I. Guidance, Subjects, Grading

# I-1. Guidance

# (1) Supervisors

For student guidance, one supervisor and two or more co-supervisors are assigned to each student. One of the co-supervisors is from a specialist field different from that of the supervisor. This arrangement helps to provide advice and guidance from an alternative perspective and, after graduation, helps graduates develop the competence to be highly skilled professionals and technologists who possess knowledge and skills which enables them to respond flexibly to a broad range of challenges on a number of fronts, and can participate in interdisciplinary discussions.

## (2) Role of Supervisors

#### Supervisor

- · Discuss and set research topics with students
- At the beginning of each semester, design the education research plan with students
- Work with the co-supervisors and guide and evaluate participation in the Kuroshio Seminar and Special Exercise, and dissertation research and writing according to the degree evaluation criteria
- Through this guidance, have the students acquire knowledge and skills whereby they can continuously contribute to research activities and society as highly skilled professionals or technologists after being awarded their degree

#### Co-supervisor (A): same field as the supervisor or a closely-related field

• Work with the supervisor and provide research guidance related to the dissertation. If the supervisor is not able to provide guidance due to some unforeseen circumstance, co-supervisor (A) will assume responsibility for education research guidance

# Co-supervisor (B): field different from both supervisor and co-supervisor (A)

- At the end of each semester, obtain a briefing and report from students on their research results and progress, and guide and advise students from the perspective of a different field so they can objectively evaluate their own research progress
- With the supervisor and co-supervisor (A), review the methods and principles of instruction to determine whether they are sufficient to encourage a wider vision in education research and foster enriched learning

# I-2. Subjects

# (1) Subjects List

Amonto Soutie         Locate         1         1         1         1         1         1         1           Specification         Exploration         Exploration         Exploration         Exploration         Exploration         Exploration         1         1         1         1         1           Specification         Exploration         Exploration         Exploration         Exploration         Exploration         Exploration         1         1         1         1         1         1           Specification         Exploration         Exploration         Exploration         Exploration         Exploration         Exploration         1         1         1         1         1         1           Specification         Exploration         Exploration         Exploration         Exploration         Exploration         Exploration         1		Code	Title	Instructor	2112	Compulsory	Elective	rear		mannannhav	INCILIALINS	Completion
1000         1000         1         1         1         1         1         1           1000         1000         1         1         1         1         1         1         1         1           11000         10000         10000         1 <td>F</td> <td></td> <td>Kuroshio Science</td> <td>Higa, Kubota, Others</td> <td>Lecture</td> <td>1</td> <td></td> <td>-</td> <td>1,2</td> <td></td> <td>Omnibus</td> <td></td>	F		Kuroshio Science	Higa, Kubota, Others	Lecture	1		-	1,2		Omnibus	
1000         Evaluation         Evaluation <td></td> <td></td> <td></td> <td>Each Supervisors</td> <td>Esercise</td> <td>1</td> <td></td> <td>1</td> <td>1,2</td> <td></td> <td></td> <td>-</td>				Each Supervisors	Esercise	1		1	1,2			-
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International static				Gyo ITANI, Hirotaka DOHO, Others	Lecture	1		-	-			_
International static		19403 Advanced Study of S	ocioeconomic Research	Teruyuki SHINBO, Mina HORI. Others	Lecture	1			1,2	2 subjects are select ed		
Independent		19404 Advanced Study on E	Ecological and Environmental Field Surveys	Yohei NAKAMURA, Motoki HIGA, Others	Lecture	1			1,2	depending on		2 credits
Option         Description         Description         Description         1         3           1001         Warne Buddensing         Main Flack Work         Element         2         1         2         1         2           1001         Warne Buddensing         Main Flack Work         Element         2         1         2         1         2           1001         Prenetion A Majore         Main Flack Work         Element         2         1         2         1         2           1001         Prenetion Set on Flack Theore Flack Work         Element Set on Flack Theore Flack Work         Element Set on Flack Theore Flack Work         2         1         2         2         1         2           1001         Manuel Element Set on Flack Theore Flack Work         Element Main Flack Work         Element Set on Flack Mork         2         1         2         2         1         2           1001         Manuel Element Set on Flack Mork         Element Main Flack Mork         Element Main Flack Mork         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         2         2		19405 Advanced Study of N	Material Analysis Technique	Takushi NANBA, Kazuhiko YAMADA, Others	Lecture	1		1	1,2	belonging course	Omnibus	
One         Matter Montescale         Construction         Easter         2         1         2           10.1         Remeine 10, and         Remeine 10, and         Remeine 10, and         Remeine 10, and         2         1         2           10.1         Remeine 10, and         Remeine 10, and         Remeine 10, and         2         1         2         2         1         2           10.1         Remeine 10, and         Remeine 10, and         Remeine 10, and         2         1         2         2         1         2         2         1         2         2         2         2         2         2         2         2         2         2         2         <			auture Co-creation	Syun-Ichiro OSHIMA, Others	Lecture		-	3	1,2		Omnibus	
Old         Unitability         Data				Osamu MIURA	Lecture		7		7			
Old         Lucture Log         Lucture Log <thlucture log<="" th=""> <thluc< td=""><td></td><td></td><td>ular Biology</td><td>Maki TERAMOTO</td><td>Lecture</td><td></td><td>2</td><td></td><td>-</td><td></td><td></td><td></td></thluc<></thlucture>			ular Biology	Maki TERAMOTO	Lecture		2		-			
Old         Annual Sup of Sant Extramoulu and Plantiny Santo         Value Name         Column         Calue         C         I         C           1091         Annual Sup of Sant Extramoulu and Plantiny Santo         Tataha WARN         Eartier         C         1         1         2         1         1         2           1091         Annual Sup of Santa Santo         Eartier         Eartier         Eartier         2         1         1         2         1         1         2           1091         Annual Santa Santo         Eartier         Eartier         Eartier         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2<	L		sa	Kazuhiko YAMADA	Lecture		7		7			
Dirth         Dira ULANOVA         Lecture         2         1         2           Dirth         Annone Mark print         Imm ULANOVA         Lecture         2         1         2           Dirth         Annone Mark print         Exercite         2         1         2         1         2           Dirth         Annone Mark print         Exercite         2         1         2         1         2           Dirth         Dirth         Exercite         2         1         2         1         2           Dirth         Dirth         Dirth         Dirth         Dirth         2         1         1           Dirth         Dirth         Dirth         Dirth         Dirth         Dirth         2         1         1           Dirth         Dirth <thdirth< th=""> <thdirth< th="">         Dirth&lt;</thdirth<></thdirth<>		19044 Advanced &udy on E	Earth, Environmental, and Planetary Science	Yoshiro NISHIO	Lecture		2	1	7			
10001         Channel Machine         Caretion			Natural Product Biosynthesis	Dana ULANOVA	Lecture		2	-	2			
1000         Montenel Iligioaction         Continue Cology			harmacology	Takushi NANBA	Lecture		2	-	-			
Obsil         Control Regionering         Contro Regionering         Con			tesource Geology	Go-Ichiro URAMOTO	Lecture		2		2			
Option         Advanced Static for Control Static for Con			emistry	Tomoyo OKUMURA	Lecture		2	-	-			
1037         Placentioning of California         Marine MURAYAM         Larme         2         1         1           1036         Productioning of California         Technic Marine         Technic Marine         2         1         1           1036         Annuel Benfintmatic         Technic Marine         Technic Marine         2         1         1           1036         Annuel Benfintmatic         Technic Marine         Exercise Marine         2         1         2         1         2           1039         Annuel Regione         Binoli VICA         Exercise Marine         Exercise Marine         2         1         2         1         2           1039         Annuel Regione         Marine Regione         Marine Regione         Marine Regione         2         1         2         1         2           1030         Annuel Regione         Marine Regione         Marine Regione         Marine Regione         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2		_	Environmental Magnetism								Not Offer this year	
1001         Contact biology         Letter         2         1         1           1001         Ansaced Biology         Letter         2         1         2         1         1           1001         Ansaced Biology         Ansaced Biology         Letter         2         1         1         2           1001         Ansaced Biology         Ansaced Biology         Letter         2         1         1         2           1001         Ansaced Biology         Ansaced Biology         Letter         2         1         1         2           1001         Ansaced Biology         Ansaced Station         Biology         Ansaced Station         Letter         2         1         1         2           1001         Ansaced Station         Biology         Ansaced Station         Letter         2         1         1         2           1001         Ansaced Station         Biology         Masaced Station         Letter         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1<			Changes in the Ocean	Masafumi MURAYAMA	Lecture		2					
9006         Antonene Blainformitististi         Tension SAKIRM         Lettine         2         1         2           9109         Antonenet Blainformitististi         Tension SAKIRM         Extine         2         1         2           9109         Antonenet Blainformitististi         Extine         2         1         2         1         2           9109         Antonenet Stevines and Environments         Extine         2         1         2         1         2           9109         Antonenet Stevines and Environments         Extine         2         1         2         1         2           9100         Apartie E trubitioner Ficines         Extine         2         1         2         1         2           9100         Apartie E trubitioner Stevines         Extine         2         1         2         1         2           9100         Antoned Stevine         Biopsil Antone Stevine         Synth Antone Stevine         Synth Antone Stevine         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1				Yuki MORONO	Lecrure		7	-	-			
9007         Advanced Study of Adminict Writolgy         Reizo MAXAMI         Lecture         2         1         2           9109         Monuced Study of Adminict Writolgy         Haryuki VRBT/MAX         Lecture         2         1         2           9109         Monuced Study or adminict miteral resources and Environments         Expression         2         1         1           9107         Advanced Studies on Minict Resource Science         Expression         Exercise         2         1         1           9100         Advanced Studies on Minict Resource Science         Exercise         2         1         1         2           9100         Advanced Studies on Minict Resource Science         Montal Minict Resource Science         Montal Minict Resource Science         2         1         1           9100         Advanced Studies on Minict Resource Management         Exercise         2         1         1         2           9101         Advanced Studies on Caucieen Prophation Biology         Montal Minist Min			natics	Tetsuya SAKURAI	Lecture		2	-	2			
9108         Advanced Bhysical Oberangenyby on the Kunshlo.         Horvaid Mysical Oberangenyby on the Kunshlo.         Horvaid Mysical Oberangenyby on the Kunshlo.         Horvaid Mysical Oberangenyby on the Kunshlo.         1         1           91070         Manued Buyio Saffore minuel Feorores: and Bayriometal.         Go (TANI, Others         Lecture         2         1         1           91070         Manued Bartio Resources: Minue			Aquatic Virology	Keizo NAGASAKI	Lecture		2		7	LSG		
10000         Advanced Sauly on Scalloor minent isconces and Drivionnets.         1 <th1< td="" th<=""><td></td><td></td><td>Oceanography on the Kuroshio</td><td>Hiroyuki YORIT AKA</td><td>Lecture</td><td></td><td>2</td><td></td><td></td><td>moa</td><td></td><td></td></th1<>			Oceanography on the Kuroshio	Hiroyuki YORIT AKA	Lecture		2			moa		
1070         Advanced Studie on Marine Resource Science         Cyo IT ANI, Ohises         Letture         2         1         1.2           10800         Advanced Study on Living Marine Resource Science         Gyo IT ANI, Ohises         Letture         2         1         1           10900         Advanced Study on Living Marine Resource Mangament         Henyaki MATSIDA         Letture         2         1         2           19010         Advanced Study on Living Marine Resource Mangament         Henyaki MATSIDA         Letture         2         1         2           19103         Advanced Study on Living Marine Resource Mangament         Henyaki MATSIDA         Letture         2         1         1           19103         Advanced Environmental Physiology of Amatine Resource Mangament         Environmental Resource Mangament         Environmental Resource Mangament         1         1         2         1         1         2           19103         Advanced Environmental Physiology of Amatine Resource Mangament         Study is NIRBO         Letture         2         1         1         2         1         1         2           19103         Advanced Environmental Relay on Vegetine Resource Mangament         Study is NIRBO         Letture         2         1         1         2         1 <td< td=""><td></td><td>19099 Advanced Study on 5</td><td>Seafloor mineral resources and Environments</td><td></td><td></td><td></td><td></td><td>-</td><td></td><td>9 gui</td><td>Not Offer this year</td><td></td></td<>		19099 Advanced Study on 5	Seafloor mineral resources and Environments					-		9 gui	Not Offer this year	
10005         Aquatic Evolutionary Ecology         Instance         Inst			Marine Resource Science	Gyo ITANI, Others	Lecture		7	-	1,2	ŝuo	Omnibus	
10006         Advanced Benthology         Lecture         2         1         2           10006         Advanced Benthology         Montaced Benthology         Lecture         2         1         2           10008         Montaced Environmental Physiology of Atimak Living in the Ocean Ecosystem         Sem-Holino OSHIMA         Lecture         2         1         1         2           10018         Advanced Environmental Physiology of Atimak Living in the Ocean Ecosystem         Sem-Holino OSHIMA         Lecture         2         1         1         2           10013         Advanced Environmental Physiology of Atimak Living in the Ocean Ecosystem         Storbit KUBOTA.         Lecture         2         1         1         2           10013         Advanced Environmental Physiology of Atimak Living in the Ocean Ecosystem         Storbit KUBOTA.         Lecture         2         1         1         2           10020         Advanced Econonics         Ecotime         Storbit KUBOTA.         Lecture         2         1         1         2         1         1         2           10020         Advanced Sevienconnics         Mana ROR         Lecture         2         1         1         2         1         1         2         1         1         1			y Ecology	Masanori HIRAOKA	Lecture		2			ləd		
9007         Advanced Subj on Living Marine Resource Mangement         Hirrywisi MATSIDA         Lecture         2         1         2           19008         Molecular Coll Biology         Sym-Living inthe Cosena Ecosystem         Sym-Living inthe Cosena Ecosystem         Sym-Living inthe Cosena Ecosystem         2         1         1         2           19018         Advanced Evolution Biology         Toshiya KISHIRO         Lecture         2         1         1         2           19013         Advanced Evolution Biology         Toshiya KISHIRO         Lecture         2         1         1         2           19013         Advanced Evolution         Sup of the Regional Environment         Tenyuki SHIBO         Lecture         2         1         1         2           19023         Advanced Evolution         Sup of the Regional Environment         Tenyuki SHIBO         Lecture         2         1         1         2         1         1           19023         Evolution Stanter         Lecture         Stanter         Lecture         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         2         1         1         1         <		19006 Advanced Bentholog	gy	Gyo ITANI	Lecture		2	-	7	mor		
10008         Molocalar Cell Biology         Joun-Intrino         Joun-Intrintrino         Joun-			Living Marine Resource Management	Hiroyuki MAT SUDA	Lecture		2	-	2	ւլ եր		
10012     Advanced Environmental Physiology of Animala Living in the Ocean Ecosystem     1 object			gy	Syun-Ichiro OSHIMA	Lecture		2	1	-	ow		6 credits or more
10013         Advanced Sudis on Cetacean Population Biology         Toshiya KISHIRO         Lecture         2         1         1.2           10019         Advanced Sudi Econom: Sudy of the Regional Ervironment         Sua TANAKA         Lecture         2         1         1         2           10019         Advanced Tropical Sul Econom: Sudy of the Regional Ervironment         Suo at TANAKA         Lecture         2         1         1         2         1         1           10920         Paveloping Economics Sulf Economics Sulf Conomics         Suo stil KUBOTA, Others         Lecture         2         1         1         1           10931         Advanced Heath Science and Natrition         Suo stil KUBOTA         Lecture         2         1         1         1           10933         Economics in Kuroshio Region         Mina HORI         Lecture         2         1         1         1           10933         Environmental History in Kuroshio Region         Mina HORI         Lecture         2         1         1         1           10935         Environmental History in Kuroshio Region         Mina HORI         Lecture         2         1         1         1           10935         Environmental History in Kuroshio Region         Nonice Heapine		19012 Advanced Environm	nental Physiology of Animals Living in the Ocean Ecosystem							10 21	Not Offer this year	
1901         Advanced Tropical Sui Ecology         Sui TANAKA         Leture         2         1         2           1902         Advanced Economic Sudy of the Regional Environment         Teruyuk SHINBO         Leture         2         1         1         2           1902         Advanced Economic Sudy of the Regional Environment         Suoshi KUBOTA Others         Leture         2         1         1         2           1903         Advanced Economics of Less Favoration         Suoshi KUBOTA         Leture         2         1         1         1           1903         Advanced Bauky on Vegetation         Mina HORI         Leture         2         1         1         1           1903         Fabrices Sciecconomics of Less Favoration Economics of Less Favoration         Mina HORI         Leture         2         1         1         1           1903         Fabrices and Nurrition         Mina HORI         Leture         2         1         1         1           1903         Envicomental History in Kuroshio Region         Mina HORI         Leture         2         1         1         1           1903         Envicomental History in Kuroshio Region         Mina HORI         Leture         2         1         1         2         1<		19013 Advanced & udies on	Cetacean Population Biology	Toshiya KISHIRO	Lecture		2	-	1,2	ibər		
1902         Advanced Economic Study of the Regional Environment         Tenyuki SHINBO         Lecture         2         1         1           1902         Developing Economics         Stroshi KUBOTA, Others         Lecture         2         1         1.2           1902         Developing Economics         Advanced Heath Science and Nutrition         Stroshi KUBOTA         Lecture         2         1         1           1903         Advanced Heath Science and Nutrition         Stroshi KUBOTA         Lecture         2         1         1           1903         Advanced Heath Science and Nutrition         Stroshi KUBOTA         Lecture         2         1         1           1903         Evononces of Less Favorable Areas         Monoki HIGA         Lecture         2         1         1           1903         Evononcencins in Kunobito Region         Motoki HIGA         Lecture         2         1         1           1905         Advanced Rauy on Science and Technology in Kunobita         Yashi KUBOTA         Lecture         2         1         1           1905         Advanced Rauy on Science and Supty on Floritica Rauto         Yashi KUBOTA         Lecture         2         1         1           1905         Advanced Rauty of Floritore Rauto of Floritica Rauto Rauto		19019 Advanced Tropical 5	Soil Ecology	Sota TANAKA	Lecture		2	-	2	5 ¥		
1902         Developing Economics         Lecture         2         1         1.2           1903         Economics of Less Favorable Areas.         stroshi KUBOTA, Others         Lecture         2         1         1.2           1903         Economics of Less Favorable Areas.         stroshi KUBOTA         stroshi KUBOTA         Lecture         2         1         1           1903         Advanced Heath Science and Nutrition         stroshi KUBOTA         Lecture         2         1         1           1903         Advanced Heath Science and Nutrition         Mina HORI         Lecture         2         1         1           1903         Evonomental History Vegata in Lucksope         Motoki HIGA         Lecture         2         1         1           1905         Advanced Sady on Environmental Ethics         Motoki HIGA         Lecture         2         1         1           1905         Advanced Sady on Environmental Ethics         Yasakzu SATAKE         Lecture         2         1         2           1905         Advanced Sady on Fish Ecology         Advanced Sady of Fish Ecology         Yasakzu SATAKE         Lecture         2         1         1           1905         Advanced Sady of Fish Ecology         Advanced Sady of Fish Ecology         Y		19020 Advanced Economic	: Study of the Regional Environment	Teruyuki SHINBO	Lecture		2	-	-	earn		
19023         Economics of Lass Favorable Areas         19023         Economics of Lass Favorable Areas         19033         Advanced Health Science and Nutrition         1         Name           19033         Advanced Health Science and Nutrition         stools (KUBOTA         Lecture         2         1         1           19033         Environments in Kuroshio Region         Mina HOKI         Lecture         2         1         1           19043         Fisheries Socioeconomics in Kuroshio Region         Motoki HIGA         Lecture         2         1         1           19043         Fisheries Socioeconomics in Kuroshio Region         Motoki HIGA         Lecture         2         1         1           19054         Advanced Rauy or Flysical Fitnes and Sports Medicine         Yasuk XATAE         Lecture         2         1         1           19055         Advanced Rauy or Flysical Fitnes and Sports Medicine         Atsum YUKI         Lecture         2         1         1           19056         Advanced Rauy or Flysical Fitnes and Sports Medicine         Atsum YUKI         Lecture         2         1         1           19056         Advanced Rauy of Flysical Fitnes and Sports Medicine         Atsum YUKI         Lecture         2         1         1           19056 <td></td> <td></td> <td>lics</td> <td>Satoshi KUBOT A, Others</td> <td>Lecture</td> <td></td> <td>2</td> <td>-</td> <td>1,2</td> <td>o I</td> <td>Omnibus</td> <td></td>			lics	Satoshi KUBOT A, Others	Lecture		2	-	1,2	o I	Omnibus	
19033         Advanced Health Science and Nutrition         Strong KuBOTA         Lecture         2         1         1           19043         Fisheries Socioeconomics in Kuroshio Region         Mina HORI         Lecture         2         1         1           19043         Fisheries Socioeconomics in Kuroshio Region         Mina HORI         Lecture         2         1         1           19043         Environmental History in Kuroshio Region         Moroki HIGA         Lecture         2         1         1           19054         Advanced Study of Physical Fitness and Sports Medicine         Ningo XAIKE         Lecture         2         1         2           19055         Advanced Study of Physical Fitness and Sports Medicine         Ningo XAIKE         Lecture         2         1         1           19056         Advanced Study of Physical Fitness and Sports Medicine         Ningo XAIKE         Lecture         2         1         1           19056         Advanced Study of Physical Fitness and Sports Medicine         Nistaru SVITAKE         Lecture         2         1         1           19056         Advanced Study of Physical Fitness and Sports Medicine         Yasharu SVITAKE         Lecture         2         1         1           19050         Advanced Study of Plan	_		Favorable Areas							veed	Not Offer this year	
19043       Fisheries Socioeconomisi in Kuroshio Region       Mini HORI       Lecture       2       1       1         19045       Advanced Study on Vegetation Landscape       Motoki HIGA       Lecture       2       1       1         19045       Advanced Study on Vegetation Landscape       Motoki HIGA       Lecture       2       1       2         19054       Advanced Ragional Ocension Regional       Shingo AKAIKE       Lecture       2       1       2         19055       Advanced Ragional Ocension Regional Ocension Regional Ocension Regional Ocension       Yasukau SATAKE       Lecture       2       1       1         19056       Advanced Study of Physical Fitness and Sports Medicine       Atsumuted Study of Physical Fitness and Sports Medicine       Atsumuted Study of Physical Fitness and Sports Medicine       2       1       1         19056       Advanced Study of Physical Fitness and Sports Medicine       Atsumuted Study of Physical Fitness and Sports Medicine       2       1       1         19056       Advanced Study of Physical Fitness and Sports Medicine       Atsumuted Study of Physical Fitness and Sports Medicine       2       1       1         19050       Advanced Study of Physical Fitness and Sports Medicine       Yasukaru SAKATA       Lecture       2       1       2         19050	-		ience and Nutrition	Satoshi KUBOT A	Lecture		2	-	-	ĩ		
19045         Advanced Study on Vegetation Landscape         Motoki HIGA         Letture         2         1         1           19033         Environmental History in Kuroshio Region         Shingo AKAIKE         Letture         2         1         2           19053         Environmental History in Kuroshio Region         Shingo AKAIKE         Letture         2         1         2           19054         Advanced Rauy on Environmental Ethics         Yasukau SATAKE         Lecture         2         1         1           19055         Advanced Rauy on Environmental Ethics         Assamu VUKI         Lecture         2         1         1           19056         Advanced Rauy on Fish Ecology         Hiroraka DOHO         Lecture         2         1         1           19056         Advanced Rauy on Fish Ecology         Hiroraka DOHO         Lecture         2         1         1           19056         Advanced Rauy or Fish Ecology         Education         Misukaru SAKATA         Lecture         2         1         2           19050         Advanced Rauy or Fish Ecology         Yasukaru SAKATA         Lecture         2         1         2           19052         Study or Environment and Health Science         Misukaru SAKATA         Lecture			omics in Kuroshio Region	Mina HORI	Lecture		7	-	-			
J0053         Environmental History in Kuroshio Region         Singo AKAIKE         Lecture         2         1         2           10054         Advanced Study on Environmental Ethics         Yasakzu SATAKE         Lecture         2         1         2         1         2           10054         Advanced Rug on Environmental Ethics         Yasakzu SATAKE         Lecture         2         1         1           10055         Advanced Rug on Environmental Ethics         Yasakzu SATAKE         Lecture         2         1         1           10056         Advanced Study of Physical Fitness and Sports Medicine         Atsumu VUKI         Lecture         2         1         1           10050         Advanced Study on Fish Ecology         Volei NAKAMURA         Lecture         2         1         1           10058         Advanced Study on Fish Ecology         Volei NAKATA         Lecture         2         1         2           10053         Advanced Study on Fish Ecology         Mitsukzus SKATA         Lecture         2         1         2           10053         Advanced Study on Fish Ecology         Mitsukzus SKATA         Lecture         2         1         2           10053         Study on Environment and Health Seinec         Mitsukzus SKATA			Veget at ion Landscape	Motoki HIGA	Lecture		2	-	-			
19054         Advanced Suty on Environmental Ethics         Yasukaru SAT AKE         I         I           19055         Advanced Regional Geography         Yasukaru SAT AKE         Lecture         2         1         1           19056         Advanced Regional Geography         Yasukaru SAT AKE         Lecture         2         1         1           19056         Advanced Ruy of Physical Fitness and Sports Medicine         Atsumu VUKI         Lecture         2         1         1           19060         Advanced Ruy on Science and Technology Education         Hirotaka DOHO         Lecture         2         1         1           19058         Advanced Ruy on Fish Ecology         Vohei NAKAURA         Lecture         2         1         2           19058         Advanced Ruy or Fish Ecology         Mitsukaru SAKATA         Lecture         2         1         2           19053         Ruy on Environment and Health Scince         Mitsukaru SAKATA         Lecture         2         1         2           19023         Study on Environment and Health Scince         Motomi KATO         Lecture         2         1         2           19029         Study on Environment and Health Scince         Motomi KATO         Lecture         2         1         2			ory in Kuroshio Region	Shingo AKAIKE	Lecture		2	-	2			
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												14 creates

# (2) Curriculum Map

DC 3				Advanced Study on Future Co-creation	Doctoral Doctoral Dissertation Review Final Examination Getting Degree
DC 2	Dissertation Research	Common Subjects	Kuroshio Science Special Exercise	•Special Exercise	Kuroshio Science Course Subjects         Field Science       Kuroshio Science Course Subjects         -Advanced Study on Vegetation Landscape       -Advanced Bernhology         -Advanced Bernhology       -Advanced Bernhology         -Advanced Bernhology       -Advanced Bernhology         -Advanced Environmental Physiology of Animals Living in the Ocean Ecosystem       -Advanced Environmental Physiology         -Advanced Environmental Physiology       -Advanced Environmental Physiology         -Advanced Study of Plant Genetic Resources       Socioeconomics in the Ocean Ecosystem         -Advanced Study of Plant Genetic Resources       Socioeconomics in Kuroshio Regional         -Advanced Study of Plant Genetic Resources       Socioeconomics in Kuroshio Regional         -Advanced Study of Physical Figures and Sports       -Advanced Economics in Kuroshio Region         -Advanced Health Science       -Advanced Study on Environmental Ethics         -Advanced Study on Mutidisciplinary Science       -Advanced Study on Living Marine Resource         -Advanced Study on Mutidisciplinary Science       -Advanced Study on Living Marine Resource
DC 1				<ul> <li>Advanced Study on Kuroshio Science</li> <li>Kuroshio Seminar</li> <li>Kuroshio Seminar</li> <li>Scientific Literacy</li> <li>Scientific Literacy</li> <li>Advanced Study of Socioeconomic Research</li> <li>Advanced Study on Ecological and Environmental Field Surveys</li> <li>Advanced Study of Material Analysis Technique</li> </ul>	Marine Resource Science Course Subjects         Marine Resource Science Course Subjects           Field Science         - Advanced Study on Fish           - Advanced Study on Earth, Environmental, and Planetary Science         - Advanced Study on Veg           - Advanced Study on Earth, Environmental, and Planetary Science         - Advanced Study on Veg           - Advanced Study on Seafhoor Mineral Resources and Environments         - Advanced Benthology           - Advanced Study of Pharmacology         - Advanced Environments           - Marine Biodiversity         - Advanced Study of Planmacology           - Advanced Study of Pharmacology         - Advanced Study of Planmacology           - Advanced Study of Pharmacology         - Advanced Study of Planmacology           - Advanced Study of Pharmacology         - Advanced Study of Planmacology           - Advanced Study of Pharmacology         - Advanced Study of Planmacology           - Advanced Study of Pharmacology         - Advanced Study of Planmacology           - Advanced Study on Natural Product Biosynthesis         - Advanced Study of Planmacology           - Advanced Study of Natural Product Biosynthesis         - Advanced Study of Planmacology           - Advanced Study on Natural Product Biosynthesis         - Advanced Study of Planmacology           - Advanced Study on Natural Product Biosynthesis         - Advanced Study of Planmacology           - Advanced Study on Natu

# I-3. Class Overview

# (1) Credits Required for Completing the Doctoral Course

Compulsory subjects				Elective subjects	Total
				Required	required
Advanced Study on Kuroshio Science		1 credit			
Kuroshio Seminar		1 credit			
Special Exercise		1 credit			
Kuroshio Science Special Exercise		2 credits	6 credits more		
Scientific Literacy		1 credit	(At least 4 credits from	14 credits or more	
Advanced Study of Socioeconomic Research	2 subjects	$\langle$	1 credit	affiliation course)	
Advanced Study on Ecological and Environmental Field	l Surveys		1 credit		
Advanced Study of Material Analysis Technique		1 credit			
Subtotal			8 credits		

# (2) Course Common Subjects

# 1) Compulsory Subjects

# Advanced Study on Kuroshio Science (Code: 19500)

The Advanced Study on Kuroshio Science is an omnibus lecture series given by faculty from a number of fields from which students gain broad knowledge and points of view about issues of the Kuroshio Region.

# Kuroshio Seminar (Code: 19600)

The Kuroshio Seminar helps students develop presentation and discussion skills through presentations of research during the master's program and dissertation research plans for PhD degree. As well as improving self-expression by trying to get researchers from other fields to understand the content of their own presentations, students enhance their ability to participate in discussions and arguments on research presentations in other fields.

#### Special Exercise (Code: 19700)

The Special Exercise is the interim presentations of dissertation research. Through presentations and discussion of research progress, students organize their references and bring into focus the direction of research, as well as improve presentation and discussion skills.

#### Kuroshio Science Special Exercise (Code: 19410)

In order to acquire the manners, methods and skills as a researcher, students will learn a series of thesis creation processes, that is, formulating and presenting research plans, organizing and reporting the progress of study for each semester, and reviewing interim presentations.

#### Scientific Literacy (Code: 19401)

Learn the ethics and information security, the importance of data analysis using appropriate statistical methods, and the significance of disseminating information to society based on scientific evidence.

#### 2) Elective Compulsory Subjects

#### Advanced Study of Socioeconomic Research (Code: 19403)

Students will learn the basics of socio-economic science, such as observation of case studies and survey methods of sustainable use of natural and environmental resources by local communities, using the mountainous area in Kochi Prefecture as a subject.

# Advanced Study on Ecological and Environmental Field Surveys (Code: 19404)

Acquire basic techniques of field science in the marine and land areas, using the coastal area, farmland and forests of Kochi as fields.

#### Advanced Study of Material Analysis Techniques (Code: 19405)

Using natural resources and agricultural, forestry and fishery products from Kochi Prefecture as samples, learn the outline of the analysis and analysis process using equipment, and acquire the basics of experimental protocol creation techniques and the basics of experimental science.

#### 3) Elective Subjects

#### Advanced Study of Future Co-creation (Code: 19402)

This subject is offered as a participatory lecture in cooperation with members of the "Center for Education and Research for Hope-Emergence". Students will learn the thoughts and needs of society and business and independently explore ways to contribute to the development of local communities and the economy while optimizing the use of resources in the real world and preserving the environment.

#### (3) Marine Resource Science Course Subjects

These subjects will train advanced professionals in the field of "Marine Resource Science in Kuroshio Region," who will explore the unutilized (micro) biological resources and seafloor mineral and energy resources which extend from the Kuroshio Current coastal area to the deep sea floor, and investigate their origins and functions and how to use them effectively. Furthermore, they will be well-versed in environmental preservation and have knowledge of the law.

# Marine Biodiversity by Osamu MIURA (Code: 19002)

There are diverse marine species in Kuroshio region. Molecular genetics is an important tool to elucidate the ecology and evolution of these marine species. In this class, you will read three papers on molecular genetics and answer the questions. Prior knowledge on evolutionary ecology and molecular genetics (master level, at least) is required. Students in my lab or in associated fields are welcome to register. Otherwise, please contact me (miurao@kochi-u.ac.jp) before the registration. The class will be conducted by "ONLINE" using Moodle site.

# Principles of Molecular Biology by Maki TERAMOTO (Code: 19041)

For research in molecular biology, we can use various techniques without knowing the underlying principles behind the techniques. In this class, students learn such principles involved in commonly used techniques as well as in latest techniques. These techniques contain those for gene cloning, gene expression and gene functional analysis. In each class, students are expected to give presentations for the topics. Afterwards, we will discuss the topics and deepen understanding.

#### Instrumental Analyses by Kazuhiko YAMADA (Code: 19042)

This lecture introduces the fundamentals and recent applications of instrumental analyses, including nuclear magnetic resonance (NMR), magnetic resonance imaging (MRI), X-ray diffraction, mass spectroscopy, and electron microscope, to organic chemistry, biochemistry, and material sciences. The purpose of this lecture is to understand standard techniques for analyzing various phenomena in science, agriculture, and medical research fields at a molecular level.

#### Advanced Study on Earth, Environmental, and Planetary Science by Yoshiro NISHIO (Code: 19044)

Nature provides us "resources" and "disaster". In this lecture, Earth, Environmental, and Planetary Science will be explained as essential knowledge to utilize the resources (water, mineral, energy, and etc.) and to reduce the damage from disasters (earthquake, volcanic activity, and etc.) in the Kuroshio Current area.

#### Advanced study on natural product biosynthesis by Dana ULANOVA (Code: 19047)

Natural products are an important source of clinically useful drugs. Detailed knowledge of how producing organisms synthesize these compounds is essential for improvement of their bioactive properties and also for discovery of new natural products. In this lecture the biosynthetic principles of main natural product groups will be explained with a special focus on products of the marine origin. We will also discuss recent approaches for manipulation of biosynthetic genes to yield new bioactive compounds.

#### Advanced study of Pharmacology by Takushi NANBA (Code: 19048)

The molecular mechanism of the effect of medicines, such as Aspirin, Penicillin, etc. in the cell level and whole body level will be discussed. The methods of development of new medicine and the leading edge of pharmacological research will also be discussed.

#### Advanced mineral resource geology by Go-Ichiro URAMOTO (Code: 19050)

Ferromanganese minerals are widely distributed in subseafloor sediments and on the seafloor in oceanic abyssal plains. Assessing their formation and preservation is important for understanding the global marine manganese cycle and associated trace elements. In this lecture, principles of earth surface systems for the formation and preservation of deep-sea ferromanganese minerals will be explained with a special focus on biological evolution and climate changes.

#### Advanced Biogeochemistry by Tomoyo OKUMURA (Code: 19051)

On a life-filled earth, biological activities and the environment interact on various scales. In this lecture, we will focus on the chemical cycles of carbon, oxygen, sulfur, and nitrogen, etc., learn a wide range of biogeochemical processes throughout the history of the earth, and aim for an integrated understanding of the earth system.

#### Paleoenvironmental changes in the ocean by Masafumi MURAYAMA (Code: 19057)

This course introduces oceanographic processes active at the Earth's surface and their relationships to most aspects of the Earth's overall environment from the past. The paleoceanographic processes including oceanic circulation, biogeochemical cycles and climate dynamics are examined based on the isotope geochemical evidence.

### Geomicrobiology by Yuki MORONO (Code: 19061)

This lecture handles microbial life mainly living beneath the seafloor, extreme habitat for life. What is the extent of the biosphere on/in Earth, how the life adapts and evolve to/in their surrounding environments will be reviewed. Also the life itself will be discussed.

# Advanced Bioinformatics by Tetsuya SAKURAI (Code: 19096)

Bioinformatics is an interdisciplinary research field used for in silico analyses of biological data using mathematical and statistical techniques. In this lecture, I hope to explain analyses of genome or transcriptome data, as well as an understanding of gene prediction and functional annotation. Prior knowledge on molecular biology (master's level, at a minimum) and some programming expertise (preferably in Perl) are prerequisites.

#### Advanced study of Aquatic Virology by Keizo NAGASAKI (Code: 19097)

In any aquatic environments, the most abundant biological entites are "viruses". In the ocean, the number of virus particles are estimated at 10E30. Hence, researchers' enthusiastic interest is located in their roles in marine environments. At this class, diversity, function, and ecological roles of aquatic viruses are plainly explained. Discussion on the raison d'être for viruses will be conducted.

#### Advanced Physical Oceanography on the Kuroshio by Hiroyuki YORITAKA (Code: 19098)

The Kuroshio that is a western boundary current of North Pacific Subtropical Gyre is driven by the wind system of the wide area in the North Pacific. I explain the variation of the Kuroshio, and the impact of the Kuroshio on the coastal ocean condition.

#### (4) Kuroshio Science Course Subjects

The principal objective of the comprehensive, interdisciplinary Kuroshio Science course is the education through integrating and providing an overall perspective of a number of specialist fields. The course focuses on resources, environment and society, medical health science, food and nursing pertaining to the extensive regions and marine areas (hereinafter, Kuroshio Region) extending from the countries and regions of Southeast Asia to East Asia. Kuroshio Science aspires to promote education and capable people in the following ways:

- To train researchers and educators to possess a high level of expertise in various fields related to coastal ecosystems, including both marine and terrestrial ecosystems, local communities and regional development as well as knowledge of and perspective on different fields
- To train new types of researchers and educators who gain an understanding of the new concept that is Kuroshio Science and possess a broad global perspective
- To provide capable people who lay a foundation based on Kuroshio Science with a broad global perspective, as well as who can play an active part in regional industry and the business community

#### Aquatic Evolutionary Ecology by Masanori HIRAOKA (Code: 19005)

This lecture introduces the latest phylogenetic and ecological studies for algae being important producers in tidal flat or rocky shore along the seashore. Algae include multifarious taxa which have evolved by symbiosis of photosynthetic bacteria and ameba like organisms. We learn the life diversity from morphology, physiology and life histories in various algal taxa. The discussion about relationships of each alga to environments would lead us to understand fishery and environmental managements more deeply.

## Advanced Benthology by Gyo ITANI (Code: 19006)

We will study biodiversity and ecological role of marine benthos. Topics include taxonomy and systematics of marine benthos, adaptation to benthic environment, species interactions, and community ecology of tidal flats.

#### Advanced Study on Living Marine Resource Management by Hiroyuki MATSUDA (Code: 19007)

I explain ecosystem management, sustainable use, risk assessment, adaptive management, definition of threatened species, fisheries impact assessment, ecological footprint, and mathematical models for these issues. I also explain several case studies, extinction risk and stock recovery plan on southern bluefin tuna, hypotheses of sardine-anchovy-mackerel stock fluctuation.

# Molecular Cell Biology by Syun-Ichirou OSHIMA (Code: 19008)

Knowledge about virus-cell interactions has been obtained through studies with various models for virus infection, and contributes to molecular cellbiology. The focus of this subject is the understanding of the mechanisms by which viral gene products manipulate key host cell molecules involved in signal transduction to virus replication and pathogenicity.

## Advanced Studies on Cetacean Population Biology by Toshiya KISHIRO (Code: 19013)

The present lecture proceeds step by step, the first phase giving a general outline of cetacean (whales, dolphins and porpoises) population biology such as their taxonomy, distribution, life history, and stock management, then the second phase focusing on the case studies of specific cetaceans in Kuroshio and its surrounding regions.

#### Advanced Tropical Soil Ecology by Sota TANAKA (Code: 19019)

Tropical soils, which are a key factor for environmental conservation and sustainable agriculture in the tropics, are discussed from the viewpoint of pedogenetic process, nutrient dynamics, and biological process. The relationship and problems between the life of local people and the conservation and management of soil environment are further discussed.

#### Advanced Economic Study of the Regional Environment by Teruyuki SHINBO (Code: 19020)

We will study regional environmental problems in the Kuroshio Sphere using economics, theoretically and empirically. We regard approaches from micro economics, public economics, and econometrics as important. In particular, we will take up the following topics: (1) the theory of environmental economics, (2) the economic valuation of environmental and natural resources, (3) environmental policy analyses.

#### Advanced Health Science and Nutrition by Satoshi KUBOTA (Code: 19033)

Lecture on basic mechanisms of nutrient metabolism, energy exchange, and body formation and public nutrition for keeping and promoting the health of populations.

#### Fisheries socioeconomics in Kuroshio Region by Mina HORI (Code: 19043)

Towards sustainable fisheries in the Kuroshio region, socioeconomic issues in fisheries such as resource management, fisheries management, fish distribution and tourism in both inland and marine fisheries will be explained using case studies from the region. Considering the world trend in management and conservation, appropriate approach and system for the region will be discussed.

#### Advance study on Vegetation Landscape by Motoki HIGA (Code: 19045)

Plant species distributions at broader scale are mainly determined by climatic factors, and those at finer scale are affected by other non-climatic factors including topography, geology, and human-activities. This class focuses on distribution and dynamics of vegetation, and changes in the structure of vegetation landscapes caused by human-activities in the Kuroshio area. Finally, effective conservation planning of vegetation landscape under the developing and declining societies are also discussed.

## Environmental History in Kuroshio Region by Shingo AKAIKE (Code: 19053)

The rate of Japanese forest is approximately 67% compared to 30% on average of the world. Of all the prefectures in Japan, Kochi has the highest forest rate at 84%. How has this come about? In this lecture, we will clarify this question from historical perspective. Specifically, Students are expected to be able to explain the historical development of "conservation" and "utilization" of the environment in relation to laws, institutions, and technologies. To deepen mutual understanding by discussing between international students.

### Advanced Regional Geography by Yasukazu SATAKE (Code: 19055)

In regional geography, regions are considered to be formed by the interaction of nature and humans and to be constantly changing according to this relationship. The purpose of this class is to systematically study the concept of region and its components and to examine the changes in regions based on them. Specifically, we will study the elements that make up a region, such as nature, economy, and transportation, and deepen our understanding of the interaction of these elements, mainly using the example of regions located in the "Kuroshio Region".

### Advanced study of Physical Fitness and Sports Medicine by Atsumu YUKI (Code: 19056)

Physical fitness is an important factor in the prevention of lifestyle-related diseases and nursing care. In this lecture, we will deepen our understanding of the history of research in physical fitness science, the definition of physical fitness, the effects of physical activity, and health problems of children and the older people.

#### Advanced Study on Science and Technology Education by Hirotaka DOHO (Code: 19060)

In modern society, technology based on science plays an important role in supporting and enriching our lives. In this lecture, we will extract the specific contents of electrical engineering, information science, and manufacturing, and consider the relationship between science and technology and the significance of education that fuses both from the perspective of academic contents and development of teaching materials.

#### Advanced Study on Fish Ecology by Yohei NAKAMURA (Code: 19058)

In this class, I will explain the factors that determine the distribution patterns of fishes on coral reefs and their surrounding ecosystems. I also explain the current status of fish resource decline and various management problems in these ecosystems.

#### Advanced Study of Plant Genetic Resources by Mitsukazu SAKATA (Code: 19059)

Effective use of bioactive natural products is important for promoting human health. It has many rich resources including marine biological resources in the Kuroshio region. In this lecture, we will discuss the current situation and problems of the environmental resources, especially plant genetic resources in the Kuroshio region. In addition, we will explain methods for genetic analysis of these resources and introduce specific examples with the latest and applied research.

#### Advanced Study on Theoretical Biology by Motomi KATO (Code: 19095)

The Kuroshio region includes mountain, river and marine ecosystems. This class focuses on theoretical studies on animal ecology and life science in these ecosystems. It further deals with applied studies on interactions between the ecosystems and ecosystem conservation.

#### (5) Dissertation Research

Dissertation Research is a related series of studies for writing the dissertation and is conducted under the guidance of the supervisor and co-supervisors. Students acquire advanced knowledge and skills in specialist fields and develop into strong inquisitive researchers. Publication of papers in academic journals and presentations at international conferences are required to have a doctoral dissertation accepted for review. (Refer to the implementation guidelines and additional notes regarding the doctoral dissertation review in "III. Getting Degree".) In addition, because the doctoral dissertation is reviewed based on the policy governing the conferral of degrees in III-2. (2) and the evaluation criteria in III-2. (3) below, students should read those sections carefully to make sure they understand them fully.

# I-4. Grading, etc

# (1) Grading

Course grades are given on a 100-point scale, with a score of 60 or higher being considered a passing grade. The grading standards are shown in the table below. The grading method varies depending on the class, so please check the "Grading Method" in the syllabus.

All registered courses are subject to grading and will be graded unless the student cancels the course registration within the designated period.

Pass/fail	Grade	Points	Criteria
	Outstanding	90 to 100 points	Student judged to have understood and grasped the knowledge, skills, and ideas indicated in the achievement goals, and performed far exceeding the standard level of achievement
	Excellent	80 to 89 points	Student judged to have understood and grasped the knowledge, skills, and ideas indicated in the achievement goals, and performed exceeding the standard level of achievement
Pass	Good	70 to 79 points	Student judged to have understood and grasped the knowledge, skills, and ideas indicated in the achievement goals, to have applied them to the prescribed tasks, and performed at about the standard level of achievement
	Passing	60 to 69 points	Although performance is below the standard level of achievement, student judged to have understood and grasped the knowledge, skills, and ideas indicated in the achievement goals
Fail	Fail	59 points or less	Student judged to have not understood and grasped the knowledge, skills, and ideas indicated in the achievement goals, and is not appropriate for credit acquisition

# (2) Grade Appeal System of Kuroshio Integrated Science Program

November 27, 2019 Decision by the Kuroshio Science Program Meeting Partially Amended on December 7, 2021

Appeal System to grades for course subjects offered in the Kuroshio Science Program will be handled as follows.

1. If a student disagrees with their grade or believes that the grading deviates from the achievement objectives and grading criteria as communicated through information from the syllabus and the classes, the student may file an appeal by filling out the form designated by the Program.

With regard to filing appeals, the following points, in particular, should be noted. No appeals may be made against the achievement objectives and grading criteria set by course instructors.

- Submit the form to the administrative staff in Kuroshio Science Office (hereinafter, the administrative staff). In principle, the form must be submitted within five (5) days after grades are announced (excluding Saturdays, Sundays, and holidays; the same shall apply hereinafter).
- 3. If a student raises an objection, an investigation committee consisting of the following three members shall be established.

Chairperson: Chairperson of the Academic Affairs Committee

(If the chairperson of the Academic Affairs Committee is the course instructor, the chairperson shall be appointed by the head of the program)

Committee members: 2 members of the Academic Affairs Committee

(Note that the committee members shall be teachers other than the course instructor and shall be appointed by the chairperson of the Academic Affairs Committee. If the chairperson of the Academic Affairs Committee is the course instructor, the committee members shall be appointed by the head of the program.)

- 4. The investigation committee will conduct an investigation, etc. and prepare a written response. After the response is prepared, it will be reported to and confirmed by the head of the department, and the response will be finalized.
- 5. The content of the written response shall be communicated to the course instructor, and the student shall be notified with the written response. Notification shall be made within seven days of the filing of the objection, in principle.

- 6. If a grade correction occurs as a result of the response, the course instructor shall immediately submit a grade correction request to the administrative staff.
- 7. If the objection is related to the completion of the course and cannot be handled based on the above schedule due to the schedule of completion judgment, a separate schedule will be set and the student will be notified.
- 8. Other matters related to grade appeals will be discussed by the Academic Affairs Committee.