karyu River Office . Using their boat, we went via the Arakawa lock gate to observe the Shinden Area Super Levee and learn about the Ara river at the Arakawa Museum of Aqua. After that, we walked along the river until we reached the Ukima Disaster Prevention Station, where we listened to an explanation of river management during both normal times and disasters.

The following day (October 28), we visited the disaster management office of the Kanto Regional Development Bureau's rivers department. Following a lecture on the state of wide-area hydrological and meteorological data management, we moved to the Metropolitan Area Outer Underground Discharge Channel where, with the cooperation of the Edogawa River Office, we visited the interior of the surge chamber. Not only were students amazed at its size, but were able to learn how to balance effectiveness with installation and maintenance costs.

On November 10, to learn about the MLIT's responses to flooding, we visited the MLIT's Tonegawa-Joryu River Office, where, after a lecture on hazard maps and river levels criteria, we viewed some flood marks on utility poles, known as "Marugoto Machigoto Hazard Maps" in the Kurihashi area and the Tone River water level display tower set up at the Kuki City Kurihara Branch Office as well as the Tone River information board set up at Kurihashi Station. The "Marugoto Machigoto Hazard Maps" are signs on utility poles along the main roads in the area; these signs use blue tape to indicate the actual depth of flooding that occurred during Typhoon Kathleen. These allow residents to easily understand the risks of flooding, and, since they are inexpensive, should prove effective in developing nations as well. In the afternoon, we moved to the Watarase Retarding Basin and viewed the site from the observation tower inside the basin area. The students were particularly interested in the environmental measures in the retarding basin, such as water purification.

On November 22, with the cooperation of the Tokyo Metropolitan Bureau of Construction, we visited the Shirako River Reservoir Cluster site and the Shakujii River flood control project in order to observe an actual example of flood control measures in the urban area without sufficient space for land. At the Shirako River Reservoir Cluster, we were able to see inside the holding ponds as well as the shafts cleverly being constructed by making use of the Oizumi Junction land. At the Shakujii River site, we received an explanation from the person in charge about the ways in which the organization had adapted to cope with water pollution and soundproof the flood control work area, as the river flows through an urban residential area downtown.

On December 9, with the guidance and cooperation of Associate Professor Masahiro Imbe (Executive Director of the Association for Rainwater Storage and Infiltration Technology) and the MILT's Keihin River Office, we visited the Tsurumi River Retarding Basin, the Kirigaoka Retarding Pond, and the houses of some local residents who had installed rainwater infiltration systems on their properties. The Tsurumi River area rapidly urbanized following the war; by learning about flood measures here, students should be able to find information that can be of use in implementing flood measures in major Asian cities, where populations are still increasing.

From March 14 to 16, with the cooperation of the MLIT's Izumo River Office, the Otagawa River Office, and the Yamatogawa River Office, we visited the Chugoku and Kinki regions. First, at the Ohashigawa Community Center in Matsue City, we received an explanation of the overall plan behind the "three-in-one" flood prevention project for the Hii River. We then observed the Hii River Diversion Channel and the Obara Dam, which just reached full capacity for the first time on March 3. The Hii River is a classic example of a raised bed river in Japan, and its drainage basin has long suffered from flooding. However, large-scale flood control measures such as cutting river channels as well as building dams and spillways have mitigated the extent of flood-related damage, and the students were given an opportunity to realize the importance of such structural measures. On March 15, in Hiroshima, the students learned about flood control plans and river usage strategies for the Ota River and observed and received explanations about the Gion Watergate as well as the Motoyasu River terrace. On March 16, students inspected the Disaster Reduction and Human Renovation Institution (Kobe) before going to see the prevention measures in place at the Kamenose landslide area, one of the largest landslide areas in Japan.

On May 19, we observed the "61st Tone River Flood Fighting Drill," held in the Kurihashi area of the Tone River; the students were surprised that such a large drill featuring so many flood control groups was held annually.

From May 21 to 22, with the cooperation of the MLIT's Kinugawa Integrated Dam Control Office and the Watarase River Office, we observed the operation of dams in the Kanto region and erosion prevention projects. On May 21, at the Kawaji and Ikari Dams, after learning how both dams were linked, we visited the connecting tunnel. In addition, we visited Akagane Shinsui Park to learn about erosion control projects. After being given an explanation using models, we climbed the hill and observed an erosion control project (Matsuki mountainside construction project), which once again allowed us to realize the importance of erosion control projects.

The following day (May 22), with the cooperation of the Japan Water Agency's Tone Water Transfer Canal System Reconstruction and Management Office, we observed the water transfer canal system for the Tone River, which plays a key role in the irrigation of the Kanto Plain. In the afternoon, we carried out ADCP exercises under the guidance of Associate Professor Yorozuya at Taisho Bridge, which crosses the Tone River in Shibukawa City, Gunma Prefecture.

From September 7 to 8, we visited Shingu City, Wakayama Prefecture, which experienced heavy flooding following torrential rains the previous year, and we were able to not only observe the extent of the damage but also attend a lecture on the support offered to those affected. We also visited the Ominato area of Ise City, where we were able to talk with the chairman of the Ominato Promotion Committee about community disaster management system. The Ominato area is located at the mouth of the Miya River, an area at risk of flooding that is well aware of the dangers of tsunamis. The students were told about the approaches the promotion committee has already taken and were able to deepen their understanding of the importance of approaches that involve the entire district.

< Master's thesis >

First, on October 11 and 13, opportunities were created for each researcher to talk about the research he

or she was conducting at ICHARM. Later, on October 18, Inception Reports were presented to allow us to understand the areas each student was interested in, and themes were narrowed down through discussions between the students and researchers regarding which ICHARM researcher each student would do their master's thesis research with.

For the three-day period from January 10 to 12, "Project Cycle Management," a very useful exercise that enabled students to objectively analyze the problems in their home countries and determine the direction of their master's theses, was taught by Keiko Kita and Fumiko Iseki from the GLM Institute (an NPO).

Following that, students gave a total of five interim presentations on their theses: first on January 16, then March 9, April 24, June 1, and July 10. These allowed the students to receive advice from ICHARM researchers as well as to compare their progress with that of other students, enabling them to stay motivated to prepare their theses. Professor Okazaki (GRIPS) also participated in the final presentations on August 10, where each student announced their results for the year.

In addition, as this course actively encourages the submission of papers to Japanese academic societies, this year Mr. Muhammad Aleem Ul Hassan Ramay (Pakistan) and Mr. Aymen Lazrak (Tunisia), though participating as observers, gave presentations at the "14th International Summer Symposium" (Nagoya University), held on September 6 by the Japan Society of Civil Engineering.

We intend to continue providing such opportunities for students to present their studies outside the program in order to motivate them in their work on their master's theses.

<Others>

Students actively participated in the "ICHARM R&D Seminar" presented by water disaster area specialists invited by ICHARM. Students were given a large number of opportunities to learn about the most recent trends and knowledge related to water disasters in both Japan and the wider world.

The Director of PWRI and the Director of the ICHARM held a tea ceremony in an ICHARM classroom to allow the students to experience Japanese culture on April 15. After a female staff of ICHARM explained about the spirit of tea ceremony, the students practiced how to whisk the tea, eat the confectionary, and taste the tea. While their actions were certainly those of beginners, they were able to enjoy both the tea and the confectionary.

On September 12, the Action Plans, which report how the results of training will be used once the students return home and what students will be involved with, were announced. This was followed by a thank-you party for the teaching faculty put on by the students.

On September 13, the closing ceremony for JICA training was held at JICA Tsukuba. During the ceremony, JICA Tsukuba Director Kimura and ICHARM Director Takeuchi made congratulatory remarks, after which program completion certificates were awarded from JICA. The Best Research Award, an award established jointly by GRIPS and PWRI for the student who wrote the best master's thesis, was given to both Miss Zhu Bing (China) and Mr. Arslan Usman (Pakistan). In addition, based on the votes of all students, ICHARM presented the ICHARM Sontoku Award, an award for the student who made the biggest

contribution to the program, to Mr. Muhammad Aleem Ul Hassan Ramay (Pakistan). Representing the trainees, Mr. Hassan shared a few words of thanks to conclude the ceremony.

On September 14, the graduation ceremony was held at GRIPS. Professor Okazaki announced the names of the students, and the Dean of GRIPS presented a diploma to each of them on the stage. The students then firmly shook hands with Professor Takeuchi, taking their diplomas—the fruit of their year of study—with expressions of great satisfaction.

On September 15, the students returned to their home countries.

Chapter 4: Master's Thesis

As noted above, Table 4-1 shows the main schedule relating to the master's theses this year.

Table 4-1 Schedule relating to master's thesis

2011	18th October	Presentation on Inception Report
2012	10th – 12th , January	Project Cycle Management exercise
	16th , January	1st Interim Presentation
	9th , March	2nd Interim Presentation
	24th , April	3rd Interim Presentation
	1st , June	4th Interim Presentation
	6th , July	Deadline of submission of the 1st draft thesis
	10th ,July	5th Interim Presentation
	27th , July	Deadline of submission of the 2nd draft thesis
	10th, August	Final Presentation
	27th ,August	Submission to GRIPS

As noted earlier, this course is a one-year master's course, and as such students select their thesis themes in October or November, immediately after arriving in Japan and without waiting for the lectures and exercises to be completed. This year, as there were so many students, each student was assigned an appropriate ICHARM teaching faculty member after ample time was taken to consider the various research areas of each ICHARM research specialist. As a rule, each year the subsequent thesis writing is supported by individual consultations between the students and their supervisors. Since Mr. Sirajul Islam (Bangladesh) and Mr. Krishna Prasad Rajbanshi (Nepal) were fortunate enough to have Professor Egashira as their supervisor, they travelled to Osaka four times to receive guidance.

Like last year, there were five interim presentations in which students presented their own research to receive advice from ICHARM faculty and other students as well as got a sense of other students' stage of progress and consequently developed an appropriate level of tension. One of our aims was also to improve the presentation skills of students by giving them several opportunities to give presentations in front of other people.

Students submitted their master's theses to the main supervisor and assistant supervisor by August 27. After the subsequent examinations, all 19 students successfully acquired a Master of Disaster Management.

Table 4-2 shows the title of each master's thesis and his or her main supervisor and assistant supervisor. Note that a synopsis of each thesis is planned to be collected in a separate report.

Working on their master's thesis allows students to not only increase their knowledge but to deepen their relationship with ICHARM, a process which serves to smooth communication channels between the agencies to which the students belong and ICHARM's research activities, thereby making research data easier to obtain. Establishing this sort of international network through students will greatly assist future ICHARM initiatives.

Table 4-2 List of master's theses

No.	Country	Name	Thesis Title	Supervisor
1	MEE11625 Bangladesh	MD. MAJADUR RAHMAN	Assessment of Precipitation and River Runoff Change on he Ganges, Brahmaputra and Meghna River Basins due to Climate Change and Adaptation Measures by Structural Means	Tanaka
2	MEE11626 Bangladesh	MD. SIRAJUL ISLAM	Influence of Jamuna Bridge on River Morphological Changes	Egashira
3	MEE11627 China	ZHANG HANG-HUI	Study on Potential Contributions of he Proposed Huangpu Gate to Flood Control in Taihu Lake Basin	Pat
4	MEE11628 China	ZHU BING	Hydrological Forecasting based on T-S-K Fuzzy Logic System in Fu River Basin	Jaya
5	MEE11629 Fiji	VILIAME VEREIVALU	APPLICATION OF FUZZY LOGIC FOR THE EARLY WARNING SYSTEM ON THE REWA RIVER DOWNSTREAM	Jayawardena Amithirigala
6	MEE11630 Indonesia	LINA FITRIANI	A CASE STUDY OF URBAN FLOOD RISK ASSESSMENT FOR CILIWUNG RIVER BASIN, JAKARTA, INDONESIA	Tanaka
7	MEE11631 Indonesia	ANDI WILDANIAH	Development of Flood Warning System in Small Scale Urbanized Basin – Study Case: Upper Citarum River Basin	Sayama
8	MEE11632 Nepal	BARUN KUMAR KARNA	THE EFFECT OF RAINFALL INPUT TO DISTRIBUTED HYDROLOGICAL MODEL ON FLOOD RUNOFF SIMULATIONS IN POORLY RAIN GAUGED RIVER BASIN	Fukami
9	MEE11633 Nepal	KRISHNA PRASAD RAJBANSHI	PREDICTION OF INUNDATION PROCESSES OF NARAYANI RIVER WITH BED DEFORMATION	Yorozuya
10	MEE11634 Pakistan	ATIF IRSHAD	FLOOD RISK MAPPING AND DAMAGE ASSESSMENT OF MIANWALI DISTRICT, INDUS RIVER BASIN, PAKISTAN	Takeuchi
11	MEE11635 Pakistan	ARSLAN USMAN	Verification of Satellite based rainfall estimates GSMaP and development of a correction method for Indus river basin	Fukami
12	MEE11636 Pakistan	RASHID KARIM	On the root causes of Indus 2010 flood through examination of the cases sent to the Supreme Court	Takeuchi
13	MEE11637 Pakistan	Mr. Ahmad Ali Gul	Rainfall-Runoff-Inundation Modeling for the Lower Indus River Basin	Sayama
14	MEE11638 Pakistan	RANA MUHAMMAD ATIF	Analysis of Quantitative Precipitation Forecast (QPF) for Floods in Pakistan using WRF Model	Sayama
15	MEE11639 Pakistan	MUHAMMAD ALEEM UL HASSAN RAMAY	Rainfall-Runoff-Inundation Modeling for the Indus River Basin in Pakistan considering the Evapotranspiration Effect	Sayama
16	MEE11640 Philippines	GRECILE CHRISTOPHER R. DAMO	FLOOD HAZARD AND RISK ASSESSMENT OF LOWER DIPOLOG RIVER, MINDANAO ISLAND, PHILIPPINES	Yorozuya
17	MEE11641 Sri Lanka	JAGATH DEHSAPRIYA AMARASEKARA	Development of a Flood Forecasting Model for Gin River and Kelani River Basins in Sri Lanka using Fuzzy Logic Approach	Jaya
18	MEE11642 Tunisia	AYMEN LAZRAK	APPLICATION OF SUPPORT VECTOR MACHINES FOR REAL TIME FLOOD STAGE FORECASTING IN A SEMI-ARID WATERSHED	Jaya
19	MEE11643 Viet Nam	PHAM DOAN KHANH	A study on necessary actions for better integration of disaster risk management into socio-economic development in Vietnam	Takeuchi

Chapter 5: Course Evaluation and Issues for Future Improvement

5.1 Course Evaluation

This section analyzes the results of questionnaires on “Course Design,” “Outputs,” and “Lectures and Exercises” in order to identify points for improvement.

For “Course Design” and “Outputs,” we analyzed the results of the questionnaires given to students at the JICA Evaluation Session on the final day of the course. For “Lectures and Exercises,” we analyzed the results of the questionnaires given by GRIPS every six months.

5.1.1 Course Design

The results of a comparison of the overall design of this course with that of the previous academic year are as shown in Tables 5-1, 5-2 and 5-3 below.

Table 5-1 Evaluation of course design (evaluations from 17 out of 19 students)

		←←Yes, appropriate		No, inappropriate→→	
Do you find the design of the program appropriate for you (your organization) to achieve the Program Objective?	This year	**9**	**8**	**0**	**0**
	(Reference) Last year	9	3	0	0

Table 5-2 Evaluation of program length (evaluations from 17 out of 19 students)

		Long	Appropriate	Short
Do you find the period of the program appropriate?	This year	**0**	**11**	**6**
	(Reference) Last year	1	6	5

Table 5-3 Evaluation of number of participants (evaluations from 17 out of 19 students)

		Too many	Appropriate	Too few
Do you find the number of participants in the program appropriate?	This year	**5**	**12**	**0**
	(Reference) Last year	0	12	0

Table 5-1 indicates that the overall program design was generally appropriate, and Table 5-2 indicates that many students responded that the length of the program was also suitable. While there were some who described the period as too short, the richness of the program content suggests this means that students wanted to continue their studies.

On the other hand, Table 5-3 indicates that, unlike in the previous academic year, about a third of the students felt that there were too many participants. There was a steep increase from 12 students last year to 19 this year, and this appears to be one aspect that needs to be improved for the next academic year.

5.1.2 Outputs

Students were asked to evaluate themselves regarding two questions, "Do you think that the three outputs were important in achieving the course goals?" and "Did you achieve the three outputs?" Table 5-4 shows the results. Table 5-4 indicates that students generally evaluated the program highly and that the output settings were appropriate for the course goals. Similarly, Table 5-4 indicates that students mostly achieved the unit goals, although this is based on their self evaluations.

Table 5-4 Evaluation for outputs (evaluations from 17 out of 19 students)

Output		Are outputs important in achieving the course objective?				Output achievement level based on self-evaluation			
		←← Very important		→→ Not important		←← Fully Achieved		→→ Unachieved	
		4	3	2	1	4	3	2	1
1) To be able to explain basic concept and theory on generation process of water-related disasters, water-related hazard risk evaluation, disaster risk management policy and technologies.	This year	10	6	1		10	7		
	(Reference) Last year	8	4			7	5		
2) To be able to explain basic concept and theory on flood countermeasures including landslide and debris flow.	This year	9	8			4	13		
	(Reference) Last year	10	2			7	5		
3) To formulate the countermeasures to solve the problems and issues concerning water-related disasters in their countries by applying techniques and knowledge acquired through the program.	This year	10	7			8	9		
	(Reference) Last year	9	3			8	3	1	

5.1.3 Lectures and Exercises

An anonymous questionnaire was conducted at GRIPS for each subject using the 14 questions shown in Table 5-5. Respondents were asked to rank each question on a scale from 5: Strongly Agree to 1: Strongly Disagree. The averaged questionnaire results per subject are shown in Figure 5-1, while Figure 5-2 shows averaged results per question.

Figure 5-1 reveals that the highly rated subjects (average rating of 4.5 or higher) were "Basic Concepts of Integrated Flood Risk Management (IFRM)," "Flood Hydraulics & Sediment Transport," "Mechanics of Sediment Transportation & Channel Changes," "Computer Programming," and "Individual Study." The first three subjects were all taught by one or two lecturers with experience as university professors. Thanks to their university experience, they were able to draw out the students' interest and concentration, and it was also easier for students to talk with them or ask questions as they were present for multiple classes. Both of these factors likely contributed to these subjects' high ratings. "Computer Programming" was a practical class on FORTRAN programming taught by three ICHARM researchers; it was likely rated highly because the students were able to acquire knowledge directly applicable in their work. "Individual Study" was a class on master's thesis writing, and was rated highly as a result of the guidance provided on how to

write and proceed with the master's thesis.

Figure 5-2 reveals that the items rated relatively highly over each subject (average rating of 4.4 or higher) were Q4 (I would like to recommend this course to other students.), Q5 (The issues and the topics discussed during the class were appropriate and relevant to the goal of the course.), Q7 (What I learned in the course will be useful for my future professional activities.), Q13 (The instructor was well prepared for each class.), and Q14 (As an overall evaluation, the course was useful and meaningful.) This suggests that each subject was beneficial to the students, and also appropriate in achieving the goals of this course. Conversely, the items rated relatively lowly (average rating of 4.3 or lower) were Q2 (The level (difficulty) of this course was appropriate.), Q6 (The course was intellectually stimulating.), and Q9 (The examination(s) and grading method were appropriate for the class). These responses suggest that there were more than a few students who, while aware of the importance of the subjects, were unable to follow their content.

Table 5-5 Questions of GRIPS questionnaire

Q1	The course was well-designed in order to provide students with good understanding of the content.
Q2	The level (difficulty) of this course was appropriate.
Q3	The course helped me think logically.
Q4	I would like to recommend this course to other students.
Q5	The issues and the topics discussed during the class were appropriate and relevant to the goal of the course
Q6	The course was intellectually stimulating.
Q7	What I learned in the course will be useful for my future professional activities.
Q8	The quantity, content, and level of assignments were adequate.
Q9	The examination(s) and grading method were appropriate for the class.
Q10	The instructor taught this course according to the syllabus.
Q11	The instructor presented ideas clearly and logically.
Q12	The instructor provided useful study materials.
Q13	The instructor was well prepared for each class.
Q14	As an overall evaluation, the course was useful and meaningful.

Fig. 5-1 Averages per subject

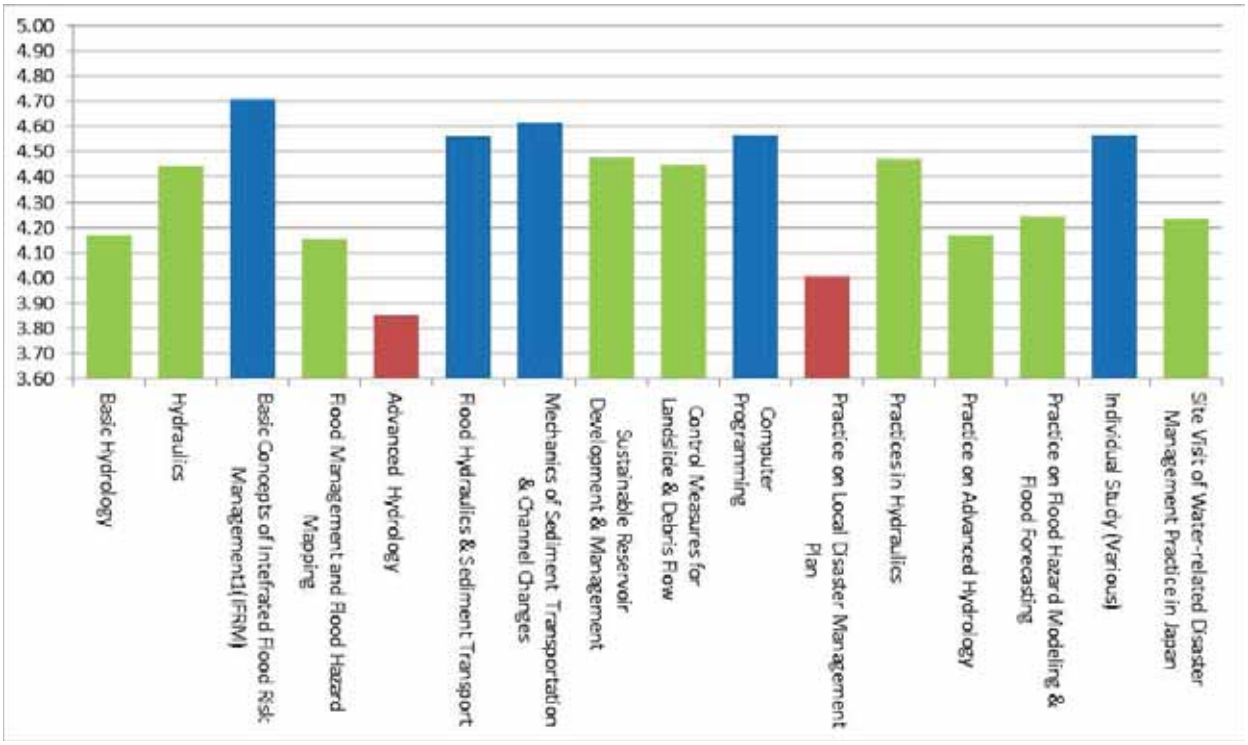
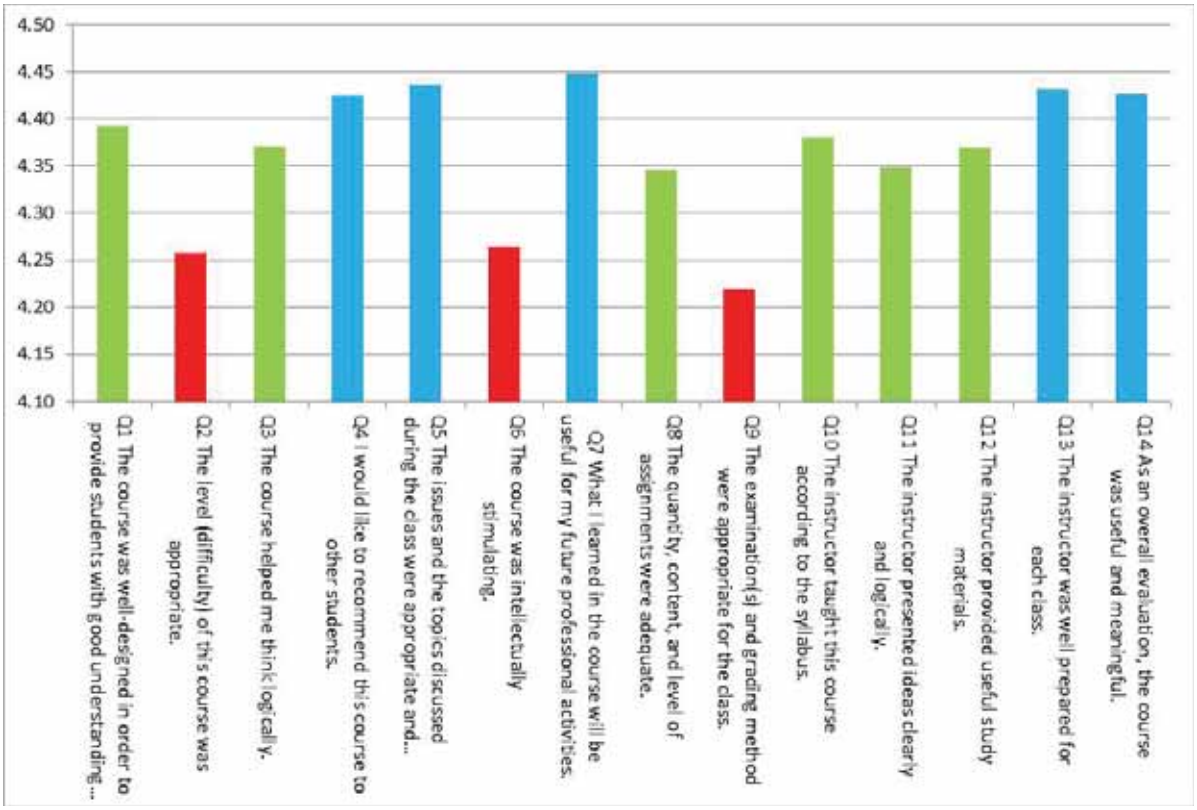


Fig. 5-2 Averages per question



5.1.4 Free Responses in the Questionnaire

In addition to the questionnaire above, a number of other questionnaires were conducted as part of this course which included spaces for students to use their own words, and, while not as easy to break down numerically as in the previous section, these responses offered many valuable opinions. We sorted these responses into categories from A to I; the categories are listed in Annex 5-1. We received about 40 opinions, and we have provided our own responses (proposals) to address these opinions as well.

In particular, setting the themes of the master's theses is a perennial problem. Leaving aside those cases when students have clearly identified the issues they wish to tackle, it is difficult to set themes for students who have vague issues, and ways must be developed to motivate such students. The backgrounds and levels of students differ each year, and there are also changes in the composition of the ICHARM teaching faculty, so at present we are continuing with a trial-and-error approach.

Note that thanks to our annual ICHARM's efforts toward improving lifestyle aspects during this course, there were hardly any lifestyle-related comments.

5.2 Future Issues

This year's course raised the following issues. We intend to do our best to improve the course for the next year and onward.

<Fewer subjects>

Each year many students have noted that there are many different subjects, resulting in tight schedules. While we naturally must continue to teach the subjects essential for attaining the course goals, this training emphasizes the practical more than the theoretical, so as of next year we intend to emphasize areas such as making the best use of software. This is why we intend to scrap the "Practice on Advanced Hydrology" subject starting from the next academic year.

<Balance of student numbers>

We had 19 students this year, the largest number ever in the five years this course has been offered. ICHARM is enhancing its teaching faculty each year, but with this rapid increase in students we found cases where guidance could not appropriately be given, such as when a student wished to meet his supervising professor for advice but the professor was absent. Starting with the next academic year, we hope to reduce the number of students to a level suitable for this educational system.

In addition, of our 19 students, 6 were from Pakistan, leading to a serious imbalance between nations. Next year, we intend to limit the number of students from any one country to a maximum of two to balance out our international composition.

<Support for site visits>

As noted above, we had 19 students this year, so when visiting sites (especially when listening to explanations), not all students could clearly hear the guide's voice, leading to loss of concentration and boredom in some. As Figure 5-1 illustrates, the "Site Visit of Water-related Disaster Management Practice in Japan" subject was not rated particularly highly. While loudspeakers were used, students who were unable to see the guide (and who were hard to see for the guide) likely suffered from loss of concentration. If one person suffers in this way, then those around him or her will also likely be affected, creating a serious vicious circle. In addition, even if someone wants to ask a question, the number of

students precludes a proper question and answer session, and this appears to have caused stress for those that were seriously interested in the site visits. As we will reduce the number of students for next year's course, we should be able to have more personal site visits.

<Master's theses>

While this is an annual issue, two or three students had still not yet decided on the theme of their master's theses by around May or June and were losing motivation to begin writing. We do urge all students who are having problems to come and talk with ICHARM faculty, but in the end we usually must wait and see for them to start the ball rolling, and this does not always work out well.

Starting next academic year, we will introduce the tutor system outlined below, and we hope to actively create a support system for students' lifestyles and studies.

<Establishment of a tutor system which allows students to receive lifestyle advice>

This course is a long one, a full year, and since as a rule students may not return home during that time, many students tell us that they have a number of lifestyle-related problems. Therefore, we intend to appoint ICHARM research specialists (both men and women) as tutors to alleviate students' worries and contribute to the smooth running of the training.

<Action plans>

There was not sufficient time to spend on developing action plans, because the students started working on them after submitting their master's theses, with not many days left before departing for their home countries. Before the students started working on their action plans, we explained the content to be included in them. However, some of the students created action plans which were irrelevant to the content of the master's theses to which they had devoted so much time. We need to make some changes next year, such as incorporating action plans as a part of individual study.

Chapter 6: Conclusion

At ICHARM, training is regarded as one of three main pillar activities, along with research and information networking.

Now that the fifth year of the course has been successfully completed, ICHARM has accumulated more know-how on training planning and administration. With students working on their master's theses, we have also contributed to solving water-related problems in the corresponding countries. These activities have given momentum to "localism," one of the keywords for ICHARM activities.

This course also makes a considerable contribution to information networking activities. That is to say, connections with the students' home organizations are becoming stronger each year, and this provides better visibility of local situations in numerous ways. This worldwide information networking through students will definitely be helpful to other ICHARM activities, and we need a system allowing us to keep close contact with the students after they have graduated.

A year may seem like a long time but is in fact quite short. However, if at least some of what the trainees have learned during this year-long master's course is of use in their work, then by extension it will have contributed to reducing flood-related damage in trainees' home countries. It may take several years or a few decades, but, through the implementation of this course, we expect to make a steady contribution to the mitigation of damage due to water-related disasters in our students' home countries.

-Acknowledgment-

This course has now completed its fifth year, over which we revised the overall schedule and curriculum based on past experiences and have worked to enhance both the educational content and environment for the students. There is, however, room for still more improvement, and we appreciate your opinions and suggestions.

Finally, we would also like to express our gratitude to instructors and administration officials who devoted their valuable time to providing lectures and exercises on this course, and to the MLIT offices, local government officials, and local residents who warmly welcomed our field trips.

LIST OF PARTICIPANTS IN "Water-related Disaster Management Program" JFY 2011
2011年度 「防災政策プログラム　水災害リスクマネジメントコース」学生リスト

No.	Photo	ID Number Country	Name	Position
1		MEE11625 Bangladesh （バングラデシュ）	MD. MAJADUR RAHMAN ラフマン	Assistant Engineer, Design Circle-4/Bangladesh Water Development Board (BWDB), M/o Water Resources バングラデシュ水開発公社　Design Circle-4　技師補
2		MEE11626 Bangladesh （バングラデシュ）	Md. SIRAJUL ISLAM イスラム	Sub-Divisional Engineer, Design Circle-5/Bangladesh Water Development Board (BWDB), M/o Water Resources バングラデシュ水開発公社　Design Circle-5　副技師
3		MEE11627 China （中華人民共和国）	ZHANG HANG-HUI ハンフイ	Senior Engineer of Development Research center/Taihu Basin Authority of ministry of Water Resources 中国水資源省　太湖流域管理局　開発研究所　上級技官
4		MEE11628 China （中華人民共和国）	ZHU BING ビン	Assistant Engineer/ Bureau of Hydrology, Ministry of Water Resources of China 中国水資源省　水文局　技師補
5		MEE11629 Fiji （フィジー）	VILIAME VEREIVALU ヴィラメ	Technical Assistant/Hydrology Division, Water Authority of Fiji フィジー水公社　水文部　技師補
6		MEE11630 Indonesia （インドネシア）	LINA FITRIANI リーナ	Chief of Water Rescources Implementation / Ciliwung Cisadane Major River Basin Board, DG of Water Resources, Ministry of Public Works 公共事業省　水資源総局　チリウン-チサダネ主要河川流域開発部　水資源実施主任
7		MEE11631 Indonesia （インドネシア）	ANDI WILDANIAH アンディ	Staff / Directorate of Planning and Programming, DG of Water Resources, Ministry of Public Works 公共事業省　水資源総局　企画・計画本部　職員
8		MEE11632 Nepal （ネパール）	BARUN KUMAR KARNA バールーン	Civil Engineer/Water Induced Disaster Prevention Office/Janakpur under Ministry of Irrigation 灌漑省　水害防災事務所（ジャナクプル）　土木技師
9		MEE11633 Nepal （ネパール）	KRISHNA PRASAD RAJBANSHI ケーピー（KP）	Engineer/People's Embankment Program/Field Office, Chitwan/Department of Water Induced DisaterPrevention under the Ministry of Irrigation 灌漑省 水害防災局　チトワン現地事務所　住民主体の護岸プログラム　技師
10		MEE11634 Pakistan （パキスタン）	ATIF IRSHAD イルシャド	Meteorologist / Flood Forecasting Division, Pakistan Meteorological Department パキスタン気象局　洪水予報課　気象専門家
11		MEE11635 Pakistan （パキスタン）	ARSLAN USMAN アルスラン	Meteorologist / Flood Forecasting Division, Pakistan Meteorologist Department パキスタン気象局　洪水予報課　気象専門家
12		MEE11636 Pakistan （パキスタン）	RASHID KARIM ラシッド	Assistant Engineer / Irrigation Division Patfeeder, Naseerabad/ Irrigation & Power Department 灌漑・電力局　バロチスタン灌漑課　技師補
13		MEE11637 Pakistan （パキスタン）	AHMAD ALI GUL グル	Assistant Manager / Pakistan Space & Upper Atmosphere Research Commission パキスタン宇宙高層大気研究委員会　アシスタントマネージャー
14		MEE11638 Pakistan （パキスタン）	RANA MUHAMMAD ATIF アティフ	Meterologist / Defence Division, Pakistan Meteorological Department 国防省　パキスタン気象局　気象専門家
15		MEE11639 Pakistan （パキスタン）	MUHAMMAD ALEEM UL HASSAN RAMAY ハッサン	Deputy Director / Hydrologist in Charge FFWS / Pakistan Meteorological Department パキスタン気象局　課長補佐
16		MEE11640 Philippines （フィリピン）	GRECILE CHRISTOPHER R. RAMO トト（TOTO）	Engineer III / Department of Public Works and Highways 公共事業・高速道路省　技師Ⅲ
17		MEE11641 Sri Lanka （スリランカ）	JAGATH DEHSAPRIYA AMARASEKARA ジャガット	Irrigation Engineer, Department of Irrigation 灌漑局　灌漑技師
18		MEE11642 Tunisia （チュニジア）	AYMEN LAZRAK アイメン	Engineer/ General Directorate of Water Resources, Ministry of Agriculture and Environment 農業環境省　水資源総局　技師
19		MEE11643 Viet Nam （ベトナム）	PHAM DOAN KHANH ハン	Official / Disaster Management Center, Ministry of Agriculture and Rural Developmnent 農業農村開発省　災害管理センター　職員

Annex 2

2011-2012 Water-related Disaster Management Course Time Table

Lecture（Lecturer）

- (1) Basic Hydrology
- (2) Hydraulics
- (3) Basic Concepts of Integrated Flood Risk management (FRM)
- (4) Urban Flood Management and Flood Hazard Mapping
- (5) Advanced Hydrology
- (6) Flood Hydraulics and Sediment Transport
- (7) Mechanics of Sediment Transportation and River Changes
- (8) Sustainable Reservoir Development & Management
- (9) Control Measures for Landslide & Debris Flow
- (10) Disaster Mitigation Policy
- (11) Disaster Risk Management

Excercise（Lecturer）

- (1)P Computer Programming
- (2)P Practices in Hydraulics
- (3)P Practice on Local Disaster Management Plan
- (4)P Practice on Advanced Hydrology
- (5)P Practice on Flood Hazard Modeling & Flood Forecasting
- (6)P Practice on floodcountermeasure in Japan (Field trips)

October

		Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
		10/2	3	4	5	6	7	8
1st period	9:00-10:30		**Entrance Ceremony at GRIPS**	(Guidance at JICA)	(Guidance by JICA)	(Guidance by JICA)	9:00-9:45 Tour of PWRI & ICHARM (M.Sc) 10:00-10:40 Opening Ceremony at PWRI (M.Sc) 10:50-11:10 Joint Entrance Ceremony at ICHARM (Ph.D & M.Sc) 11:00-12:00 Course Orientation(Ph.D & M.Sc)	
2nd period	10:45-12:15							
3rd period	13:15-14:45							
4th period	15:00-16:30							
		9	10	11	12	13	14	15
1st period	9:00-10:30			(3)-1 Introduction: What is natural disaster? Overview of the course — Prof. Takeuchi (ICHARM)	(3)-2 Introduction of Risk, Hazard and Vulnerability — Prof. Takeuchi (ICHARM)	(3)-4 PAR Model (2) — Prof. Takeuchi (ICHARM)	(6)-1 Characteristics and river management of Japanese rivers — Prof. Fukuoka (Chuo Univ.)	
2nd period	10:45-12:15			(3)-3 PAR Model (1) — Prof. Takeuchi (ICHARM)	**Site visit of PWRI experimental facilities**	(3)-5 ACCESS Model — Prof. Takeuchi (ICHARM)	(6)-2 Prediction method of flow resistance in rivers with compound channels and application to river course design (1) — Prof. Fukuoka (Chuo Univ.)	
				12:10-12:50 Welcome party (Ph.D & M.Sc)	**Lunch at PWRI**			
3rd period	13:15-14:45			13:15-14:15 Introduction of ICHARM research activities (1) (Director: 15min, Mr. Fukami:30min, Mr. Okazumi: 15min)	Move to Bu lding Research Institute	13:15-15:15 Introduction of ICHARM research activities (2)	(5)P-8 Introduction of GFAS (Global Flood Alert System) — Asso. Prof. Fukami (ICHARM)	
4th period	15:00-16:30				Lecture at Building Research Institute		(5)P-9 Introduction of IFAS (Integrated Flood Analysis System) — Mr. Nabesaka (ICHARM)	
		16	17	18	19	20	21	22
1st period	9:00-10:30		(3)-6 Disaster management cycle — Prof. Takeuchi (ICHARM)	(3)-8 Concept of IWRM (1) — Prof. Takeuchi (ICHARM)	(6)-3 Prediction method of flow resistance in rivers with compound channels and application to river course design (2) — Prof. Fukuoka (Chuo Univ.)	(3)-10 Japanese experiences (1) — Prof. Takeuchi (ICHARM)	(6)-5 Steady quasi-two dimensional analysis of flood flows (2) — Prof. Fukuoka (Chuo Univ.)	
2nd period	10:45-12:15		(3)-7 IFRM and traditional FRM — Prof. Takeuchi (ICHARM)	(3)-9 Concept of IWRM (2) — Prof. Takeuchi (ICHARM)	(6)-4 Steady quasi-two dimensional analysis of flood flows (1) — Prof. Fukuoka (Chuo Univ.)	(3)-11 Japanese experiences (2) — Prof. Takeuchi (ICHARM)	(6)-6 Unsteady quasi-two-dimensional analysis of flood flows (1) — Prof. Fukuoka (Chuo Univ.)	
3rd period	13:15-14:45		14:00-15 30 36th ICHARM R&D Seminar	13:00-16:30 Presentation of Inception Report (1 student * 10 min)	Self Study	Self Study	Self Study	
4th period	15:00-16:30				Thesis Work	Self Study	Self Study	
		23	24	25	26	27	28	29
1st period	9:00-10:30		Self Study	Self Study	(6)-7 Unsteady quasi-two-dimensional analysis of flood flows (2) — Prof. Fukuoka (Chuo Univ.)	Site Visit (1) River in Japan (Ara River)	(6)-9 How do we make a river cross-section harmonizing flood control and river environment — Prof. Fukuoka (Chuo Univ.)	
2nd period	10:45-12:15		(1)-1 Basic concepts of the Hydrological Cycle — Prof. Jaya (ICHARM)	(1)-2 Precipitation — Prof. Jaya (ICHARM)	(6)-8 To derive a real ons hip between stable dimensionless width, depth and discharge in natural rivers - learning from natural rivers — Prof. Fukuoka (Chuo Univ.)		Ste Visit (2) Flood Information (MLIT Kanto) Metropolitan Area Outer Underground Discharge	
3rd period	13:15-14:45		(2)P-1 Review of Mathematics (Ordinary differential equation) — Asso. Prof. Yorozuya (ICHARM)	(1)-3 Extreme weather — Prof. Jaya (ICHARM)	(3)-14 Future Issues of IFRM — Prof. Takeuchi (ICHARM)	(4)-5 River management during normal time	(4)-6 13:00-14:30 River management during flooding	
4th period	15:00-16:30		Self Study	Consultation with supervisors	Thesis Work	Stay in Tokyo	15 30-17 00 Metropolitan Area Outer Underground Discharge Channel	

Annex 3

November

		30	31	11/1	2	3	4	5
1st period	9:00-10:30		(2)-1 Introduction & Fundamental equations — Prof. HUANG (Sophia Univ)	(1)-10 9:30-11:00 Satellite observation of rainfall (1) — Dr. Kachi, Dr. Kubota (JAXA)	(1)-5 Peak discharge estimation — Prof. Jaya (ICHARM)		(2)-3 Flow resistance calculation in engineering practice — Prof. HUANG (Sophia Univ)	
2nd period	10:45-12:15		(2)-2 Flow resistance in open channel — Prof. HUANG (Sophia Univ)	(1)-11 11:00-12:30 Satellite observation of rainfall (2)	(1)-9 Remote sensing in Hydrology — Asso.Prof. Fukami (ICHARM)		(2)-4 Steady uniform flow in prismatic channels — Prof. HUANG (Sophia Univ)	
3rd period	13:15-14:45		(1)-4 Runoff — Prof. Jaya (ICHARM)	**14:00- Tour of JAXA**	(2)P-2 Review of Mathematics (Partial differential equations) — Asso. Prof. Yorozuya (ICHARM)		(2)P-3 Fundamentals of Fluid Flow (Equation of continuity) — Asso. Prof. Yorozuya (ICHARM)	
4th period	15:00-16:30		Self Study		Thesis Work		Self Study	
		6	7	8	9	10	11	12
1st period	9:00-10:30		(1)-6 Concept of rainfall excess — Prof. Jaya (ICHARM)	(5)P-10 Correction and Validation of Satellite-Based Rainfall — Mr. Nabesaka (ICHARM)	(1)-8 Unit Hydrograph Methods II — Prof. Jaya (ICHARM)	Site Visit (3) 9:30-12:00 Kurihashi Town, 13:30-15:00 Watarase Retarding Basin	(2)-5 Steady gradually-varied flow – backwater surface profiles — Prof. HUANG (Sophia Univ)	
2nd period	10:45-12:15		(1)-7 Unit Hydrograph Methods I — Prof. Jaya (ICHARM)	(5)P-11 Runoff analysis using IFAS (1) Data import, Model building — Mr. Nabesaka (ICHARM)	(5)P-13 Runoff analysis using IFAS (3) Validation of calculated discharge — Mr. Nabesaka (ICHARM)		(2)-6 Numerical solution of the gradually-varied flow equation — Prof. HUANG (Sophia Univ)	
3rd period	13:15-14:45		Medical Checkup by JICA	(5)P-12 Runoff analysis using IFAS (2) Parameter estimation — Mr. Nabesaka (ICHARM)	(5)P-14 Runoff analysis using IFAS (4) Application to actual basins — Mr. Nabesaka (ICHARM)		(2)P-5 Flow in closed conduits (Reynolds number, Friction factor) — Asso. Prof. Yorozuya (ICHARM)	
4th period	15:00-16:30			(2)P-4 Fundamentals of Fluid Flow (Energy equation, Bernoulli's equation) — Asso. Prof. Yorozuya (ICHARM)	Thesis Work		Self Study	
		13	14	15	16	17	18	19
1st period	9:00-10:30		Self Study	Self Study	(1)P-1 Introduction of Computer Programming with Fortran90 — Asso. Prof. Sayama (ICHARM)	Self Study	(2)-9 The diffusive wave model — Prof. HUANG (Sophia Univ)	
2nd period	10:45-12:15		(3)-12 Global trends (1) Impact of climatic change — Prof. Oki (Tokyo Univ.)	(5)P-15 Runoff analysis with IFAS (5) Application to actual basins — Mr. Nabesaka (ICHARM)	(5)P Runoff analysis with IFAS (7) Application to actual basins — Mr. Nabesaka (ICHARM)	(1)-12 Probability and statistics in hydrology I — Prof. Jaya (ICHARM)	(2)-10 The dynamic wave model — Prof. HUANG (Sophia Univ)	
3rd period	13:15-14:45		(2)-7 Hydraulic jump — Prof. HUANG (Sophia Univ)	(5)P Runoff analysis with IFAS (6) Application to actual basins — Mr. Nabesaka (ICHARM)	(5)P Runoff analysis with IFAS (8) Application to actual basins — Mr. Nabesaka (ICHARM)	(1)P-2 Variables — Asso. Prof. Sayama (ICHARM)	(7)-1 Introduction (1) — Prof. Egashira (Newjec)	
4th period	15:00-16:30		(2)-8 The kinematic wave model — Prof. HUANG (Sophia Univ)	Consultation with supervisors	Thesis Work	Self Study	(7)-2 Introduction (2) — Prof. Egashira (Newjec)	
		20	21	22	23	24	25	26
1st period	9:00-10:30		(2)-11 Method of characteristics — Prof. HUANG (Sophia Univ)	Site Visit (4) River improvement in urban area (Tokyo Shirako River)		Self Study	(1)-13 Probability and statistics in hydrology II — Prof. Jaya (ICHARM)	
2nd period	10:45-12:15		(2)-12 The Preissmann scheme — Prof. HUANG (Sophia Univ)			(3)-13 Global trends (2) International actions — Prof. Oki (Tokyo Univ.)	(1)-14 Basic concepts of Stochastic Hydrology — Prof. Jaya (ICHARM)	
3rd period	13:15-14:45		(1)P-3 Arithmetic Calculation — Asso. Prof. Sayama (ICHARM)			(1)P-4 Program Structure (if, do loop) — Dr. Hasegawa (ICHARM)	Self Study	
4th period	15:00-16:30		Consultation with supervisors			Self Study	Thesis Work	
		27	28	29	30	12/1	2	3
1st period	9:00-10:30		Self Study	(4)P-1 Exercises on System function estimation — Prof. Jaya (ICHARM)	Thesis Work	(4)P-3 Exercises on Impulse and Frequency Response Functions — Prof. Jaya (ICHARM)	Self Study	
2nd period	10:45-12:15		(6)-1 Hydrological modelling – basic concepts and approaches — Prof. Jaya (ICHARM)	(6)-2 Systems theory approach I – Linear theory; Time domain analysis; Frequency domain — Prof. Jaya (ICHARM)	(4)P-2 Exercises on least squares estimation — Prof. Jaya (ICHARM)	(6)-4 Instantaneous Unit Hydrograph (IUH) — Prof. Jaya (ICHARM)	(4)P-4 Exercises on IUH determination — Prof. Jaya (ICHARM)	
3rd period	13:15-14:45		(1)P-5 Program Structure (if, do loop) — Dr. Hasegawa (ICHARM)	Self Study	(6)-3 Systems theory approach II – Non-linear systems, multi-linear systems — Prof. Jaya (ICHARM)	(1)P-6 Program Structure (if, do loop) — Dr. Hasegawa (ICHARM)	(7)-3 Mechanics of sediment transportation (1) — Prof. Egashira (Newjec)	
4th period	15:00-16:30		Self Study	Self Study	Self Study	Self Study	(7)-4 Mechanics of sediment transportation (2) — Prof. Egashira (Newjec)	
		4	5	6	7	8	9	10
1st period	9:00-10:30		(6)-10 1-D bed deformation, computing model — Prof. Watanabe (Ktami Institute of Technology)	Self Study	Thesis Work	Self Study	Site Visit (5) Integrated flood management (Tsurumi River)	
2nd period	10:45-12:15		(6)-11 2-D bed deformation, sand waves and bars, meandering — Prof. Watanabe (Ktami Institute of Technology)	(5)P-1 Introduction to Flood Hazard Modeling — Asso.Prof. Sayama (ICHARM)	(4)P-5 Exercises on IUH application — Prof. Jaya (ICHARM)	(6)-6 Synthetic Unit Hydrograph — Prof. Jaya (ICHARM)		
3rd period	13:15-14:45		(6)-5 Conceptual models of IUH — Prof. Jaya (ICHARM)	(1)P-7 I/O Statement — Dr. Hasegawa (ICHARM)	(1)P-8 Hydrologic Application Exercise (1) — Asso. Prof. Sayama (ICHARM)	(1)P-10 Arrays — Dr. Ushiyama (ICHARM)	(4)-12 Case study of integrated flood management -Tsurumi river- — Mr. Imbe (ARSIT)	
4th period	15:00-16:30		Consultation with supervisors	Self Study	(1)P-9 Quiz(1) — Dr. Hasegawa (ICHARM)	Self Study		

Annex 4

December		11	12	13	14	15	16	17
	1st period 9:00-10:30		(6)-12 Vegetations, flows in vegetated zone — Prof. Watanabe (Ktami Institute of Technology)	(3)-15 Application of Sabo Works and landslide countermeasures to overseas — Mr. Watanabe	Thesis Work	(5)P-2 Fundamentals of Conceptual Rainfall-Runoff Models — Asso.Prof. Sayama (ICHARM)	Self Study	
	2nd period 10:45-12:15		(6)-13 River restoration based on sediment transport and vegetation on stabilized bars — Prof. Watanabe (Ktami Institute of Technology)	ICHARM R&D Seminar by Prof. Koike	Thesis Work	(2)-15 Design of weirs and spillways — Prof. HUANG (Sophia Univ)	(3) Supplimentary lecture — Prof. Takeuchi (ICHARM)	
	3rd period 13:15-14:45		(2)-13 Explicit Forward-Time-Centre-Space scheme — Prof. HUANG (Sophia Univ)	(1)P-11 Arrays — Dr. Ushiyama (ICHARM)	Thesis Work	(1)P-12 Procedures and Structured Programming (subroutine, function) — Dr. Ushiyama (ICHARM)	(3) Supplimentary lecture — Prof. Takeuchi (ICHARM)	
	4th period 15:00-16:30		(2)-14 Calculation of backwater profiles for levee design — Prof. HUANG (Sophia Univ)	ICHARM R&D Seminar by Prof. Asaeda	Thesis Work	Self Study	(3) Supplimentary lecture — Prof. Takeuchi (ICHARM)	
		18	19	20	21	22	23	24
	1st period 9:00-10:30		(6)-14 Re-meandering project for river restoration — Prof. Watanabe (Ktami Institute of Technology)	(5)P-3 Finite Difference Method for Ordinary Differential Equations — Asso.Prof. Sayama (ICHARM)	Thesis Work	(3) Examination — Prof. Takeuchi (ICHARM)		
	2nd period 10:45-12:15		(6)-15 Bank erosion and drift woods — Prof. Watanabe (Ktami Institute of Technology)	(4)P-6 Exercises on a typical rainfall-runoff model I — Prof. Jaya (ICHARM)	(4)-13 Developments in social sciences on people's reactions and responses to disasters — Prof. Hayashi (Kyoto Univ.)	(1)P-13 Procedures and Structured Programming (subroutine, function) — Dr. Ushiyama (ICHARM)		
	3rd period 13:15-14:45		(1)-15 Examination — Prof. Jaya (ICHARM)	(6)-7 Rainfall-runoff modelling I – Conceptual type — Prof. Jaya (ICHARM)	(3)P-8 Geographic Information System (GIS) (1) — Dr. Kwak (ICHARM)	Self Study		
	4th period 15:00-16:30		Consultation with supervisors	Self Study	(3)P-9 Geographic Information System (GIS) (2) — Dr. Kwak (ICHARM)	Self Study		
		25	26	27	28	29	30	31
	1st period 9:00-10:30		Self Study	Self Study	Thesis Work			
	2nd period 10:45-12:15		Consultation with supervisors	(1)P-14 Hydrologic Application Exercise (2) — Asso. Prof. Sayama (ICHARM)	Thesis Work			
	3rd period 13:15-14:45		(7)-7 Mechanics of sediment transportation (5) — Prof. Egashira (Newjec)	(1)P-15 Quiz(2) — Dr. Ushiyama (ICHARM)	Thesis Work			
	4th period 15:00-16:30		(7)-8 Mechanics of sediment transportation (6) — Prof. Egashira (Newjec)	Self Study	Thesis Work			
January		1/1	2	3	4	5	6	7
	1st period 9:00-10:30				Thesis Work	Thesis Work	(7)-5 Mechanics of sediment transportation (3) — Prof. Egashira (Newjec)	
	2nd period 10:45-12:15				Thesis Work	Thesis Work	(7)-6 Mechanics of sediment transportation (4) — Prof. Egashira (Newjec)	
	3rd period 13:15-14:45				Thesis Work	(3)P-10 Geographic Information System (GIS) (3) — Dr. Kwak (ICHARM)	(6) Examination — Prof. Fukuoka (Chuo Univ.)	
	4th period 15:00-16:30				Thesis Work	(3)P-11 Geographic Information System (GIS) (4) — Dr. Kwak (ICHARM)	Consultation with supervisors	
		8	9	10	11	12	13	14
	1st period 9:00-10:30			(3)P-1 Project Cycle Management (PCM) (1) — Ms. Kita, Ms. Iseki (GLM Institute)	(3)P-3 Project Cycle Management (PCM) (3) — Ms. Kita, Ms. Iseki (GLM Institute)	(3)P-5 Project Cycle Management (PCM) (5) — Ms. Kita, Ms. Iseki (GLM Institute)	(2) Examination — Prof. HUANG	
	2nd period 10:45-12:15						Self Study	
	3rd period 13:15-14:45			(3)P-2 Project Cycle Management (PCM) (2) — Ms. Kita, Ms. Iseki (GLM Institute)	(3)P-4 Project Cycle Management (PCM) (4) — Ms. Kita, Ms. Iseki (GLM Institute)	Thesis Work	(7)-9 Mechanics of debris flow (1) — Prof. Egashira (Newjec)	
	4th period 15:00-16:30					Thesis Work	(7)-10 Mechanics of debris flow (2) — Prof. Egashira (Newjec)	
		15	16	17	18	19	20	21
	1st period 9:00-10:30		1st Interim Presentation	(4)-9 Geomorphology around rivers and alluvial plain (1) — Prof. Haruyama (Mie Univ.)	Thesis Work	(6)-8 Rainfall-runoff modelling II – Physics-based type — Prof. Jaya (ICHARM)	(7)-11 Bed forms and flow resistance (1) — Prof. Egashira (Newjec)	
	2nd period 10:45-12:15			(4)-10 Geomorphology around rivers and alluvial plain (2) — Prof. Haruyama (Mie Univ.)	Thesis Work	Self Study	(7)-12 Bed forms and flow resistance (2) — Prof. Egashira (Newjec)	
	3rd period 13:15-14:45		Self Study	(5)P-4 Finite Difference Method for ODE with Fortran Exercise — Asso.Prof. Sayama (ICHARM)	(5)P-6 Finite Difference Method for Partial Differential Equations — Asso.Prof. Sayama (ICHARM)	(3)P-12 Geographic Information System (GIS) (5) — Dr. Kwak (ICHARM)	(4)P-8 Exercises on flood routing — Prof. Jaya (ICHARM)	
	4th period 15:00-16:30		(4)P-7 Exercises on a typical rainfall-runoff model II — Prof. Jaya (ICHARM)	(5)P-5 Fundamentals of Physically based Rainfall-Runoff Models — Asso.Prof. Sayama (ICHARM)	(5)P-7 Finite Difference Method for PDE with Fortran Exercise — Asso.Prof. Sayama (ICHARM)	(3)P-13 Geographic Information System (GIS) (6) — Dr. Kwak (ICHARM)	Consultation with supervisors	

Annex 5

		22	23	24	25	26	27	28
	1st period 9:00-10:30		Disaster Mitigation Policy (Prof. Morichi)					
	2nd period 10:45-12:15							
	3rd period 13:15-14:45		Disaster Risk Management (Prof. Okazaki)					
	4th period 15:00-16:30							
		29	30	31	2/1	2	3	4
	1st period 9:00-10:30		Disaster Risk Management (Prof. Okazaki)				Site Visit (6) Kyusyu Region (By GRIPS)	
	2nd period 10:45-12:15							
	3rd period 13:15-14:45		Disaster Mitigation Policy (Prof. Morichi)					
	4th period 15:00-16:30							
		5	6	7	8	9	10	11
	1st period 9:00-10:30		Self Study	Thesis Work	Self Study	Self Study	Self Study	
	2nd period 10:45-12:15		(6)-9 Introduction to Hydroinformatics Prof. Jaya (ICHARM)	Thesis Work	(6)-10 Flood routing – Muskingam method; Muskingam-Cunge method Prof. Jaya (ICHARM)	Self Study	(4)P-10 Exercises on Kalman filtering II Prof. Jaya (ICHARM)	
	3rd period 13:15-14:45		(4)P-9 Exercises on Kalman filtering I Prof. Jaya (ICHARM)	Thesis Work	(6)-11 Kalman Filtering Prof. Jaya (ICHARM)	Self Study	(9)-1 Outline of sediment-related disasters and Sabo projects Prof. Ikeya (STC)	
	4th period 15:00-16:30		Consultation with supervisors	Thesis Work	Self Study	Self Study	(2)P-6 Pre Meeting of Flume experiments of open channel flow Asso. Prof. Yorozuya (ICHARM)	
February		12	13	14	15	16	17	18
	1st period 9:00-10:30		(9)-2 Sabo planning Prof. Sasahara (Kochi Univ.)	(2)P-7,8,9 Flume experiments of open channel flow Asso. Prof. Yorozuya (ICHARM)	Thesis Work	Self Study	(7)-13 Prediction of channel changes (1) Prof. Egashira (Newjec)	
	2nd period 10:45-12:15		(9)-3 Design of Sabo dam		(9)-4 Warning and evacuation system for sediment-related disasters Dr. Hara	(9)-5 Hazard mapping for sediment-related disasters Dr. Takanashi (Asia Air Survey Co.,LTD.)	(7)-14 Prediction of channel changes (2) Prof. Egashira (Newjec)	
	3rd period 13:15-14:45		(3)P-14 Geographic Information System (GIS) (7) Dr. Kwak (ICHARM)		(4)P-11 Exercises on Frequency analysis I Prof. Jaya (ICHARM)	(9)-6 Training of hazard mapping for sediment-related disasters (1)	(2)P-10 Post Meeting of Flume experiments of open channel flow Asso. Prof. Yorozuya (ICHARM)	
	4th period 15:00-16:30		Thesis Work		(3)P-15 Geographic Information System (GIS) (8) Dr. Kwak (ICHARM)	(9)-7 Training of hazard mapping for sediment-related disasters (2)	Self Study	
		19	20	21	22	23	24	25
	1st period 9:00-10:30		Self Study	Self Study	Thesis Work	Self Study	Self Study	
	2nd period 10:45-12:15		(4)P-12 Exercises on Frequency analysis II Prof. Jaya (ICHARM)	(8)-2 Planning and Operation of Flood Control Dr. Umino (PWRI)	(8)-3 Earthquake Engineering for Dams Dr. Omachi (Dam Center)	(8)-4 Environmental Impact of Dams (1) Dr. Amano (NILIM)	(6)-13 Parameter estimation Prof. Jaya (ICHARM)	
	3rd period 13:15-14:45		(8)-1 Outline of Dam Engineering Dr. Sakamoto (JCO LD)	(9)-8 Sabo Works in arid area and reforestation of degraded land Prof. Ikeya (STC)	(9)-10 Introduction of landslides Dr. Tsunaki (STC)	(6)-12 Frequency analysis Prof. Jaya (ICHARM)	(9)-12 Permanent measures for landslide damage reduction Dr. Tsunaki (STC)	
	4th period 15:00-16:30		Consultation with supervisors	(9)-9 Countermeasures for earthquake-induced natural Dams Dr. Osanai (PWRI)	(9)-11 Survey and emergency response for landslides Dr. Fujisawa (NEXCO)	Self Study	(9)-13 Case study of landslide Dr. Fujisawa (NEXCO)	
		26	27	28	29	3/1	2	3
	1st period 9:00-10:30		(8)-5 Environmental Impact of Dams (2)	Self Study	Thesis Work	Self Study	(7)-15 Method to predict sediment transport process in drainage basins Prof. Egashira (Newjec)	
	2nd period 10:45-12:15		(8)-6 Sediment Management in Reservoirs (1) Prof. Sumi (Kyoto Uni.)	(4)P-13 Exercises on Frequency analysis III Prof. Jaya (ICHARM)	Thesis Work	(8)-10 Dam Management Prof. Yamaguchi (PWRI)	(8)-11 Effective Use of Existing Dams Prof. Matsumoto (Dam Center)	
	3rd period 13:15-14:45		(8)-7 Sediment Management in Reservoirs (2)	(8)-8 Dam Construction (1) Prof. Yamaguchi (PWRI)	Thesis Work	(6)-14 Error analysis Prof. Jaya (ICHARM)	(8)-12 Roles of Dams in the 21st Century	
	4th period 15:00-16:30		Self Study	(8)-9 Dam Construction (2) Dr. Kashiwai (Dam Center)	Thesis Work	Self Study	Self Study	

Annex 6

		4	5	6	7	8	9	10
March	1st period 9:00-10:30		Consultation with supervisors	Self Study	Self Study	Thesis Work	Self Study	
	2nd period 10:45-12:15		(4)P-14 Exercises on parameter estimation Prof. Jaya (ICHARM)	(4)-2 River planning in Japan Prof. Tanaka (ICHARM)	(4)P-15 Exercises on error analysis Prof. Jaya (ICHARM)	Thesis Work	2nd Interim Presentation	
	3rd period 13:15-14:45		(4)-1 River law in Japan Prof. Tanaka (ICHARM)	(9)-14 Application of Sabo/landslide projects to overseas countries Prof. Ikeya, Dr. Osanai	Self Study	Thesis Work		
	4th period 15:00-16:30		Self Study	(9)-15	Self Study	Thesis Work	Self Study	
		11	12	13	14	15	16	17
	1st period 9:00-10:30		Self Study	Examination Prof. Egashira (Newjec)	Site visit (7) Chugoku and Kinki Region (Hii River, Ota River, Kamenose Landslice, etc.)			
	2nd period 10:45-12:15		(8)-14 Presentation of report (1) Prof. Matsumoto, Prof. Yamaguchi	(4)-7 Discussion on urban flood management Prof. Tanaka (ICHARM)				
	3rd period 13:15-14:45		(8)-15 Presentation of report (2) Prof. Matsumoto, Prof. Yamaguchi	(4)-8 Outline of flood hazard map and evacuation plan and local disaster management plan Prof. Tanaka (ICHARM)				
	4th period 15:00-16:30		Self Study	Thesis Work				
		18	19	20	21	22	23	24
	1st period 9:00-10:30		Consultation with supervisors		Thesis Work	Thesis Work		
	2nd period 10:45-12:15		Thesis Work		(6)-15 Examination Prof. Jaya (ICHARM)	(4)-3 Levee structure (1) (tentative)	Thesis Work	
	3rd period 13:15-14:45				(4)-14 Early evacuation of residents ICHARM	(4)-4 Levee structure (2) (tentative)		
	4th period 15:00-16:30				Thesis Work	Thesis Work		
		25	26	27	28	29	30	31
April	1st period 9:00-10:30		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	2nd period 10:45-12:15					(4)-15 Examination ICHARM		
	3rd period 13:15-14:45		Consultation with supervisors			Thesis Work		
	4th period 15:00-16:30		Thesis Work					
		4/1	2	3	4	5	6	7
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		8	9	10	11	12	13	14
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		15	16	17	18	19	20	21
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		22	23	24	25	26	27	28
	AM		Thesis Work	3rd Interim Presentation	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors	Thesis Work				
		29	30	1	2	3	4	5
	AM			Thesis Work	Thesis Work			
	PM							
		6	7	8	9	10	11	12
May	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		13	14	15	16	17	18	19
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Lecture at Japan Meteorological Agency	Site visit (8) Flood Fighting Drill
	PM		Consultation with supervisors					
		20	21	22	23	24	25	26
	AM		Site visit (9) Dam & Sabo project in Kanto Region		Thesis Work	Thesis Work	Thesis Work	
	PM			ADCP exercise in Tone River				

Annex 7

June		27	28	29	30	31	6/1	2
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	4th Interim Presentation	
	PM		Consultation with supervisors				Thesis Work	
		3	4	5	6	7	8	9
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		10	11	12	13	14	15	16
	AM		ICHARM R&D Seminar	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		17	18	19	20	21	22	23
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
July		24	25	26	27	28	29	30
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		7/1	2	3	4	5	6	7
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Deadline of submission of the 1st draft thesis	
	PM							
		8	9	10	11	12	13	14
	AM		Thesis Work	5th Interim Presentation	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors	Thesis Work				
		15	16	17	18	19	20	21
	AM			Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM							
		22	23	24	25	26	27	28
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Deadline of submission of 2nd draft thesis	
	PM		Consultation with supervisors					
August		29	30	31	8/1	2	3	4
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		5	6	7	8	9	10	11
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	**Final Presentation**	
	PM		Consultation with supervisors					
		12	13	14	15	16	17	18
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
		19	20	21	22	23	24	25
	AM		Thesis Work	Thesis Work	Thesis Work	Thesis Work	Thesis Work	
	PM		Consultation with supervisors					
September		26	27	28	29	30	31	9/1
	AM		Submission of Master Thesis to GRIPS	Makig Action Plan	Makig Action Plan	Makig Action Plan	Makig Action Plan	
	PM							
		2	3	4	5	6	7	8
	AM		Makig Action Plan	Makig Action Plan	Makig Action Plan	**Presentation at JSCE annual meeting**	Site visit (10) Shingu City, Ise City	
	PM							
		9	10	11	12	13	14	15
	AM		Makig Action Plan	ICHARM R&D Seminar	Presentation on Action Plan	Closing Ceremony at JICA	Graduation Ceremony at GRIPS	
	PM			Makig Action Plan				

Curriculum (Recommended course)

Lecture	Disaster Mitigation Policy		Disaster Risk Management		Basic Hydrology	
Number	DMP200E		DMP201E		DMP280E	
Instructor	Prof. Shigeru MORICHI		Prof. Kenji OKAZAKI		Prof. Amithirigala Widhanelage JAYAWARDENA	
Period	Winter		Winter		Fall through Winter	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Introduction: Coverage of this class Disaster mitigation policy	Prof. Morichi, GRIPS	Introduction: Disasters in the world	Prof. Okazaki, GRIPS	Basic concepts of the Hydrological Cycle; Processes in the Hydrological Cycle	Prof. Jayawardena, ICHARM
2	Social systems against disaster	Prof. Morichi, GRIPS	International activities for disaster mitigation	Prof. Okazaki, GRIPS	Precipitation – Types, measurement and presentation of data	Prof. Jayawardena, ICHARM
3	Education on basic knowledge for disasters (1)	Prof. Morichi, GRIPS	Japan's policy making	Prof. Okazaki, GRIPS	Extreme weather – cyclones, typhoons, hurricanes Evaporation and evapo-transpiration; Infiltration	Prof. Jayawardena, ICHARM
4	Education on basic knowledge for disasters (2)	Prof. Morichi, GRIPS	Basics of Disaster Risk Management	Prof. Okazaki, GRIPS	Runoff – Components, measurement and estimation of runoff	Prof. Jayawardena, ICHARM
5	Lessons from tragedies	Prof. Hitoshi IEDA,The University of Tokyo	Disaster risk management policies in Japan -1	Prof. Okazaki, GRIPS	Peak discharge estimation; Rational Method, Baseflow Separation	Prof. Jayawardena, ICHARM
6	Reliability analysis of transportation network	Prof. Morichi, GRIPS	Disaster risk management policies in Japan -2	Prof. Okazaki, GRIPS	Concept of rainfall excess; Role of infiltration and evaporation	Prof. Jayawardena, ICHARM
7	Policy for Transportation Infrastructure	Prof. Morichi, GRIPS	Lessons from Hanshin-Awaji Earthquake Disaster	Prof. Okazaki, GRIPS	Unit Hydrograph Methods I	Prof. Jayawardena, ICHARM
8	Policy for road infrastructure	Prof. Morichi, GRIPS	Building regulation	Prof. Okazaki, GRIPS	Unit Hydrograph Methods II	Prof. Jayawardena, ICHARM
9	Policy for port infrastructure	Prof. Morichi, GRIPS	Housing safety	Prof. Okazaki, GRIPS	Remote sensing in Hydrology	Ass. Prof. Fukami, ICHARM
10	Policy for airport infrastructure	Prof. Morichi, GRIPS	Issues of disaster management	Prof. Okazaki, GRIPS	Satellite observation of rainfall (1)	Dr. Kachi, Dr. Kubota, Japan Aerospace Exploration Agency (JAXA)
11	Policy for airport infrastructure	Prof. Morichi, GRIPS	Urban development and disaster management	Prof. Okazaki, GRIPS	Satellite observation of rainfall (2)	Dr. Kachi, Dr. Kubota, Japan Aerospace Exploration Agency (JAXA)
12	Land use and regulations	Prof. Morichi, GRIPS	Community based disaster risk management	Prof. Okazaki, GRIPS	Probability and statistics in hydrology I; IDF curves	Prof. Jayawardena, ICHARM
13	Policy Making Process	Prof. Morichi, GRIPS	Practical risk assessment I	Prof. Okazaki, GRIPS	Probability and statistics in hydrology II; Extreme value distribution	Prof. Jayawardena, ICHARM
14	Presentation by students and discussion (1)	Prof. Morichi, GRIPS	Practical risk assessment II	Prof. Okazaki, GRIPS	Basic concepts of Stochastic Hydrology	Prof. Jayawardena, ICHARM
15	Presentation by students and discussion (2)	Prof. Morichi, GRIPS	Special lecture		Examination	

Lecture	Hydraulics		Basic Concepts of Integrated Flood Risk management (IFRM)		Urban Flood Management and Flood Hazard Mapping	
Number	DMP281E		DMP282E		DMP287E	
Instructor	Prof. Guangwei HUANG		Prof. Kuniyoshi TAKEUCHI		Prof. Shigenobu TANAKA	
Period	Fall through Winter		Fall through Winter		Fall through Spring	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Introduction & Fundamental equations	Prof. Huang, ICHARM	Introduction: What is natural disaster? Overview of the class	Prof. Takeuchi, ICHARM	River law in Japan	Dr. Tanaka, ICHARM
2	Flow resistance in open channel	Prof. Huang, ICHARM	Introduction of Risk, Hazard and Vulnerability	Prof. Takeuchi, ICHARM	River planning in Japan	Dr. Tanaka, ICHARM
3	Flow resistance calculation in engineering practice	Prof. Huang, ICHARM	PAR Model (1) Root causes, progress of dynamic pressure and unsafe conditions	Prof. Takeuchi, ICHARM	Levee structure (1)	ICHARM
4	Steady uniform flow in prismatic channels	Prof. Huang, ICHARM	PAR Model (2) Concrete examples	Prof. Takeuchi, ICHARM	Levee structure (2)	ICHARM
5	Steady gradually-varied flow – backwater surface profiles	Prof. Huang, ICHARM	ACCESS Model	Prof. Takeuchi, ICHARM	River management during normal time	Ara River MLIT Office
6	Numerical solution of the gradually-varied flow equation	Prof. Huang, ICHARM	Disaster management cycle; Hyogo Framework for Action	Prof. Takeuchi, ICHARM	River management during flooding	Tone River MLIT Office
7	Hydraulic jump	Prof. Huang, ICHARM	IFRM and traditional FRM; IFRM as part of IWRM	Prof. Takeuchi, ICHARM	Discussion on urban flood management	Dr. Tanaka, ICHARM
8	The kinematic wave model	Prof. Huang, ICHARM	Concept of IWRM (1): Agenda 21, Global Water Partnership	Prof. Takeuchi, ICHARM	Outline of flood hazard map and evacuation plan and local disaster management plan	Dr. Tanaka, ICHARM
9	The diffusive wave model	Prof. Huang, ICHARM	Concept of IWRM (2): Guideline for IWRM at basin scale	Prof. Takeuchi, ICHARM	Geomorphology around rivers and alluvial plain (1)	Prof. Haruyama, Mie Univ.
10	The dynamic wave model	Prof. Huang, ICHARM	Japanese experiences (1) Flood damages and flood control investment	Prof. Takeuchi, ICHARM	Geomorphology around rivers and alluvial plain (2)	Prof. Haruyama, Mie Univ.
11	Method of characteristics	Prof. Huang, ICHARM	Japanese experiences (2) Ground subsidence control	Prof. Takeuchi, ICHARM	Disaster imagination game (DIG)	ICHARM
12	The Preissmann scheme	Prof. Huang, ICHARM	Global trends (1) Impact of climatic change	Prof. Oki, Tokyo Univ.	Case study of integrated flood management -Tsurumi river-	Mr Imbe, Association for Rainwater Storage and Infiltration Technology
13	Explicit Forward-Time-Centre-Space scheme	Prof. Huang, ICHARM	Global trends (2) International actions	Prof. Oki, Tokyo Univ.	Developments in social sciences on people ' s reactions and responses to disasters	Prof. Hayashi, Kyoto Univ.
14	Calculation of backwater profiles for levee design	Prof. Huang, ICHARM	Future Issues of IFRM: Adaptation; Aging society; Depopulation; Social Capital;	Prof. Takeuchi, ICHARM	Early evacuation of residents	ICHARM
15	Design of weirs and spillways	Prof. Huang, ICHARM	Application of Sabo Works and landslide countermeasures to overseas countries	Mr. Watanabe	Examination	ICHARM

Lecture	Advanced Hydrology		Flood Hydraulics and Sediment Transport		Mechanics of Sediment Transportation and River Changes	
Number	DMP380E		DMP381E		DMP382E	
Instructor	Prof. Amithirigala Widhanelage JAYAWARDENA		Prof. Shoji FUKUOKA		Prof. Shinji EGASHIRA	
Period	Fall through Winter		Fall through Winter		Fall through Winter	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Hydrological modelling – basic concepts and approaches	Prof. Jayawardena, ICHARM	Characteristics and river management of Japanese rivers	Prof. Fukuoka, Chuo Univ.	Introduction (1) - Characteristics of sediment	Prof. Egashira, Newjec
2	Systems theory approach I – Linear theory; Time domain analysis; Frequency domain analysis	Prof. Jayawardena, ICHARM	Prediction method of flow resistance in rivers with compound channels and application to river course design (1)	Prof. Fukuoka, Chuo Univ.	Introduction (2) - Sediment transportation and corresponding channel changes - Methods to evaluate channel changes	Prof. Egashira, Newjec
3	Systems theory approach II – Non-linear systems, multi-linear systems	Prof. Jayawardena, ICHARM	Prediction method of flow resistance in rivers with compound channels and application to river course design (2)	Prof. Fukuoka, Chuo Univ.	Mechanics of sediment transportation (1) - Parameters associated with sediment transportation	Prof. Egashira, Newjec
4	Instantaneous Unit Hydrograph (IUH)	Prof. Jayawardena, ICHARM	Steady quasi-two dimensional analysis of flood flows (1)	Prof. Fukuoka, Chuo Univ.	Mechanics of sediment transportation (2) - Critical condition for initiating bed load	Prof. Egashira, Newjec
5	Conceptual models of IUH	Prof. Jayawardena, ICHARM	Steady quasi-two dimensional analysis of flood flows (2)	Prof. Fukuoka, Chuo Univ.	Mechanics of sediment transportation (3) - Bed load formulas	Prof. Egashira, Newjec
6	Synthetic Unit Hydrograph	Prof. Jayawardena, ICHARM	Unsteady quasi-two-dimensional analysis of flood flows (1)	Prof. Fukuoka, Chuo Univ.	Mechanics of sediment transportation (4) - Bed load formulas	Prof. Egashira, Newjec
7	Rainfall-runoff modelling I – Conceptual type	Prof. Jayawardena, ICHARM	Unsteady quasi-two-dimensional analysis of flood flows (2)	Prof. Fukuoka, Chuo Univ.	Mechanics of sediment transportation (5) - Extension of bed load formula to non-uniform sediment	Prof. Egashira, Newjec
8	Rainfall-runoff modelling II – Physics-based type	Prof. Jayawardena, ICHARM	To derive a relationship between stable dimensionless width, depth and discharge in natural rivers - learning from natural rivers	Prof. Fukuoka, Chuo Univ.	Mechanics of sediment transportation (6) - Suspended load	Prof. Egashira, Newjec
9	Introduction to Hydroinformatics	Prof. Jayawardena, ICHARM	How do we make a river cross-section harmonizing flood control and river environment	Prof. Fukuoka, Chuo Univ.	Mechanics of debris flow (1) - Constitutive equations - Debris flow characteristics over erodible beds	Prof. Egashira, Newjec
10	Flood routing – Muskingam method; Muskingam-Cunge method	Prof. Jayawardena, ICHARM	1-D bed deformation, computing model	Prof. Watanabe, Kitami Institute of Technology	Mechanics of debris flow (2) - A bed load formula derived from constitutive equations	Prof. Egashira, Newjec
11	Kalman Filtering	Prof. Jayawardena, ICHARM	2-D bed deformation, sand waves and bars, meandering	Prof. Watanabe, Kitami Institute of Technology	Bed forms and flow resistance (1) - Geometric characteristics of bed forms - Formative domain of bed forms	Prof. Egashira, Newjec
12	Frequency analysis	Prof. Jayawardena, ICHARM	Vegetations, flows in vegetated zone	Prof. Watanabe, Kitami Institute of Technology	Bed forms and flow resistance (2) - Flow resistance	Prof. Egashira, Newjec
13	Parameter estimation	Prof. Jayawardena, ICHARM	River restoration based on sediment transport and vegetation on stabilized bars	Prof. Watanabe, Kitami Institute of Technology	Prediction of channel changes (1) - Governing equations employed in steep areas - Topographic change in steep areas	Prof. Egashira, Newjec
14	Errors in frequency analysis	Prof. Jayawardena, ICHARM	Re-meandering project for river restoration	Prof. Watanabe, Kitami Institute of Technology	Prediction of channel changes (2) - Governing equations employed in alluvial reaches - Topographic change in alluvial reaches	Prof. Egashira, Newjec
15	Examination		Bank erosion and drift woods	Prof. Watanabe, Kitami Institute of Technology	Method to predict sediment transport process in drainage basins - Sediment management in drainage basin	Prof. Egashira, Newjec

Lecture	Sustainable Reservoir Development & Management		Control Measures for Landslide & Debris Flow	
Number	DMP383E		DMP384E	
Instructor	Prof. Norihisa MATSUMOTO		Prof. Hiroshi IKEYA	
Period	Fall through Winter		Fall through Winter	
	Lecture	Lecturer	Lecture	Lecturer
1	Outline of Dam Engineering	Dr. Sakamoto, Japan Commission on Large Dams	Outline of sediment-related disasters and Sabo projects	Prof. Ikeya, SABO Technical Center
2	Planning and Operation of Flood Control	Mr. Umino, PWRI	Sabo planning	Prof. Sasahara, Kochi Univ.
3	Earthquake Engineering for Dams	Dr. Omachi Japan Dam Engineering Center	Design of Sabo dam	Prof. Sasahara, Kochi Univ.
4	Environmental Impact of Dams (1)	Dr. Amano, NILIM	Warning and evacuation system for sediment-related disasters	Dr. Hara, Sabo Technical Center
5	Environmental Impact of Dams (2)	Prof.Sumi, Kyoto Univ.	Hazard mapping for sediment-related disasters	Dr. Takanashi, Asia Air Survey CO.,LTD
6	Sediment Management in Reservoirs (1)	Prof.Sumi, Kyoto Univ.	Training of hazard mapping for sediment-related disasters (1)	Dr. Takanashi, Asia Air Survey CO.,LTD
7	Sediment Management in Reservoirs (2)	Prof.Sumi, Kyoto Univ.	Training of hazard mapping for sediment-related disasters (2)	Dr. Takanashi, Asia Air Survey CO.,LTD
8	Dam Construction (1)	Prof. Yamaguchi, PWRI	Sabo Works in arid area and reforestation of degraded land	Prof. Ikeya, SABO Technical Center
9	Dam Construction (2)	Dr. Kashiwai, Japan Dam Engineering Center	Countermeasures for earthquake-induced natural Dams	Dr. Osanai, PWRI
10	Dam Management	Prof. Yamaguchi, PWRI	Introduction of landslides	Dr. Tsunaki, SABO Technical Center
11	Effective Use of Existing Dams	Prof. Matsumoto, Japan Dam Engineering Center	Survey and emergency response for landslide	Dr. Fujisawa, NEXCO
12	Roles of Dams in 21st Century	Prof. Matsumoto, Japan Dam Engineering Center	Permanent measures for landslide damage reduction	Dr. Tsunaki, SABO Technical Center
13	Practice on Dam Planning (1) -Presentation-	Prof. Matsumoto, Prof. Yamaguchi	Case study of landslide	Dr. Fujisawa, NEXCO
14	Practice on Dam Planning (2) -Presentation-	Prof. Matsumoto, Prof. Yamaguchi	Application of Sabo/landslide projects to overseas countries (1) -Presentation-	Prof. Ikeya, Dr. Osanai
15	Tour of Dam Laboratory of PWRI	Mr. Umino, PWRI	Application of Sabo/landslide projects to overseas countries (2) -Presentation-	Prof. Ikeya, Dr. Osanai

Curriculum （Elective course)

Lecture	Computer Programming		Practices in Hydraulics		Practice on Local Disaster Management Plan	
Number	DMP180E		DMP288E		DMP286E	
Instructor	Asso. Prof. Takahiro SAYAMA		Asso. Prof. Atsuhiro YOROZUYA		Prof. Shigenobu TANAKA	
Period	Fall through Winter		Fall through Spring		Fall through Spring	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Introduction of Computer Programming with Fortran90	Asso Prof Sayama, ICHARM	Mathematic 1 (Ordinary Differential equations)	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (1)	Ms Kita, Ms Iseki, GLM Institute
2	Variables	Asso Prof Sayama, ICHARM	Mathematic 2 (Partial Differential equations)	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (2)	Ms Kita, Ms Iseki, GLM Institute
3	Arithmetic Calculation	Asso Prof Sayama, ICHARM	Review of Advection and Diffusion	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (3)	Ms Kita, Ms Iseki, GLM Institute
4	Program Structure (if, do loop)	Dr Hasegawa, ICHARM	Review of General transport equations	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (4)	Ms Kita, Ms Iseki, GLM Institute
5	Program Structure (if, do loop)	Dr Hasegawa, ICHARM	Discussion about Quiz-1	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (5)	Ms Kita, Ms Iseki, GLM Institute
6	Program Structure (if, do loop)	Dr Hasegawa, ICHARM	Review of One dimensional energy equation	Dr Yorozuya, ICHARM	Flood Fighting Drill	ICHARM
7	I/O Statement	Dr Hasegawa, ICHARM	Review of Specific energy	Dr Yorozuya, ICHARM	Town Watching (Field survey)	ICHARM
8	Hydrologic Application Exercise (1)	Asso Prof Sayama, ICHARM	Review of Gradually varied flow	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (1)	Dr Kwak, ICHARM
9	Quiz(1)	Dr Hasegawa, ICHARM	Discussion about Quiz-2	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (2)	Dr Kwak, ICHARM
10	Arrays	Dr Ushiyama, ICHARM	Review of Specific force	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (3)	Dr Kwak, ICHARM
11	Arrays	Dr Ushiyama, ICHARM	Review of Hydraulic jump, Junction and Diversion	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (4)	Dr Kwak, ICHARM
12	Procedures and Structured Programming (subroutine, function)	Dr Ushiyama, ICHARM	Review of Composite channel flow	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (5)	Dr Kwak, ICHARM
13	Procedures and Structured Programming (subroutine, function)	Dr Ushiyama, ICHARM	Review of Secondary flow	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (6)	Dr Kwak, ICHARM
14	Hydrologic Application Exercise (2)	Asso Prof Sayama, ICHARM	Review of Density currents	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (7)	Dr Kwak, ICHARM
15	Quiz(2)	Dr Ushiyama, ICHARM	Discussion about Examination	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (8)	Dr Kwak, ICHARM

Lecture	Practice on Advanced Hydrology		Practice on Flood Hazard Modeling & Flood Forecasting		Site Visit of Water-related Disaster Management Practice in Japan	
Number	DMP385E		DMP386E		DMP390E	
Instructor	Prof. Amithirigala Widhanelage JAYAWARDENA		Asso. Prof. Kazuhiko FUKAMI		Prof. Shigenobu TANAKA	
Period	Fall through Spring		Fall through Spring		Fall through Summer	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Exercises on System function estimation	Prof Jayawardena, ICHARM	Introduction to Flood Hazard Modeling	Ass Prof Sayama, ICHARM	River in Japan -Diversion Channel, Levee ,River administration - (Ara River)	MLIT local office
2	Exercises on least squares estimation	Prof Jayawardena, ICHARM	Fundamentals of Conceptual Rainfall-Runoff Models	Ass Prof Sayama, ICHARM	Flood information (MLIT Regional bureau, Kita City or Kuki City)	MLIT local office
3	Exercises on Impulse and Frequency Response Functions	Prof Jayawardena, ICHARM	Finite Difference Method for Ordinary Differential Equations	Ass Prof Sayama, ICHARM	Retarding Basin (Watarase Retarding Basin)	MLIT local office
4	Exercises on IUH determination	Prof Jayawardena, ICHARM	Finite Difference Method for ODE with Fortran Exercise	Ass Prof Sayama, ICHARM	Metropolitan Area Outer Underground Discharge Channel	MLIT local office
5	Exercises on IUH application	Prof Jayawardena, ICHARM	Fundamentals of Physically based Rainfall-Runoff Models	Ass Prof Sayama, ICHARM	Integrated flood management (Tsurumi River)	MLIT local office
6	Exercises on a typical rainfall-runoff model I	Prof Jayawardena, ICHARM	Finite Difference Method for Partial Differential Equations	Ass Prof Sayama, ICHARM	Collaborative administration of Ikari Dam & Kawaji Dam	MLIT local office
7	Exercises on a typical rainfall-runoff model II	Prof Jayawardena, ICHARM	Finite Difference Method for PDE with Fortran Exercise	Ass Prof Sayama, ICHARM	Sabo work in Ashio	MLIT local office
8	Exercises on flood routing	Prof Jayawardena, ICHARM	Introduction of GFAS (Global Flood Alert System)	Ass Prof Fukami, ICHARM	River Basin Planning (1) (Hii River)	MLIT local office
9	Exercises on Kalman filtering I	Prof Jayawardena, ICHARM	Introduction of IFAS (Integrated Flood Analysis System)	Mr Nabesaka, Dr Sugiura, Mr Fujioka, ICHARM	River Basin Planning (2) (Ota River)	MLIT local office
10	Exercises on Kalman filtering II	Prof Jayawardena, ICHARM	Correction and Validation of Satellite-Based Rainfall	Mr Nabesaka, Dr Sugiura, Mr Fujioka, ICHARM	River improvement in mid-size river	Tokyo Metropolitan
11	Exercises on Frequency analysis I	Prof Jayawardena, ICHARM	Runoff analysis with IFAS (1) Data import, Model building	Mr Nabesaka, Dr Sugiura, Mr Fujioka, ICHARM	Sabo work in Kamenose	MLIT local office
12	Exercises on Frequency analysis II	Prof Jayawardena, ICHARM	Runoff analysis with IFAS (2) Parameter estimation	Mr Nabesaka, Dr Sugiura, Mr Fujioka, ICHARM	Recovery from flood	Shingu City, Wakayama Pref
13	Exercises on Frequency analysis III	Prof Jayawardena, ICHARM	Runoff analysis with IFAS (3) Validation of calculated discharge	Mr Nabesaka, Dr Sugiura, Mr Fujioka, ICHARM	Community based disaster management in Ise	Ominato comunnity, Ise City, Mie Pref
14	Exercises on parameter estimation	Prof Jayawardena, ICHARM	Runoff analysis with IFAS (4) Application to actual basins	Mr Nabesaka, Dr Sugiura, Mr Fujioka, ICHARM		
15	Exercises on error analysis	Prof Jayawardena, ICHARM	Run-off analysis with IFAS (5) Application to actual basins	Mr Nabesaka, Dr Sugiura, Mr Fujioka, ICHARM		

Subject: Computer Programming

Course number：DMP180E
Instructor：Ass. Prof. Takahiro SAYAMA
Term / Time：Fall through Winter

1 Course Description

This course provides general knowledge on Fortran90 computer programming and its skills for solving water-related problems covered in Course No. DMP280E “Basic Hydrology”, No. DMP281E “Hydraulics”, No. DMP380E “Advanced Hydrology”, No.DMP381E “Flood Hydraulics and Sediment Transport”, and No.DMP386E “Practice on Flood hazard Modeling & Flood Forecasting”.

2 Course Outline (Course Topics)

Week

1 : Introduction of Computer Programming with Fortran90
2 : Variables
3 : Arithmetic Calculation
4 : Program Structure (if, do loop)
5 : Program Structure (if, do loop)
6 : Program Structure (if, do loop)
7 : I/O Statement
8 : Hydrologic Application Exercise (1)
9 : Quiz(1)
10 : Arrays
11 : Arrays
12 : Procedures and Structured Programming (subroutine, function)
13 : Procedures and Structured Programming (subroutine, function)
14 : Hydrologic Application Exercise (2)
15 : Quiz(2)

3 Grading

Quiz (50%)

Reports (50%)

If a report is late for the deadline, it will be not evaluated.

4 Textbooks

Reference: Fortran95/2000 for Scientists and Engineers (Third Ed.), by Stephen J. Chapman, McGraw-Hill,

Subject: Basic Hydrology

Course number：DMP280E
Instructor：Prof. A. W. Jayawardena
Term / Time：Fall through Winter

1 Course Description

The aim of this course is to introduce and expose the students to the basic concepts of hydrology including the different processes, quantification of hydrological variables and their measurement and/or estimation, unit hydrograph methods and the application of probability and statistics in hydrology

2 Course Outline (Course Topics)

Week

1 : Basic concepts of the Hydrological Cycle; Processes in the Hydrological Cycle
2 : Precipitation – Types, measurement and presentation of data
3 : Extreme weather – cyclones, typhoons, hurricanes
Evaporation and evapo-transpiration; Infiltration
4 : Runoff – Components, measurement and estimation of runoff
5 : Peak discharge estimation; Rational Method, Baseflow Separation
6 : Concept of rainfall excess; Role of infiltration and evaporation
7 : Unit Hydrograph Methods I
8 : Unit Hydrograph Methods II
9 : Remote sensing in Hydrology
10 : Satellite observation of rainfall (1) (by JAXA)
11 : Satellite observation of rainfall (2) (by JAXA)
12 : Probability and statistics in hydrology I; IDF curves
13 : Probability and statistics in hydrology II; Extreme value distribution
14 : Basic concepts of Stochastic Hydrology
15 : Examination

3 Grading

60% by examination; 40% by in-course assessment

4 Textbooks

4-1 Required

4-2 Others

References (selected)

- Linsley, R. K., Kohler, M.A. and Paulhus, J.L.H. (1988): Hydrology for Engineers, SI Metric Edition), McGraw-Hill Book Company
- Raudkivi, A. J. (1979): Hydrology – An Advanced Introduction to Hydrological Processes and Modelling, Pergamon Press.
- Shaw, E. M. (1983) Hydrology in Practice, Van Nostrand Reinhold (UK)
- Singh, V. P. (1992): Elementary Hydrology, Prentice Hall
- Viessman, W., Lewis, G. L. and knapp, J.W. (1989): Introduction to Hydrology (Third Edition), Harper Row, Publishers.
- Wanielista, M., Kersten, R. and Eaglin, R. (1997): Hydrology: Water quantity and quality control, Second Edition, John Wiley & Sons Inc.
- Course Lecture Notes

Subject: Hydraulics

Course number：DMP281E
Instructor：Prof. Guangwei HUANG
Term / Time：Fall through Winter

1. Course Description

Analysis of open channel flows and a selective presentation of some of the common river management problems encountered by practicing engineers with the inclusion of related computational techniques.

Course Goal:

To enable students to conduct professional channel flow analysis and applications and to develop independent learning and problem solving skills. After completing this course, you will be able to…

1. set up systems of equations representing flow through channel systems
2. perform 1-D steady and unsteady flow analysis of open channel systems
3. apply solution approaches to levee design
4. gain advanced knowledge on the design of weirs and spillways
5. present technical information effectively

2. Course Outline (Course Topics)

1. Basic principles of open channel flows

- Introduction & Fundamental equations
- Flow resistance in open channel
- Flow resistance calculation in engineering practice

2. Uniform, gradually-varied and rapidly-varied flows

- Steady uniform flow in prismatic channels
- Steady gradually-varied flow – backwater surface profiles
- Numerical solution of the gradually-varied flow equation
- Hydraulic jump

Quiz

3. Unsteady flows

- The kinematic wave model
- The diffusive wave model
- The dynamic wave model
- Method of characteristics
- The Preissmann scheme
- Explicit Forward-Time-Centre-Space scheme

Exercise

4. Practical topics

- Calculation of backwater profiles for levee design
- Design of weirs and spillways

Final exam

3. Grading:

Class participation (30%), Quiz and exercise (30%), Examination (40%)

4. Textbooks

Recommended books:

Open-channel Hydraulics, Ven Te Chow;

Practical aspects of computational river hydraulics, J.A. Cunge, F.M. Holly, Jr., A. Verwey.

Handouts will be distributed.

Subject: Basic Concepts of Integrated Flood Risk management (IFRM)

Course number : DMP282E
Instructor : Prof. Kuniyoshi TAKEUCHI
Term / Time : Fall through Winter

1 Course Description

This course provides the basic concepts of "Integrated Flood Risk Management (IFRM)" as part of Integrated Water resources Management (IWRM). The mechanism of disaster risk development with natural hazard, societal vulnerability, exposure and coping capacity will be emphasized. New concepts of IWRM at basin scale will be introduced and, as concrete examples, Japanese flood management experiences and global activity trends will be introduced emphasizing good practices and key for success. Anticipated future direction of risk management to cope with societal changes and global climate changes will also be covered.

2 Course Outline (Course Topics)

1. Introduction: What is natural disaster? Overview of the course
2. Introduction of Risk, Hazard and Vulnerability
3. PAR Model (1) Root causes, progress of dynamic pressure and unsafe conditions
4. PAR Model (2) Concrete examples
5. ACCESS Model
6. Disaster management cycle; Hyogo Framework for Action
7. IFRM and traditional FRM; IFRM as part of IWRM
8. Concept of IWRM (1): Agenda 21, Global Water Partnership
9. Concept of IWRM (2): Guideline for IWRM at basin scale
10. Japanese experiences (1) Flood damages and flood control investment
11. Japanese experiences (2) Comprehensive flood control measures and focus expansion from river to basin
12. Global trends (1) Impact of climatic change
13. Global trends (2) International actions
14. Future Issues of IFRM: Adaptation; Aging society; Depopulation; Social Capital;
15. Examination

3 Grading

Active participation(30%), Reports(40%), Final Examination(30%)

4 Textbooks

4-1 Required

1. Ben Wisner, Piers Blaikie, Terry Cannon and Ian Davis, At Risk -natural hazards, people's vulnerability and disasters- (Routledge, London & NY, 2004)
2. UNESCO IWRM guidelines steering committee, IWRM Guidelines at River Basin Level: Part 1-1 Principles, 2-1 Part 2-1 Coordination, 2-2 Flood Management, 2-3 Irrigation. (UNESCO, 2009)

Subject: Practice on Local Disaster Management Plan

Course number：DMP286E
Instructor：Prof. Shigenobu TANAKA
Term / Time：Fall through Spring

1 Course Description

This course aims at consolidating the material covered in Course No. DMP287E "Urban Flood Management and Flood Hazard Mapping".

Exercises related to each topic will be given to the students and they will be discussed and explained.

2 Course Outline (Course Topics)

Week

1 : Project Cycle Management (PCM) (1)
2 : Project Cycle Management (PCM) (2)
3 : Project Cycle Management (PCM) (3)
4 : Project Cycle Management (PCM) (4)
5 : Project Cycle Management (PCM) (5)
6 : Flood Fighting Drill
7 : Town Watching (Field survey)
8 : Geographic Information System (GIS) (1)
9 : Geographic Information System (GIS) (2)
10 : Geographic Information System (GIS) (3)
11 : Geographic Information System (GIS) (4)
12 : Geographic Information System (GIS) (5)
13 : Geographic Information System (GIS) (6)
14 : Geographic Information System (GIS) (7)
15 : Geographic Information System (GIS) (8)

3 Grading

Reports (100%)

If a report is late for the deadline, it will be not evaluated.

4 Textbooks

4-1 Required

4-2 Others

Subject: Urban Flood Management and Flood Hazard Mapping

Course number：DMP287E
Instructor：Prof. Shigenobu TANAKA
Term / Time：Fall through Spring

1 Course Description

This course is specifically designed to study urban flood management. In the first half of the course, students will learn about Japan's basic legal systems concerning rivers and river planning and management with special focus on the construction and management of river levees, which are an important flood defense structure for urban areas. The second half aims to acquire knowledge required to promote early public evacuation. Students will study topography, hazard mapping and Disaster Imagination Game, for example. They will also learn about psychological aspects underlying public behavior during disaster. Toward the end of the course, students will conduct interviews in flood-vulnerable urban areas to investigate what measures are in place to promote early public evacuation.

2 Course Outline (Course Topics)

Week

1 ：River law in Japan
2 ：River planning in Japan
3 ：Levee structure (1)
4 ：Levee structure (2)
5 ：River management during normal time
6 ：River management during flooding
7 ：Discussion on urban flood management
8 ：Outline of flood hazard map and evacuation plan and local disaster management plan
9 ：Geomorphology around rivers and alluvial plain (1)
10 ：Geomorphology around rivers and alluvial plain (2)
11 ：Disaster imagination game (DIG)
12 ：Case study of integrated flood management -Tsurumi river-
13 ：Developments in social sciences on people's reactions and responses to disasters
14 ：Early evacuation of residents
15 ：Examination

3 Grading

Reports (40%), Final Exam (60%)

If a report is late for the deadline, it will be not evaluated.

4 Textbooks

4-1 Required

"Local Disaster Management and Hazard Mapping" (2009), ICHARM

4-2 Others

Subject: Practices in Hydraulics

Course number：DMP288E
Instructor：Dr. Atsuhiro YOROZUYA
Term / Time：Fall through Spring

1. Course Description:
Analysis of open channel flows and a selective presentation of some of the common river management problems encountered by practicing engineers with the inclusion of related computational techniques.

Course Goal:

To enable students to prepare studying in class in Graduate school, and to understand basic hydraulics with experimental study using computational study as well as flume study. Also to understand a practical subject about hydraulics with studying about water discharge measurement in a river.

2. Course Outline (Course Topics)

1. Review of Mathematics
- Ordinary differential equation
- Partial differential equations

2. Fundamentals of Fluid Flow
- Equation of continuity
- Energy equation
- Bernoulli's equation

3. Flow in closed conduits
- Reynolds number
- Friction factor

4. Computational experiments of open channel flow

5. Flume experiments of open channel flow

6. Practical topics
- Introduction about flow discharge measurement
- Field trip to flow discharge measurement in a river
- Presentation about flow discharge measurement in your countries

3. Grading:

Class participation (10%), Experiment participation (30%), Reports (60%)

4. Text book

Beginning Calculus, Elliott Mendelson Ph.D., Schaum's outlines
Fluid Mechanics and Hydraulics, R. V. Giles, J. B. Evett, and C. Lin, Schaum's outlines

Subject : Advanced Hydrology

Course number : DMP380E
Instructor : Prof. A. W. Jayawardena
Term / Time : Fall through Winter

1 Course Description

The objective of this course is to provide knowledge and skill in advanced techniques of hydrological data analysis, modeling and prediction.

2 Course Outline (Course Topics)

1 : Hydrological modelling – basic concepts and approaches
2 : Systems theory approach I – Linear theory; Time domain analysis; Frequency domain analysis
3 : Systems theory approach II – Non-linear systems, multi-linear systems
4 : Instantaneous Unit Hydrograph (IUH)
5 : Conceptual models of IUH
6 : Synthetic Unit Hydrograph
7 : Rainfall-runoff modelling I – Conceptual type
8 : Rainfall-runoff modelling II – Physics-based type
9 : Introduction to Hydroinformatics
10 : Flood routing – Muskingam method; Muskingam-Cunge method
11 : Kalman Filtering
12 : Frequency analysis
13 : Parameter estimation
14 : Errors in frequency analysis
15 : Examination

3 Grading

60% by examination; 40% by in-course assessment

4 Textbooks

4-1 Required

4-2 Others

Reference books

- Battan, L. J. (1984) : Fundamentals of meteorology, Prentice Hall Inc. Englewood Cliffs, New Jersey
- Eagleson, P. S: (1970) : Dynamic hydrology, McGraw Hill Book Co.
- Kite, G. W. (1977): Frequency and risk analysis in hydrology, Water resources publication, Fort Collins, Colorado.
- Lattermann, A. (1991) : System-Theoretical modelling in surface water hydrology, Springer- Verlag.
- McCuen, R. M. ((1989) Hydrologic analysis and design, Prentice Hall
- Raudkivi, R. J. (1979) : Hydrology - An advanced introduction to hydrological processing and modelling, Pergamon Press
- Viessman, W. Lewis, G. L. and Knapp, J. W. (1989): Introduction to hydrology, 3rd Edition, Harper & Row.
- Wanielista, M. (1990) : Hydrology and water quality control, John Wiley
- Course Lecture Notes

Subject: Flood Hydraulics and Sediment Transport

Course number：DMP381E
Instructor：Prof. Shoji FUKUOKA
Term / Time：Fall through Winter

1 Course Description

This course provides the basic knowledge necessary for planning and designing the structural measures for Integrated Flood Risk Management (IFRM). The course first describes the river administration and planning for application of IFRM. Especially the methodology of comprehensive river management will be emphasized that includes planning of flood hydraulics, flood control, and sediment movement to river channels and dam reservoirs. This will be followed by specific technologies of channel control and channel improvement.

2. Course Outline (Course Topics)

Week

1. Characteristics and river management of Japanese rivers
2. Prediction method of flow resistance in rivers with compound channels and application to river course design (1)
3. Prediction method of flow resistance in rivers with compound channels and application to river course design (2)
4. Steady quasi-two dimensional analysis of flood flows (1)
5. Steady quasi-two dimensional analysis of flood flows (2)
6. Unsteady quasi-two-dimensional analysis of flood flows (1)
7. Unsteady quasi-two-dimensional analysis of flood flows (2)
8. To derive a relationship between stable dimensionless width, depth and discharge in natural rivers - learning from natural rivers
9. How do we make a river cross-section harmonizing flood control and river environment
10. 1-D bed deformation, computing model
11. 2-D bed deformation, sand waves and bars, meandering
12. Vegetations, flows in vegetated zone
13. River restoration based on sediment transport and vegetation on stabilized bars
14. Re-meandering project for river restoration
15. Bank erosion and drift woods

3 Grading

Reports (20%) Final examination (80%)

4 Textbooks

4-1 Required

4-2 Others

Subject: Mechanics of Sediment Transportation and Channel Changes

Course number：DMP 382E
Instructor：Prof. Shinji EGASHIRA
Term / Time：Fall through Winter

1 Course Description

Sediment transportation takes place in various forms such as bed-load, suspended load, debris flow etc. and its spatial imbalance causes river bed degradation and aggradation, side bank erosion, sand bar formation and channel shifting. Although these channel changes will be suitable for ecological systems, if they are within an allowable level. However, if these are over some critical level, flood and sediment disasters will happen. This course provides methods for evaluating sediment transportation and associated channel changes with attention focused on basic principles of sediment mechanics. In addition, methods of sediment management are discussed for disaster mitigation as well as for developing a suitable channel condition.

2 Course Outline (Course Topics)

Week

1 : Introduction (1)
- Characteristics of sediment

2 : Introduction (2)
- Sediment transportation and corresponding channel changes
- Methods to evaluate channel changes

3 : Mechanics of sediment transportation (1)
- Parameters associated with sediment transportation

4 : Mechanics of sediment transportation (2)
- Critical condition for initiating bed load

5 : Mechanics of sediment transportation (3)
- Bed load formulas

6 : Mechanics of sediment transportation (4)
- Bed load formulas

7 : Mechanics of sediment transportation (5)
- Extension of bed load formula to non-uniform sediment

8 : Mechanics of sediment transportation (6)
- Suspended load

9 : Mechanics of debris flow (1)
- Constitutive equations
- Debris flow characteristics over erodible beds

10 : Mechanics of debris flow (2)
- A bed load formula derived from constitutive equations

１１：Bed forms and flow resistance (1)
- Geometric characteristics of bed forms
- Formative domain of bed forms

１２：Bed forms and flow resistance (2)
- Flow resistance

１３：Prediction of channel changes (1)
- Governing equations employed in steep areas
- Topographic change in steep areas

１４：Prediction of channel changes (2)
- Governing equations employed in alluvial reaches
- Topographic change in alluvial reaches

１５：Method to predict sediment transport process in drainage basins
-Sediment management in drainage basin

3 Grading

50 points for reports and short quizzes

50 points for the examination at the end of semester

Notice: Either a report or a short quiz is assigned every two weeks, regarding questions illustrated at the end of each chapter in Lecture Note.

4 Textbooks

4-1 Required

- Egashira, S. (2009): Mechanics of Sediment Transportation and River Changes, Lecture Note

4-2 Others

- Sturm, T. W. (2001): Open Channel hydraulics, McGraw-Hill.
- Graf, W. H. (1997): Fluvial Hydraulics, Wiley.
- Julien Pierre: River Mechanics, Cambridge University Press
  (Website: http://www.cambridge.org/us/catalogue/catalogue.asp?isbn=9780521529709)
  (http://www.amazon.co.jp/River-Mechanics-Pierre-Y-julien/dp/0521529700)
- Albert Gyr and Klaus Hoyer: Sediment Transport, A Geophysical Phenomenon, Springer Netherlands
  (http://www.springerlink.com/content/q0x656/)
- Ashida K., Egashira S. and Nakagawa H. (2008), River Morphodynamics for the 21st Century, Kyoto University Press (in Japanese)

Subject: Sustainable Reservoir Development & Management

Course number：DMP 383E
Instructor：Prof. Norihisa MATSUMOTO
Term / Time：Fall through Winter

1 Course Description

This course provides the basic ideas of dam reservoir design, construction and operation & maintenance. The lecture starts from the purposes of dam reservoirs and looks into their environmental and societal impacts. The lecture covers the basic methodologies of project planning, site selection, design, construction, environmental impact assessment, sediment management and operation and maintenance of dam reservoirs. The students are expected to experience a preliminary but concrete process of environmental assessment of reservoirs and gets insight of the role of reservoirs as one of adaptation measures of climate changes.

2 Course Outline (Course Topics)

Week

1: Outline of Dam Engineering
2: Planning and Operation of Flood Control
3: Earthquake Engineering for Dams
4: Environmental Impact of Dams (1)
5: Environmental Impact of Dams (2)
6: Sediment Management in Reservoirs (1)
7: Sediment Management in Reservoirs (2)
8: Dam Construction (1)
9: Dam Construction (2)
10: Dam Management
11: Effective Use of Existing Dams
12: Roles of Dams in the 21st Century
13: Practice on Dam Planning (1) -Presentation-
14: Practice on Dam Planning (2) -Presentation-
15: Tour of Dam Laboratory of PWRI

3 Grading

Class participation 50%, Reports 30% Presentation 20%

If you miss the deadline for reports, your reports will only be evaluated for a certain percentage of what they are supposed to be:

Up to seven days: 70%, Eight days or more: 50%

4 Textbooks

4-1 Required

Japan Commission on Large Dams, “Dams in Japan ---Past, Present and Future”
A Balkema Book, CRD Press 2009

4-2 Others

Subject: Control Measures for Landslide & Debris Flow

Course number：DMP 384E
Instructor：Prof. Hiroshi IKEYA
Term / Time：Fall through Winter

1 Course Description

This course provides the necessary knowledge and understanding of landslide and debris flow phenomena and their control measures necessary to exercise the IFRM. The lecture will illustrate the devastating phenomena and the causes of landslides and debris flows and provide the basic concepts of the measures for sediment-related disasters, so-called Sabo Works which is executed in the hill slopes and the channels. It will cover the important role of hazard mapping for sediment-related disasters in both structural and non-structural measures.

2 Course Outline (Course Topics)

Week

1. Outline of sediment-related disasters and Sabo projects
2. Sabo planning
3. Design of Sabo dam
4. Warning and evacuation system for sediment-related disasters
5. Hazard mapping for sediment-related disasters
6. Training of hazard mapping for sediment-related disasters (1)
7. Training of hazard mapping for sediment-related disasters (2)
8. Sabo Works in arid area and reforestation of degraded land
9. Countermeasures for earthquake-induced natural Dams
10. Introduction of landslides
11. Survey and emergency response for landslides
12. Permanent measures for landslide damage reduction
13. Case study of landslide
14. Application of Sabo/landslide projects to overseas countries (1)
15. Application of Sabo/landslide projects to overseas countries (2)

3 Grading

Class participation (30%) Report and final examination (70%)

4 Textbooks

4-1 Required

4-2 Others

Subject: Practice on Advanced Hydrology

Course number：DMP385E
Instructor：Prof. A. W. Jayawardena
Term / Time：Fall through Spring

1 Course Description

The objective of this course is to train the students in various quantitative methods in Hydrology including some exercises on hydrological data analysis, modeling and prediction.

2 Course Outline (Course Topics)

1 ：Exercises on System function estimation
2 ：Exercises on least squares estimation
3 ：Exercises on Impulse and Frequency Response Functions
4 ：Exercises on IUH determination
5 ：Exercises on IUH application
6 ：Exercises on a typical rainfall-runoff model I
7 ：Exercises on a typical rainfall-runoff model II
8 ：Exercises on flood routing
9 ：Exercises on Kalman filtering I
10 ：Exercises on Kalman filtering II
11 ：Exercises on Frequency analysis I
12 ：Exercises on Frequency analysis II
13 ：Exercises on Frequency analysis III
14 ：Exercises on parameter estimation
15 ：Exercises on error analysis

3 Grading

100% in-course assessment

4 Textbooks

4-1 Required

4-2 Others

Subject: Practice on Flood Hazard Modeling & Flood Forecasting

Course number：DMP386E
Instructor：Ass. Prof. Kazuhiko FUKAMI
Term / Time：Fall through Spring

1 Course Description

The objective of this course is to build capacities for undertaking hydrological predictions in poorly-gauged basins. The course first introduces the fundamentals of rainfall-runoff models and flood inundation models. Then it describes finite difference methods to solve simple differential equations for flood hazard modeling. The basic knowledge with computer programming exercises will lead for understanding the background of the "Integrated Flood Analysis System: IFAS," which is a software developed by ICHARM for rainfall-runoff analysis. During the second half of the course, the participants will learn how to apply IFAS for flood predictions using IFAS in poorly-gauged basins with satellite-based rainfall information.

2 Course Outline (Course Topics)

Week

1 : Introduction to Flood Hazard Modeling
2 : Fundamentals of Conceptual Rainfall-Runoff Models
3 : Finite Difference Method for Ordinary Differential Equations
4 : Finite Difference Method for ODE with Fortran Exercise
5 : Fundamentals of Physically based Rainfall-Runoff Models
6 : Finite Difference Method for Partial Differential Equations
7 : Finite Difference Method for PDE with Fortran Exercise
8 : Introduction of GFAS (Global Flood Alert System)
9 : Introduction of IFAS (Integrated Flood Analysis System)
10 : Correction and Validation of Satellite-Based Rainfall
11 : Runoff analysis with IFAS (1) Data import, Model building
12 : Runoff analysis with IFAS (2) Parameter estimation
13 : Runoff analysis with IFAS (3) Validation of calculated discharge
14 : Runoff analysis with IFAS (4) Application to actual basins
15 : Runoff analysis with IFAS (5) Application to actual basins

3 Grading

Reports (100%)

4 Textbooks

4-1 Required

4-2 Others

Material made by the instructors

Subject: Site Visit of Water-related Disaster Management Practice in Japan

Course number：DMP390E
Instructor：Prof. Shigenobu TANAKA
Term / Time：Fall through Summer

1 Course Description

This course provides opportunities for students to actually visit and study flood control structures in Japan, which are introduced in other courses. The structures include river levees, flood retarding basins, dams, and sabo structures. After each study visit, students will be required to submit a report comparing the target structures in Japan and those in their countries.

2 Course Outline (Course Topics)

（Kanto Area : November - December）

１：River in Japan -Diversion Channel, Levee ,River administration - (Ara River)
２：Flood information (MLIT Regional bureau, Kita City or Kuki City）
３：Retarding Basin (Watarase Retarding Basin)
４：Metropolitan Area Outer Underground Discharge Channel
５：Integrated flood management (Tsurumi River)
６：Collaborative administration of Ikari Dam & Kawaji Dam
７：Sabo work in Nikko

（Chugoku & Kinki Area : March）

８：River Basin Planning (1) (Hii River)
９：River Basin Planning (2) (Ota River)
１０：River use in Osaka City (Doutonbori)
１１：Sabo work in Kamenose

（Tohoku Area : May）

１２：Designated disaster hazard area along Kitakami River (Fujisawa Town, Iwate Pref.)
１３：Secondary levee (Kashimadai District, Miyagi Pref.)

（Hokuriku Area : August）

１４：Discontinuous levee, Silt flashing from dams (Kurobe River)
１５：Japanese philosophy on river improvement (Shinano River)

3 Grading

Attendance (60%), Report (40%)

If a report is late for the deadline, it will be not evaluated.

4 Textbooks

4-1 Required
4-2 Others

Site Visit (1)　Urban River in Japan (Arakawa River)
[River management during normal time]

● Date:　　October 27th (Thu)

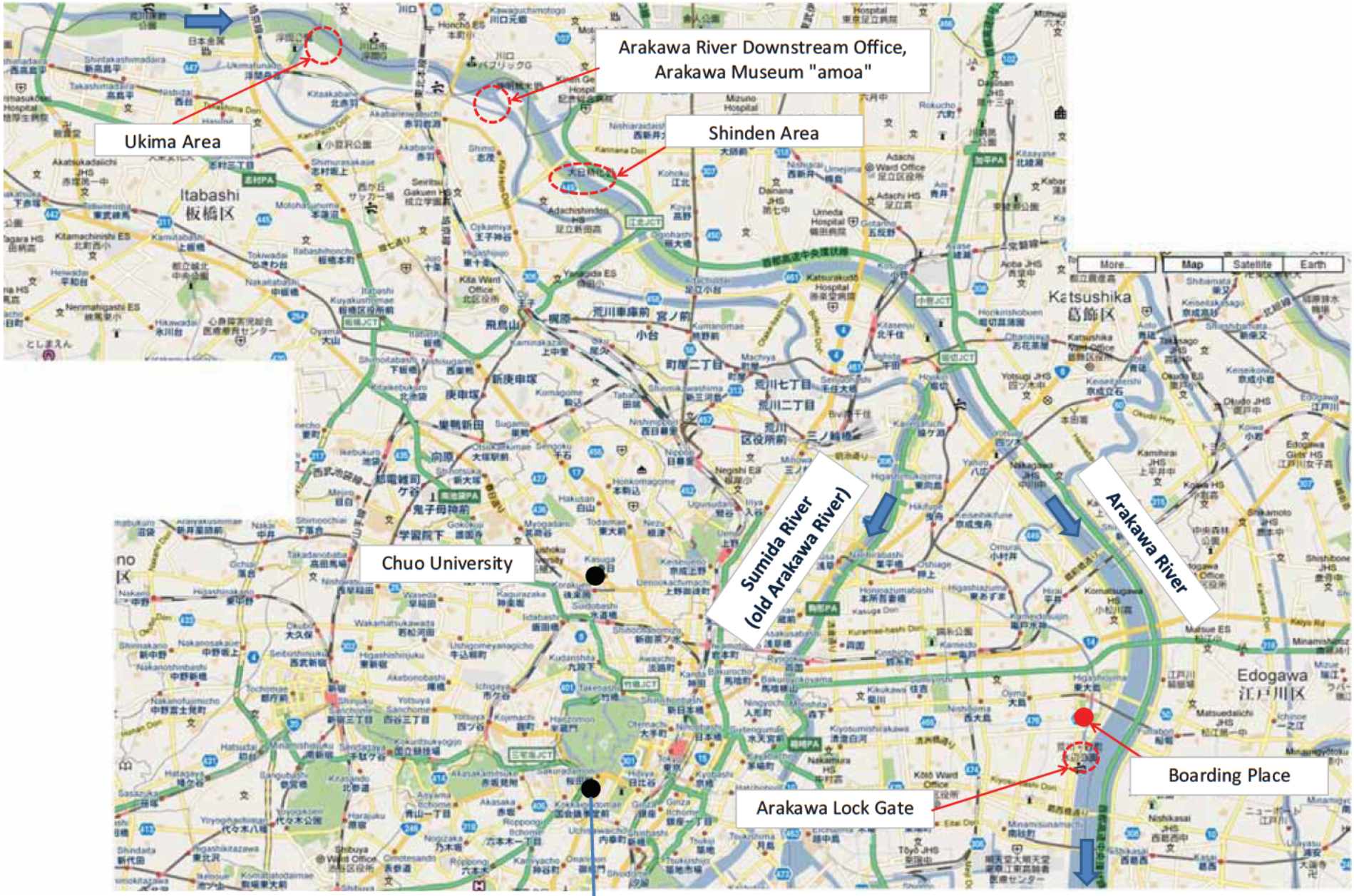
● Lecturer:　Mr. Ohta, Chief of Local Cooperation Section,
Arakawa-Karyu (Arakawa River Downstream) Office,
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

● Time table (tentative)

10:10	Boarding place
	↓ship　[Arakawa Lock Gate]
11:20	River Station in Shinden Area
11:25-11:45	Super Levee in Shinden Area
11:50	Boarding place
	↓ship
12:10	River Station in Iwabuchi Area
	↓walk
12:20-13:20	Lunch at Arakawa River Museum “amoa”
13:20-13:50	Tour of amoa &
	Disaster management room in MLIT local office
	↓walk　[Usual use of river side]
14:30-15:00	Disaster Prevention Station in Ukima Area

[End of the trip]

Location Map in Ara River



Annex 32

Site Visit (2) Flood Information (MLIT Kanto) & Water Discharge Tunnel

● Date: October 28th (Fri)

● Lecturer: Officer in charge

River Management Division,Kanto Regional Development Bureau,

Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Officer in charge

Edogawa River Work Office,

Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

● Time table (tentative)

9:00-10:30	Lecture by Prof. Fukuoka at Chou Univ.
10:30-12:00	Move to Saitama City by train
12:00-13:00	Lunch
13:00-14:30	Site visit at Flood Forecasting Center, Kanto Regional Development Bureau, MLIT
14:30-15:30	Move by bus
15:30-17:00	Site visit at Water Discharge Tunnel
17:00-18:00	Move to TBIC

Site Visit (3)
Kuki City Town & Watarase Retarding Basin

- Date： 10th November (Thu)
- Schedule：

７：２０ Departure from TBIC

↓ Bus

(７：５０ Departure from ICHARM)

↓ Bus

９：３０－１０：３０ Lecture on “Flood Information (2)”

［Tonegawa-Joryu (Tone River Upstream River) Work Office, MLIT］

↓ Bus

１０：４０－１２：１０ Tour in Kuki City

- **Breach point by Typhoon Kathleen in 1947**
- **“Marugoto Machigoto Hazard Map” (Past Flood Marks)**
- **Display Tower of Water Level of Tone River**
- **Display on Flood Information at Kurihashi Station**

１２：３０－１３：２０ Lunch & Break

［Road Station “Kita-kawabe”］

↓ Bus

１３：３０－１３：５０ Lecture on Watarase Retarding Basin

［Branch office of Tonegawa-Joryu (Tone River Upstream River) Work Office］

↓ Bus

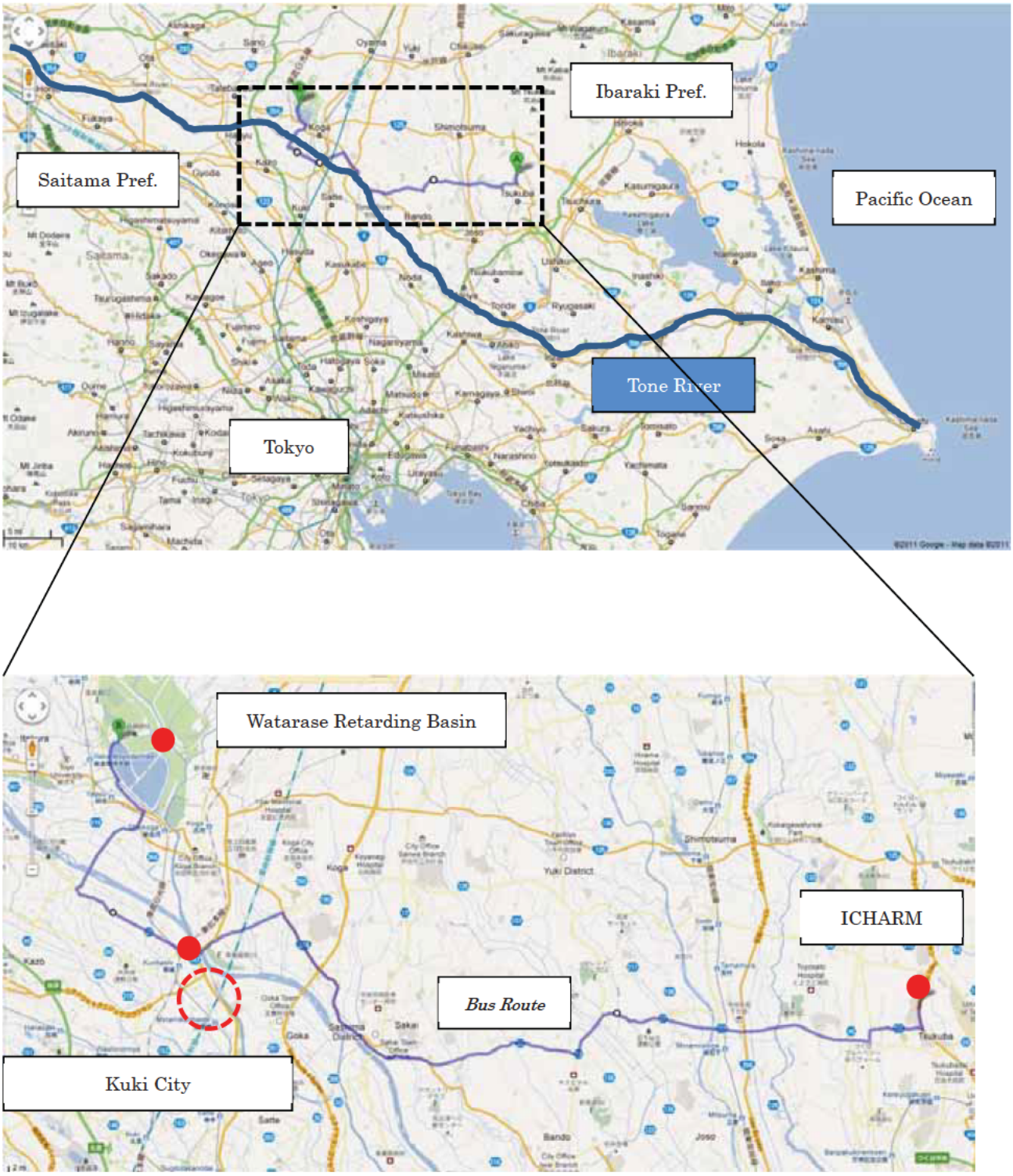
１４：００－１５：００ Watarase Retarding Basin

↓ Bus

(１６：４５ Arrival at ICHARM)

↓ Bus

１７：１５ Arrival at TBIC


Ibaraki Pref.
Saitama Pref.
Pacific Ocean
Tone River
Tokyo
Watarase Retarding Basin
ICHARM
Bus Route
Kuki City

Site Visit (4)
River improvement in Tokyo Metropolitan

Date: 22nd November, 2011

Schedule:

8:10 Tsukuba Center

↓ Bus

8:40 JICA Tsukuba

↓ Bus

10:00-11:30 Lecture on "River improvement by Tokyo Metropolitan Government"

11:30-12:00 Site visit of Bikunibashi downstream flood control reservoir

12:00-13:00 Lunch & Break

13:00-14:10 Site visit of Bikunibashi upstream flood control reservoir

14:15-14:45 Site visit of river improvement of Shirako River

↓ Bus

15:25-16:00 Site visit of river improvement of Shakujii River

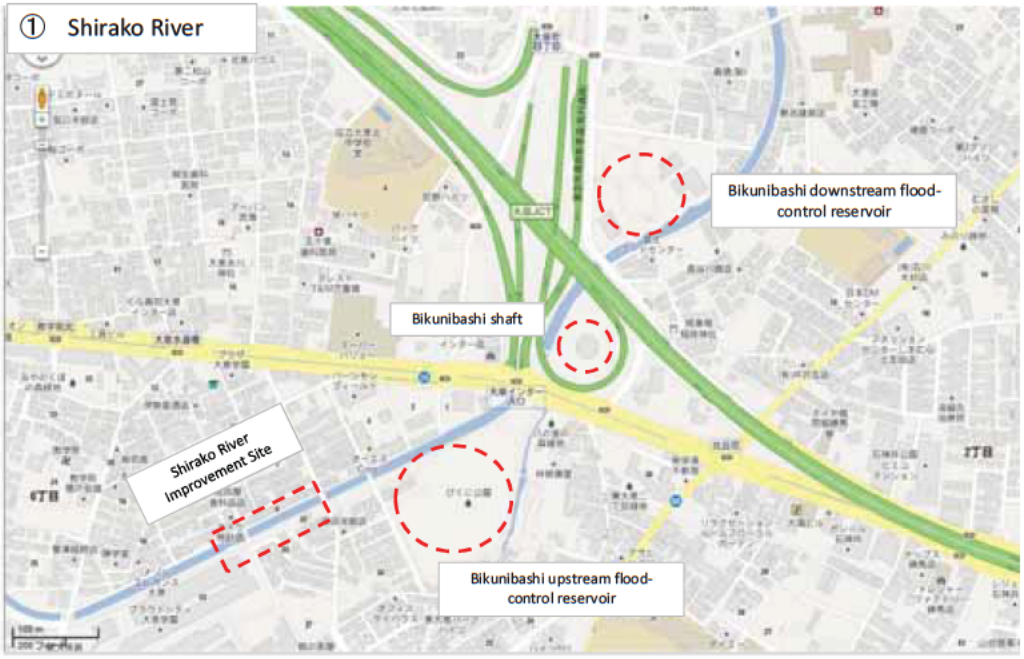
↓ Bus

17:15 JICA Tsukuba

↓ Bus

17:45 Tsukuba Center


①
②
Sirako River
Shakujii River
Sumida River
Nerima
練馬区
Nishitokyo
西東京市
Musashino
武蔵野市
Mitaka
三鷹市
Suginami
杉並区
Bunkyo
文京区
Taito
台東区
Sumida
墨田区
Chiyoda
千代田区
Shinjuku
新宿区
Shibuya
渋谷区
Minato
港区
Koto
江東区


① Shirako River
Bikunibashi downstream flood-control reservoir
Bikunibashi shaft
Shirako River Improvement Site
Bikunibashi upstream flood-control reservoir


② Shakujii River
Shakujii River Improvement Site

Site Visit (5) Integrated River Basin Management on Urban Rivers –Case study in Tsurumi River-

[9th December (Fri)]

7:00	Tsukuba Center
7:25	JICA Tsukuba
	move by bus
9:30	**①Tsurumi River Basin Information Center (Kozukue, Kouhoku-ku, Yokohama-city)**
9:30-10:30	**Lecture on Integrated River Basin Management by Mr. Imbe**
10:30-11:30	Guidance on Integrated River Basin Management in Tsurumi River (including a view from the rooftop)
11:30-12:30	Walk and look around the Tsurumi retarding basin
12:30-13:20	Lunch at Shin-yokohama Park
	move by bus
14:00-14:20	**②Kirigaoka Regulating Pond (Kirigaoka, Midori-ku, Yokohama-city)**
	move by bus
14:40-15:10	**③ Onmawasi Park Underground Tunnel-type Reservoir (Miwa-machi, Machida-city, Tokyo)**
	move by bus
16:00-16:30	**④Rainwater storage and infiltration system in individual house (Prof. Takahashi's house : Todoroki, Setagaya-ku, Tokyo)**
	move by bus
18:30	JICA Tsukuba
19:00	Tsukuba Center

9:30-10:30 ① Lecture on Integrated River Basin Management
（鶴見川流域センター）
10:30-11:30 Guidance on Integrated River Basin Management in Tsurumi River
11:30-12:30 Walk and look around the Tsurumi retarding basin
↓ move by bus
14:00-14:20 ② Kirigaoka Regulating Pond
（緑テニスガーデン（霧が丘遊水地））
↓ move by bus
14:40-15:10 ③ Onmawashi Park Underground Tunnel-type Reservoir
（恩廻公園地下調整池）
↓ move by bus
16:00-16:30 ④ Rainwater storage and infiltration system at individual house
（高橋裕先生宅での貯留浸透施設）

Site Visit (7)

Chugoku & Kinki Region

【13 March (Tue)】

TBIC →(Bus)→ Hitachi-no-ushiku Sta.

15:09 Hitachi-no-ushiku Sta. →(JR)→ 15:53 Nippori Sta. →(JR)→ 16:20 Shinagawa Sta. →(Keikyu Railway)→ 16:51 Haneda Airport

18:30 Haneda Airport

↓ JAL1671

20:00 Izumo Airport

20:10 Izumo Airport

↓Local Bus

20:40 Hotel in Matsue City

[Accommodation: Matsue Tokyu Inn]

http://www.tokyuhotelsjapan.com/en/TI/TI_MATUE/index.html

Matsue Castle

－－

【14 March(Wed)】

8:30 Departure from Hotel

↓ Bus (30min.)

9:00- 9:45 **１．Ohashi Riv. Community Center** (Matsue City, Shimane Pref.)

大橋川コミュニティセンター（松江市殿町 383 番地山陰中央ビル 1 階 ）

↓ Bus (60min.)

10:45-12:00 **２．Construction site of Hii Riv. Diversion Channel** (Izumo City, Shimane Pref.)

斐伊川放水路建設現場

（斐伊川放水路ふれあいセンター（出雲市上塩冶町 942-1））

↓ Lunch in the conference room & Bus (60min.)

14:00-15:00 **３．Obara Dam**(Unnan City, Shimane Pref.)

尾原ダム（島根県雲南市木次町平田 36）

↓ Bus (4 hours including break)

19:00 Hotel in Higashi-hiroshima City

[Accommodation: JICA Chugoku]

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【15 March(Thu)】

8:30 Departure from JICA Chugoku

↓ Bus (1 hours)

9:30- **４．Ota Riv. (Takase Weir, Gion Water Gate, Motoyasu Riv. Water Terrace)**

（Hiroshima City, Hiroshima Pref.）

9:30-10:00 Outline of Ota River 太田川概要説明

Visit of Takase Weir 高瀬堰視察

↓ Move (20 min.) 移動（20 分）

10:20-11:00　Visit of Sabo countermeasure in west side of Hiroshima City

（砂防施設視察（相田 1 号堰堤））

↓ Move (20 min.) 移動（20 分）

11:20-11:50　Visit of Gion Water Gate

祇園水門説明・視察（大芝出張所内（広島市西区大芝 3-1-1））

↓ Move (15 min.) 移動（15 分）

12:05-12:30　Motoyasu Riv. Water Terrace 元安川親水テラス

12:30-14:00　Lunch

↓ Bus (10 min.)

14:44　Hiroshima Sta.

↓ Shinkansen (NOZOMI 128) 新幹線（のぞみ 128 号）

16:01　Shin-Kobe Sta.

↓ JR, etc.

17:00　Hotel in Kobe City

[Accommodation: JICA Hyogo]

http://www.jica.go.jp/english/contact/domestic/pdf/hyogo_facilities.pdf

A-Bomb Dome

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【16 March(Fri)】

9:00　Departure from Hotel

↓ bus

9:30-11:00　５．**Disaster Reduction and Human Renovation Institution**　(Kobe City, Hyogo Pref.)

阪神・淡路大震災記念　人と防災未来センター（神戸市）

↓ Lunch & Bus (90min.)

12:30-14:00　**６．Kamenose Landslide**（Kashiwara City, Osaka Pref）

亀の瀬地すべり（大阪府柏原市大字峠）

↓ Bus (50min.)

15:00　Shin-Osaka Sta.

15:27　Shin-Osaka Sta.

↓ Shinkansen (NOZOMI 238) 新幹線（のぞみ 238 号）

18:03　Tokyo Sta.

18:15　Tokyo Sta.

↓ JR

18:38　Ueno Sta.-> (JR Joban Line) -> 19:39　Hitachi-no-ushiku Sta.

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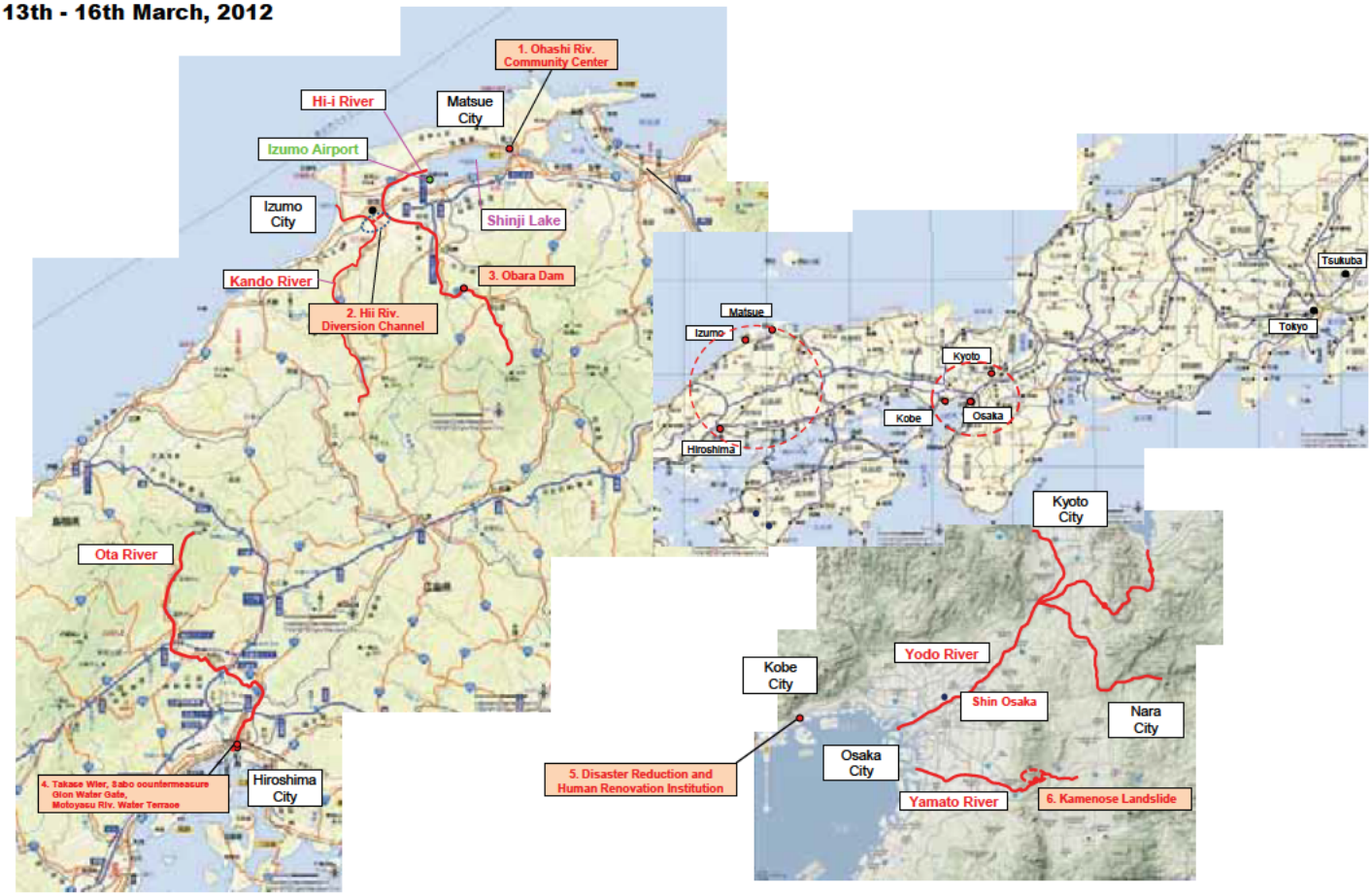
Map of Field Trip in Chugoku & Kinki Region

13th - 16th March, 2012



Site Visit (8)

Lecture at Japan Meteorological Agency (JMA) & "The 61st Tonegawa River System Joint Flood Fighting Drill"

【Venue】 HQs of Japan Meteorological Agency (JMA) (Otemachi, Tokyo)
Kurihashi Area, Kuki City, Saitama Pref

【Schedule】 18th May (Fri)

8:00 TBIC -> (JICA Bus) -> 8:10 Hitachi-no-ushiku Sta 8:27 Hitachi-no-ushiku Sta. -> (JR Joban Line) -> 9:16 Kitasenju Sta. -> (Transfer to Tokyo Metro Chiyoda Line)-> 9:29 Kitasenju Sta. -> 9:45 Otemachi Sta -> walk (5 minutes)

10:00 Arrival at JMA

10:30-12:00 Lecture at JMA

12:00-14:30 Lunch & Break (Mr. Kamoto will accompany.)

14:49 Otemachi Sta -> (Tokyo Metro Hanzomon Line) -> 15:57 Kuki Sta. -> (transfer) -> 15:59 Kuki City -> (Tobu Line) -> 16:09 Kazo Sta. -> walk (7 minutes)

16:15 Arrival at the hotel in Kazo City (Kazo Daiichi hotel)

19th May (Sat)

7:30 Departure from the hotel by bus

8:00 Arrival at the venue of flood fighting drill (Kuki City)

8:50 Opening event

9:30 Opening Ceremony

10:00- Start of the drills (Session Part I: Flood Fighting Drill)

11:35 Closing of the Session Part I

11:35-12:15 Seeing of displays

Exercise on Flood Fighting activities" will be held from 10:00-12:20.

We can experience of making sandbags, etc.

12:15-14:00 move by bus

14:00 Arrival at TBIC via Tsukuba Center

Site Visit (9) Sabo & Dam Project in Kanto Region

【21st May (Mon)】

6:30 Departure from Tsukuba Center

↓

7:00 Departure from TBIC

↓

10:00-12:00 Dam Collaboration between Kawaji Dam & Ikari Dam
（行先：川治ダム管理所（栃木県日光市川治温泉川治 319-6））

↓

Lunch

↓

14:00-16:00 Sabo Works in Ashio
（行先：銅親水公園（栃木県日光市足尾町原レ 885））

↓

19:00 Stay in Kazo City (Kazo Daiichi Hotel)

【22nd May (Tue)】

8:30 Departure from hotel

↓

9:00-10:15 Tone Weir 利根大堰
（行先：（独）水資源機構　利根導水総合事務所
（埼玉県行田市大字須加字船川 4369））

↓

Lunch

↓

13:00-15:00 Exercise on ADCP at Taisho Bridge of Tone River by Dr. Yorozuya
（行先：群馬県渋川市大正橋付近）

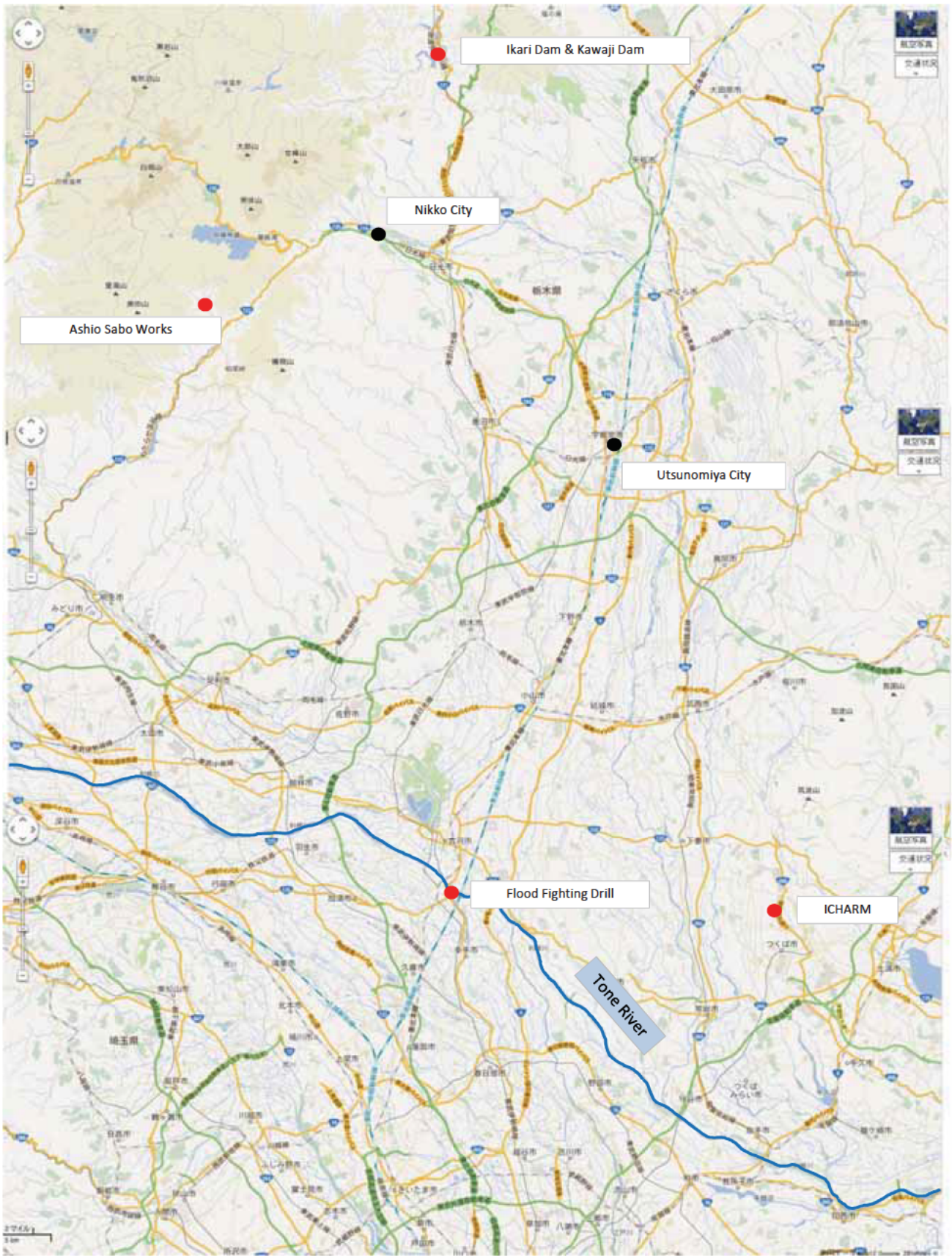
↓

17:30 Arrival at TBIC

↓

18:00 Arrival at Tsukuba Center

Map of Site Visit (8) & (9)



Site Visit (10) Shingu City, Ise City

5th Sep (Wed)

15:09　Hitachi-no-ushiku Sta.->(JR Line)-> 15:53　Nippori Sta. 16:00-> (JR Line) ->

16:11　Tokyo Sta. *(Ph.D. students and Prof. Jaya join at the Shinkansen Platform)*

16:40 ->（Shinkansen NOZOMI 241）->18:24　Nagoya Sta.->（Subway, etc.）->Hotel

6th Sep. (Thu)

Hotel

↓（Subway, etc.）

9:30-　JSCE General Meeting at Nagoya University

Registration

10:25-11:55　Presentation by ICHARM students

12:00-13:00 Lunch

13:00　Departure from Nagoya Univ.

↓（Bus: 4 hours including break)

17:00　Shingu City

7th Sep. (Fri)

8:30 Hotel

9:00-12:00　Explanation of flood damage last year by Shingu City officer

(Mr. Kuribayashi and some students will return from Shingu Sta. to Tsukuba)

12:00-13:00 Lunch

13:00-15:00 Explanation of flood damage last year by MLIT officer

15:00 Departure from Shingu City

↓（Bus: 3 hours including break)

18:00 Ise City

8th Sep. (Sat)

9:30-10:30 Community based disaster management activities in Ohminato district

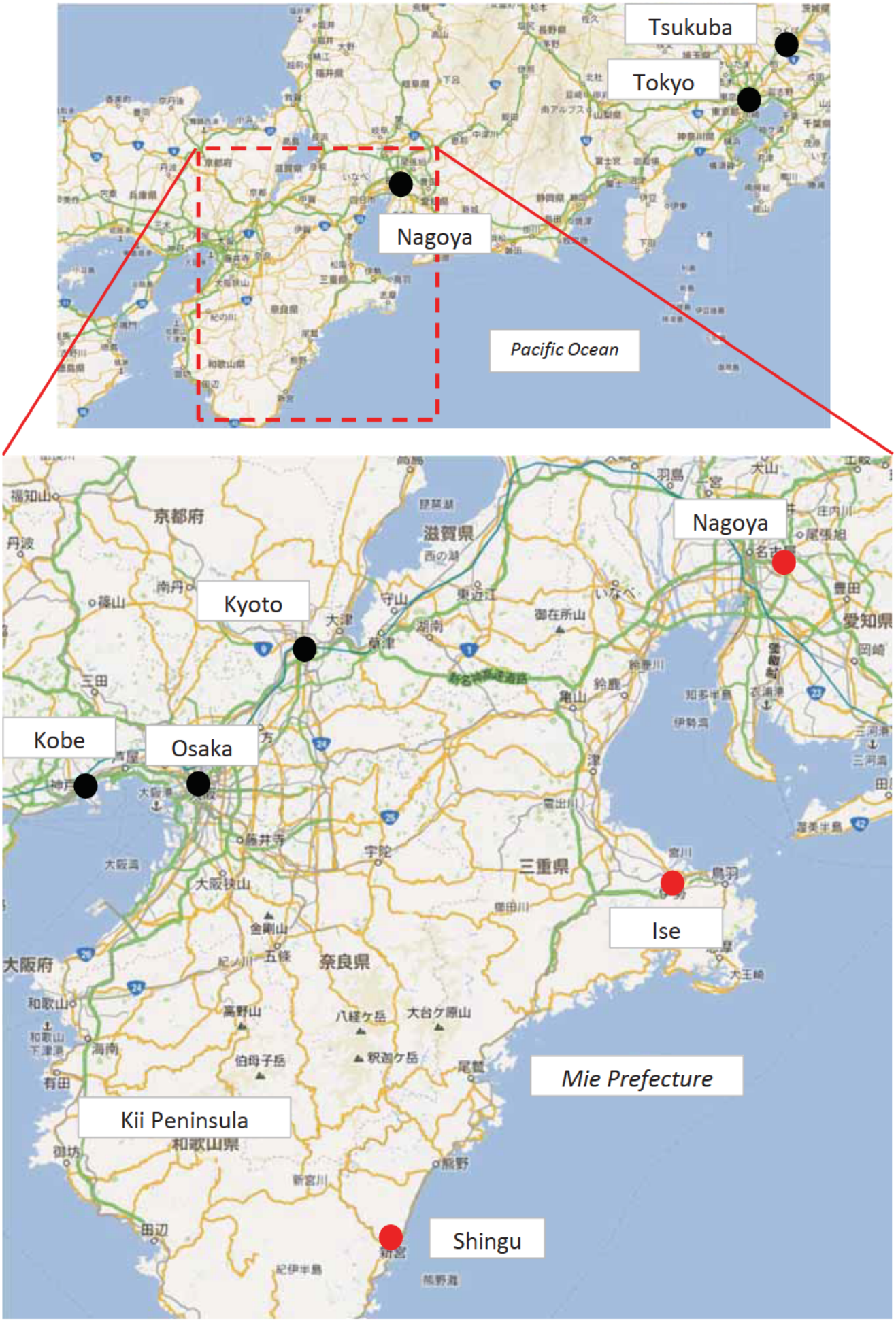
↓（Bus:30 minutes)

11:14 Ujiyamada Sta.

↓（Kintetsu Railway)

12:37 Nagoya Sta. 13:10 -> (Shinkansen NOZOMI 122）-> 14:53 Tokyo Sta. ->(JR Line)->

Nippori Sta. 15:36->(JR Line) 16:39 Hitachi-no-ushiku Sta.->(Bus)->　TBIC


Tsukuba
Tokyo
Nagoya
Pacific Ocean
Nagoya
Kyoto
Kobe
Osaka
Ise
Mie Prefecture
Kii Peninsula
Shingu
京都府
滋賀県
三重県
奈良県
大阪府
和歌山県
愛知県

Major feedback from M.Sc. students (Questionnaire Result)

Category	*No.*	Feedback 研修生からの意見	Question date 回答時期	Actions to be taken by ICHARM 意見に対する対応（案）
A Course Contents	*1*	Some design part like levees, head works, spill ways, dam is necessary regarding Master's course	June	We will deliver the feedback to Prof Matsumoto to take some actions
		Dam & reservoir & Landslide debris flow are very poor quality for master degree course So many lecturer and overlap lecture Grading system is not ok	June	
	2	Some of the subjects which have little relevance with the course (Earthquakes we studied at GRIPS)	June	We will deliver the feedback to Prof Okazaki to take some actions
	3	More emphasis should be given to the flood forecasting and flood management in small and large rivers, steep slope and gentle slope rivers	June	We will rearrange the contents
	4	Joining international meeting (or seminar) may be a good choice	June September	We have to investigate the international meeting (or seminar) to which students can attend
	5	Some students duplicated other's students report (examination) Please be strict to them	September	As for examinations held in ICHARM, we can take some measures (e g 1 student for 1 desk) But as for the reports, we have to ask lecturers to look into their reports more closely
	6	More time should be given to technical software	June	We will arrange the schedule to focus on practical courses
		The theory subjects should be reduced and practical training (IFAS, GIS, RRI, & Fortran) be given more time	September	
	7	The number of course and the time should be increased	September	We have to make balance on appreciate volume of this course
B Course Schedule	*8*	Course work was so extensive	June	The whole duration (1 year) cannot be changed We deleted “Practice on Advanced Hydrology” to increase thesis work time
		The course is packed a little	June	
		The duration of the course is quite short	June September	
	9	Software tools used for research work should be taught as a subject from start of course	June September	In the early stage (October) we put priorities on courses by Prof Takeuchi and Prof Fukuoka After those, we start software classes
		In the first month (October), some basic courses should be conducted for beginners	September	
	10	Modeling lectures should be at the end of first semester	June	We don't think so
	11	There is no coordination between exam date/time and next lecture	June	In the next course, we arranged the course schedule to make intervals of at least 2 week between the last lecture and examination And avoid concentration as much as possible
		Please avoid the concentration of many examinations	September	
	12	There should make a balance between the theory course and individual study	June	(We should discuss continuously)
C Lecturer	*13*	Teacher should provide more example, guidance & answers to help student be easy to understand clearly	June	We will ask lecturers to do so
		Some of lecture materials do not include the sample questions that were asked in examination	June	
	14	Most of the lecturers were very weak in English conversation	June	
	15	Teaching procedure is not academic standard Japanese river law and subjects are also not academic standards	June	
	16	Same subject areas done by different lecturers	June	We have to try to investigate whole contents to remove meaningless duplication
		Some contents of lectures were duplicated	September	
D Master's Thesis (Schedule)	*17*	Research work should be started as one subject from the start of the course	June September	Research work is one subject as Individual study We have to arrange their thesis matching activities earlier
		The thesis proceedings should be started with the start of course	June September	We deleted “Practice on Advanced Hydrology” to increase thesis work time
		If thesis work starts in parallel to course work, we can save time	June	

		More time should be spare for individual study during course work as well	June September	
		More time would be helpful for better thesis	September	
	18	Students employing numerical model need more time	September	We have to prepare higher spec PCs
	19	Before coming to Japan, please instruct us to bring what kind of data should be brought with us	September	In the General Information which is distributed to each participant before coming to Japan , the instruction is written as follows; *The participants are strongly recommended to bring the relevant data for water-related disasters in your country on your laptop/notebook computers for preparing the action plan presentation slides etc.* But in detail, supervisor have to tell students what kind of date they need.
E Master's Thesis (Theme)	*20*	Options were limited in selecting topic	June	(We should discuss continuously)
	21	Some participants have experience to have written Master's thesis, but some don't I'd like ICHARM to have instructed how to write thesis for them	September	
	22	Some participants feel realized that they chose wrong thesis title or supervisor Please be mindful a little more while allocating thesis topics and supervisors	September	
	23	Please ask some private company to accept some students to make M Sc thesis from the next year	September	
	24	I'd like ICHARM to suggest thesis topic, subject, and software because some of them are written by Japanese	September	
F Master's Thesis (Supervisor)	*25*	Sometimes supervisors have no time to guidance	September	Supervisors have to have time to consult with students
	26	There is limited guidance for the students who are doing research in social topics	September	ICHARM has to increase various kinds of researchers
	27	Sometime the methods/advises given to students are not clear or often miss-guided	June	This year some supervisors were assigned to one student, which is the cause of confusion by student From next year, we have to consider the supervisor system
	28	The supervisors should be grouped and they can provide more support from different aspects	September	
	29	The evaluation system of individual study is not good/fare It's better to give chance to everybody to increase their grades Some supervisors give the chance, but the others didn't	September	(We should discuss continuously)
	30	Please tell us not what we should study, but how we study	September	(We should discuss continuously)
G Master's Thesis (Others)	*31*	The time for final presentation was very short	September	The presentation time was 20 minutes for each student In the next year, we can increase presentation time because the number of students reduced
	32	I wish more good laptops	September	We have 4 high spec PC As for rental laptop PC It's difficult to procure them
H Field trips	*33*	We should have more field trips if possible	June	We think the total number of field trips is enough
	34	The materials of field trips if provided in soft copy from will be helpful in future	June	From the next year, we will give students soft copy after permission from lecturers
I Others	*35*	There should be more exchange between ICHARM staff & students	June	We have to have some occasions of Japanese cultural events besides weekday lectures to become familiar with students
	36	We wanted some opportunities to discuss with other university students	September	We have to seek or arrange some occasions (with Tsukuba Univ (?))
	37	Japanese language class should be added	September	The Japanese language classes have been conducted by JICA But JICA has been reducing such classes Do we have to add some language classes in self-study time (e g once in a week)?