		[Title]	[Instructor]			
		Remote Sensing and GIS I	Keiichi Mas	Keiichi Masutani / Hiroshi Ishidaira / Jun Magome		
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]	
GTR503	1	Civil and Environmental Engineering Special Educational Program on River Basin Environmental Science	2nd Semester	Fri./I	Japanese ⁄English	
[Outline an	[Outline and purpose]					
This course	e provides	basic theories and techniques to analyze environ	imental inform	nation, incl	uding remote	
sensing, GI	sensing, GIS.					
Japanese a	nd oversea	students study together through work group on so	me topics. Eng	glish is poter	itially used.	
[Objectives] and the priv	nainles of nometo consing and CIS				
To understa	and the pri	nciples of remote sensing and GIS.	ental analysis			
10 01100150	ind the pot	ential use of remote sensing and ous of environme	intar anary 515.			
[m] ·	. 1					
[Requireme	ents]					
Basic skills	of comput	.ng.				
[Evaluation	h					
1. Report: 2	20%					
2. Attendar	ice and Att	itude: 50%				
3. Summar	y report: 30)%				
[Textbooks]						
Using origi	nal docume	ents.				
References]					
Liverenenee	.1					
[Schedule]						
1 Introduct	tion					
2. Basic cor	ncept of ren	note sensing				
3. Basic the	eory of rem	ote sensing				
4. Exercise	(1): handli	ng of satellite images				
5. Correctio	on of satelli	te images				
6. Exercise	(2) geomet	land				
8. Exercise	(3): normal	lized difference vegetation index (NDVI) and land-	over classifica	tion		
9. Basic cor	9. Basic concept of GIS					
10. Structu	10. Structure and preparation of GIS data					
11. Exercise (4): visualization of GIS data						
12. Spatial	12. Spatial information analysis method					
10. Exercise	14 Exercise (6): spatial analyses with GIS					
15. Summa	ry					

		[Title]	[Instructor]		
	Adva	nced Hydraulics and Hydrology I	Yasushi Sak / Hiroshi Ish	amoto / Kei idaira / Yut	ichi Masutani aka Ichikawa
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
GTR506	2	Civil and Environmental Engineering Special Educational Program on River Basin Environmental Science	1st Semester	Thu.∕I	Japanese/ English
[Outline an	d purpose]				
The aim of basic equation dynamics n numerical s river basin needed.	the lecture tions of flu nodeling. T solution tec environme	e is to learn mechanism and modeling of water flo uid motion, followed by 1-dimensional water flo he lecture deals with not only theoretical descript chnique. The topics treated in the lecture are cruc ental science. The lecture is mainly given in Japa	ws. The lectu w equations ion of water f tial for unders unese while E	re starts fro and storag low modelin standing wa nglish is ala	om describing e type water ig but also its ter flows and so used when
[Objectives]]				
 To under To under To under To under To under To under Equireme Basic know 	stand basic stand 1-dir stand kiner stand stora stand basic ents] ledge on hy	e equations of fluid motion and their derivation. nensional open channel flow equations and their dematic wave model equations and their derivation. age type water dynamics model and their derivation of numerical solution technique for water flow model addraulics, hydrology and calculus.	erivation. 1. dels.		
[Evaluation	1]				
Report: 40% Final exam	% : 40%	de: 20%			
[Textbooks]					
[References	ş]				
[Schedule]					
 Introduct Basic equ Basic equ Basic equ Runoff pr Vertical r Groundw River flow Evapotra Evapotra Evapotra River ba River ba Modelin Water r Water r Summa 	tion uations of fl uations of n rocess and movement of vater flow a w process unspiration asin hydrol asin hydrol asin hydrol asin hydrol esources in esources in ry	luid motion naterial transport water quality of soil water and solute transport nd solute transport : theory : model ogical model: conceptual model and lumped model ogical model: distributed model use and water control .Japan the world			

		[Title]		[Instructor]
\$	Seminar in	River Basin Environmental Science IA	all ac	ademic supe	rvisors
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
GTR601	1	Special Educational Program on River Basin Environmental Science	1st Semester	Mon. ⁄V	Japanese/ English
[Outline and purpose] The purpose of this practice is to secure necessary basic knowledge and technique for research. Survey, experiment and analysis concerning research subject et al. are conducted under the guidance of a group of academic supervisors. And presentation and discussion are conducted. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar. [Objectives]					
[Requireme	ents]	group of academic supervisors decided			
Reviewing	Reviewing lecture relating research at undergraduate course				
[Evaluation Integrated	l] evaluation	including interim presentation : 100%			
[Textbooks]					
Textbooks t	hat a grouj	o of academic supervisors designates			
[References	3]				
References	that a grou	up of academic supervisors designates			
[Schedule]					
Contents th	aat a group	of academic supervisors designates			

		[Title]		[Instructor]]
\$	Seminar in	River Basin Environmental Science IB	all ac	ademic supe	rvisors
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
GTR602	1	Special Educational Program on River Basin Environmental Science	2nd Semester	Mon./V	Japanese/ English
[Outline and purpose] The purpose of this practice is to secure necessary basic knowledge and technique for research. Survey, experiment and analysis concerning research subject et al. are conducted under the guidance of a group of academic supervisors. And presentation and discussion are conducted. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar. [Objectives] Ultimate target that a group of academic supervisors decided					
[Requireme Reviewing	ents] lecture rela	ting research at undergraduate course			
[Evaluation	ı]				
Integrated	evaluation	including interim presentation : 100%			
[Textbooks]					
Textbooks t	hat a grouj	p of academic supervisors designates			
[References	5]				
References	that a grou	up of academic supervisors designates			
[Schedule]					
Contents th	at a group	of academic supervisors designates			

[Title]		[Instructor]			
River Basin Environmental Science IIA	all academic supervisors				
[Program]	[Semester]	[Hours]	[Language of instruction]		
Special Educational Program on River Basin Environmental Science	1st Semester	Fri./V	Japanese/ English		
[Outline and purpose] The purpose of this practice is to secure necessary advanced knowledge and technique for research. Survey, experiment and analysis concerning research subject et al. are conducted under the guidance of a group of academic supervisors. And presentation and discussion are conducted. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar. [Objectives] Ultimate target that a group of academic supervisors decided					
[Requirements] Reviewing lecture relating research at undergraduate course					
including interim procentation : 100%					
including internit presentation . 100%					
p of academic supervisors designates					
up of academic supervisors designates					
o of academic supervisors designates					
	[Title] River Basin Environmental Science IIA [Program] Special Educational Program on River Basin Environmental Science practice is to secure necessary advanced knowledy ysis concerning research subject et al. are conducted hydraulic, water quality, microbiology) composed ar to attend other seminar. a group of academic supervisors decided a ting research at undergraduate course n including interim presentation : 100% up of academic supervisors designates up of academic supervisors designates o of academic supervisors designates	[Title] all act River Basin Environmental Science IIA all act [Program] [Semester] Special Educational Program on River Basin 1st Environmental Science Semester practice is to secure necessary advanced knowledge and technicysis concerning research subject et al. are conducted under the s. And presentation and discussion are conducted. Student m thy and presentation and discussion are conducted. Student m thy and presentation supervisors decided a group of academic supervisors decided attend other seminar. a group of academic supervisors decided atting research at undergraduate course in including interim presentation : 100% pof academic supervisors designates up of academic supervisors designates pof academic supervisors designates	[Title] [Instructor River Basin Environmental Science IIA all academic super Image: special Educational Program on River Basin Environmental Science 1st Semester Fri./V Image: special Educational Program on River Basin Environmental Science 1st Semester Fri./V Image: special Educational Program on River Basin Environmental Science 1st Semester Fri./V Image: special Education and discussion are conducted under the guidance sysis concerning research subject et al. are conducted under the guidance site of the seminar. 1st Semester Fri./V Image: special Education and discussion are conducted. Student must belong a hydraulic, water quality, microbiology) composed of graduate students, reser to attend other seminar.		

		[Title]		[Instructor]
S	eminar in	River Basin Environmental Science IIB	all aca	ademic supe	ervisors
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]
GTR604	1	Special Educational Program on River Basin Environmental Science	2nd Semester	Fri./V	Japanese/ English
[Outline and purpose] The purpose of this practice is to secure necessary advanced knowledge and technique for research. Survey, experiment and analysis concerning research subject et al. are conducted under the guidance of academic supervisor and a group of academic supervisors. And presentation and discussion are conducted. Student must belong to a seminar group (Hydrology and hydraulic, water quality, microbiology) composed of graduate students, researchers and teachers and it's better to attend other seminar.					
Ultimate ta	[Objectives] Ultimate target that a group of academic supervisors decided				
[Requirements]					
Reviewing lecture relating research at undergraduate course					
[Evaluation]					
Integrated	evaluation	including interim presentation : 100%			
[Textbooks]					
Textbooks t	hat a grouj	p of academic supervisors designates			
[References	5]				
References	that a grou	up of academic supervisors designates			
[Schedule]					
Contents th	at a group	of academic supervisors designates			

[Title]			[Instructor]			
Res	earch Work	in River Basin Environmental Science IA	all ac	ademic supe	ervisors	
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]	
GTR605	2	Special Educational Program on River Basin Environmental Science	1st Semester		Japanese/ English	
[Outline an	d purpose]					
Student of under the g	carry out re guidance of	esearch activity such as investigation of research l a group of academic supervisors about each research	background ac ch subject sele	ecording to a	research style	
[Objectives]]					
Ultimate ta	arget that a	group of academic supervisors decided				
[D]	. 1					
[Requireme Various know	entsj owledge rel	ating research				
various kii	Swieuge iei					
[Evaluation	n]					
Integrated	evaluation	including attitude at seminar : 100%				
[Textbooks]						
Textbooks t	hat a grou	o of academic supervisors designates				
[References	5]					
References	that a grou	up of academic supervisors designates				
[Schedule]						
Contents th	nat a group	of academic supervisors designates				

[Title]			[Instructor]			
Res	earch Work	in River Basin Environmental Science IB	all ac	ademic supe	ervisors	
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]	
GTR606	2	Special Educational Program on River Basin Environmental Science	2nd Semester		Japanese/ English	
[Outline an	d purpose]					
Student of under the g	carry out re guidance of	esearch activity such as investigation of research l a group of academic supervisors about each researc	background ac ch subject sele	ecording to a ected	research style	
[Objectives]]					
Ultimate ta	arget that a	group of academic supervisors decided				
Requireme	ents]					
Various kno	owledge rel	ating research				
[Evaluation	n]					
Integrated	evaluation	including attitude at seminar : 100%				
Textbooks						
Textbooks t	hat a grou	o of academic supervisors designates				
		r o				
References	2]					
References	that a grou	up of academic supervisors designates				
	0					
[Schedule]						
Contents th	nat a group	of academic supervisors designates				

[Title]			[Instructor]			
Rese	earch Work	in River Basin Environmental Science IIA	all ac	ademic supe	ervisors	
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]	
GTR607	2	Special Educational Program on River Basin Environmental Science	1st Semester		Japanese/ English	
[Outline an	d purpose]					
Student of under the g	carry out r guidance of	esearch activity such as investigation of research l a group of academic supervisors about to each rese	background ac arch subject s	ecording to a elected	research style	
[Objectives]]					
Ultimate ta	arget that a	group of academic supervisors decided				
[Requireme	ents]					
Various kno	owledge rel	ating research				
[Evaluation	n]					
Integrated	evaluation	including interim presentation : 100%				
[Textbooks]						
Textbooks t	hat a grou	o of academic supervisors designates				
		i C				
References	s]					
References	that a grou	up of academic supervisors designates				
[Schedule]						
Contents th	nat a group	of academic supervisors designates				

		[Title]		[Instructor	·]	
Rese	earch Work	in River Basin Environmental Science IIB	all ac	ademic supe	ervisors	
[Code]	[Credits]	[Program]	[Semester]	[Hours]	[Language of instruction]	
GTR608	2	Special Educational Program on River Basin Environmental Science	2nd Semester		Japanese/ English	
[Outline an	d purpose]					
Student o under the g	carry out r guidance of	esearch activity such as investigation of research l a group of academic supervisors about to each rese	background ac arch subject s	ecording to elected	research style	
[Objectives]]					
Ultimate ta	arget that a	group of academic supervisors decided				
Requireme	entsl					
Various kno	owledge rel	ating research				
Evaluation	n]					
Integrated	evaluation	including presentation of research result at master	course : 1009	%		
Textbooks	1					
Textbooks t	that a grou	o of academic supervisors designates				
References						
References	that a grou	in of academic supervisors designates				
	that a grot	p of academic supervisors designates				
[Schedule]						
Contents th	nat a group	of academic supervisors designates				