Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Bioecology of Tropical Waters	Semester 1 Credit 3
Key words	Tropical waters, geographical distribution in tropical waters, species interaction, typical tropical ecosystem: mangrove, coral reefs, seagrass, sea weed estuary, hydrology of Pacific and Indian Ocean.	
Professor Lecturer	Prof. Fontje KALIGIS, Dr. MedyOMPi	
Contact Office		
Contact Hours	1300-1600	
Target	To let the student understand: (1) Characteristic of Tropical waters, (2) Geographical distribution in tropical waters, (3) Species interaction, (4) typical tropical ecosystem, mangrove, coral reefs, seagrass, and estuary, (5) Hydrology of Pacific and Indian Ocean.	
Course description	The characteristic of tropical waters bioecology, including species interaction, typical tropical ecosystem will be explained by the professor. Students are requested to search literatures/journals relevant to the explained model and report it.	
Schedule	1. Introduction to the science of ecology and biology of tropical waters 2. Geographical distribution 3. The problem of abundance in tropical waters 4. Species Interaction 5. Conservation Biology 6. Distribution and abundance at community level 7. Ecosystem metabolism 8. Bioecology of mangrove 9. Bioecology of coral reefs 10. Bioecology of seagrass 11. Bioecology of seaweed 12. Bioecology of estuary 13. Bioecology of intertidal area of tropical waters 14. Hydrology of the Pacific Ocean 15. Hydrology of the Indian ocean	
Important items:	Some typical tropical ecosystem will be closely looked on the surrounding local area in Manado bay. Comparison to the temperate waters is important to take into consideration.	
Self-studies and other advices	Homework needs searching and summarizing journal papers and preparing reports on all items of 15 lectures.	
Textbooks	Handout is prepared by the lecturer and students have to find relevant journal papers.	
Requisites to take subject:	unconditional and no prerequisite	
Assessment method	Continues assessment on the basis of reporting and participation the discussion	
Evaluation criteria	Pass if satisfactory reporting and participating into discussions and not less than 60% of classes	
Relevant matters	Lecture will be in English.	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Technology of Capture Fisheries	Semester 1 Credit 3
Key words	Fishing technology, responsible fishing, fishing gear	
Professor Lecturer	Dr. Johnny Budiman Dr. Vivanda Modaso Dr. Alfret Luasunaung	
Contact Office	Fishing Technology Laboratory	
Contact Hours	1300-1600	
Target	To make students understand how to analyze the process of fishing operations and the use of fishing methods.	
Course description	This course discusses the technological of capture fisheries focused on greater and more appropriate fishing methods to reduce negative environmental impacts.	
Schedule	1. Introduction 2. Indonesian fishery management area and its characteristics 3. Current status of capture fisheries in Indonesia 4. Fish behavior (advanced) 5. Electronic instruments and fish detection equipment 6. Fish handling mechanisms 7. Fishing gear selectivity, discard, by catch and ghost fishing 8. Fishing methods	
Self-studies and other devices	Students should search related topics through internet and solve some problems prepared by the lecturer.	
Textbooks	Handout is prepared by the lecturer and students have to find relevant journal papers.	
Requisites to take subj	unconditional and no prerequisite	
Assessment method	Assessment on the basis of report and participation in the discussion	
Evaluation criteria	Pass if satisfactory reporting and participating into discussions and not less than 60% of classes	
Relevant matters	Lecture will be in English.	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Fisheries Vessel Practice	Semester 1 Credit 1
Key words	Fish Behavior, Rumpon, Fish aggregating devices (FAD), plankton net, video sounder, data analysis	
Professor Lecturer	Dr. Johnny Budiman Prof. K.W.A. Masengi Dr. Alfret Luasunaung	
Contact Office	Fishing Technology Laboratory	
Contact Hours	During on-board training	
Target	To understand measuring and operating principles of various devices for oceanographic and FADs observations To collect data and samples in rumpon (FADs) To observation and data analysis for fish school under the “rumpon” (FADs) To practice fishing using tuna hand line	
Course description	This course focused on rumpon (FADs) observation and fishing practice using tuna hand line	
Schedule	1. Introduction (before going on-board)Intro 2. introduction to rumpon (FADs) and fish behaviour 3. Current description of cruise navigation 4. oceanographic data measurements 5. Sample collection using plankton net 6. Observations on fish schooling patterns using video sounder 7. Data Analysis on fish distribution pattern and graph 8. Data analysis on fish catch using tuna hand line	
Important items:		
Self-studies and other devices	Students should search and know various devices and equipment related topics before going on-board.	
Textbooks	Handout is prepared by the lecturer and team	
Requisites’ to take subject:	unconditional and no prerequisite	
Assessment method	Asessment is done on the basis of reporting and participation the discussion.	
Evaluation criteria	Pass if report and participation in the discussions and not less than 60% of classes	
Relevant matters	Lecture will be in English.	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Marine Food Resources	Semester 1 Credit 3
Key words	Marine resources, Marine Food Science, Source of protein, minerals, carbohydrate. Food safety, food poisoning	
Professor	Professor Siegfried Berhimpon Professor I Ketut Suwetja Professor Frans Ijong	
Contact office	Faculty of Fishery and Marine Science, Sam Ratulangi University. Manado, Indonesia. berhimpons@yahoo.com Mobile phone: +62811430567	
Contact hours	Any time by appointment	
Target	To let students to obtain basic knowledge for 1) Marine food resources: sources of protein, carbohydrate, fat, minerals, vitamin, 2) Food crisis, New food resources from sea, 3) Characteristics of seafood, advantages and disadvantages, 4) introduction to Marine food handling and processing, 5) Food and marine pollution, 6) Marine food poisoning, 7) Marine Food Safety.	
Course description	This lecture is conducted by three professors. Each major section is scheduled for one to three days and an additional section is set in the last day to check student's understandings.	
Schedule	1. Introduction to Marine food resources: sources of protein, carbohydrate, fat, minerals, vitamin, Presence depend on cultural, socio economics, ecology (S. Berhimpon) 2. World food crisis, New food resources from sea, potency and technology (S. Berhimpon) 3. Characteristics of seafood and the need for special handling; Advantages and disadvantages (I Ketut Suwetja) 4. Introduction to Marine Food Processing. (S. Berhimpon) 5. Mid Test to check students understanding (Tim) 7. Seafood and Marine pollution: chemical and microorganism, Food safety (F. Ijong) 8. Marine food Poisoning (S. Berhimpon) 9. Marine Exotic Food (S. Berhimpon).	
Important items	To introduce basic understanding of marine food resource and characteristics, and can develop a knowledge to find new food sources.	
Self-studies and other advices	Homework needs reading documents distributed before a class, and writing a paper in a special topic.	
Textbooks	Prepared by the professor each time	
Requisites to take subject:	Unconditional and no prerequisite	
Assessment method:	Multiple choice, essay test, papers	
Evaluation criteria:	Follow the Unsrat criteria	
Relevant matters:	Explanations in English entirely	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Advanced Special Course 1	Semester All (1 & 2) Credit 3
Key words	Independent activity, laboratory and/or field works, tropical fisheries issue.	
Professor	Prof. Dr. Grevo S. Gerung, M.Sc	
Contact Office	Dept. of Marine Science, Faculty of Fisheries and Marine Science	
Contact hours	Monday to Friday (10.00 – 16.00)	
Target	To let the student(s) works independently in laboratory and/or field for a certain topic of tropical fishery science and management.	
Course description		
Schedule	1. Introduction (meeting between professor and student(s); discussion about activities will be carried out) 2. Independent activities by the student(s) 3. Monitoring 4. Evaluation: oral presentation and written report	
Important items	Cases in tropical fishery sciences and management, including community roles.	
Self-studies and other advices	Field and/or laboratory works	
Textbooks	Free	
Requisite to take subject	none	
Assessment method	Oral presentation and written report on a certain topic	
Evaluation criteria	Pass if the activities done as the plan and satisfactory in written report.	
Relevant matters	Communication in English	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Advanced Special Course 2	Semester All (1 & 2) Credit 3
Key words	Independent activity, laboratory and/or field works, tropical fisheries issue.	
Professor	Prof. Dr. Markus T. Lasut	
Contact Office	Dept. of Marine Science, Faculty of Fisheries and Marine Science	
Contact hours	Monday to Friday (10.00 – 16.00)	
Target	To let the student(s) works independently in laboratory and/or field for a certain topic of tropical fishery science and management.	
Course description		
Schedule	1. Introduction (meeting between professor and student(s); discussion about activities will be carried out) 2. Independent activities by the student(s) 3. Monitoring 4. Evaluation: oral presentation and written report	
Important items	Cases in tropical fishery sciences and management, including community roles.	
Self-studies and other advices	Field and/or laboratory works	
Textbooks	Free	
Requisite to take subject	none	
Assessment method	Oral presentation and written report on a certain topic	
Evaluation criteria	Pass if the activities done as the plan and satisfactory in written report.	
Relevant matters	Communication in English	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Marine Pollution and the Health of Marine Life	Semester 2 Credit 3
Key words	Tropical waters, geographical distribution in tropical waters, species interaction, typical tropical ecosystem: mangrove, coral reefs, seagrass, sea weed estuary, hydrology of Pacific and Indian Ocean.	
Professor	Ir. Suzanne Lydia Undap, M.Si., Ph.D and teams.	
Contact Office	Afterclass	
Target	The students will be able to understand the problem of marine pollution, environmental threats and the harmful effects of marine pollution to marine life, especially on tropical species.	
Course description	This course explores the intersections of marine pollution environmental and health concerns in marine life with tropical species as the focus. Emphasis is placed on marine pollution in context: causes and effects, regulations and enforcement. The lecture decribes the major issues and challenges in health of marine life. Students will also attain a basic understanding of the interdependent between marine pollutants and the health of marine life. Finally, students will have group discussions and interpreting field observations.	
Schedule	1. Introductionto the Course (What is the marine pollution environment; sources, types and their impacts; What is the health of marine life, the relationship of marine pollution and health of marine life; regulations.) 2. Pollutions problems of groundwater resources (Common transport processes of pollutants to the marine life). 3. Pollutants (sewage, pesticides, radioactives wastes, biomedical wastes. Oils, metals) 4. Marine oil pollution (What is oil, fate of spilled oil, treatment of oil at marine, dispersant, marine life health risks and damage, case studies. 5. Heavy metals pollution (Characteristics, input and uptake, marine life health risks and damage, case studies) 6. Harmful algae bloom and their managements (Causative marine organisms, impact and relation witheutrophication, case studies) 7. Methodsof pollution surveys. 8. Field observations, student presentation and discussions	
Important items:	Some typical tropical ecosystem will be closely looked on the surrounding local area in Manado bay. Comparison to the temperate waters is important to take into consideration.	
Textbooks	Prepared by lecturers using recent references (such as (textbooks: Marine Pollution by Clark, R.B, 2001; Marine Pollution bulletin etc.)	
Requisites to take subject:	unconditional and no prerequisite	
Assessment method	Continues assessment on the basis of reporting and participation the discussion	
Evaluation criteria	Pass if satisfactory reporting and participating into discussions and not less than 60% of classes	
Relevant matters	Lecture will be in English.	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Tropical Marine Biodiversity	Semester 2 Credit 3
Key words	Marine, Biodiversity, Conservation,	
Professor	Professor Grevo S. Gerung	
Contact Office	Department of Marine Sciece	
Contact Hours	After Class	
Target	To lead students having more perspectives on marine biodiversity to explore how reach the biodiversity in tropical waters especially in coral triangle region	
Course description	The subject gives principles of research methodology for exploration and exploitation of the molecular potentials of marine organisms and remediation of contaminated ecosystem. Gene expression for some important target proteins is emphasized, and some methods on how to explore biological potentials by external and internal manipulation are elaborated as well.	
Schedule	1. Introduction 2. Understanding marine biodiversity 3. Tropical marine region 4. Distribution of tropical marine organism 5. Marine biodiversity in coral triangle region 6. Taxonomical approach on tropical marine biodiversity 7. Species diveristy, Genetic diversity, Ecosystem diversity 8. Conservation of tropical marine organism 9. Marine protected area 10. Laboratory and field Practices	
Important items:	To understand distribution, biodiversity of tropical waters. Taxonomical approach of some marine organism to know the reach of coral triangle region biodiversity. Conservation of marine species, genetic and ecosystem	
Self-studies and other devices	Students should search related lecture topics through internet and answering some problems. Library task.	
Textbooks	Prepared by lecturers using recent references	
Requisites' to take subject:	Unconditional and no prerequisite	
Assessment method	Analysis operation, use of some related laboratory equipments, understanding the principles and submitted report in each time is assessed	
Evaluation criteria	Pass if reports and continuous assessment of participation to practices are not less than 60%. Passing grade is determined according to examination score, assignment and percentage attendance in class	
Relevant matters	Conducted in English (Dictionary is required), Laptop/Computer	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Tropical Aquaculture	Semester 2 Credit 3
Key words	Tropical aquaculture, hatchery, fish farming, shellfish farming, Crustacean farming, overharvest, fish feed,	
Professor Lecturer	Dr. Reiny A. Tumbol.	
Contact Office	Faculty of Fisheries and Marine Science, Jl. Kampus Unsrat Bahu, Manado – 95115. Indonesia	
Contact Hours	After Class	
Target	To provide students with a general understanding of tropical aquaculture, to give a comparative knowledge of the techniques used for culturing various tropical aquatic species and to enable students to understand the environmental demands including aspects of pollution and disease for sustainable aquaculture.	
Course description	The course will focus on rearing of aquaculture species relevant to tropical environment. The description of the course will be described by the professor and the students are required to search for relevant literatures.	
Schedule	1. Introduction 2. Aquaculture principal and practice 3. Feeds and Nutrition 4. Propagation and Hatchery Techniques 5. Genetics and stock improvement 6. Finfish culture 7. Crustacean culture 8. Shellfish culture 9. Production and evaluation Report 10. Aquatic Pathobiology/Diseases of warm water fish 11. Sustainable aquaculture 12. Presentation and discussion 13. Presentation and discussion 14. Exam	
Important items:	Understanding current topics in tropical aquaculture and conduct a project	
Self-studies and other devices	Students should search related lecture topics through internet and answering some problems prepared by each lecturer.	
Textbooks	Prepared by lecturers using recent references	
Requisites' to take subject:	Unconditional and no prerequisite	
Assessment method	Class participation and performance in report writing and final project presentation	
Evaluation criteria	The assessment is based on the attendance of students in class and their participation in the discussion (70%), Submission of the reports (20%), project presentation (10%). Attendance should be not less than 80%.	
Relevant matters	Recent scientific journals preferably with impact factor. Recent related scientific text books)	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Marine Biotechnology	Semester 2 Credit 3
Key words	Molecular potentials, gene expression, target protein, bioactive substances, bioremediation	
Professor Lecturer	Professor Inneke F M Rumengan Assistant Professor StenlyWullur Assistant Professor ElvyLikeGinting.	
Contact Office	Laboratory of Marine Biotechnology, Faculty of Fisheries and Marine Science	
Contact Hours	After Class	
Target	To lead students having more perspectives on biotechnology to explore and exploit molecular potentials of marine bioresources, especially on tropical species.	
Course description	The subject gives principles of research methodology for exploration and exploitation of the molecular potentials of marine organisms and remediation of contaminated ecosystem. Gene expression for some important target proteins is emphasized, and some methods on how to explore biological potentials by external and internal manipulation are elaborated as well.	
Schedule	1. Introduction 2. Perspectives on biotechnological scope 3. Molecular potentials 4. Gene expression for some important target proteins 5. Exploration and exploitation of molecular potentials for developing biomaterials 6. Biological potentials of important marine organisms 7. External manipulation of potential marine organisms 8. Internal manipulation of potential marine organisms 9. Bioremediation 10. Laboratory Practices	
Important items:	To understand molecular potentials and methods to explore them, and to explore by molecular approaches, and to exploit biological potentials by external and internal manipulation.	
Self-studies and other devices	Students should search related lecture topics through internet and answering some problems prepared by each lecturer.	
Textbooks	Prepared by lecturers using recent references	
Requisites' to take subject:	Unconditional and no prerequisite	
Assessment method	Analysis operation, use of some related laboratory equipments, understanding the principles and submitted report in each time is assessed	
Evaluation criteria	Pass if reports and continuous assessment of participation to practices are not less than 60%. Passing grade is determined according to examination score, assignment and percentage attendance in class	
Relevant matters	Conducted in English (Dictionary is required)	

Faculty of Fisheries and Marine Science, Sam Ratulangi University

Subject title	Integrated Tropical Coastal Zone Management	Semester 2 Credit 3
Key words	Integrated tropical coastal zone management, concept tropical coastal planning and management, tropical coastal management and planning techniques, case study of tropical coastal zone management in South-East Asian countries	
Professor	Prof. Markus T. Lasut	
Contact Office	Dept. of Marine Science, Faculty of Fisheries and Marine Science	
Contact hours	Monday to Friday (10.00 – 16.00)	
Target	To let the students understand: the current topic in tropical coastal zone management and to improve ability to overcome the tropical coastal management cases	
Course description		
Schedule	1. Introduction to the course and its requirements 2. Overview of current tropical coastal management issues 3. The imperative of tropical coastal zone management 4. Concept of tropical coastal planning 5. Concept of tropical coastal management 6. Administrative arrangement for tropical coastal planning and management 7. Major tropical coastal management and planning techniques: Administrative aspect 8. Major tropical coastal management and planning techniques: Social aspect 9. Major tropical coastal management and planning techniques: Technical aspect 10. Tropical Coastal Management planning 11. Dynamic of tropical coastal zone management 12. Case study: Bunaken National Park, Indonesia 13. Field trip observation 14. Student presentation 15. Group presentations 16. Overall discussion	
Important items	Cases in tropical coastal zone management and planning in South-East Asian countries, tropical coastal management and techniques.	
Self-studies and other advices	Summarizing journal articles and preparing paper; preparing personal and group presentation; and preparing discussion	
Textbooks	Handout is prepared by the lecturer; textbooks; and relevant journal papers.	
Requisites to take subject	none	
Assessment method	Class participation; performance in paper writing; participation in student and group presentations; participation in discussion	
Evaluation criteria	Pass if satisfactory reporting and participating into presentation and discussion are not less than 80% of classes	
Relevant matters	Conducted in English for all classes	