ISSN 0386-5878
Technical Note of PWRI No.4215

ICHARM Publication No.24

Report on 2010-2011 M.Sc. Program, "Water-related Disaster Management Course of Disaster Management Policy Program"

January 2012

ICHARM

PWRI

UNESCO

United Nations Educational, Scientific and Cultural Organization

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

Technical Note of PWRI No. 4215

January 2012

Technical Note of PWRI

Report on 2010-2011
M.Sc. Program,
"Water-related Disaster Management Course of Disaster Management Policy Program"

January 2012

International Centre for Water Hazard and Risk Management

under the auspices of UNESCO (ICHARM),

Public Works Research Institute (PWRI)

Technical Note of PWRI No. 4215

January 2012

Report on 2010-2011
M.Sc. Program,
"Water-related Disaster Management Course of Disaster Management Policy Program"

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 5 October 2010 to 16 September 2011 in collaboration with JICA and GRIPS.

The twelve 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 2010-2011 M.Sc. program, "Water-related Disaster Management Course of Disaster Management Policy Program"

- Table of Contents -

- Annexes -

＜Opening Ceremony＞(Position is at the time.)

Congratulatory address by

Director Sato, JICA Tsukuba

Congratulatory address by

Prof. Okazaki

Congratulatory address by

Chief Executive Uomoto, PWRI

Address by a participant representative

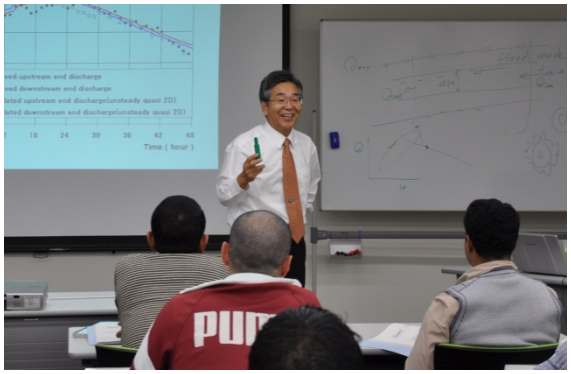
Mr. Rodrigo Fernandez Reynosa

Photo 1

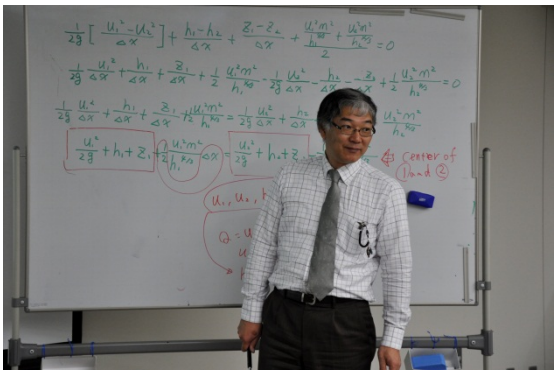
＜Lecture & Exercise＞

Prof. Takeuchi

Prof. Oki



Prof. Fukuoka

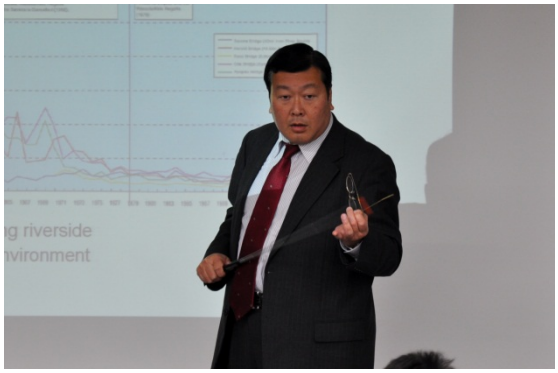


Prof. Watanabe

Prof. Ishikawa

Prof. Egashira

Photo 2



Prof. Kudo

Prof. Suetsugi

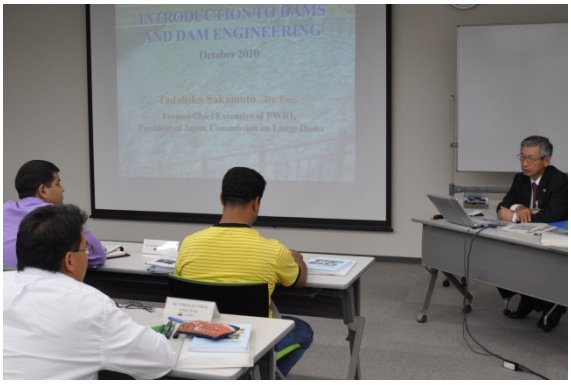
Prof. Matsumoto

Prof. Yamaguchi

Prof. Sumi

Prof. Kawasaki

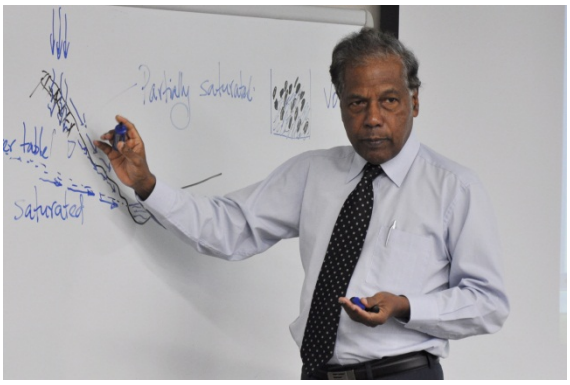
Photo 3



Dr. Sakamoto

Dr. Kashiwai

Dr. Umino



Prof. Jayawardena

Dr. Kubota

Dr. Kachi

Photo 4

Asso. Prof. Fukami

Prof. Tanaka

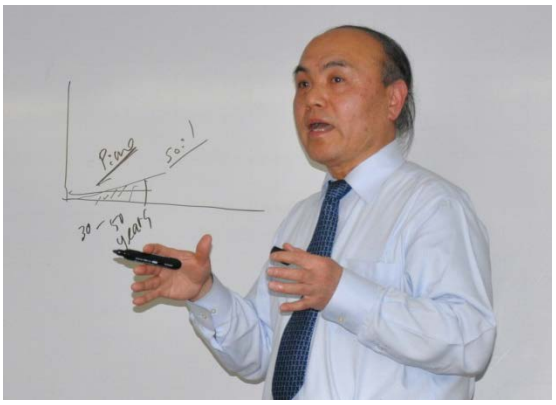
Mr. Nabesaka

Prof. Haruyama

Prof. Morichi

Prof. Okazaki

Photo 5



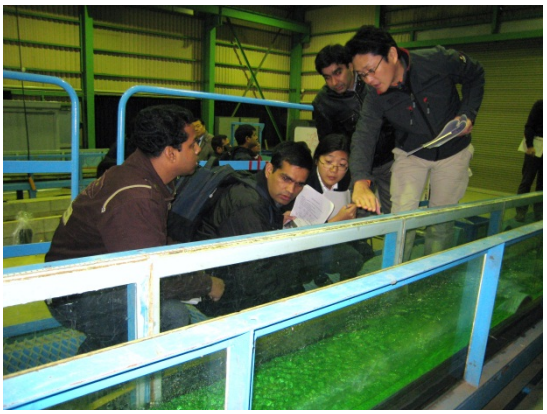
Prof. Ikeya

Lecturer Takanashi

Prof. Sasahara

Photo 6

Lecturer Yorozuya



Hydraulic Experiment

ADCP experiment in Tone River

Lecturers on Computer Programming
(Asso. Prof. Sayama, Dr. Hasegawa, Dr. Ushiyama)

Dr. Kwak

Photo 7

＜Field Trip＞

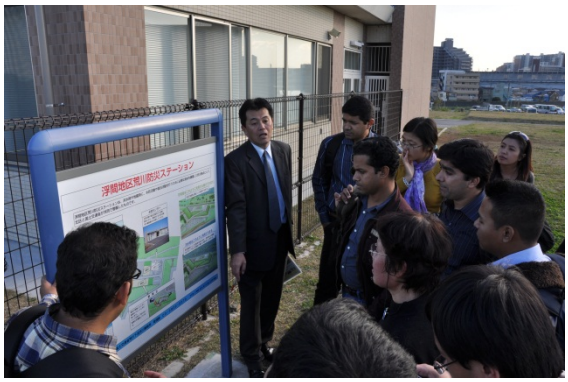
Boarding from ship station

Arakawa Lock Gate

Super levee at Shinden

Old Iwabuchi Gate and Flood Mark

Disaster management room



Ukima Disaster Prevention Station

Photo 8

Explanation on Watarase Retarding Basin

Old Yanaka Village in the Basin

Tower in the Basin

Explanation on Metropolitan Area Outer Underground Discharge Channel

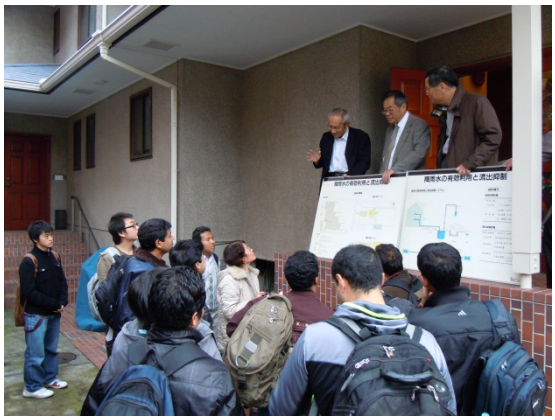
Surge tank of the Discharge Channel

Explanation on Tsurumi River basin

Tsurumi River Retarding Basin

Kirigaoka Retarding Basin

Onda River Retarding Basin



Explanation on infiltration system

Explanation on Shirako River Reservoir Cluster

River improvement in Shakujii River

Blue tape as flood mark

Tone River Water Level Tower

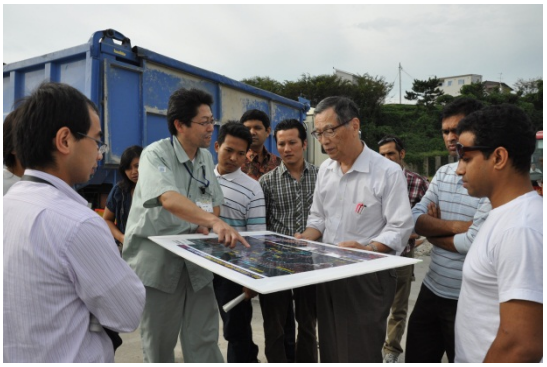
Flood mark in Edogawa Ward

Ara River Water Level Tower

Lecture by Officer of Edogawa Ward

On the levee of Naka River

View from Hiyoriyama Park, Ishinomaki

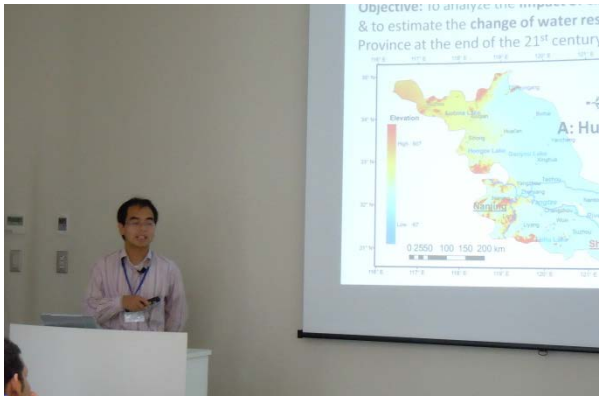


Explanation on recovery
and reconstruction efforts

＜Master's Thesis＞

Practice on Project Cycle Management

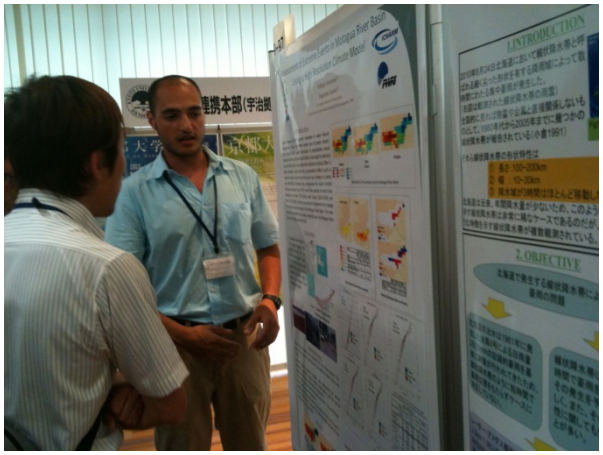
Final Presentation



Oral Presentation by Mr. Zhou Huaqiang

Oral Presentation by Mr. Reynosa

Photo 13

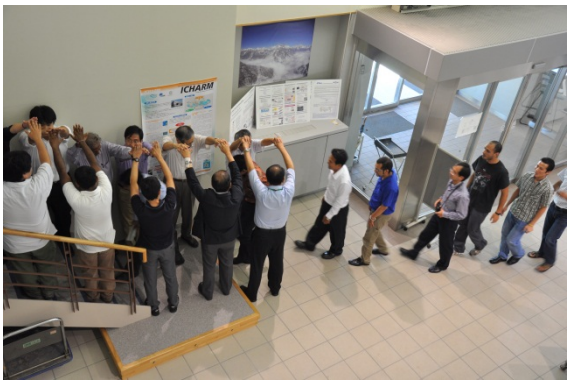


Poster Presentation by Mr. Reynosa Rodrigo

＜Others＞

Tea ceremony in ICHARM

Under cherry blossom tree



Farewell Party in ICHARM

＜Closing Ceremony＞

Conferment of JICA Certificate

Conferment of ICHARM Award

Thanks speech by Mr. Manish

Photo 16

＜Graduation Ceremony＞

Photo 17






Photo 18






Photo 19

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.

Among natural disasters, water-related disasters, such as floods and droughts, present particularly major challenges that need to be successfully met in order to ensure sustainable human development 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 water-front 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.

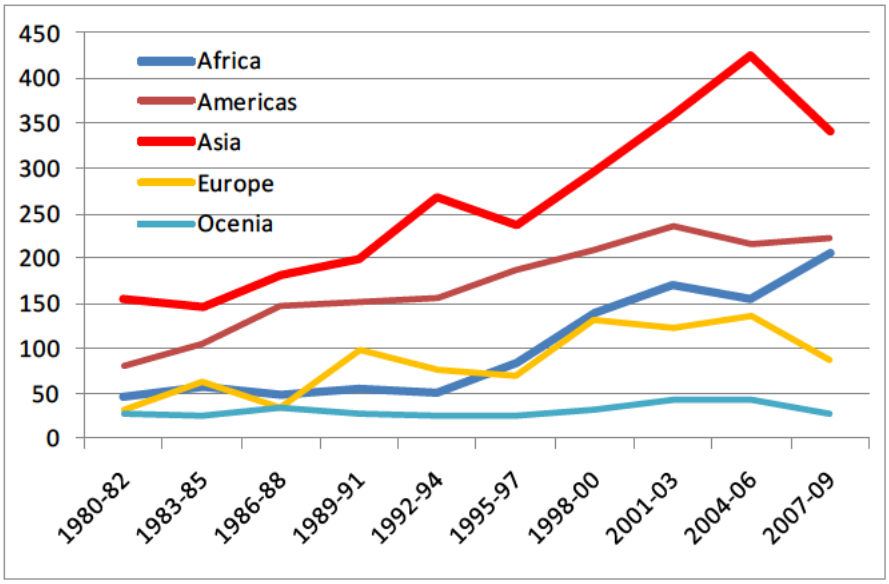


Figure 1-1 Annual variation in the number of water-related disasters by region

(Prepared by ICHARM based on CRED EM-DAT)

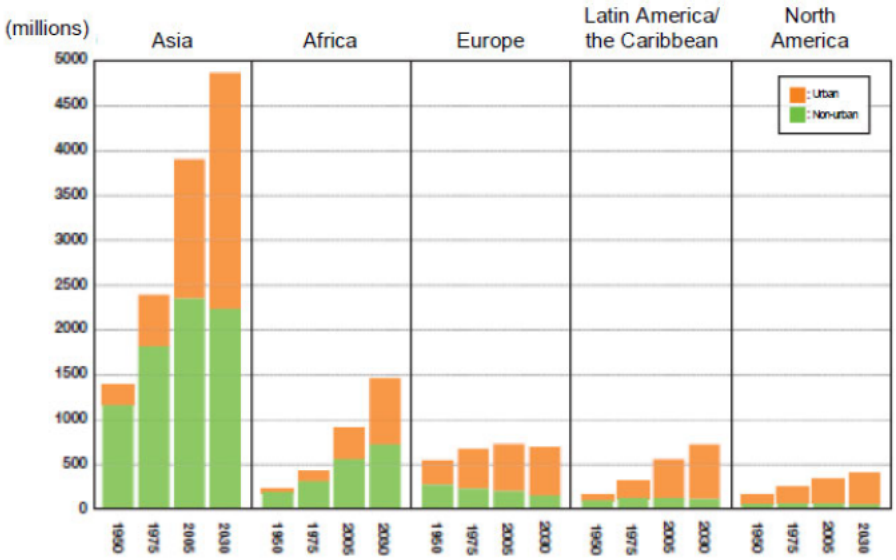


Figure 1-2 Demographic changes in urban and non-urban areas by region

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

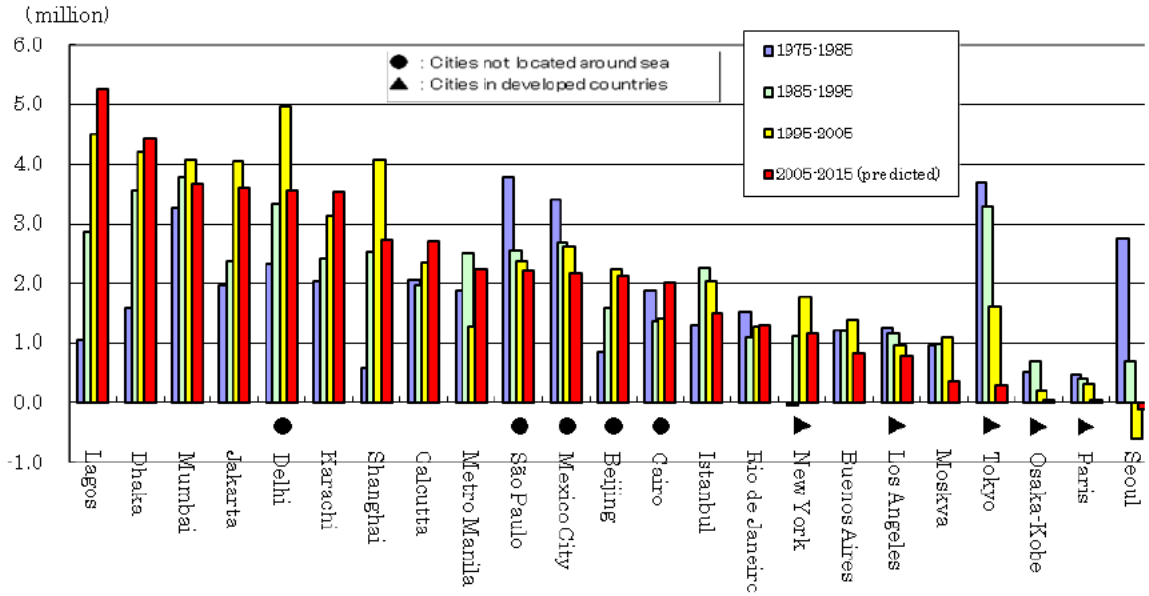


Figure 1-3 Demographic changes in major cities worldwide between 1975 and 2015

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

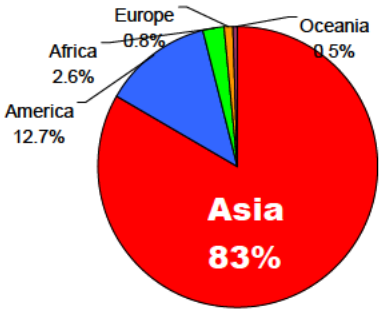


Figure 1-4
Distribution of fatalities due to water-related disasters (1980-2006)
(Prepared by ICHARM based on CRED EM-DAT)

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 "Disaster Management Policy Program Water-related Disaster Management Course" (afterwards referred to as "the course") in 2007. The course for this academic year represents the fourth to be run.

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 overall goal of this training course is to reduce the damage of water-related disasters for planning and implementing the countermeasures of water-related disasters in their countries.

<Program Objective>

The program objective is to develop the participant's capacity to practically manage the problems and issues concerning water-related disasters 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.

(1) To be able to explain basic concept and theory on Generation Process of Water-related Disasters, Control measures for Landslide and Debris Flow.
(2) To be able to explain basic concept and theory on Water-related Hazard Risk Evaluation, Disaster Risk Management Policy and Technologies.
(3) To formulate the countermeasures (Master Thesis and Action plan) to solve the problems and issues concerning water-related disasters for applying techniques and knowledge acquired through the training course in their countries.

1.4 Features of this Course

The course is characterized by the four 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. "Students from the same organization"

As mentioned earlier, in order to develop organization level capabilities in disaster management, the course organizers intentionally recruit several students from the same organization for the course. The organizers also make direct requests for organizations in the relevant countries to send capable students.

III. "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.

IV. 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 Attendance of 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. The first method imposes limits on the home countries of students who are eligible to apply, but no such limit is set for the second method.

1.5.1 Application as JICA Trainee

For application as a JICA trainee, candidate countries, eligible organizations, expected number of students, and requirements on applicants were as follows.

Candidate Countries:

14 countries (Bangladesh, China, Colombia, Ethiopia, Guatemala, Haiti, Indonesia, Iran, Laos, Morocco, Mozambique, Nepal, Pakistan, and Philippines)

Eligible/Target Organization:

Governmental organizations concerning river management or water-related disasters

Total Number of Students:

Twenty (20) participants from above-mentioned target countries in total are expected to participate in this training program.

Nominee Qualifications:

Applicants should;

(1) be nominated by their governments in accordance with the designated procedures.
(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.
(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 equivalent to TOEFL CBT 213 or more
(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 550 (Computer-Based Test (CBT) 213, Internet-Based Test (iBT) 79), IELTS 6.0 or its equivalent.
5) must be in good health.

1.5.3 Final Decision on Acceptance of Students

Twelve 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
- 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

Annex 1-1 shows the list of students. Please note that for this academic year, the twelve students will be participating as JICA trainees.

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 (Acting Director)	Shigenobu Tanaka
Collaborating Professor (Team Leader)	Kei Kudo (until Jan. 2011)
Collaborating Professor (Senior Researcher)	Huang Guangwei (from Jan. 2011)
Collaborating Associate Professor (Researcher)	Takahiro Sayama

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

The ICHARM International Technical Exchange Team worked on general affairs relating to the program, such as coordination of administrational tasks.

Chapter 2: Course Content

2.1 Course Schedule

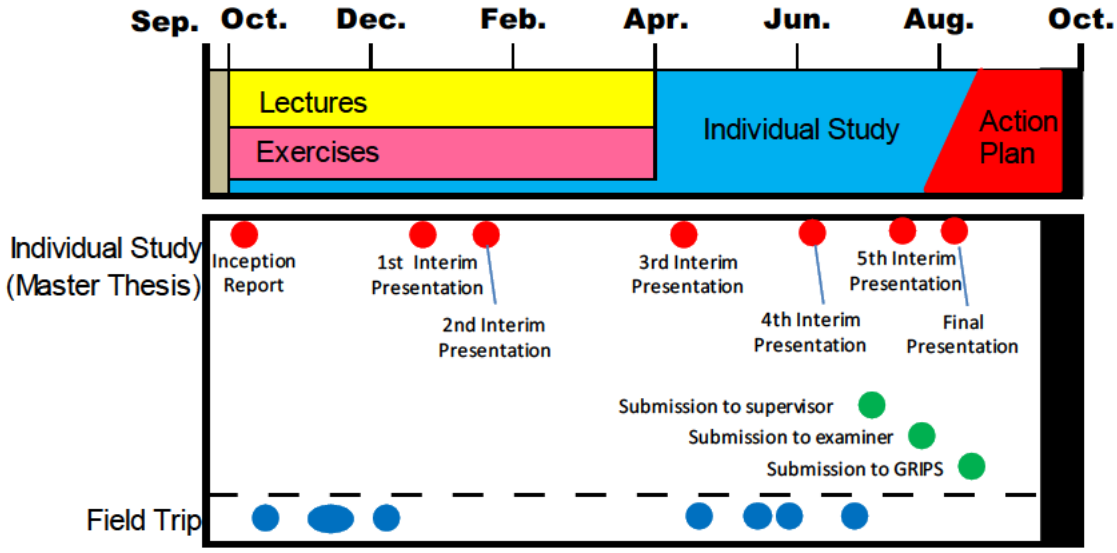


Figure 2-1 Conceptual representation of overall course schedule

The course was conducted over a period of around one year, from September 28, 2010 (date of arrival in Japan) to September 17, 2011 (departure date). The opening ceremony at GRIPS was held on October 4, 2010, and the graduation ceremony on September 16, 2011.

Figure 2-1 shows a conceptual representation of the overall course schedule.

The first half of the course consists mainly of "Lectures" (12 subjects) and "Exercises" (7 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 the second half of the course, students conducted Individual Study, 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 shows the main annual schedule for the course. Lectures started in the second week of October 2010, including the United Nation's International Day for Natural Disaster Reduction. Annex 2-1 shows a detailed schedule for the entire course.

Table 2-1 Main schedule for year

Date		Event
2010	4th	Opening Ceremony at GRIPS
October	5th	Opening Ceremony at ICHARM
	7th	Presentation on Inception Report
	19th – 21st	Project Cycle Management (PCM) Practice
	27th	Individual discussion with supervisors
November	2nd	Homeroom
	10th	Field trip (1) Ara River
	16th – 18th	Field trip (2) Kyushu Region
	24th	PWRI Laboratory Tour
	25th	ICHARM R&D seminar by Asso. Prof. Takebayashi (Kyoto University)
December	2nd	Field trip (3) Watarase Retarding Basin, Tokyo Metropolitan Outer Diversion Channel
	8th	Hydraulic Experiment
	13th	1st Interim Presentation & Homeroom
	15th	Field trip (4) Tsurumi River Basin
2011	12th	Field trip (5) Shirako River Regulationg basin
January	14th – 28th	Joint classes with the "Local Emergency Operation Plan with Flood Hazard Map" training course
	18th	Field trip (6) Flood information in Kurihashi Town
	31st- 10th	Lecture at GRIPS
February	4th -5th	Field trip (7) Nagoya & Kyoto
	23rd	2nd Interim Presentation
	28th	Field trip (8) Edogawa City
March	9th – 11th	Field trip (9) Chugoku & Kinki Region
	[13th – 25th]	[Stay at JICA Tokyo]
April	12th	3rd Interim Presentation
	13th	ICHARM R&D seminar by Prof. Koike (Tokyo University)
May	20th	4th Interim Presentation of Master Thesis
June	2nd – 3rd	Field trip (10) Sabo & Dam Project in Kanto Region
	3rd	Exercise on ADCP in Tone River
	22nd	5th Interim Presentation of Master Thesis
July	1st	Deadline of submission of the 1st draft thesis
	29th	Deadline of submission of complete draft thesis
August	5th	Final Presentation of Master Thesis
	25th	Submission of Master Thesis to GRIPS
	26th	International Summer Symposium by JSCE at Kyoto Univ.
	30th – 1st	Japan Society of Hydrology and Water Resources at Kyoto Univ.
September	8th -9th	Field trip (11) Tsunami hit are in Tohoku
	14th	Presentation on Action Plan
	15th	Closing Ceremony at JICA
	16th	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 20 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, NILIM and universities, so that students can learn the latest information. As shown in Table 2-4, there were 15 lecturers from universities, 15 from incorporated government agencies / foundations / securities research institutes, etc., 9 from the Cabinet Office / Public Works Research Institute / National Institute for Land and Infrastructure Management, and 16 from ICHARM, for a total of 55 lecturers both in-house and invited.

With respect to the implementation of lectures, exercises, and individual studies on this course, the ICHARM staff and external lecturers listed in Annex 2-4 are also contracted to act as GRIPS coordinating instructors, providing various guidance.

2.2.3 Field Trips and Lectures conducted by Disaster Prevention Administration Officials

In order that students can learn by observing the actual conditions relating to Japan's flood countermeasures, the course, in addition to lectures and exercises at ICHARM, has 11 field trips, including some one-day 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. Annex 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 2-6 shows the itineraries of the field trips.

Table 2-2 List of courses

Category	Course No.	Course Title	Instructor	Position (as of the beginning of the course)	Term Fall..Oct-Jan Winter..Feb-Mar Spring..Apr-Jly Summer..Aug-Sep	Credit	
I Required Courses	DMP480E	Individual Study			Winter through Summer	10	
II Recommended Courses	DMP200E	Disaster Mitigation Policy	Shigeru Morichi	GRIPS Professor	Winter	2	
	DMP201E	Disaster Risk Management	Kenji Okazaki	GRIPS Professor	Winter	2	
	DMP280E	Basic Hydrology	Amithirigala Jayawardena	ICHARM Research & Training Advisor	Fall through Winter	2	
	DMP281E	Hydraulics	Tadaharu Ishikawa	Tokyo Institute of Technology Professor	Fall through Winter	2	
	DMP282E	Basic Concepts of Integrated Flood Risk Management(IFRM)	Kuniyoshi Takeuchi	ICHARM Director	Fall through Winter	2	
	DMP283E	Local Disaster Management and Hazard Mapping	Shigenobu Tanaka	ICHARM Acting Director	Fall through Spring	2	
	DMP284E	Urban Flood Management	Kei Kudo	ICHARM Team Leader	Fall through Winter	2	
	DMP380E	Advanced Hydrology	Amithirigala Jayawardena	ICHARM Research and Training Advisor	Fall through Winter	2	
	DMP381E	Flood Hydraulics and Sediment Transport	Shoji Fukuoka	Chuo University Professor	Fall through Winter	2	
	DMP382E	Mechanics of Sediment Transportation and Channel Changes	Shinji Egashira	NEWJEC Inc. Chairman of Engineers	Fall through Winter	2	16
	DMP383E	Sustainable Reservoir Development & Management	Norihisa Matsumoto	Japan Dam Engineering Center Advisor	Fall through Winter	2	
	DMP384E	Control Measures for Landslide & Debris Flow	Hiroshi Ikeya	Sabo Technical Center Director	Fall through Winter	2	
III Elective Courses	DMP180E	Computer Programming	Takahiro Sayama	ICHARM Researcher	Fall through Winter	1	
	DMP285E	Practice on Hydraulics	Tadaharu Ishikawa	Tokyo Institute of Technology Professor	Fall through Spring	1	
	DMP286E	Practice on Local Disaster Management Plan	Shigenobu Tanaka	ICHARM Deputy Director	Fall through Spring	1	
	DMP385E	Practice on Advanced Hydrology	Amithirigala Jayawardena	ICHARM Research & Training Advisor	Fall through Spring	1	
	DMP386E	Practice on Flood Hazard Modeling & Flood Forecastiong	Kazuhiko Fukami	ICHARM Team Leader	Fall through Spring	1	
	DMP387E	Practice on Sustainable Reservoir Development & Management	Norihisa Matsumoto	Japan Dam Engineering Center Advisor	Fall through Spring	1	
	DMP388E	Practice on Control Measures for Landslide & Debris Flow	Hiroshi Ikeya	Sabo Technical Center Director	Fall through Spring	1	
							30

Table 2-3 Courses contributing to outputs

Output	Course
1) To be able to explain basic concept and theory on generation process of water-related disasters, control measures for landslide and debris flow.	● DMP180E: Computer Programming ● DMP280E: Basic Hydrology ● DMP380E: Advanced Hydrology ● DMP385E: Practice on Advanced Hydrology ● DMP281E: Hydraulics ● DMP285E: Practice on Hydraulics ● DMP284E: Urban Flood Management ● DMP386E: Practice on Flood Hazard Modeling & Flood Forecasting ● DMP381E: Flood Hydraulics and Sediment Transport ● DMP382E: Mechanics of Sediment Transportation and River Changes ● DMP383E: Sustainable Reservoir Development & Management ● DMP387E: Practice on Sustainable Reservoir Development & Management ● DMP384E: Control Measures for Landslide & Debris Flow ● DMP388E: Practice on Control Measures for Landslide & Debris Flow
2) To be able to explain basic concept and theory on water-related hazard risk evaluation, disaster risk management policy and technologies.	● DMP200E: Disaster Management Policy ● DMP201E: Disaster Risk Management ● DMP282E: Basic Concepts of Integrated Flood Risk management (IFRM) ● DMP283E: Local Disaster Management and Hazard Mapping ● DMP286E: Practice on Local Disaster Management Plan
3) To formulate the countermeasures (Master Thesis and Action plan) to solve the problems and issues concerning water-related disasters for applying techniques and knowledge acquired through the training course in their countries.	● DMP480E: Individual Study ● Practice on Project Cycle Management ● Self-study, discussion and presentation for Master's Thesis ● Action Plan

Table 2-4 List of Lecturers (positions as of the beginning of the course)

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. Tadaharu Ishikawa	Tokyo Institute of Technology	Hydraulics, Practice on Hydraulics
Prof. Taikan Oki	University of Tokyo	Basic Concepts IFRM
Prof. Shigeko Haruyama	Mie University	Local Disaster Management and Hazard Mapping
Prof. Tadashi Suetsugi	Yamanashi University	Urban Flood Management
Prof. Haruo Hayashi	Disaster Prevention Research Institute, Kyoto University	Urban Flood Management
Prof. Yuichi Onda	University of Tsukuba	Urban Flood Management
Prof. Shouji Fukuoka	Chuo University	Flood Hydraulics and Sediment Transport
Prof. Yasuharu Watanabe	Kitami Institute of Technology	Flood Hydraulics and Sediment Transport
Prof. Hideaki Kawasaki	Yamaguchi University	Sustainable Reservoir Development & Management
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. Masahiro Imbe	Association for Rainwater Storage and Infiltration Technology	Urban Flood Management
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. Kazuyuki Takanashi	Asia Air Survey Co., Ltd.	Control Measures for Landslide & Debris Flow
Mr. Masayuki Watanabe	Institute for International Development, Disaster Prevention and Peace Inc.	Control Measures for Landslide & Debris Flow
Dr. Ryosuke Tsunaki	Sabo Technical Center	Control Measures for Landslide & Debris Flow
Dr. Kazunori Fujisawa	NEXCO	Control Measures for Landslide & Debris Flow
Ms. Keiko Kita	GLM Institute	Practice on Local Disaster Management Plan
Mr. Ryosuke Kawabe	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. Atsushi Yoshii	Public Works research Institute (PWRI)	Urban Flood Management
Prof. Yoshikazu Yamaguchi	Public Works research Institute (PWRI)	Sustainable Reservoir Development & Management
Dr. Hitoshi Umino	Public Works research Institute (PWRI)	Sustainable Reservoir Development & Management
Dr. Kunihiko Amano	National Institute for Land and Infrastructure Management (NILIM)	Sustainable Reservoir Development & Management
Dr. Yoshihumi Hara	Public Works research Institute (PWRI)	Control Measures for Landslide & Debris Flow
Dr. Nobutomo Osanai	National Institute for Land and Infrastructure Management (NILIM)	Control Measures for Landslide & Debris Flow

ICHARM	
Prof. Kuniyoshi Takeuchi	Basic Concepts IFRM
Prof. Shigenobu Tanaka	Local Disaster Management and Hazard Mapping
Prof. Amithirigala JAYAWARDENA	Basic Hydrology, Advanced Hydrology, Practice on Advanced Hydrology
Prof. Kei Kudo	Urban Flood Management
Asso. Prof. Kazuhiko Fukami	Practice on Flood Forecasting
Asso. Prof. Takahiro Sayama	Computer Programming, Practice on Flood Forecasting
Mr. Seishi Nabesaka	Local Disaster Management and Hazard Mapping, Urban Flood Management
Dr. Atsuhiro Yorozuya	Practice on Hydraulics
Dr. Kwak Young Joo	Practice on Local Disaster Management Plan
Dr. Akira Hasegawa	Computer Programming
Dr. Tomoki Ushiyama	Computer Programming
Prof. Guangwei Huang	Master's Thesis
Dr. Ai Sugiura	Master's Thesis
Dr. Mamoru Miyamoto	Master's Thesis
Mr. Go Ozawa	Practice on Flood Forecasting
Mr. Takahiro Kawakami	Practice on Flood Forecasting

2.2.4 Studying and Living Environment

As is usual in universities, lesson time is divided into credits of 90 minutes. Table 2-5 shows the daily timetable. Students accepted through JICA recruitment stay at JICA Tsukuba (Kouyadai, Ushiku, Ibaraki) and commute to classes on the JICA bus.

Table 2-5 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. Annex 2-7 shows the Nicchoku Sheet.

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, in the week of arrival in Japan - one month earlier than last year - ICHARM supervisors and students discussed themes for study, and students started working on their own study themes from late March 2011, at which time they had completed most of their lectures and exercises. The deadline for submitting master's theses was late August 2011, and submission was followed by acceptance examinations in GRIPS to determine whether master's degrees could be awarded.

2.4 Yearbook

In previous years, ICHARM has created yearbooks containing photographs of lectures, exercises, and field trips, which were given to the students at the JICA closing ceremony. Same as in the previous year, students were requested to design page and photograph layouts to reflect their own ideas so that students would feel a greater sense of attachment to their yearbooks.

Chapter 3: 2010-2011 Activity Report

Group Photograph taken at the National Graduate Institute for Policy Studies (September, 16, 2011)

(From third person from the right: Professor Jayawardena (ICHARM), Professor Okazaki (GRIPS), Professor Takeuchi (ICHARM), Professor Morichi (GRIPS), Professor Tanaka (ICHARM))

(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 September 28, 2010 to September 17, 2011 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 twelve students this year: two from Bangladesh, two from China, one from Indonesia, one from Columbia, one from Guatemala, one from Myanmar, three from Nepal, and one from Pakistan. This was the first year we had students from Latin America. These twelve 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 4, 2010 with an Entrance Ceremony held by GRIPS at the GRIPS building (Roppongi, Tokyo).

The following day (October 5), PWRI executives (the Chief Executive, Deputy Chief Executive, Executive Director for Geology, Director of the General Affairs Department, Director of the Planning and Research Administration Department), ICHARM faculty (Professor Takeuchi, Professor Jayawardena, Professor Tanaka, Professor Kudo, Professor Sayama), JICA Tsukuba personnel (Director Sato, Mr. Yuasa, Training Coordinator Araki), and Professor Okazaki from GRIPS attended the Opening Ceremony at PWRI, where Mr. Rodrigo Fernandez Reynosa from Guatemala, 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 (Oct. – Dec.)> (positions as of the beginning of the course)

Starting this year, we added a new class, "Urban Flood Management." As an additional trial, we started the "Sustainable Reservoir Development & Management" class in October rather than in February as usual.

First, Professor Kuniyoshi Takeuchi (ICHARM) and Professor Taikan Oki (University of Tokyo), et. al., 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, 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.) and "Hydraulics" lectures by Professor Tadaharu Ishikawa (Tokyo Institute of Technology). Professor Ishikawa's lectures were mainly held at the Tokyo Institute of Technology (Yokohama).

In addition, the new "Urban Flood Management" class was taught by Professor Kei Kudo (ICHARM), Professor Tadashi Suetsugu (Yamanashi University), Professor Yuichi Onda (University of Tsukuba), Dr. Atsushi Yoshii (Executive Director for Research Coordination of Civil Engineering Research, Institute for Cold Regions), et. al., and largely concerned measures for dealing with flood-related problems in urban areas.

The "Sustainable Reservoir Development & Management" lectures covered the latest trends and technologies relating to dams, and were given by numerous lecturers including Professor Norihisa

Matsumoto (Japan Dam Engineering Center), President Tadahiko Sakamoto (Japan Commission on Large Dams), Professor Tetsuya Sumi (Kyoto University), Professor Hideaki Kawasaki (Yamaguchi University), Team Leader Kunihiko Amano (NILIM), Head Researcher Josuke Kashiwai (Japan Dam Engineering Center), Professor Yoshikazu Yamaguchi (PWRI), and Senior Researcher Hitoshi Umino (PWRI).

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.

<Lectures (Jan. – Mar.)> (positions as of the beginning of the course)

The “Local Disaster Management and Hazard Mapping” class, which started in January, was conducted as a series of practical applied lectures. Some of these lectures was held jointly with the “Local Emergency Operation Plan with Flood Hazard Map” JICA training which was conducted concurrently at ICHARM. A total of 24 students from 13 countries participated: three from Bangladesh, two from Bhutan, two from China, three from Indonesia, two from Pakistan, one from Colombia, two from Myanmar, one from Laos, one from Guatemala, four from Nepal, one from Thailand, one from Sri Lanka, and one from Tajikistan.

For this subject, Professor Shigenobu Tanaka and Researcher Seishi Nabesaka (ICHARM) gave lectures on Japan’s disaster prevention systems and river information systems, guest lecturer Professor Haruo Hayashi (Kyoto University) on disaster psychology, and Professor Shigeko Haruyama (Mie University) on geomorphology, an important topic for understanding flooding areas.

Intensive lectures were offered at GRIPS school buildings (Roppongi, Minato-ku, Tokyo) for two weeks between January 31 and February 10. 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 Nagoya and Kyoto to participate in observation tours.

From February to March, the “Control Measures for Landslides & Debris Flow” class covered the latest trends and technologies for erosion control. Lecturers included Professor Hiroshi Ikeya and Manager Ryosuke Tsunaki (both from the Sabo Technical Center), Professor Katsuo Sasahara (Kochi University), Group Leader Yoshifumi Hara (PWRI), Manager Kazunori Fujisawa (Nippon Expressway Research Institute Company Ltd.), Lecturer Kazuyuki Takanashi (Senior Executive Officer, Asia Air Survey Co., Ltd.), Team Leader Nobutomo Osanai (NILIM), and President Masayuki Watanabe (Institute for International Development, Disaster Prevention and Peace Inc.)

<Exercises>

Immediately after the course started, Project Cycle Management (PCM) exercises were held for three

days to enable students to consider the problems their home countries were facing both objectively and systematically.

Other technical exercises were also carried out by ICHARM staff.

The “Hydraulics” exercises were administered by Lecturer Atsuhiro Yorozuya (ICHARM). Starting from a review of mathematics and physics, the exercises proceeded to allow the students to actually witness the fundamentals of hydraulics; for the first experiment, the students visited a hydraulic experimental facility (the Civil Engineering Research Laboratory) in Tsukuba on December 8, where they split into three groups and conducted experiments on hydraulics. In addition, on June 3, at the Taisho Bridge over the Tone River (Shibukawa City, Gunma), the students carried out flow volume measurement using an Acoustic Doppler Current Profiler (ADCP) measurement gauge with the cooperation of Suimon Kankyo, Co., Ltd.

For the “Computer Programming” exercises, this year Associate Professor Takahiro Sayama, Research Specialist Tomoki Ushiyama, and Research Specialist Akira Hasegawa (all from ICHARM) taught the class for the first time and provided instruction on numerical analysis using Fortran.

In the “Practice on Local Disaster Management Plan” exercises, Research Specialist Kwak Youngjoo (ICHARM) provided instruction on using GIS software, while Professor Huang Guangwei (ICHARM) covered basic knowledge of flood simulations.

In the “Practice on Flood Hazard Modeling & Flood Forecasting” exercise, in addition to the IFAS exercises, this year we added lectures on flood modeling in order to allow students to understand the IFAS system. Associate Professor Kazuhiko Fukami served as principal lecturer and Associate Professor Sayama, Researcher Nabesaka, Exchange Researcher Go Ozawa, and Exchange Researcher Takahiro Kawakami provided additional instruction.

In addition, the “ICHARM R&D Seminar,” lead by specialists in water-based disasters invited by ICHARM, provided the students with numerous opportunities to learn about the latest trends and knowledge on flood-related disasters both in Japan and around the world.

< Field trips and exercises >

With the support of local offices of the Ministry of Land, Infrastructure, Transport and Tourism 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.

Once the students had spent some time learning about the rivers of Japan, on November 10, 2010, they visited the lower reaches of the Arakawa river with the cooperation of the Arakawa-Karyu Office of the Ministry of Land, Infrastructure and Transport. Using an Arakawa-Karyu Office boat, we went via the Arakawa lock gate to observe the Shinden Area Super Levee and learn about the Arakawa 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.

Next, from November 16 to 18, we visited northern Kyushu to observe Japanese dams and erosion prevention efforts. With the cooperation of the Japan Water Agency’s Oyama Dam Construction Office and

the MLIT Chikugo River Office, the Kasegawa Dam Construction Office, and the Unzen Restoration Work Office, we observed flood measures in the Chikugo River Zone, including the Oyama Dam that is currently under construction, the Kasegawa Dam site which is also under construction, and erosion prevention projects in the area around Mt. Unzen.

On December 2, with the cooperation of the MLIT's Tonegawa-Joryu Office and Edogawa River Office, we visited the Watarase Retarding Basin and the Metropolitan Area Outer Underground Discharge Channel to observe measures taken against major flooding in the Kanto region. The students were particularly interested in the environmental measures taken in the Watarase Retarding Basin.

On December 15, with the guidance and cooperation of Associate Professor Masahiro Imbe (Executive Director of the Association for Rainwater Storage and Infiltration Technology) and the MILT Keihin River Office, we visited the Tsurumi River Retarding Basin, the Kirigaoka Retarding Basin, and the houses of some local residents who had installed rainwater infiltration systems on their properties. Students were even able to listen to descriptions of an infiltration system directly from Yutaka Takahashi, professor emeritus of the University of Tokyo and Chairman of the Association for Rainwater Storage and Infiltration Technology, at his private residence.

On January 12, 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 January 18, along with trainees from the JICA “Local Emergency Operation Plan with Flood Hazard Mapping” course conducted at ICHARM, we visited the MLIT Tonegawa-Joryu Office. After attending a lecture on how to provide information during a flood, we viewed the flood information notification facilities in the Kurihashi area of Kuki City. The flood marks sign on power poles along the main roads in the area use blue tape to indicate the actual depth of flooding that occurred during the 1947 Typhoon Kathleen. Such a strategy may also be effective in developing nations, given their limits with respect to disaster budgets and personnel. We also visited the Tone River Water Level Tower, which is located in the Kurihashi Branch Office of Kuki City Hall.

On February 28, we visited Edogawa Ward in Tokyo, a densely populated area surrounded by three rivers and thus very vulnerable to flooding. We were given a lecture on the local authorities’ flood measures. We also received an explanation from the chairman of the Nagisa Disaster Prevention Council, which is working to realize disaster prevention measures at the residential level, regarding their approaches. Afterwards, we visited the Nakagawa Levee and observed the topography of Edogawa Ward.

From March 9 to 11, with the cooperation of the MLIT 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 is currently under construction. 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 10, we moved on to Hiroshima, where 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 11, 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.

The Great East Japan Earthquake struck while we were returning to Tokyo by Shinkansen (bullet train). Since service on all railways, including the Shinkansen, was stopped, it took the students two days to finally arrive back in Tsukuba. The students were able to observe in real time what Japan was like during an emergency, and in that sense this could be considered a valuable experience for them.

From June 2 to 3, with the cooperation of the MLIT Kinugawa Integrated Dam Control Office, the Nikko Sabo Office, and the Watarase River Office, we observed the operation of dams in the Kanto region and erosion prevention projects. At the Kawaji and Ikari Dams, after learning how both dams were linked, we visited the connecting tunnel. In addition, we observed erosion control projects in the Nikko area (Onagi mountainside construction project) and the Ashio area (Matsuki mountainside construction project), which once again allowed us to realize the importance of erosion control projects.

From September 8 to 9, we observed the Naruse River and the Kitakami River downstream drainage basins, both of which suffered severe damage as a result of the Great East Japan Earthquake and the accompanying tsunami, as well as the disaster-stricken areas of Ishinomaki City. The removal of debris was already well underway, but the students were still stunned by the power of the tsunami and astonished at the speed at which recovery and reconstruction efforts were taking place, including how emergency access routes were cleared just one day after the earthquake.

At the end of their visit to each inspection site, one student, acting as a representative for the group, expressed their appreciation. Students were also required to submit reports regarding these inspections.

Note that participation in the “60th Tone River Flood Fighting Drill,” which was scheduled for May, was cancelled as a result of the cancellation of the entire exercise due to the earthquake.

< Master’s thesis >

As noted earlier, for three days in mid-October at the beginning of the course, we invited Keiko Kita from the GLM Institute (an NPO) as an outside instructor. She taught “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 before beginning to work on the theses.

Based on the questionnaire we conducted after the exercise, students had achieved a high level of awareness of the PCM method, and the exercise can be considered a success. Of the six steps (Stakeholder analysis, Problem analysis, Objective analysis, project (approach) selection, PDM creation, PO creation), there were particularly high levels of understanding for "Stakeholder analysis," "Problem analysis," and "Objective analysis."

All participants rated the exercise structure as "Good" or "Mostly good." Thus the structure of the workshops, which combined lectures with exercises, was effective in establishing trainees' understanding. The level of the workshop was rated "Just right" by more than 70% of the trainees, indicating the level was set appropriately. More than 90% of the trainees responded that the proportion of lecture to exercise time in the exercises was "Just right." These responses appear to reflect a high level of trainee participation. The remaining 10% tended to want longer lectures and shorter exercises.

For the writing of the master's thesis, ICHARM researchers individually consulted with students and properly supported their research while respecting the topics that the students wished to study, these being intended to contribute to the solution of problems presented by water-related disasters in their own home countries. In the first week of the course, Professor Jayawardena, who served as Research and Training Advisor, conducted ten-minute interviews with each individual student, confirming their level of knowledge and interests. Starting in mid-November, students were offered several opportunities to exchange their views with ICHARM faculty in free discussions. There were also a total of five interim thesis presentation sessions (December 13, February 23, April 12, May 20, and July 22). 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 5, where each student announced their results for the year.

In addition, two years ago we started to encourage more active submission of articles to Japanese academic societies. During this year's course, Mr. Rodrigo Fernandez Reynosa (Guatemala) and Mr. Zhou Huaqiang (China) gave presentations at the "13th International Summer Symposium" of the Japan Society of Civil Engineers at Kyoto University's Uji Campus on August 26. Mr. Reynosa again presented a poster session at the Japan Society of Hydrology and Water Resources conference (August 30 to September 1), also held at Kyoto University's Uji Campus. 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 >

Homeroom sessions with ICHARM instructors, the first held about one month after the start of this course and the second about a month after that, gave opportunities to students to express their opinions regarding improving their daily lives and their progress on their master's theses.

In addition, 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 employee of ICHARM explained about the spirit of tea ceremony, the students practiced how to whisk the tea, eat the confectionary, and drink 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 Farewell Ceremony was held in the ICHARM entrance hall, where the students mingled with PWRI executives and ICHARM staff. Representing the students, Mr. Kyaw Zayer Tint performed on the keyboard. The ICHARM staff sang songs. At the end, the ICHARM staff paired off to form human arches on the stairs as the trainees made their exit.

On September 14, the Action Plans, which report how the results of training will be used once the students return home and what students are involved with was announced.

On September 15, the closing ceremony for JICA training was held at JICA Tsukuba. During the ceremony, Ms. Umezaki (Deputy Director of JICA Tsukuba), Dr. Uomoto (Chief Executive of PWRI), and Professor Okazaki (of GRIPS) made congratulatory remarks, after which program completion certificates were awarded to one student each from JICA and PWRI. 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 Mr. Rodrigo Fernandez Reynosa (Guatemala) and Mr. Manish Maharjan (Nepal). 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. Zhou Huaqiang (China). Representing the trainees, Mr. Manish shared a few words of thanks to conclude the ceremony.

On September 16, 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 the following day, September 17, the students returned to their home countries.

As described above, the objective of this course is to develop officials who are oriented towards problem solving based on sound theory and skills and who are capable of making good use of their abilities for planning and implementing flood management within a comprehensive river basin management framework, at all levels, from the national to the local.

Through this one-year master's program, students, in addition to acquiring basic knowledge of hydrology, hydraulics and sediment transportation to a possibly higher level than other college students in Japan, also gained a thorough understanding of applied knowledge such as disaster policy, comprehensive flood management, local disaster prevention planning, dam engineering, and landslide engineering. In addition, students had many opportunities to make actual observations of flood countermeasures in Japan. It is also our belief that we succeeded in providing a good environment in which each student could work towards their master's thesis.

However, the development of officials who are oriented toward problem solving cannot be accomplished by a one-year master's program alone. We feel that it is necessary to follow up, on a continuing basis, on the activities of students after they return home.

Chapter 4: Master's Thesis

Table 4-1 shows the main schedule relating to the master's thesis this year.

Table 4-1 Schedule relating to master's thesis

2010	7th	Presentation on Inception Report
	7th - 8th ,October	Interview
	19th -21st ,October	Project Cycle Managements
	27th ,October	Individual Discussion with supervisors
	2nd , November	Individual Discussion with supervisors
	13th , December	1st Interim Presentation
2011	23rd , February	2nd Interim Presentation
	12th , April	3rd Interim Presentation
	20th , May	4th Interim Presentation
	1st , July	Deadline of submission of the 1st draft thesis
	22nd ,July	5th Interim Presentation
	5th, August	Final Presentation on Master Thesis
	25th ,August	Submission of Master Thesis

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, the students met with Professor Jayawardena (ICHARM Research & Training Advisor) individually during the first week to discuss their ideas about their theses, after which they determined the themes they wished to tackle while consulting with ICHARM faculty. As a rule, each year the subsequent writing is supported by individual consultations between the students and their supervisors. Since Mr. Rahman (Bangladesh) was fortunate enough to have Professor Egashira as his supervisor, he 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 25. After the subsequent examinations, all 12 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. We will be providing a synopsis of each thesis 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

	Country	Name	Title of Master's Thesis	Main Supervisor	Assistant Supervisor		
1	Bangladesh	Pijush Krishna Kundu	EFFECTS OF COASTAL VEGETATION AND EMBANKMENT ON STORM SURGE INUNDATIONS N BANGLADESH	Asso. Prof. Sayama	Prof. Huang	Prof. Tanaka	Prof. Okazaki
2	Bangladesh	Md. Sabibur Rahman	MORPHOLOGICAL CHANGES IN GANGES RIVER AND ITS MPACTS ON THE BRANCHES	Prof. Egashira	Dr. Yorozuya	Asso. Prof. Sayama	Prof. Morichi
3	China	Xu Guanglei	Dam Safety Preparedness Exercises in China	Prof. Takeuchi	Asso. Prof. Miyake	Prof. Yamaguchi	Prof. Fukui
4	China	ZHOU Huaqiang	CHANGE OF WATER RESOURCES N JIANGSU PROVINCE WITH ECONOMIC DEVELOPMENT AND CLIMATE CHANGE	Prof. Takeuchi	Asso. Prof. Sayama	Prof. Tanaka	Prof. Okazaki
5	Colombia	Julian Javier Corrales Cobos	APPLICATION OF A SPATIALLY DISTRIBUTED MODEL FOR PREDICTIONS OF FLOOD DISCHARGE AND INUNDATION IN THE MAGDALENA-CAUCA BASIN OF COLOMBIA	Asso. Prof. Sayama	Asso. Prof. Fukami	Dr. Yorozuya	Prof. Morichi
6	Guatemala	Rodrigo Fernandez Reynosa	Assessment and Adaptation to Climate Change Using Precipitation and Discharge Projections on Motagua River Basin	Prof. Tanaka	Asso. Prof. Fukami	Prof. Huang	Prof. Fukui
7	Indonesia	Ambar Puspitosari	STUDY OF IMPROVEMENT OF FLOOD WARN NG SYSTEM US NG IFAS IN SOLO RIVER BASIN	Prof. Tanaka	Asso. Prof. Fukami	Dr. Yorozuya	Prof. Okazaki
8	Myanmar	Kyaw Zayer Tint	STORM SURGE NUNDATION ANALYSIS OF RIVER AND FLOODPLA N DUR NG CYCLONE NARGIS	Asso. Prof. Sayama	Prof. Huang	Prof. Takeuchi	Prof. Morichi
9	Nepal	Prem Raj Ghimire	Application of support vector machine (SVM)for rainfall- runoff modeling In West Rapti River Basin, Nepal	Prof. Jayawardena	Prof. Huang	Asso. Prof. Osti	Prof. Fukui
10	Nepal	Manish Maharjan	Application of Recurrent Neural Network for Runoff Prediction in Bagmati River Basin	Prof. Jayawardena	Prof. Huang	Asso. Prof. Osti	Prof. Okazaki
11	Nepal	Rajendra Sharma	Development of a Flood Forecasting Model for Lothar River Basin in Nepal using Radial Basis Function Neural Networks	Prof. Jayawardena	Prof. Takeuchi	Asso. Prof. Osti	Prof. Morichi
12	Pakistan	ABDUL AZIZ	REGIONAL PARAMETERIZATION AND APPLICABILITY OF NTEGRATED FLOOD ANALYSIS SYSTEM (IFAS) FOR FLOOD FORECASTING OF UPPER-MIDDLE INDUS RIVER	Prof. Tanaka	Asso. Prof. Fukami	Dr. Yorozuya	Prof. Fukui

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 and 5-2 below.

Table 5-1 Evaluation of course design (evaluations from 12 persons)

		←←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	3		
	(Reference) Last year	7	4		

Table 5-2 Evaluation of program length (evaluations from 12 persons)

		Long	Appropriate	Short
Do you find the period of the program appropriate?	This year	1	6	5
	(Reference) Last year	1	6	3

The results shown in the two tables above indicate that the overall program design was appropriate, though there were a number of students who considered the length of the program to be too short. As the program is rich in content, this suggests that students wanted to continue their studies.

5.1.2 Outputs

Students were asked to evaluate themselves regarding “Do you think that the three outputs were important in achieving the course goals?” and “Did you achieve the three outputs?” Table 5-3 shows the results. Comparison with the previous year is not possible as the output settings were different, but Table 5-3 indicates that students generally evaluated the program highly and that the output settings were appropriate for the course goals. Similarly, Table 5-3 indicates that students mostly achieved the unit goals, although this is based on their self evaluations.

Table 5-3 Evaluation for outputs (evaluation based on 12 trainees)

	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, control measures for landslide and debris flow.	10	2			7	5		
2) To be able to explain basic concept and theory on water-related hazard risk evaluation, disaster risk management policy and technologies.	8	4			7	5		
3) To formulate the countermeasures (Master Thesis and Action plan) to solve the problems and issues concerning water-related disasters for applying techniques and knowledge acquired through the training course in their countries.	9	3			8	3	1	

5.1.3 Lectures and Exercises

Students were asked to rate the statements shown in Table 5-4 for each lecture and exercise on a scale of one (strongly disagree) to five (strongly agree). Comparative results of the average values for each evaluation item are shown in Figure 5-1.

Table 5-4 Evaluation items for lectures and exercises

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	The course was intellectually stimulating.
Q5	What I learned in the course will be useful for my future professional activities.
Q6	The instructor presented ideas clearly and logically
Q7	The instructor provided useful study materials.
Q8	The instructor was well prepared for each class.
Q9	As an overall evaluation, the course was useful and meaningful.

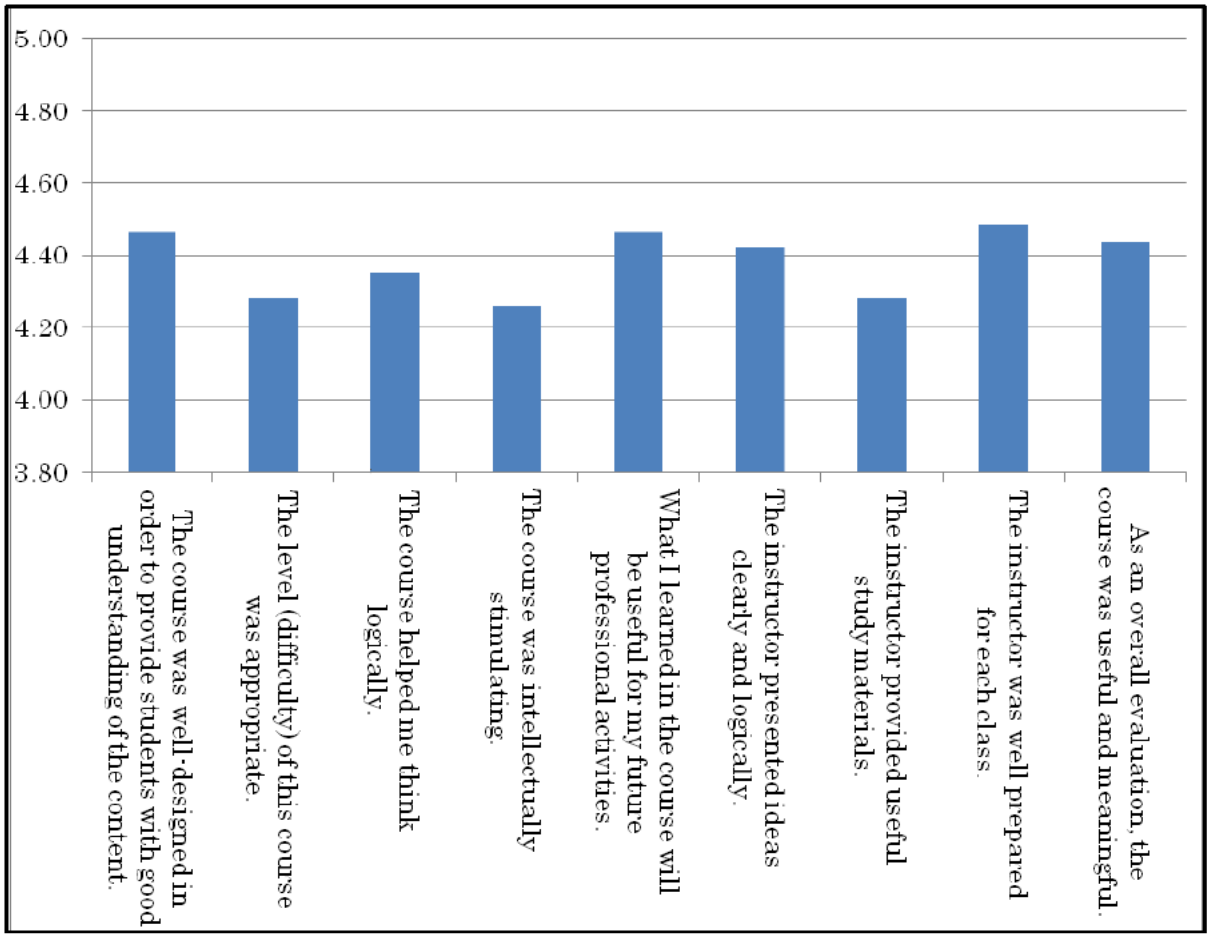


Figure 5-1 Results of a comparison of the average values for each evaluation item (max. 5 points, min. 1 point)

Of the nine evaluation items listed in Table 5-4, the highest scores were received by Q1 (The course was well-designed in order to provide students with good understanding of the content.), Q5 (What I learned in the course will be useful for my future professional activities.), Q8 (The instructor was well prepared for each class.) The results show that all instructors succeeded in deepening students' understanding by preparing properly for lectures and that the students feel they will be able to make good use of the knowledge they gained in the future, both of which are extremely satisfying. That said, starting with next year's course we will attempt to improve the scores of the evaluation items which were rated relatively poorly.

5.2 Efforts to Improve Learning Effectiveness

In order to improve learning effectiveness in this year's course, the following efforts were made.

- Starting this academic year, we added the creation of Inception Reports as one of the admission selection materials to ensure that we would be able to select eager students capable of understanding the course content.
- When the course started, we invited an outside lecturer to introduce "Project Cycle Management" to the students, teaching them to objectively analyze the problems their home countries were facing. This proved to be an extremely effective exercise in determining the direction of their theses.

- This year, Professor Ishikawa's classes were held at the Tokyo Institute of Technology (Yokohama), but it was very difficult for students to commute from Tsukuba to Yokohama, so we attempted to arrange the schedule such that the classes at the Tokyo Institute of Technology were combined with field trips to Tokyo region sites, which allowed us to reduce students' commuting time.
- Through interim presentations on their theses and similar activities, students became able to manage presentation times on their own and developed a feeling of ownership over their own presentation sessions.
- To provide additional incentives for writing the master's theses, we offered a few opportunities for the theses to be presented to Japanese academic societies. As a result, Mr. Zhou Huaqiang (China) and Mr. Rodrigo Fernandez Reynosa (Guatemala) gave presentations at the "13th International Summer Symposium" of the Japan Society of Civil Engineers at Kyoto University on August 26. Mr. Reynosa also presented a poster session at the Japan Society of Hydrology and Water Resources conference in 2011, which ran from August 30 to September 1.
- Field trips were a valuable learning opportunity for the trainees that enabled them to see Japan's flood measures firsthand for themselves. The field trips were also important to underscore various classes' emphasis on actual applications. To ensure that these field trips did not simply become sightseeing tours, we always distributed informational pamphlets prior to each trip and asked that the students do some preparatory study. Furthermore, we required students to write reports after field trips to get them into the habit of making observations in which they compare Japan's flood management measures with conditions in their home countries.

5.3 Future Issues

As a result of this year's course, the following issues have come to our attention.

<Links with other training courses>

In January, about halfway through this course, JICA's "Local Emergency Operation Plan with Flood Hazard Map in 2010" training was held in parallel with this course; some lectures and exercises were shared between the two. As a result, at times there were a total of 24 students from 13 countries.

Though it was a very international group, the backgrounds and training goals of the students and trainees were different, so it was not always possible to conduct both programs smoothly. It was difficult for the lecturers to adjust the content of their lectures, the trainees had only limited time for questions, and such training required significant work to adjust the schedules appropriately, leading to a number of difficulties. As a result, for next year we hope to completely separate the training schedules, keeping the goals of both programs in mind.

<Master's thesis writing procedures>

Of this year's twelve students, though one was still polishing his manuscript and receiving guidance until just before he left the country, in general the thesis writing progressed well. However, next year about 20 students, twice the number of this year, are expected to participate in programs, so we intend to start even earlier than this year and, while keeping students' research intentions in mind, encourage them to think about selecting master's thesis themes that are more in line with the research being conducted by ICHARM faculty.

< 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.

In order to make action plans more feasible, we should also require students to communicate with their home organizations during the process of creating them and provide follow-ups six months and one year after the students have returned home.

<English proficiency sufficient for writing a master's thesis>

Though we currently require a certain level of English proficiency when recruiting students, that alone does not constitute proof that one is capable of writing a master's thesis in English. We must either offer intensive English lessons during training or provide guidance in English composition when students begin writing their theses. Furthermore, we need to provide guidance on how to use the basic computer software, such as MS Word and Excel, necessary for writing a thesis.

Chapter 6: Conclusion

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

Now that the fourth 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.

Finally, here are some messages from our graduates.

It was a great pleasure in my life. I enjoyed one year in Japan and learnt a lot. Japanese people are very much cordial and helpful. I hope this course will help everyone in future.

Mr. Pijush Krishna Kundu (Bangladesh)

Disaster management policy in Japan is really appreciable though we can't adopt all of those in our countries. However we are very lucky to observe closely how Japanese Govt. with its people response to disaster especially during the historical disastrous tsunami on March 11, 2011. I hope such experience will enrich our knowledge in disaster management in our own field. Sharing experiences of different professionals from different field in ICHARM was very enjoyable. We never forget those sweet memories with our friends from different countries and cultures. Thanks JICA. Hope to meet with such excellent friends again once.

Mr. Md. Sabibur Rahman (Bangladesh)

As my first training abroad, I have harvested much more than I expected. I get not only improvement of knowledge of specialty but also of communication, corporation, thinking and different cultures. Moreover, I get great friendship with classmates from 8 countries and with all ICHARM staff. I cherish the one year's life in Japan. I think our training course is nice and perfect.

Ms. Xu Guanglei (China)

It is my first time staying aboard and also first time studying in English environment. It is really unforgettable experience in my whole life in the future. There were so many kind senseis, so many beneficial activities and so many stories with my colleagues in the one year life. I cannot speak too much to express my gratitude to all of you. Best wishes to all, all of us have a better tomorrow!

Mr. Zhou Huaqiang (China)

I really like this year in Japan, and it was a nice experience in many aspects, the experience and knowledge of the Japanese people is an invaluable gift I hope I can share with my people. Having witnessed the Tohoku disaster made me realize the importance of been prepared and understand the endurance, strength and organization of the Japanese people. Thanks Japan, JICA, GRIPS and ICHARM.

Mr. Julian Javier Corrales Cobos (Colombia)

Congratulations fellow students for the completion of this Masters Course. After all this year and all this work we finally made it. Remember this is only one further step in acquiring knowledge, and as professionals and researchers it is our duty to improve our knowledge day by day. I hope you all continue to develop your knowledge and contribute to the development of your countries. I hope we meet again in some international conference presenting our future research.

Mr. Rodrigo Fernandez Reynosa (Guatemala)

I'm really glad that I become one of the participants of this course. Here I've learned not only the course contents but also the Japanese life. I met all the people from many countries, understood and respected their culture, also experienced the disaster, which really impressed me. Hope we can always remember everything when we're living here. Ganbatte kudasai.

Ms. Amber Puspitosari (Indonesia)

I spent one year to study how to minimize the destructive disasters by flood in future, from my respected senseis I received most heartfelt kindness and guidance which make me believe that I can help my country to develop sustainably.

Mr. Kyaw Zayer Tint (Myanmar)

This one year course is well designed and highly effective in providing applied knowledge for flood disaster risk reduction. Lectures, field excursions and individual study have good combinations for delivering the knowledge. Having friends from different corners of the world is my great asset of this study. Finally, kind and well-disciplined Japanese people, and extraordinary civil engineering mega-structures are highly impressive to me.

Mr. Prem Raj Ghimire (Nepal)

I enjoyed a lot during my stay in Japan. The moment that I spent with my friends is the most valuable. I am thankful to JICA, ICHARM and all my classmates for their support.

Mr. Manish Maharjan (Nepal)

It was a great pleasure to study in ICHARM. The course is simply the best. I enjoyed a lot and learned many things for one year. ICHRAM is actually a center of excellence for the researchers and students involved in the field of water related disaster management.

Mr. Rajendra Sharma (Nepal)

My induction for this master course, particularly at the time when Pakistan experienced a huge and colossal flood 2010, is really admirable decision by JICA. Regarding the course, it is compacted and research work is solution oriented. The contents of the course are practically helpful to manage the flood disaster in my country. This course has significantly improved my capabilities mainly in the fields of computer, presentation skills and acquiring knowledge from field trips.

Mr. Abdul Aziz (Pakistan)

—Acknowledgements—

This master’s course is in its fourth year. Based on our past experience of the program, we have made various improvements, including reorganizing the overall schedules and curriculum, and making changes to the educational content and learning environment of 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 Ministry of Land, Infrastructure, Transport and Tourism offices, local government officials, and local residents who warmly welcomed our field trips.

Participant List of
2010-2011Water-related Disaster Management of Disaster Management Policy Program

No.	Country	photo	Name	Sex	Age	Organization	Position
1	Bangladesh		Pijush Krishna Kundu (クリシュナ)	M	33	バングラデシュ水開発公社サトクヒラ運営管理課2 Satkhira Operation and Maintenance Division-2, Bangladesh Water Development Board	副技士 Sub-Divisional Engineer
2	Bangladesh		Md. Sabibur Rahman (ラフマン)	M	29	バングラデシュ水開発公社クリグラム運営管理課 Kurigram Operation and Maintenance Division, Bangladesh Water Development Board	副技士 Sub-Divisional Engineer
3	China		Xu Guanglei (グアンレイ)	F	29	南京水力学研究所/ダム安全管理部 Nanjing Hydraulic Research Institute Dam safety management department	技士補 Assistant Engineer
4	China		ZHOU Huaqiang (ホアジャン)	M	26	江蘇省水保全研究所 Jiangsu Water Conservancy Research Institute (Agriculutural Hydraulic Engineering and Water and Soil Conservation)	水力学技士補 Assistant Hydraulic Engineer
5	Colombia		Julian Javier Corrales Cobos (フリアン)	M	39	Institute of Hydrology, Meteorology and Environmental Studies-IDEAM	Specialized Professional
6	Guatemala		Rodrigo Fernandez Reynosa (ロドリーゴ)	M	25	国家災害対策調整委員会 National Coordinator for Disaster Reduction (CONRED)	技術調査員 Investigator Technician
7	Indonesia		Ambar Puspitosari (アンバール)	F	27	公共事業省水資源部 Ministry of Public Works Directorate General of Water Resources	企画計画部職員 Staff of Directorate of Planning and Programming
8	Myanmar		Kyaw Zayer Tint (ジョーズアティン)	M	29	Irrigation Department, Ministry of Agriculture and Irrigation	Assistant Engineer (Staff Officer)
9	Nepal		Prem Raj Ghimire (プレム)	M	30	水害対策部 ブットワル人民堤防計画 Department of Water Induced Disaster Prevention People's Embankment Program, Butwal, Ministry of Irrigation	技士 Civil Engineer
10	Nepal		Manish Maharjan (マニッシュ)	M	29	水害対策部 ルパンデヒ水害対策課第5事務所 Department of Water Induced Disaster Prevention Water Induced Disaster Prevention, Ministry of Irrigation	土木技士 Civil Engineer
11	Nepal		Rajendra Sharma (ラジェンドラ)	M	32	灌漑省水害対策部 Department of Water Induced Disaster Prevention, Ministry of Irrigation	水文学者 Hydrologist
12	Pakistan		ABDUL AZIZ (アジズ)	M	29	パキスタン気象省国立気象予報センター Pakistan Meteorological Department, National Weather Forecasting Centre	気象学者 Meteorologist

Time Table

Lecture（Lecturer）

(1) DMP280E Basic Hydrology	(7) DMP381E Flood Hydraulics and Sediment Transport
(2) DMP281E Hydraulics	(8) DMP382E Mechanics of Sediment Transportation and River Changes
(3) DMP282E Basic Concepts of Integrated Flood Risk management (IFRM)	(9) DMP383E Sustainable Reservoir Development & Management
(4) DMP283E Local Disaster Management and Hazard Mapping	(10) DMP384E Control Measures for Landslide & Debris Flow
(5) DMP284E Urban Flood Management	(11) DMP200E Disaster Mitigation Policy
(6) DMP380E Advanced Hydrology	(12) DMP201E Disaster Risk Management

Excercise（Lecturer）

(1)P DMP180E Computer Programming	(4)P DMP385E Practice on Advanced Hydrology
(2)P DMP285E Practice on Hydraulics	(5)P DMP386E Practice on Flood Hazard Modeling & Flood Forecasting
(3)P DMP286E Practice on Local Disaster Management Plan	(6)P DMP387E Practice on Sustainable Reservoir Development & Management
	(7)P DMP388E Practice on Control Measures for Landslide & Debris Flow

Annex 2

October

	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
	10/3	4	5	6	7	8	9
1st period 9:00-10:30		9:30-14:00 Entrance Ceremony at GRIPS	**9:00-9:20 Course Orientation (1)** **9:30-10:30 Entrance Ceremony at ICHARM** **10:40-12:00 Course Orientation (2)**	(7)-1 Do alluvial rivers have a stable river width and depth- learning from natural rivers — Prof. Fukuoka	9:00-12:15 Presentation on Inception Report (Tentative) (15 min. * 12 participant)	Self Study	
2nd period 10:45-12:15				(7)-2 To derive a relationship between stable dimensionless width, depth and discharge in natural rivers — Prof. Fukuoka		(1)-2 Precipitation — Prof. Jaya	
3rd period 13:15-14:45				(9)-1 Outline of Dam Engineering — Dr. Sakamoto	(1)-1 Basic concepts of the Hydrological Cycle — Prof. Jaya	(1)-3 Extreme weather — Prof. Jaya	
4th period 15:00-16:30				15:00-16:30 Course orientation (3)	15:00-16:30 Interview to 6 students with Prof. Jaya (10 min. each)	15:00-16:30 Interview to 6 students with Prof. Jaya (10 min. each)	
	10	11	12	13	14	15	16
1st period 9:00-10:30			10:00-12:00 (3)-1 Introduction: What is natural disaster? Risk, Hazard and Vulnerability — Prof. Takeuchi	**9:00-10:30 PC setting**	Self Study	(7)-5 Prediction method of flow resistance in rivers with compound channels and applica ion to river course design (2) — Prof. Fukuoka	
2nd period 10:45-12:15				(3)-12 Global trends (1) -Impact of climatic change- — Prof. Oki	(9)-2 Flood Control Plan — Dr. Umino	(7)-6 Steady quasi-two dimensional analysis of flood flows (1)	
3rd period 13:15-14:45			(7)-3 How do we make a river cross-section harmonizing flood control and river environment — Prof. Fukuoka	(3)-2 PAR Model (1) — Prof. Takeuchi	(9)-3 Flood Control Operation — Dr. Umino	(1)P-1 Computer programming (1) — ICHARM	
4th period 15:00-16:30			(7)-4 Predic ion method of flow resistance in rivers w th compound channels and application to river course design (1)	(3)-3 PAR Model (2)	(2)P-1 Review of assignment — Dr. Yorozuya	(3)-4 ACCESS Model — Prof. Takeuchi	
	17	18	19	20	21	22	23
1st period 9:00-10:30		Self Study	(3)P-1 Project Cycle Management (PCM) — Ms. Kita, Mr. Kawabe	(3)P-3 Project Cycle Management (PCM) — Ms. Kita, Mr. Kawabe	Self Study	(8)-1 Introduction (1) — Prof. Egashira	
2nd period 10:45-12:15		(3)-5 Disaster management cycle; Hyogo Framework for Action — Prof. Takeuchi			(3)-13 Global trends (2) -International actions- — Prof. Oki	(8)-2 Introduction (2)	
3rd period 13:15-14:45		(3)-6 IFRM and traditional FRM; IFRM as part of IWRM	(3)P-2 Project Cycle Management (PCM) — Ms. Kita, Mr. Kawabe	(3)P-4 Project Cycle Management (PCM) — Ms. Kita, Mr. Kawabe	(3)P-5 Project Cycle Management (PCM) — Ms. Kita, Mr. Kawabe	(1)P-3 Computer programming (3) — Asso.Prof. Sayama	
4th period 15:00-16:30		(1)P-2 Computer programming (2) — Asso. Prof. Sayama				Self Study	
	24	25	26	27	28	29	30
1st period 9:00-10:30		(9)-4 Seismic Design for Dams — Prof. Kawasaki	(7)-7 Steady quasi-two dimensional analysis of flood flows (2) — Prof. Fukuoka	(1)-4 Runoff — Prof. Jaya	(1)-5 Peak discharge estimation — Prof. Jaya	(7)-9 Unsteady quasi-two-dimensional analysis of flood flows (2) — Prof. Fukuoka	
2nd period 10:45-12:15		(9)-5 Latest Technology for Concrete Dam (1)	(7)-8 Unsteady quasi-two-dimensional analysis of flood flows (1)	(9)-7 Environmental Impact of Dams (1) — Dr. Amano	(5)-1 Outline of urban flood — Prof. Kudo	(1)-6 Concept of rainfall excess — Prof. Jaya	
3rd period 13:15-14:45		(Medical checkup by JICA)	(9)-6 Latest Technology for Concrete Dam (2) — Prof. Kawasaki	Individual discussion with supervisor	(5)-2 Countermeasures of urban flood	(1)-7 Unit Hydrograph Methods I — Prof. Jaya	
4th period 15:00-16:30			Self Study		Self Study	Self Study	
	31	11/1	2	3	4	5	6
1st period 9:00-10:30		Self Study	(1)-8 Unit Hydrograph Methods II — Prof. Jaya		(1)-12 Probability and statistics in hydrology I — Prof. Jaya	(8)-3 Mechanics of sediment transportation (1) — Prof. Egashira	
2nd period 10:45-12:15		(9)-8 Environmental Impact of Dams (2) — Prof. Sumi	Self Study		Self Study	(8)-4 Mechanics of sediment transportation (2)	
3rd period 13:15-14:45		(9)-9 Sediment Management in Reservoirs (1)	Self Study		(1)P-4 Computer programming (4) — Asso. Prof. Sayama	(9)-11 Dam Construction (1) — Prof. Yamaguchi	
4th period 15:00-16:30		(9)-10 Sediment Management in Reservoirs (2)	Discussion with supervisors & Homeroom		(1)P-5 Computer programming (5)	Self Study	

Annex 3

November

	7	8	9	10	11	12	13
1st period 9:00-10:30		(5)-3 Characteristics and analysis of inundation (1) Prof. Suetsugi	move	Field Trip (1) in Ara River including lecture on "(5)-8 Case Study (1) Ara River" by Prof. Kudo	(3)-7 Concept of IWRM (1) Prof. Takeuchi	(9)-14 Effective Use of Existing Dams Prof. Matsumoto	
2nd period 10:45-12:15		(9)-12 Dam Construction (2) Dr. Kashiwai	(2)-1 Balance equation Prof. Ishikawa		(1)P-6 Computer programming (6) Dr. Hasegawa	(9)-15 Roles of Dams in 21st Century	
3rd period 13:15-14:45		(9)-13 Dam Management Prof. Yamaguchi	(2)-2 Differential form of balance equation		(2)P-2 Mathematic 1 (Ordinary Differential equations) Dr. Yorozuya	(1)P-7 Computer programming (7) Dr. Hasegawa	
4th period 15:00-16:30		Self Study	(2)-3 Transport equation stay at Tokyo		(2)P-3 Mathematic 2 (Partial Differential equations) Dr. Yorozuya	Self Study	
	14	15	16	17	18	19	20
1st period 9:00-10:30		(5)-4 Characteristics and analysis of inundation (2) Prof. Suetsugi	Field Trip (2) to Kyusyu			(8)-5 Mechanics of sediment transportation (3) Prof. Egashira	
2nd period 10:45-12:15		(5)-5 Characteristics and analysis of inundation (3)				(8)-6 Mechanics of sediment transportation (4)	
3rd period 13:15-14:45		(1)P-8 Computer programming (8) Dr. Hasegawa				(1)P-9 Computer programming (9) Dr. Hasegawa	
4th period 15:00-16:30		Self Study				Self Study	
	21	22	23	24	25	26	27
1st period 9:00-10:30		(5)-6 Countermeasure against inundation (1) Prof. Suetsugi		(1)P-10 Computer programming(10) Dr. Hasegawa	Self Study	(1)-10 Satellite observation of rainfall (1) Dr. Kachi, Dr. Kubota (JAXA)	
2nd period 10:45-12:15		(5)-7 Countermeasure against inundation (2)		(1)-13 Probability and statistics in hydrology II Prof. Jaya	(1)-9 Remote sensing in Hydrology Asso.Prof. Fukami	(1)-11 Satellite observation of rainfall (2)	
3rd period 13:15-14:45		(3)-8 Concept of IWRM Prof. Takeuchi		(1)-14 Basic concepts of Stochastic Hydrology Prof. Jaya	Self Study	(1)P-11 Computer programming(11) Dr. Ushiyama	
4th period 15:00-16:30		(3)-9 Japanese experiences (1) Prof. Takeuchi		15:00-16:30 PWRI Laboratory Tour	15:00-16:00 ICHARM R&D Seminar by Asso. Prof. Takebayashi	Self Study	

December

	28	29	30	12/1	2	3	4
1st period 9:00-10:30		(6)-1 Hydrological modelling – basic concepts and approaches Prof. Jaya	(7)-10 1-D Bed Deformation Computing Model Prof. Watanabe	Self Study	Field Trip (3) in Watarase Retarding Basin, Tokyo Metropolitan Outer Diversion Channel (3)-11 Japanese experiences (3)	(8)-7 Mechanics of sediment transportation (5) Prof. Egashira	
2nd period 10:45-12:15		(4)P-1 Exercises on System function estimation Prof. Jaya	(7)-11 2-D Bed Deformation Sand Waves and Bars, Meandering	(4)P-2 Exercises on least squares estimation Prof. Jaya		(8)-8 Mechanics of sediment transportation (6)	
3rd period 13:15-14:45		(1)P-12 Computer programming (12) Dr. Ushiyama	(6)-2 Systems theory approach I – Linear theory; Time domain analysis; Frequency domain Prof. Jaya	Self Study		(6)-3 Systems theory approach II – Non-linear systems, multi-linear systems Prof. Jaya	
4th period 15:00-16:30		Self Study	Self Study	Self Study		Self Study	
	5	6	7	8	9	10	11
1st period 9:00-10:30		(1)P-13 Computer programming (13) Dr. Ushiyama	(3)-10 Japanese experiences (2) Prof. Takeuchi	(2)P-6 Hydrualic Experience (1) Dr. Yorozuya	Self Study	(6)P-14 9:00-12:30 Application of dam projects for other countries Prof. Matsumoto & Dr. Yamaguchi	
2nd period 10:45-12:15		(4)P-3 Exercises on Impulse and Frequency Response Functions Prof. Jaya	(3)-14 Future Issues of IFRM	(2)P-7 Hydrualic Experience (2) Dr. Yorozuya	(6)-4 Instantaneous Unit Hydrograph (IUH) Prof. Jaya	(6)P-15	
3rd period 13:15-14:45		(2)P-4 Pre Meeting (1) Dr. Yorozuya	(1)-15 Examination Prof. Jaya	(2)P-8 Hydrualic Experience (3) Dr. Yorozuya	(2)P-10 Post Meeting (1) Dr. Yorozuya	Joint Class with Students of Hosei Univ. Prof. Takeuchi	
4th period 15:00-16:30		(2)P-5 Pre Meeting (2) Dr. Yorozuya	Self Study	(2)P-9 Hydrualic Experience (4) Dr. Yorozuya	(2)P-11 Post Meeting (2) Dr. Yorozuya	Self Study	
	12	13	14	15	16	17	18
1st period 9:00-10:30		9 00-12 30 1st Interim Presentaiton (10 min. including Q&A)	move	Self Study	(7)-12 Vegetation Flow in Vegetated Zone Prof. Watanabe	(8)-9 Mechanics of debris flow (1) Prof. Egashira	
2nd period 10:45-12:15			(2)-4 Diffusion Prof. Ishikawa	(5)-9 Case Study (2) Tsurumi River Mr. Imbe	(7)-13 River restoration based on sediment transport and vegetation on stabilized bars	(8)-10 Mechanics of debris flow (2)	
3rd period 13:15-14:45		Homeroom	(2)-6 One dimensional energy equation	Field Trip (4) in Tsurumi River	(4)P-4 Exercises on IUH determination Prof. Jaya	(3)-15 Examination Prof. Takeuchi	
4th period 15:00-16:30		Self Study	(2)-7 Specific energy stay at Yokohama		Self Study	Self Study	

Annex 4

January

		19	20	21	22	23	24	25
1st period	9:00-10:30		Self Study	(7)-14 Re-meandering project for river restoration Prof. Watanabe	Self Study		Self Study	
2nd period	10:45-12:15		(5)-10 Administration of urban rivers Prof. Kudo	(7)-15 Bank erosion and drift woods	(5)-13 Disaster education Mr. Yoshii		Self Study	
3rd period	13:15-14:45		(5)-14 Effect of forest Prof. Onda	(1)P-14 Computer programming (14) Dr. Ushiyama	(2)P-12 Review on One dimensional energy equation Dr. Yorozuya		Self Study	
4th period	15:00-16:30		Self Study	Self Study	(2)P-13 Review on Specific energy Dr. Yorozuya		Self Study	
		26	27	28	29	30	31	1/1
1st period	9:00-10:30		Self Study	Self Study				
2nd period	10:45-12:15		Self Study	Self Study				
3rd period	13:15-14:45		Self Study	Self Study				
4th period	15:00-16:30		Self Study	Self Study				
		2	3	4	5	6	7	8
1st period	9:00-10:30			Self Study	Self Study	Self Study	(8)-11 Bed forms and flow resistance (1) Prof. Egashira	
2nd period	10:45-12:15			Self Study	Self Study	(2)-5 Quiz-1 ICHARM	(8)-12 Bed forms and flow resistance (2) Prof. Egashira	
3rd period	13:15-14:45			Self Study	Self Study	Self Study	(1)P-15 Computer programming (15) Dr. Ushiyama	
4th period	15:00-16:30			Self Study	Self Study	Self Study	Orientation on Joint Course	
		9	10	11	12	13	14	15
1st period	9:00-10:30			move	Field Trip (5) in Tokyo Area	Self Study	Self Study	
2nd period	10:45-12:15			(2)-8 Gradually varied flow Prof. Ishikawa		(3)P-8 Geographic Information System (GIS) (1) Dr. Kwak	(5)P-1 Introduction to Flood Hazard Modeling Asso.Prof. Sayama	
3rd period	13:15-14:45			(2)-10 Specific force		(3)P-9 Geographic Information System (GIS) (2) Dr. Kwak	(5)P-2 Fundamentals of Rainfall-Runoff Models Asso.Prof. Sayama	
4th period	15:00-16:30			(2)-11 Hydraulic jump, Junction and Diversion		Self Study	Self Study	
		16	17	18	19	20	21	22
1st period	9:00-10:30		Self Study	(4)-3 Flood fighting law and some water levels for evacuation criteria Mr. Nabesaka	Self Study	Self Study	(5)P-11 Runoff analysis using IFAS (1) Data import, Model building ICHARM	
2nd period	10:45-12:15		(4)-1 Outline of disaster prevention countermeasures in Japan Prof. Tanaka	Field Trip (6) in Kurihashi Town	(5)P-5 Fundamentals of Flood Inundation Models Asso.Prof. Sayama	(5)P-8 Introduction of GFAS/IFAS Asso. Prof. Fukami	(5)P-12 Runoff analysis using IFAS (2) Parameter estimation ICHARM	
3rd period	13:15-14:45		(4)-2 River information and early warning system in Japan Mr. Nabesaka	(4)-6 Communication system during floods in Japan (2) Tone River Upstream Work Office	(3)P-10 Geographic Information System (GIS) (3) Dr. Kwak	(5)P-9 Main Functions of GFAS, Applicability of the Satellite-Based Rainfall ICHARM	(5)P-13 Runoff analysis using IFAS (3) Validation of calculated discharge ICHARM	
4th period	15:00-16:30		(4)-4 Outline of flood hazard map and evacuation plan and local disaster management plan Prof. Tanaka	(3)P-7 Town Watching (Field survey) in Kurihashi ICHARM	Self Study	(5)P-10 Correction Method of the Satellite-Based Rainfall, Validation of satellite-based ICHARM	(5)P-14 Runoff analysis using IFAS (4) Application to actual basins ICHARM	
		23	24	25	26	27	28	29
1st period	9:00-10:30		(5)P-3 Finite Difference Method for Differential Equations (1) Asso.Prof. Sayama	(5)P-6 Inundation Analysis (1) (Fortran Exercise) Asso.Prof. Sayama	9:30-10:15 Interview with Dr. Huang	Practice on inundation symulation (1) Asso. Prof. Huang	Practice on inundation symulation (2) Asso. Prof. Huang	
2nd period	10:45-12:15		(5)P-4 Finite Difference Method for Differential Equations (2) (Fortran Exercise) Asso.Prof. Sayama	(5)P-7 Inundation Analysis (2) (Fortran Exercise) Asso.Prof. Sayama	(3)P-11 Geographic Information System (GIS) (4) Dr. Kwak			
3rd period	13:15-14:45		(2)P-14 Review on Gradually varied flow Dr. Yorozuya	13:15-15:00 Interview with Dr. Huang	(3)P-12 Geographic Information System (GIS) (5) Dr. Kwak			
4th period	15:00-16:30		(2)P-15 Review on Hydraulic jump, Junction and Diversion Dr. Yorozuya		15:00-15:30 Interview with Dr. Huang		(4)-14 Discussion on local disaster management plan (1) ICHARM	
		30	31	2/1	2	3	4	5
1st period	9:00-10:30		Guidance at GRIPS	(12) Disaster Risk Management Prof. Okazaki	(12) Disaster Risk Management Prof. Okazaki	(12) Disaster Risk Management Prof. Okazaki	Field Trip (7) by GR PS in Nagoya & Kyoto	
2nd period	10:45-12:15		(12) Disaster Risk Management Prof. Okazaki	(12) Disaster Risk Management Prof. Okazaki	(12) Disaster Risk Management Prof. Okazaki	(12) Disaster Risk Management Prof. Okazaki		
3rd period	13:15-14:45		(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi		
4th period	15:00-16:30		(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi		

Annex 5

February

		6	7	8	9	10	11	12
1st period	9:00-10:30		(12) Disaster Risk Management Prof. Okazaki	(12) Disaster Risk Management Prof. Okazaki	(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi		
2nd period	10:45-12:15		(12) Disaster Risk Management Prof. Okazaki	(12) Disaster Risk Management Prof. Okazaki	(11) Disaster Mitigation Policy Prof. Morichi	(12) Disaster Risk Management Prof. Okazaki		
3rd period	13:15-14:45		(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi	【Special Lecture】 Disaster Risk Management at Ministry of Land, Infrastructure, and Transportation/Cabinet Office	13:20 - 14:50【Examination】 Disaster Risk Management - Prof.Okazaki		
4th period	15:00-16:30		(11) Disaster Mitigation Policy Prof. Morichi	(11) Disaster Mitigation Policy Prof. Morichi		15:00 - 15:30 【Instruction on Course Evaluations】		

		13	14	15	16	17	18	19
				Special Lecture at Meteorology Research Institute (MRI)				
1st period	9:00-10:30		Self Study	IPCC and international activity on climate change projections Dr. Akio Kitoh Director, Climate Research Department	Self Study	(4)-12 Geomorphology around rivers and alluvial plain (1) Prof. Haruyama	(8)-13 Prediction of channel changes (1) Prof. Egashira	
2nd period	10:45-12:15		(6)-5 Conceptual models of IUH Prof. Jaya	An overview of the KAKUSHIN program	Self Study	(4)-13 Geomorphology around rivers and alluvial plain (2) Prof. Haruyama	(8)-14 Prediction of channel changes (2)	
3rd period	13:15-14:45		(4)P-5 Exercises on IUH application Prof. Jaya	Future projections of extreme precipitation using high-resolution climate models and its reliability evaluation Mr. Kenji Kamiguchi, Researcher, First Research	(10)-1 Outline of sediment-related disasters and Sabo projects Prof. Ikeya	(6)-6 Synthetic Unit Hydrograph Prof. Jaya	(4)P-6 Exercises on a typical rainfall-runoff model I Prof. Jaya	
4th period	15:00-16:30		Self Study	Future change in water balance in Asian continental-scale river basins Dr. Shinjiro Nakaegawa Senior Researcher, Second Research Laboratory,	Self Study	Self Study	Self Study	

		20	21	22	23	24	25	26
1st period	9:00-10:30		Self Study	Self Study	9 00-12 15 2nd Interim Presentaiton (Presentation 8min. Q&A 7 min.)	(10)-2 Sediment transport hydraulics Prof. Sasahara, Kouchi Univ.	(4)P-8 Exercises on flood routing Prof. Jaya	
2nd period	10:45-12:15		(6)-7 Rainfall-runoff modelling I – Conceptual type Prof. Jaya	(2)-12 Composite channel flow		(10)-3 Sabo planning Prof. Sasahara, Kouchi Univ.	(10)-6 Hazard mapping for sediment-related disasters Dr. Takanashi, Asia Air	
3rd period	13:15-14:45		(4)P-7 Exercises on a typical rainfall-runoff model II Prof. Jaya	(2)-13 Secondary flow Prof. Ishikawa	(6)-8 Rainfall-runoff modelling II – Physics-based type Prof. Jaya	(10)-4 Design of Sabo dam Prof. Sasahara, Kouchi Univ.	Self Study	
4th period	15:00-16:30		Self Study	(2)-14 Density currents	Self Study	15:00-15:20 Explanation on Sabo Report	Self Study	

March

		27	28	3/1	2	3	4	5
1st period	9:00-10:30			(10)-5 Warning and evacuation system for sediment-related disasters Dr. Hara, PWRI	Self Study	Self Study	(8)-15 Method to predict sediment transport process in drainage basins Prof. Egashira	
2nd period	10:45-12:15		Field Trip (8) in Edogawa City	(7)P-10	(6)-9 Introduction to Hydroinformatics Prof. Jaya	(4)P-9 Exercises on Kalman filtering I Prof. Jaya	(8)-A Supplementary Lecture Prof. Egashira	
3rd period	13:15-14:45		(4)-7 13:00-17:00 Communication system during floods in Japan (3)	(7)P-11 Training of hazard mapping for sediment-related disasters Dr. Takanashi	(10)-7 Sabo works in arid area and reforestation of degraded lands Prof. Ikeya	(3)P-13 Geographic Information System (GIS) (6) Dr. Kwak	(6)-10 Flood routing – Muskingam method; Muskingam-Cunge method Prof. Jaya	
4th period	15:00-16:30		(4)-8 Community based disaster management NPO"Nagisa Disaster Prevention Gropu"	(7)P-12	Self Study	(3)P-14 Geographic Information System (GIS) (7) Dr. Kwak	Self Study	

		6	7	8	9	10	11	12
1st period	9:00-10:30		(2)-15 Examination ICHARM	Self Study	Field Trip (9) to Chugoku & Kinki (Hii River, Oota River, Disaster reduction and human renovation institution in Kobe, Kamenose landslide protection work)			
2nd period	10:45-12:15		Self Study	Self Study				
3rd period	13:15-14:45		Self Study	Self Study				
4th period	15:00-16:30		Self Study	Self Study				

		13	14	15	16	17	18	19
1st period	9:00-10:30		Self Study	Self Study	Self Study	Self Study	Self Study	
2nd period	10:45-12:15		Self Study	Self Study	Self Study	Self Study	Self Study	
3rd period	13:15-14:45		Self Study	Self Study	Self Study	Self Study	Self Study	
4th period	15:00-16:30		Self Study	Self Study	Self Study	Self Study	Self Study	

Annex 6

		20	21	22	23	24	25	26
	1st period 9:00-10:30			Self Study	(at JICA Tokyo)	(at JICA Tokyo)	(at JICA Tokyo)	
	2nd period 10:45-12:15			Self Study	(10)-10 Introduction of landslides Dr. Tsunaki, SABO Technical Center	(10)-11 Survey and emergency response for landslide Dr. Fujisawa, NEXCO	(4)P-10 Exercises on Kalman filtering II Prof. Jaya	
	3rd period 13:15-14:45			Self Study	(10)-12 Stability analysis for landslide Dr. Tsunaki, SABO Technical Center	(10)-14 Maintenance measures for roads and reservoirs in landslide areas Dr. Fujisawa, NEXCO	(6)-11 Kalman Filtering Prof. Jaya	
	4th period 15:00-16:30			Self Study	(10)-13 Permanent measures for landslide damage reduction Dr. Tsunaki, SABO Technical Center	(10)-15 Case study of landslide Dr. Fujisawa, NEXCO	(10)-8 Countermeasures for earthquake-induced natural dams Dr. Osanai, NILIM	
		27	28	29	30	31	4/1	2
	1st period 9:00-10:30		(at ICHARM)	Self Study	(5)-11 Developments in social sciences on people's reactions and responses to disasters(1) Prof. Hayashi	Self Study	Self Study	
	2nd period 10:45-12:15		(4)P-11 Exercises on Frequency analysis I Prof. Jaya	(4)P-12 Exercises on Frequency analysis II Prof. Jaya	(5)-12 Developments in social sciences on people's reactions and responses to disasters(2) Prof. Hayashi	(4)P-13 Exercises on Frequency analysis III Prof. Jaya	(6)-14 Error analysis Prof. Jaya	
	3rd period 13:15-14:45		(6)-12 Frequency analysis Prof. Jaya	(6)-13 Parameter estimation Prof. Jaya	(3)P-15 Geographic Information System (GIS) (8) Dr. Kwak	(4)P-14 Exercises on parameter estimation Prof. Jaya	(4)P-15 Exercises on error analysis Prof. Jaya	
	4th period 15:00-16:30		Self Study	Self Study	Self Study	Self Study	Self Study	
April		3	4	5	6	7	8	9
	1st period 9:00-10:30		Self Study	Self Study	(6)-15 Examination Prof. Jaya	Self Study	Self Study	
	2nd period 10:45-12:15		(10)-9 Application of Sabo Works and landslide countermeasures to overseas countries Mr. Watanabe, Institute for	Self Study	Self Study	Self Study	Self Study	
	3rd period 13:15-14:45		(8) Examination Prof. Egashira	Self Study	Self Study	Self Study	Self Study	
	4th period 15:00-16:30		Self Study	Self Study	Self Study	Self Study	Self Study	
		10	11	12	13	14	15	16
	1st period 9:00-10:30		Self Study	Self Study	Self Study	Self Study	**9:00-10:00 Tea Ceremony**	
	2nd period 10:45-12:15		Self Study	Self Study	Self Study	Self Study	(7)P-13, 14,15 10:30-16:30 Application of sabo/landslide projects for other countries Dr. Ikeya& Dr. Hara	
	3rd period 13:15-14:45		Self Study	**13 15-16 30 3rd Interim Presentation (7min Presentation, 8min Q&A)**	**13 00-15 00 33th ICHARM R&D Seminar (Lecture Prof. Koike (Tokyo Univ.)**	Self Study		
	4th period 15:00-16:30		Self Study			Self Study		
		17	18	19	20	21	22	23
	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
	PM		Self Study	Self Study	Self Study	Self Study	Self Study	
		24	25	26	27	28	29	30
	AM		Self Study	Self Study	Self Study	Self Study		
	PM		Self Study	Self Study	Self Study	Self Study		
		5/1	2	3	4	5	6	7
	AM		Self Study				Self Study	
	PM		Self Study				Self Study	
		8	9	10	11	12	13	14
May	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
	PM		Self Study	Self Study	Self Study	Self Study	Self Study	
		15	16	17	18	19	20	21
	AM		Self Study	Self Study	Self Study	Self Study		
	PM		Self Study	Self Study	Self Study	Self Study	**13:00-16:15 4th Interim Presentation**	
		22	23	24	25	26	27	28
	AM		Self Study	Self Study	Self Study	14:00 Deadline of Papers for JSHWR	Self Study	
	PM		Self Study	Self Study	Self Study		Self Study	
		29	30	31	6/1	2	3	4
	AM		Self Study	Deadline of Papers for International Summer Symposium		Field Trip (10) to Kanto	Field Trip (10) to Kanto Sabo	
	PM		Self Study		13:00-14:00 Explanation on ADCP	Dam & Sabo	Exercise on ADCP in Tone River	
		5	6	7	8	9	10	11
	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
ne	PM		Self Study	Self Study	Self Study	Self Study	Self Study	

Annex 7

Jur		12	13	14	15	16	17	18
	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
	PM		13:00-16:00 Presentation on Discharge Measurement	Self Study	Self Study	Self Study	Self Study	
		19	20	21	22	23	24	25
	AM		Self Study	Self Study	5th Interim Presentation, Homeroom	Self Study	Self Study	
	PM		Self Study	Self Study		Self Study	Self Study	
July		26	27	28	29	30	7/1	2
	AM		Self Study	Self Study	Self Study	Self Study	Submission of the 1st draft	
	PM		Self Study	Self Study	Self Study	Self Study		
		3	4	5	6	7	8	9
	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
	PM		Self Study	Self Study	Self Study	Self Study	Self Study	
		10	11	12	13	14	15	16
	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
	PM		Self Study	Self Study	Self Study	Self Study	Self Study	
		17	18	19	20	21	22	23
	AM			Self Study	Self Study	Self Study	Self Study	
	PM			Self Study	Self Study	Self Study	Self Study	
		24	25	26	27	28	29	30
	AM		Self Study	Self Study	Self Study	Self Study	Submission of the complete draft	
	PM		Self Study	Self Study	Self Study	Self Study		
August		31	8/1	2	3	4	5	6
	AM		Self Study	Self Study	Self Study	Self Study	**Final Presentation**	
	PM		Self Study	Self Study	Self Study	Self Study		
		7	8	9	10	11	12	13
	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
	PM		Self Study	Self Study	Self Study	Self Study	Self Study	
		14	15	16	17	18	19	20
	AM		Self Study	Self Study	Self Study	Self Study	Self Study	
	PM		Self Study	Self Study	Self Study	Self Study	Self Study	
		21	22	23	24	25	26	27
	AM		Self Study	Self Study	Self Study	Submission of the thesis to GRIPS	13th International Summer Symposium by Japan Society of Civil Engineers, Kyoto Univ.	
	PM		Self Study	Self Study	Self Study			
September		28	29	30	31	9/1	2	3
	AM		Self Study	Self Study	General Conference of Japan Society of Hydrology and Water Resources, Kyoto Univ.	Self Study	Self Study	
	PM		Self Study	Self Study		Self Study	Self Study	
		4	5	6	7	8	9	10
	AM		Self Study	Self Study	Self Study	Field Trip (11) in Tohoku		
	PM		Self Study	Self Study	Self Study			
		11	12	13	14	15	16	17
	AM		Self Study	Self Study	Presentation on Action Plan	Closing Ceremony at JICA	Graduation Ceremony at GRIPS	Return to home country
	PM		Self Study	Self Study				

Course 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	Dr Shigeki UNJYOU, PWRI	Building regulation	Prof Okazaki, GRIPS	Unit Hydrograph Methods II	Prof Jayawardena, ICHARM
9	Policy for port infrastructure	Mr Hidetoshi KUME, JTERC	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)	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)	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)		Local Disaster Management and Hazard Mapping	
Number	DMP281E		DMP282E		DMP283E	
Instructor	Prof. Tadaharu ISHIKAWA		Prof. Kuniyoshi TAKEUCHI		Prof. Shigenobu Tanaka	
Period	Fall through Winter		Fall through Winter		Fall through Winter	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Ms Kita, Mr Kawabe (GLMi)	Prof Ishikawa, Tokyo Institute of Technology	Introduction What is natural disaster? Risk, Hazard and Vulnerability	Prof Takeuchi, ICHARM	Outline of disaster prevention countermeasures in Japan	Prof Tanaka, ICHARM
2	Ms Kita, Mr Kawabe (GLMi)	Prof Ishikawa, Tokyo Institute of Technology	PAR Model (1) Root causes, progress of dynamic pressure and unsafe conditions	Prof Takeuchi, ICHARM	River information and early warning system in Japan	Mr Nabesaka, ICHARM
3	Ms Kita, Mr Kawabe (GLMi)	Prof Ishikawa, Tokyo Institute of Technology	PAR Model (2) Concrete examples	Prof Takeuchi, ICHARM	Flood fighting law and some water levels for evacuation criteria	Mr Nabesaka, ICHARM
4	Ms Kita, Mr Kawabe (GLMi)	Prof Ishikawa, Tokyo Institute of Technology	ACCESS Model	Prof Takeuchi, ICHARM	Outline of flood hazard map and evacuation plan and local disaster management plan	Prof Tanaka, ICHARM
5	Ms Kita, Mr Kawabe (GLMi)	ICHARM staff	Disaster management cycle; Hyogo Framework for Action	Prof Takeuchi, ICHARM	Communication system during floods in Japan (1)	Japan Meteorolgical Agency (JMA)
6	One dimensional energy equation	Prof Ishikawa, Tokyo Institute of Technology	IFRM and traditional FRM; IFRM as part of IWRM	Prof Takeuchi, ICHARM	Communication system during floods in Japan (2)	Tone River Upstream Work Office, MLIT
7	Specific energy	Prof Ishikawa, Tokyo Institute of Technology	Concept of IWRM (1) Agenda 21, Global Water Partnership	Prof Takeuchi, ICHARM	Communication system during floods in Japan (3)	Edogawa City
8	Gradually varied flow	Prof Ishikawa, Tokyo Institute of Technology	Concept of IWRM (2) Guideline for IWRM at basin scale	Prof Takeuchi, ICHARM	Community based disaster management	Edogawa City
9	Quiz-2	ICHARM staff	Japanese experiences (1) Flood damages and flood control investment	Prof Takeuchi, ICHARM	Disaster imagination game (DIG)	ICHARM
10	Specific force	Prof Ishikawa, Tokyo Institute of Technology	Japanese experiences (2) Ground subsidence control	Prof Takeuchi, ICHARM	Decision making under uncertainty (1)	
11	Hydraulic jump, Junction and Diversion	Prof Ishikawa, Tokyo Institute of Technology	Japanese experiences (3) Comprehensive flood control measures and focus expansion from river to basin	Prof Takeuchi, ICHARM	Decision making under uncertainty (2)	
12	Composite channel flow	Prof Ishikawa, Tokyo Institute of Technology	Global trends (1) Impact of climatic change	Prof Oki, Tokyo Univ	Geomorphology around rivers and alluvial plain (1)	Prof Haruyama, Mie Univ
13	Secondary flow	Prof Ishikawa, Tokyo Institute of Technology	Global trends (2) International actions	Prof Oki, Tokyo Univ	Geomorphology around rivers and alluvial plain (2)	Prof Haruyama, Mie Univ
14	Density currents	Prof Ishikawa, Tokyo Institute of Technology	Future Issues of IFRM Adaptation; Aging society; Depopulation; Social Capital;	Prof Takeuchi, ICHARM	Discussion on local disaster management plan(1)	ICHARM
15	Examination		Examination	ICHARM	Discussion on local disaster management plan(2)	ICHARM

Lecture	Urban Flood Management		Advanced Hydrology		Flood Hydraulics and Sediment Transport	
Number	DMP284E		DMP380E		DMP381E	
Instructor	Prof. Kei KUDO		Prof. Amithirigala Widhanelage JAYAWARDENA		Prof. Shoji FUKUOKA	
Period	Fall through Winter		Fall through Winter		Fall through Winter	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Outline of urban flood	Prof Kudo, ICHARM	Hydrological modelling – basic concepts and approaches	Prof Jayawardena, ICHARM	Do alluvial rivers have a stable river width and depth- learning from natural rivers	Prof Fukuoka, Chuo Univ
2	Countermeasures of urban flood	Prof Kudo, ICHARM	Systems theory approach I – Linear theory; Time domain analysis; Frequency domain analysis	Prof Jayawardena, ICHARM	To derive a relationship between stable dimensionless width, depth and discharge in natural rivers	Prof Fukuoka, Chuo Univ
3	Characteristics and analysis of inundation (1)	Prof Suetsugi, Yamanashi Univ	Systems theory approach II – Non-linear systems, multi-linear systems	Prof Jayawardena, ICHARM	How do we make a river cross-section harmonizing flood control and river environment	Prof Fukuoka, Chuo Univ
4	Characteristics and analysis of inundation (2)	Prof Suetsugi, Yamanashi Univ	Instantaneous Unit Hydrograph (IUH)	Prof Jayawardena, ICHARM	Prediction method of flow resistance in rivers with compound channels and application to river course design (1)	Prof Fukuoka, Chuo Univ
5	Characteristics and analysis of inundation (3)	Prof Suetsugi, Yamanashi Univ	Conceptual models of IUH	Prof Jayawardena, ICHARM	Prediction method of flow resistance in rivers with compound channels and application to river course design (2)	Prof Fukuoka, Chuo Univ
6	Countermeasure against inundation (1)	Prof Suetsugi, Yamanashi Univ	Synthetic Unit Hydrograph	Prof Jayawardena, ICHARM	Steady quasi-two dimensional analysis of flood flows (1)	Prof Fukuoka, Chuo Univ
7	Countermeasure against inundation (2)	Prof Suetsugi, Yamanashi Univ	Rainfall-runoff modelling I – Conceptual type	Prof Jayawardena, ICHARM	Steady quasi-two dimensional analysis of flood flows (2)	Prof Fukuoka, Chuo Univ
8	Case Study (1) Ara River	Prof Kudo, ICHARM	Rainfall-runoff modelling II – Physics-based type	Prof Jayawardena, ICHARM	Unsteady quasi-two-dimensional analysis of flood flows (1)	Prof Fukuoka, Chuo Univ
9	Case Study (2) Tsurumi River	Mr Imbe, ARSIT	Introduction to Hydroinformatics	Prof Jayawardena, ICHARM	Unsteady quasi-two-dimensional analysis of flood flows (2)	Prof Fukuoka, Chuo Univ
10	Administration of urban rivers	Prof Kudo, ICHARM	Flood routing – Muskingam method; Muskingam-Cunge method	Prof Jayawardena, ICHARM	1-D bed deformation, computing model	Prof Watanabe, Kitami Institute of Technology
11	Developments in social sciences on people ' s reactions and responses to disasters(1)	Prof Hayashi, Kyoto Unv	Kalman Filtering	Prof Jayawardena, ICHARM	2-D bed deformation, sand waves and bars, meandering	Prof Watanabe, Kitami Institute of Technology
12	Developments in social sciences on people ' s reactions and responses to disasters(2)	Prof Hayashi, Kyoto Unv	Frequency analysis	Prof Jayawardena, ICHARM	Vegetations, flows in vegetated zone	Prof Watanabe, Kitami Institute of Technology
13	Disaster education	Mr Yoshii, PWRI	Parameter estimation	Prof Jayawardena, ICHARM	River restoration based on sediment transport and vegetation on stabilized bars	Prof Watanabe, Kitami Institute of Technology
14	Effect of forest	Prof Onda, Tsukuba Univ	Errors in frequency analysis	Prof Jayawardena, ICHARM	Re-meandering project for river restoration	Prof Watanabe, Kitami Institute of Technology
15	Examination		Examination		Bank erosion and drift woods	Prof Watanabe, Kitami Institute of Technology

Lecture	Mechanics of Sediment Transportation and River Changes		Sustainable Reservoir Development & Management		Control Measures for Landslide & Debris Flow	
Number	DMP382E		DMP383E		DMP384E	
Instructor	Prof. Shinji EGASHIRA		Prof. Norihisa MATSUMOTO		Prof. Hiroshi IKEYA	
Period	Fall through Winter		Fall through Winter		Fall through Winter	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Introduction - Characteristics of sediment	Prof Egashira, Newjec	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	Introduction - Sediment transportation and corresponding channel changes - Methods to evaluate channel changes	Prof Egashira, Newjec	Flood Control Plan	Mr Umino, PWRI	Sediment transport hydraulics	Prof Sasahara, Kouchi Univ
3	Mechanics of sediment transportation - Parameters associated with sediment transportation	Prof Egashira, Newjec	Flood Control Operation	Mr Umino, PWRI	Sabo planning	Prof Sasahara, Kouchi Univ
4	Mechanics of sediment transportation - Critical condition for initiating bed load	Prof Egashira, Newjec	Seismic Design for Dams	Prof Kawasaki, Yamaguchi Univ	Design of Sabo dam	Prof Sasahara, Kouchi Univ
5	Mechanics of sediment transportation - Bed load formulas	Prof Egashira, Newjec	Latest Technology for Concrete Dam (1)	Prof Kawasaki, Yamaguchi Univ	Warning and evacuation system for sediment-related disasters	Dr Hara, PWRI
6	Mechanics of sediment transportation - Bed load formulas	Prof Egashira, Newjec	Latest Technology for Concrete Dam (2)	Prof Kawasaki, Yamaguchi Univ	Hazard mapping for sediment-related disasters	Dr Takanashi, Asia Air Survey CO ,LTD
7	Mechanics of sediment transportation - Extension of bed load formula to non-uniform sediment	Prof Egashira, Newjec	Environmental Impact of Dams (1)	Dr Amano, NILIM	Sabo works in arid area and reforestation of degraded lands	Prof Ikeya, SABO Technical Center
8	Mechanics of sediment transportation - Suspended load	Prof Egashira, Newjec	Environmental Impact of Dams (2)	Prof Sumi, Kyoto Univ	Countermeasures for earthquake-induced natural dams	Dr Osanai, NILIM
9	Mechanics of debris flow - Constitutive equations - Debris flow characteristics over erodible beds	Prof Egashira, Newjec	Sediment Management in Reservoirs (1)	Prof Sumi, Kyoto Univ	Application of Sabo Works and landslide countermeasures to overseas countries	Mr Watanabe, Institute for International Development, Disaster Prevention and
10	Mechanics of debris flow - A bed load formula derived from constitutive equations	Prof Egashira, Newjec	Sediment Management in Reservoirs (2)	Prof Sumi, Kyoto Univ	Introduction of landslides	Dr Tsunaki, SABO Technical Center
11	Bed forms and flow resistance - Geometric characteristics of bed forms - Formative domain of bed forms	Prof Egashira, Newjec	Dam Construction (1)	Prof Yamaguchi, PWRI	Survey and emergency response for landslide	Dr Fujisawa, NEXCO
12	Bed forms and flow resistance - Flow resistance	Prof Egashira, Newjec	Dam Construction (2)	Dr Kashiwai, Japan Dam Engineering Center	Stability analysis for landslide	Dr Tsunaki, SABO Technical Center
13	Prediction of channel changes - Governing equations employed in steep areas - Topographic change in steep areas	Prof Egashira, Newjec	Dam Management	Prof Yamaguchi, PWRI	Permanent measures for landslide damage reduction	Dr Tsunaki, SABO Technical Center
14	Prediction of channel changes - Governing equations employed in alluvial reaches - Topographic change in alluvial reaches	Prof Egashira, Newjec	Effective Use of Existing Dams	Prof Matsumoto, Japan Dam Engineering Center	Maintenance measures for roads and reservoirs in landslide areas	Dr Fujisawa, NEXCO
15	Method to predict sediment transport process in drainage basins - Sediment management in drainage basin	Prof Egashira, Newjec	Roles of Dams in 21st Century	Prof Matsumoto, Japan Dam Engineering Center	Case study of landslide	Dr Fujisawa, NEXCO

Course Curriculum （Elective course)

Lecture	Computer Programming		Practice on Hydraulics		Practice on Local Disaster Management Plan	
Number	DMP180E		DMP285E		DMP286E	
Instructor	Ass. Prof. Takahiro SAYAMA		Prof. Tadaharu ISHIKAWA		Mr. Shigenobu TANAKA	
Period	Fall through Winter		Fall through Spring		Fall through Spring	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Programming Language (1)	Asso Prof Sayama, Dr Hasegawa, Dr Ushiyama, ICHARM	Mathematic 1 (Ordinary Differential equations)	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (1)	Ms Kita, Mr Kawabe (GLMi)
2	Programming Language (2)	Asso Prof Sayama, ICHARM	Mathematic 2 (Partial Differential equations)	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (2)	Ms Kita, Mr Kawabe (GLMi)
3	Programming Language (3)	Asso Prof Sayama, ICHARM	Review of Advection and Diffusion	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (3)	Ms Kita, Mr Kawabe (GLMi)
4	Programming Language (4)	Asso Prof Sayama, ICHARM	Review of General transport equations	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (4)	Ms Kita, Mr Kawabe (GLMi)
5	Programming Language (5)	Asso Prof Sayama, ICHARM	Discussion about Quiz-1	Dr Yorozuya, ICHARM	Project Cycle Management (PCM) (5)	Ms Kita, Mr Kawabe (GLMi)
6	Numerical Computation (1)	Dr Hasegawa, ICHARM	Review of One dimensional energy equation	Dr Yorozuya, ICHARM	Flood Fighting Drill	ICHARM staff
7	Numerical Computation (2)	Dr Hasegawa, ICHARM	Review of Specific energy	Dr Yorozuya, ICHARM	Town Watching (Field survey) in Kurihashi	Dr Kwak, ICHARM
8	Numerical Computation (3)	Dr Hasegawa, ICHARM	Review of Gradually varied flow	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (1)	Dr Kwak, ICHARM
9	Numerical Computation (4)	Dr Hasegawa, ICHARM	Discussion about Quiz-2	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (2)	Dr Kwak, ICHARM
10	Numerical Computation (5)	Dr Hasegawa, ICHARM	Review of Specific force	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (3)	Dr Kwak, ICHARM
11	Numerical Computation (6)	Dr Ushiyama, ICHARM	Review of Hydraulic jump, Junction and Diversion	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (4)	Dr Kwak, ICHARM
12	Numerical Computation (7)	Dr Ushiyama, ICHARM	Review of Composite channel flow	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (5)	Dr Kwak, ICHARM
13	Numerical Computation (8)	Dr Ushiyama, ICHARM	Review of Secondary flow	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (6)	Dr Kwak, ICHARM
14	Numerical Computation (9)	Dr Ushiyama, ICHARM	Review of Density currents	Dr Yorozuya, ICHARM	Geographic Information System (GIS) (7)	Dr Kwak, ICHARM
15	Numerical Computation (10)	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		Practice on Sustainable Reservoir Development & Management	
Number	DMP385E		DMP386E		DMP387E	
Instructor	Prof. Amithirigala Widhanelage JAYAWARDENA		Ass. Prof. Kazuhiko FUKAMI		Prof. Norihisa MATSUMOTO	
Period	Fall through Spring		Fall through Spring		Fall through Spring	
	Lecture	Lecturer	Lecture	Lecturer	Lecture	Lecturer
1	Exercises on System function estimation	Prof Jayawardena, ICHARM	Introduction to Flood Hazard Modeling	Ass Prof Sayama, ICHARM	On-sight Survey for Dam Construction Site (1)	Regional Office of MLIT
2	Exercises on least squares estimation	Prof Jayawardena, ICHARM	Fundamentals of Rainfall-Runoff Models	Ass Prof Sayama, ICHARM	On-sight Survey for Dam Construction Site (2)	Regional Office of MLIT
3	Exercises on Impulse and Frequency Response Functions	Prof Jayawardena, ICHARM	Finite Difference Method for Differential Equations (1)	Ass Prof Sayama, ICHARM	On-sight Survey for Dam Construction Site (3)	Regional Office of MLIT
4	Exercises on IUH determination	Prof Jayawardena, ICHARM	Finite Difference Method for Differential Equations (2) (Fortran Exercise)	Ass Prof Sayama, ICHARM	On-sight Survey for Dam Construction Site (4)	Regional Office of MLIT
5	Exercises on IUH application	Prof Jayawardena, ICHARM	Fundamentals of Flood Inundation Models	Ass Prof Sayama, ICHARM	On-sight Survey for Dam Construction Site (5)	Regional Office of MLIT
6	Exercises on a typical rainfall-runoff model I	Prof Jayawardena, ICHARM	Inundation Analysis (1) (Fortran Exercise)	Ass Prof Sayama, ICHARM	On-sight Survey on Dam Administration (1)	Regional Office of MLIT
7	Exercises on a typical rainfall-runoff model II	Prof Jayawardena, ICHARM	Inundation Analysis (2) (Fortran Exercise)	Ass Prof Sayama, ICHARM	On-sight Survey on Dam Administration (2)	Regional Office of MLIT
8	Exercises on flood routing	Prof Jayawardena, ICHARM	Introduction of GFAS/IFAS	Ass Prof Fukami, ICHARM	On-sight Survey on Dam Administration (3)	Regional Office of MLIT
9	Exercises on Kalman filtering I	Prof Jayawardena, ICHARM	Main Functions of GFAS, Applicability of the Satellite-Based Rainfall	Mr Nabesaka, Mr Ozawa, Mr Kawakami, ICHARM	On-sight Survey on Dam Administration (4)	Regional Office of MLIT
10	Exercises on Kalman filtering II	Prof Jayawardena, ICHARM	Correction Method of the Satellite-Based Rainfall, Validation of satellite-based rainfall	Mr Nabesaka, Mr Ozawa, Mr Kawakami, ICHARM	Practice on Dam Design (1)	Public Works Research Institute (PWRI)
11	Exercises on Frequency analysis I	Prof Jayawardena, ICHARM	Runoff analysis using IFAS (1) Data import, Model building	Mr Nabesaka, Mr Ozawa, Mr Kawakami, ICHARM	Practice on Dam Design (2)	Public Works Research Institute (PWRI)
12	Exercises on Frequency analysis II	Prof Jayawardena, ICHARM	Runoff analysis using IFAS (2) Parameter estimation	Mr Nabesaka, Mr Ozawa, Mr Kawakami, ICHARM	Practice on Dam Design (3)	Public Works Research Institute (PWRI)
13	Exercises on Frequency analysis III	Prof Jayawardena, ICHARM	Runoff analysis using IFAS (3) Validation of calculated discharge	Mr Nabesaka, Mr Ozawa, Mr Kawakami, ICHARM	Practice on Dam Design (4)	Public Works Research Institute (PWRI)
14	Exercises on parameter estimation	Prof Jayawardena, ICHARM	Runoff analysis using IFAS (4) Application to actual basins	Mr Nabesaka, Mr Ozawa, Mr Kawakami, ICHARM	Application for other countries (1)	Prof Matsumoto & Prof Yamaguchi
15	Exercises on error analysis	Prof Jayawardena, ICHARM	Run-off analysis using IFAS (5) Application to actual basins	Mr Nabesaka, Mr Ozawa, Mr Kawakami, ICHARM	Application for other countries (2)	Prof Matsumoto & Prof Yamaguchi

Lecture	Practice on Control Measures for Landslide & Debris Flow	
Number	DMP388E	
Instructor	Prof. Hiroshi IKEYA	
Period	Fall through Spring	
	Lecture	Lecturer
1	On-sight Survey for Sabo/Landslide Projects (1)	Regional Office of MLIT
2	On-sight Survey for Sabo/Landslide Projects (2)	Regional Office of MLIT
3	On-sight Survey for Sabo/Landslide Projects (3)	Regional Office of MLIT
4	On-sight Survey for Sabo/Landslide Projects (4)	Regional Office of MLIT
5	On-sight Survey for Sabo/Landslide Projects (5)	Regional Office of MLIT
6	On-sight Survey for Sabo/Landslide Projects (6)	Regional Office of MLIT
7	On-sight Survey for Sabo/Landslide Projects (7)	Regional Office of MLIT
8	On-sight Survey for Sabo/Landslide Projects (8)	Regional Office of MLIT
9	On-sight Survey for Sabo/Landslide Projects (9)	Regional Office of MLIT
10	Training of hazard mapping for sediment-related disasters (1)	Dr Takanashi, Asia Air Survey CO ,LTD
11	Training of hazard mapping for sediment-related disasters (2)	Dr Takanashi, Asia Air Survey CO ,LTD
12	Training of hazard mapping for sediment-related disasters (3)	Dr Takanashi, Asia Air Survey CO ,LTD
13	Application of Sabo/Landslide Projects to Overseas Countries (1)	Prof Ikeya & Dr Hara
14	Application of Sabo/Landslide Projects to Overseas Countries (2)	Prof Ikeya & Dr Hara
15	Application of Sabo/Landslide Projects to Overseas Countries (3)	Prof Ikeya & Dr Hara

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 computer programming and its skills for computation solving water-related problems covered in Course No. DMP280E “Basic Hydrology”, No. DMP281E “Hydraulics”, No. DMP380E “Advanced Hydrology” and No.DMP381E “Flood Hydraulics and Sediment Transport”.

2　Course Outline (Course Topics)

Week

1 ：Programming Language (1)
2 ：Programming Language (2)
3 ：Programming Language (3)
4 ：Programming Language (4)
5 ：Programming Language (5)
6 ：Numerical Computation (1)
7 ：Numerical Computation (2)
8 ：Numerical Computation (3)
9 ：Numerical Computation (4)
10 ：Numerical Computation (5)
11 ：Numerical Computation (6)
12 ：Numerical Computation (7)
13 ：Numerical Computation (8)
14 ：Numerical Computation (9)
15 ：Numerical Computation (10)

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: 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. Tadaharu ISHIKAWA
Term / Time：Fall through Winter

1 Course Description

Open Channel Hydraulics is a branch of applied fluid mechanics to support river management and improvement works for flood disaster prevention and water environment conservation. The first half of the lecture provides the fundamentals; general transport equation being based on the idea of conservation law, and basic characteristic of one dimensional open channel flow by using the energy transport equation. The second half of the lecture provides practical features of open channel hydraulics; hydraulic jump, composite channel flow, secondary flow, and salt wedge dynamics in estuaries.

2 Course Outline (Course Topics)

Week

1 : Balance equation
2 : Differential form of balance equation
3 : Transport equation
4 : Diffusion
5 : Quiz-1
6 : One dimensional energy equation
7 : Specific Energy
8 : Gradually varied flow
9 : Quiz-2
10 : Specific force
11 : Hydraulic jump, Junction and Diversion
12 : Composite channel flow
13 : Secondary flow
14 : Density currents
15 : Term examination

3 Grading

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

4 Textbooks

4-1 Required
4-2 Others

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)

Week

1. Introduction: What is natural disaster? Risk, Hazard and Vulnerability
2. PAR Model (1) Root causes, progress of dynamic pressure and unsafe conditions
3. PAR Model (2) Concrete examples
4. ACCESS Model
5. Disaster management cycle; Hyogo Framework for Action
6. IFRM and traditional FRM; IFRM as part of IWRM
7. Concept of IWRM (1): Agenda 21, Global Water Partnership
8. Concept of IWRM (2): Guideline for IWRM at basin scale
9. Japanese experiences (1) Flood damages and flood control investment
10. Japanese experiences (2) Ground subsidence control
11. Japanese experiences (3) 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: Local Disaster Management and Hazard Mapping

Course number：DMP283E
Instructor：Prof. Shigenobu TANAKA
Term / Time：Fall through Spring

1 Course Description

This course provides not only general knowledge on disaster prevention countermeasures in Japan, but also practical knowledge and techniques such as flood hazard maps which are indispensable for local disaster management. In addition, students will also have opportunity to interview to local governmental officers, community leaders and residents to learn/understand actual situation of local disaster management.

2 Course Outline (Course Topics)

Week

1 : Outline of disaster prevention countermeasures in Japan
2 : River information and early warning system in Japan
3 : Flood fighting law and some water levels for evacuation criteria
4 : Outline of flood hazard map and evacuation plan and local disaster management plan
5 : Communication system during floods in Japan (1)
6 : Communication system during floods in Japan (2)
7 : Communication system during floods in Japan (3)
8 : Community based disaster management
9 : Disaster imagination game (DIG)
10 : Decision making under uncertainty (1)
11 : Decision making under uncertainty (2)
12 : Geomorphology around rivers and alluvial plain (1)
13 : Geomorphology around rivers and alluvial plain (2)
14 : Discussion on local disaster management plan(1)
15 : Discussion on local disaster management plan(2)

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: Urban Flood Management

Course number：DMP284E
Instructor：Project Prof. Kei KUDOU
Term / Time：Fall through Winter

1 Course Description

This course provides the basic and practical knowledge of urban flood risk management in Japan; characteristics of urban flood (including inundation by flooding), countermeasures against urban flood and administration of urban rivers. Case studies will be conducted in the fields.

2 Course Outline (Course Topics)

Week

1 : Outline of urban flood
2 : Countermeasures of urban flood
3 : Characteristics and analysis of inundation (1)
4 : Characteristics and analysis of inundation (2)
5 : Characteristics and analysis of inundation (3)
6 : Countermeasure against inundation (1)
7 : Countermeasure against inundation (2)
8 : Case Study (1) Ara River
9 : Case Study (2) Tsurumi River
10 : Administration of urban rivers
11 : Developments in social sciences on people's reactions and responses to disasters(1)
12 : Developments in social sciences on people's reactions and responses to disasters(2)
13 : Disaster Education
14 : Effect of forest
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

4-2 Others

Subject: Practice on Hydraulics

Course number：DMP285E
Instructor：Prof. Tadaharu ISHIKAWA
Term / Time：Fall through Spring

1 Course Description

This course is review and discussion about Open Channel Hydraulics, which is a branch of applied fluid mechanics to support river management and improvement works for flood disaster prevention and water environment conservation. This helps students understand deeply about topics explained in DMP281E “Hydraulics”, as well as Quiz.

2 Course Outline (Course Topics)

Week

1 : Mathematic 1 (Ordinary Differential equations)
2 : Mathematic 2 (Partial Differential equations)
3 : review of Advection and Diffusion
4 : review of General transport equations
5 : discussion about Quiz1
6 : review of One dimensional energy equation
7 : review of Specific Energy
8 : review of Gradually varied flow
9 : discussion about Quiz-2
10 : review of Specific force
11 : review of Hydraulic jump, Junction and Diversion
12 : review of Composite channel flow
13 : review of Secondary flow
14 : review of Density currents
15 : discussion about Examination

3 Grading

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

4 Textbooks

4-1 Required

4-2 Others

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. DMP283E "Local Disaster Management and 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) in Kurihashi
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 : 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)

Week

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. Do alluvial rivers have a stable river width and depth- learning from natural rivers
2. To derive a relationship between stable dimensionless width, depth and discharge in natural rivers
3. How do we make a river cross-section harmonizing flood control and river environment
4. Prediction method of flow resistance in rivers with compound channels and application to river course design (1)
5. Prediction method of flow resistance in rivers with compound channels and application to river course design (2)
6. Steady quasi-two dimensional analysis of flood flows (1)
7. Steady quasi-two dimensional analysis of flood flows (2)
8. Unsteady quasi-two-dimensional analysis of flood flows (1)
9. Unsteady quasi-two-dimensional analysis of flood flows (2)
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 a suitable drainage 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: Flood Control Plan
3: Flood Control Operation
4: Seismic Design for Dams
5: Latest Technology for Concrete Dam (1)
6: Latest Technology for Concrete Dam (2)
7: Environmental Impact of Dams (1)
8: Environmental Impact of Dams (2)
9: Sediment Management in Reservoirs (1)
10: Sediment Management in Reservoirs (2)
11: Dam Construction (1)
12: Dam Construction (2)
13: Dam Management
14: Effective Use of Existing Dams
15: Roles of Dams in the 21st Century

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. Sediment transport hydraulics
3. Sabo planning
4. Design of Sabo dam
5. Warning and evacuation system for sediment-related disasters
6. Hazard mapping for sediment-related disasters
7. Sabo Works in arid area and reforestation of degraded land
8. Countermeasures for earthquake-induced natural Dams
9. Application of Sabo Works and landslide countermeasures to overseas countries
10. Introduction of landslides
11. Survey and emergency response for landslides
12. Stability analysis for landslide
13. Permanent measures for landslide damage reduction
14. Maintenance measures for roads and reservoirs in landslide areas
15. Case study of landslide

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)

Week

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 Rainfall-Runoff Models
3 : Finite Difference Method for Differential Equations (1)
4 : Finite Difference Method for Differential Equations (2) (Fortran Exercise)
5 : Fundamentals of Flood Inundation Models
6 : Inundation Analysis (1) (Fortran Exercise)
7 : Inundation Analysis (2) (Fortran Exercise)
8 : Introduction of GFAS/IFAS
9 : Main Functions of GFAS, Applicability of the Satellite-Based Rainfall
10 : Correction Method of the Satellite-Based Rainfall, Validation of satellite-based rainfall
11 : Runoff analysis using IFAS (1) Data import, Model building
12 : Runoff analysis using IFAS (2) Parameter estimation
13 : Runoff analysis using IFAS (3) Validation of calculated discharge
14 : Runoff analysis using IFAS (4) Application to actual basins
15 : Runoff analysis using IFAS (5) Application to actual basins

3 Grading

Reports (100%)

4 Textbooks

4-1 Required

4-2 Others

Material made by the instructors

Subject: Practice on Sustainable Reservoir Development & Management

Course number：DMP387E
Instructor：Prof. Norihisa MATSUMOTO
Term / Time：Fall through Spring

1 Course Description

This course aims at consolidating the material covered in Course No. DMP383E “Sustainable Reservoir Development & Management”.

Exercises related to each topic will be given to the students. Two technical field trips will be arranged to enable students to learn about Japan’s current activities in multipurpose dams development and upgrading.

2 Course Outline (Course Topics)

Week

1 : On-sight Survey for Dam Construction Site (1)
2 : On-sight Survey for Dam Construction Site (2)
3 : On-sight Survey for Dam Construction Site (3)
4 : On-sight Survey for Dam Construction Site (4)
5 : On-sight Survey for Dam Construction Site (5)
6 : On-sight Survey for Dam Administration (1)
7 : On-sight Survey for Dam Administration (2)
8 : On-sight Survey for Dam Administration (3)
9 : On-sight Survey for Dam Administration (4)
10 : Practice on Dam Design (1)
11 : Practice on Dam Design (2)
12 : Practice on Dam Design (3)
13 : Practice on Dam Design (4)
14 : Application for other countries (1)
15 : Application for other countries (2)

3 Grading

Attendance: 70% Report: 30%

4 Textbooks

4-1 Required

4-2 Others

Subject: Practice on Control Measures for Landslide & Debris Flow

Course number：DMP388E
Instructor：Prof. Hiroshi IKEYA
Term / Time：Fall through Spring

1 Course Description

This course aims at consolidating the material covered in Course No. DMP384E “Control Measures for Landslide & Debris Flow”.

Exercises related to each topic will be given to the students and they will be discussed and explained. It also includes field survey.

Student performance at these exercises will be counted toward their grades.

2 Course Outline (Course Topics)

Week

1. On-sight survey for Sabo/landslide projects (1)
2. On-sight survey for Sabo/landslide projects (2)
3. On-sight survey for Sabo/landslide projects (3)
4. On-sight survey for Sabo/landslide projects (4)
5. On-sight survey for Sabo/landslide projects (5)
6. On-sight survey for Sabo/landslide projects (6)
7. On-sight survey for Sabo/landslide projects (7)
8. On-sight survey for Sabo/landslide projects (8)
9. On-sight survey for Sabo/landslide projects (9)
10. Training of hazard mapping for sediment-related disasters (1)
11. Training of hazard mapping for sediment-related disasters (2)
12. Training of hazard mapping for sediment-related disasters (3)
13. Application of Sabo/landslide projects to overseas countries (1)
14. Application of Sabo/landslide projects to overseas countries (2)
15 Application of Sabo/landslide projects to overseas countries(3)

3 Grading

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

4 Textbooks

4-1 Required

4-2 Others

List of instructors coordinating with GRIPS

Title	Name	Main role (during lecturing period)
Professor	Kuniyoshi Takeuchi	Director of ICHARM, PWRI
Professor	Shigenobu Tanaka	Acting Director of ICHARM, PWRI
Professor	Yoshikazu Yamaguchi	Team Leader of Dam and Appurtenant Structures Research Team, PWRI
Professor	Amithirigala JAYAWARDENA	Research and Training Advisor, PWRI
Adjunct professor	Kei Kudo	Chief Researcher of ICHARM, PWRI
Associate professor	Kazuhiko Fukami	Chief Researcher of ICHARM, PWRI
Associate professor	Katsuhito Miyake	Chief Researcher of ICHARM, PWRI
Professor	Guangwei Huang	Senior researcher of ICHARM, PWRI
Associate professor	Osti Rabindra	Senior researcher of ICHARM, PWRI
Associate professor	Takahiro Sayama	Researcher of ICHARM, PWRI
Part-time instructor	Minoru Kamoto	Chief researcher of ICHARM, PWRI
Part-time instructor	Daisuke Kuribayashi	Senior researcher of ICHARM, PWRI
Part-time instructor	KWAK Young Joo	Research Specialist of ICHARM, PWRI
Part-time instructor	ADIKARI Yoganath	Research Specialist of ICHARM, PWRI
Part-time instructor	CHAVOSHIAN Seyed Ali	Research Specialist of ICHARM, PWRI
Part-time instructor	Dinar Catur Istiyanto	Research Specialist of ICHARM, PWRI
Part-time instructor	Atsuhiro Yorozuya	Research Specialist of ICHARM, PWRI
Part-time instructor	Hironori Inomata	Researcher of ICHARM, PWRI
Part-time instructor	Mamoru Miyamoto	Research Specialist of ICHARM, PWRI
Guest Professor	Hiroshi Ikeya	Director of SABO Technical Center
Guest Professor	Tadaharu Ishikawa	Professor at Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology
Guest Professor	Shun Okubo	Advisor of Japan SABO Association
Guest Professor	Shinji Egashira	Chief of Engineering at NEWJEC Inc.
Guest Professor	Shoji Fukuoka	Professor at Research and Development Initiative, Chuo University
Guest Professor	Yasuharu Watanabe	Professor at Department of Civil and Environmental Engineering, Kitami Institute of Technology
Guest Professor	Norihisa Matsumoto	Counselor at Japan Dam Engineering Center
Guest Professor	Hideaki Kawasaki	Professor at Yamaguchi University Graduate School of Science and Engineering
Guest Professor	Tetsuya Sumi	Professor at Water Resources Research Center, Disaster Prevention Research Institute, Kyoto University
Guest Professor	Tadashi Suetsugi	Professor at Yamanashi University
Associate Guest Professor	Masahiro Imbe	Managing Director, Rainwater Storage and Infiltration Technology Association
Part-time instructor	Kazuyuki Takanashi	Senior executive officer, Business Management Headquarters, Asia Air Survey Co., Ltd.

List of Field Trip Destinations and Facilities

Date		Destinations/Facilities		Structural Countermeasures							Non-structural Countermeasures			
				Diversion Channel	Super Levee	Improvement of Levee	Retarding Basin	Dam	Sabo	Others	Disaster Management	Early Warning System	Flood Hazard Map	Others
Field trip (1) 10th November	1	Diversion Channel	Arakawa-Karyu (Ara River Downstream) River Office, MLIT	○										
	2	Ara River Lock Gate								○				
	3	Super Levee at Shindan Area			○									
	4	Disaster Management Room of MLIT local office												○
	5	Disaster Management Station at Ukima Area									○			
Field trip (2) 16th-18th November	6	Construction site of Oyama Dam	Oyama Dam Constructuion Office, Japan Water Agency					○						
	7	Chikugo River	Chikugo River Office, MLIT			○								
	8	Construction site of Kase Dam	Chikugo River Office, MLIT					○						
	9	Sabo works in Mt. Unzen	Unzen Sabo Restoration Office, MLIT						○					
Field trip (3) 2nd December	10	Watarase Retarding Basin	Tonegawa-Joryu (Tone River Upstream) River Office, MLIT				○							
	11	Metropolitan Area Outer Underground Discharge Channel	Edogawa River Office, MLIT	○										
Field trip (4) 15th December	12	Tsurumi River Multi-purpose Runoff Retarding Basin	Keihin River Office, MLIT				○							
	13	Kirigaoka Regurating Pond	Midori Tennis Garden				○							
	14	Onmawashi Park Underground Tunnel-type Reservoir	Kanagawa Prefedture				○							
	15	Rainwater storage and infiltration system at individual house	Dr. Yutaka Takahashi							○				
Field trip (5) 12th January	16	Shirako River Regulating Reservoir	Bureau of Construction, Tokyo Metropolitan Government				○							
	17	Shakujii River Improvement				○								
Field trip (6) 18th January	18	Lecture and site visit on flood information system in Japan	Tonegawa-Joryu (Tone River Upstream) River Office, MLIT										○	○
Field trip (7) 4th-5th February	19	Storm surge damaged area in Nagoya City	–							○				
Field trip (8) 28th February	20	Flood countermeasers in lowland area	Edogawa City, Tokyo Prefecture			○						○	○	
Field trip (9) 9th-11th March	21	Integrated Flood Control Projects of Hii River	Izumo River Office, MLIT			○								
	22	Construction site of Diversion Channel		○										
	23	Construction site of Obara dam						○						
	24	Integrated Flood Control Projects of Ota River	Otagawa River Office, MLIT			○								
	25	Disaster Reduction and Human Renovation Institution	–								○			
	26	Countermeasures against Kamenose Landslide	Yamatogawa River Office, MLIT						○					
Field trip (10) 2nd-3rd June	27	Collaborative operation of Ikari Dam & Kawaji Dam	Kinugawa Integrated Dam Control Office, MLIT					○		○				
	28	Sabo Works in Nikko & Ashio	Nikko Sabo Work Office, MLIT						○					
Field trip (11) 8th-9th September	29	Tsunami hit area in Tohoku	Kitakamigawa-Karyu (Kitakami River Downstream) River Office, MLIT							○				

Field Trip (1)

Flood countermeasures in urban river (Ara River)

- Date: November 10th (Wed)
- Lecturer: Mr. Ohta, Chief of Local Cooperation Section,
  Arakawa-Karyu (Ara River Downstream) Office,
  Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
- Time table

9:20 Hotel Juraku
↓walk
9:38 Ogawa-cho Sta.
↓subway (Toei Shinjuku Line)
9:53 Higasi-Ohjima Sta.
10:00 Higasi-Ohjima Sta.
↓walk

10:10 Boarding place
↓ship [Arakawa Lock Gate]

11:20-11:50 River Station in Shinden Area

Super Levee in Shinden Area

11:50 Boarding place
↓ship
12:00 River Station in Iwabuchi Area
↓walk
12:10-13:00 Lunch at Ara River office
13:00-13:30 Disaster management room in the office
↓walk

13:35-14:30 Arakawa Museum of Aqua “amoa”

↓walk

15:00-16:00 Disaster Prevention Station in Ukima Area

↓walk
16:15 Kita Akabane Sta.
↓JR Line
18:10 Hitachi-no-ushiku Sta.

Field Trip (2) in Kyushu Region (16-18 Nov, 2010)

[16 Nov. (TUE)]
9:20 Haneda Airport
↓ JAL315
11:15 Fukuoka Airport
↓ Lunch & Bus
14:00-16:30 Oyama Dam Constructuion Office, JWA
↓ Bus
17:30 Kurume Hotel ESPRIT (Kurume City)

[17 Nov. (WED)]
8:00 Departure from Hotel
↓ Bus
8:30-11:30 Chikugogawa River Office, MLIT
↓ Lunch & Bus
13:00-14:00 Kase Dam Construction Office, MLIT
↓ Bus
14:30-15:30 Explanation on Dam site
↓ Bus
19:00 Shimabara Daiichi Hotel (Shimabara City)

[18 Nov. (THU)]
8:20 Departure from Hotel
↓ Bus
8:30-9:30 Unzen Restoration Office, MLIT
↓ Bus
9:50-11:10 Explanation on Sabo site
↓ Lunch & Bus
14:25 Nagasaki Airport
↓ JAL1850
16:00 Haneda Airport
↓ Bus
18:30 TBIC

Schedule of Field Trip (3)
to urban flood control facilities

((Date)) Thursday, 2 December 2010

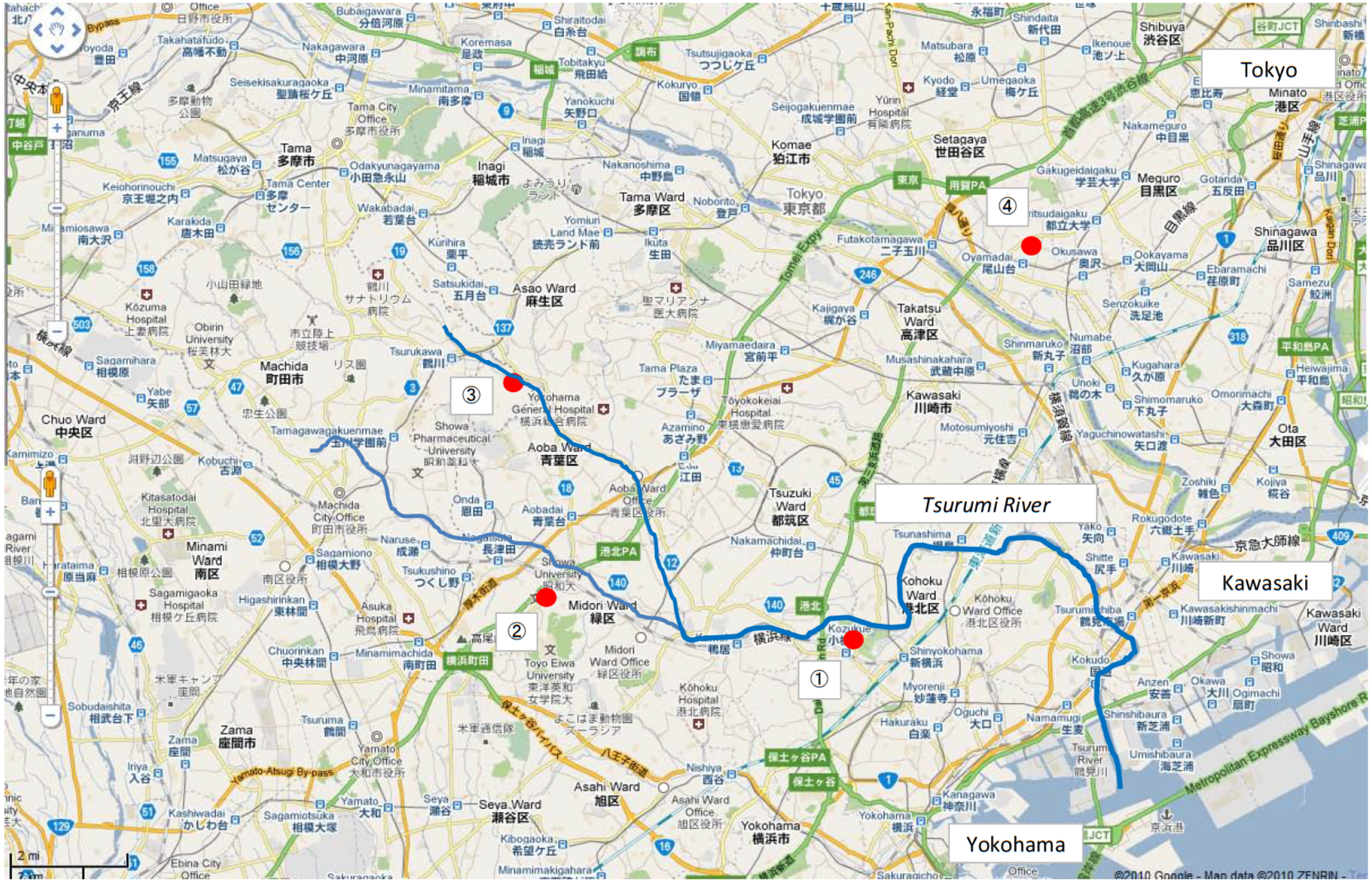
((Visitors)) 12 Participants
3-4 accompanying coordinators

((Schedule))

Time	Tour
7:50	Leaving JICA Tsukuba
	↓ Bus
8:20	Leaving PWRI/ICHARM
(1:40)	↓ Bus
10:00 – 11:30	**MLIT Watarase Retarding Basin**
	General explanation showing a DVD
	Historic site conservation zone
	(Nakanoshima, old Yanaka village)
	Questions and Answers at Watching Tower
	↓ Bus
13:30 – 15:00	**Water Discharge Tunnel on the Outskirt of the Metropolitan Area**
	Explanation and Observation
	↓ Bus
16:00	Arrival to JICA Tsukuba
	↓ Bus
16:30	Arrival to PWRI/ICHARM

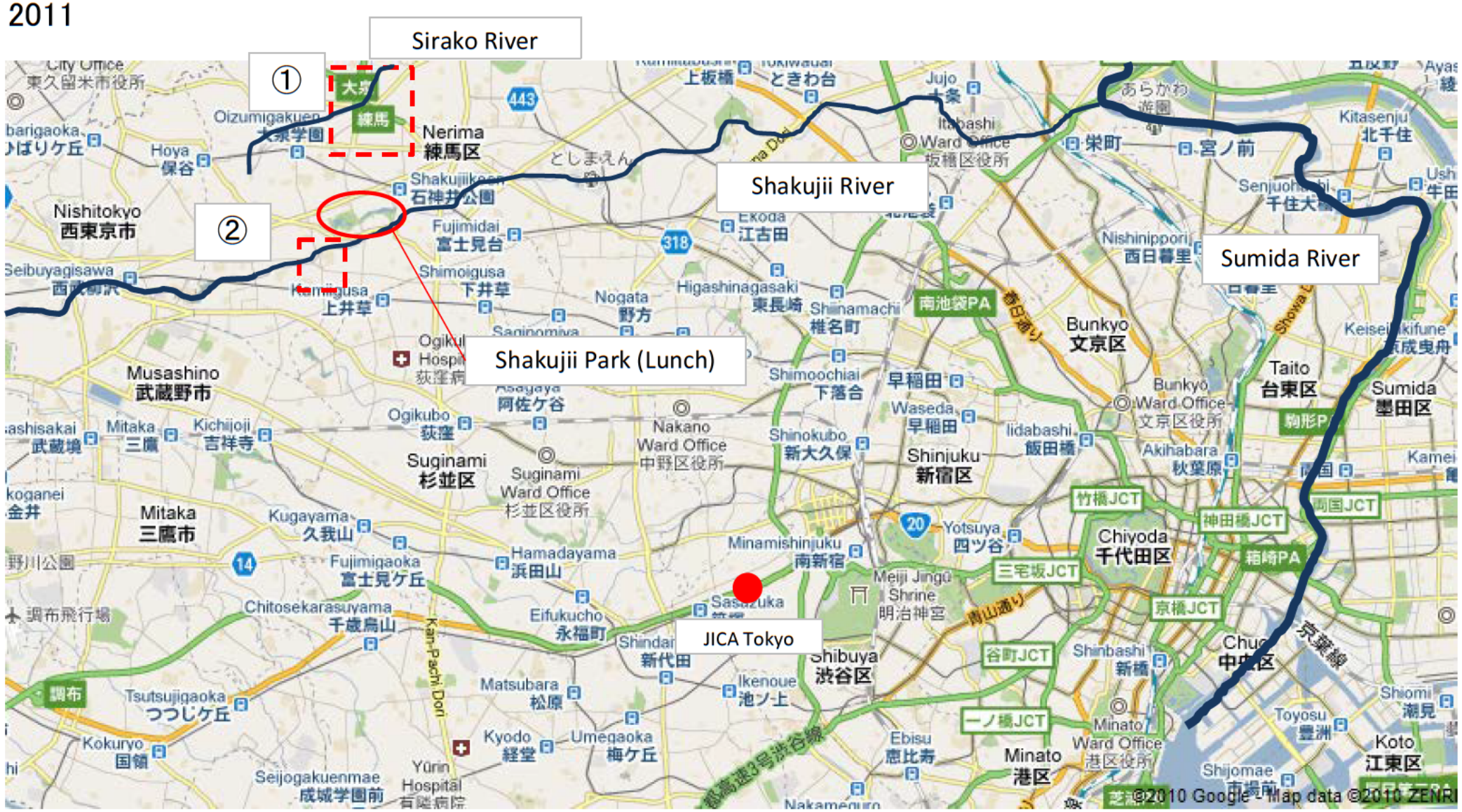
Field Trip (4) Integrated River Basin Management in Tsurumi River

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
11:30-12:15 Walk and look around the Tsurumi retarding basin
↓ move by bus (including lunch)
13:30-13:45 ② Kirigaoka Regulating Pond （緑テニスガーデン(霧が丘遊水地)）
↓ move by bus
14:05-14:30 ③ Onmawashi Park Underground Tunnel-type Reservoir （恩廻公園地下調整池）
↓ move by bus
15:30-16:00 ④ Rainwater storage and infiltration system at individual house （高橋裕先生宅での貯留浸透施設）



Field Trip (5) in Tokyo Area

12th January, 2011



① 10:00-12:00 Shirako River Regulating Reservoir

② 14:00-16:00 Shakujii River

Town Watching in Kurihashi Town

River information

Dangerous point

Flood countermeasure

Flood mark of Kathleen Typhoon in 1947 on utility poles

Water Shrine

Canal

Tone River

Kurihashi Sta.

Iki-iki Katsudou Center (Community Center)

Goal

Start

Total 2,500m

Kurihashi Elementary School

Kurihashi Hights Community Center

Manhole

Municipal Emergency Radio Stations

Canal

National Route 4

National Route 125

Temporary Regurating Reservior

Underpass

Bus's waiting place

Water level information

0 100m

Annex 40

Field Trip (9) to Chugoku & Kinki Region

－－－－－－－－－－－－－－－－－－－－－－－－－－－－

【9 March(Wed)】

7:47　Hitachi No Ushiku Sta.

↓　JR etc.

9:42　Haneda Airport 1st　building Sta.

10:45　Haneda Airport

↓　JAL1665

12:20　Izumo Airport

↓　Lunch at the Airport, move by Bus (40min.)

14:00-14:45　**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.)

15:45-17:00　**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））

↓　Bus

17:30　Stay in Izumo city

－－－－－－－－－－－－－－－－－－－－－－－－－－－－

【10 March(Thu)】

8:00　Hotel

↓　Bus

9:00-10:00　**３．Construction Site of Obara Dam**(Unnan City, Shimane Pref.)

尾原ダム建設現場（島根県雲南市木次町平田 36）

↓　Bus

13:45-15:45　**４．Oota Riv. (Gion Water Gate, Motoyasu Riv. Water Terrace)**

（Hiroshima City, Hiroshima Pref.）

太田川河川事務所大芝出張所（広島市西区大芝 3-1-1）

（祇園水門、元安川テラス）（広島市）

↓　Bus

16:00-17:30　**５．Peace Memorial Park・Peace Museum**　(Hiroshima City, Hiroshima Pref.)

平和記念公園（広島市中区中島町）

↓　Bus

18:06 Hiroshima Sta.

↓　Nozomi 56

19:21　Shin-Kobe Sta.

↓　Bus etc.

20:00　Stay in Kobe city

－－－－－－－－－－－－－－－－－－－－－－－－－－－－

【11 March(Fri)】

9:00　Hotel

↓　Walk or bus

9:30-11:00　**６．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）

↓　Bus (75min.)

12:30-14:00　**７．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.

↓　Nozomi 238

18:03　Tokyo Sta.

18:15　Tokyo Sta.

↓　JR

18:23　Ueno Sta.

18:38　Ueno Sta.

↓　JR

19:39　Hitachi-no-ushiku Sta.

－－－－－－－－－－－－－－－－－－－－－－－－－－－－

Field Trip (10) in Kanto Region

【2nd June (Thu)】

7:00	Departure from Tsukuba Center
↓	
7:30	Departure from TBIC
↓	
10:30-12:30	Dam Collaboration between Kawaji Dam & Ikari Dam
↓	
14:30-17:00	Sabo Works in Nikko
↓	
17:30	Stay in Nikko

【3rd June (Fri)】

8:30	Departure from hotel
↓	
9:30-11:30	Sabo work in Ashio
↓	
14:00-15:30	Exercise on ADCP at Taisho Bridge of Tone River
↓	
18:30	Arrival at TBIC

Field Trip (11) in Tsunami hit area (Tohoku Region)

【September 8th (Thu)】

8:05　TBIC

↓ JICA Bus

8:20　Hitachi-no-Ushiku Sta.

8:27　Hitachi-no-Ushiku Sta.

↓ JR Joban Line

9:28　Ueno Sta.

9:46　Ueno Sta.

↓ Shinkansen (Yamabiko 275)

11:40　Sendai Sta.

Lunch at Sendai Sta.

12:15　Departure from Sendai Sta.

↓ Bus

14:00-17:00 Field Survey in Ishinomaki City and Kitakami River

↓ Bus

17:00　Stay ay Library Hotel in Sendai City

【September 9th (Fri)】

9:00　Departure from the hotel

↓ Bus

10:00-12:00

Field Survey along Narusegawa River

(Tributary of Kitakami gawaRiver)

↓ Lunch in Ishinomaki City, Bus

14:17　Sendai Sta.

↓ Shinkansen (Yamabiko 276)

16:18　Ueno Sta.

16:46　Ueno Sta.

↓ JR Joban Line

17:46　Hitachi-no-Ushiku Sta.

18:00　Hitachi-no-Ushiku Sta.

↓ JICA Bus

18:20　TBIC

"Nicchoku(日直)" Sheet

Roles of "Nicchoku"	
Before the class	○Take attendance. (If you have to be absent due to illness or other reasons, you need to tell the Nicchoku of the day about your absence. The Nicchoku will then report it to the training coordinator in the morning before the class starts.)
During the class	○Take notes to fill in necessary information on the Nicchoku sheet. ○(At the time of field survey) Take attendance and report to the coordinator every time the class come back on the bus to make sure that no body will be left behind.
After the class	○Clean the whiteboards. ○Turn off the room lights in Student's room and the classroom. ○Close and lock the windows in Student's room and the classroom. ○Take out garbage in Student's room, lecture room and kitchen to the collection point everyday. ○Fill in this sheet and e-mail to Ms. Ebashi (ebashi77@pwri.go.jp) within the day.

Day/Month					
Name of the Nicchoku					
List of Participant (Please mark if he/she is absent)		Mr. KUNDU Pijush Krishna		Ms. Ambar Puspitosari	
		Mr. Md. Sabibur Rahman		Mr. Kyaw Zayer Tint	
		Ms. XU Guanglei		Mr. Prem Raj Ghimire	
		Mr. ZHOU Huaqiang		Mr. Manish Maharjan	
		Mr. Julian Javier Corrales Cobos		Mr. Rajendra Sharma	
		Mr. Rodrigo Fernandez Reynosa		Mr. ABDUL AZIZ	
About Each Class	1st Class	Lecture			
		Lecturer			
		Contents (5 Key Words)			
	2nd Class	Lecture			
		Lecturer			
		Contents (5 Key Words)			
	3rd Class	Lecture			
		Lecturer			
		Contents (5 Key Words)			
	4th Class	Lecture			
		Lecturer			
		Contents (5 Key Words)			
Comments on the day's classes (At least 100 words)					