

STUDY PROGRAM OF AQUATIC RESOURCES MANAGEMENT

Course Chairman : Dr. Ir. Enan M. Adiwilaga
Vice Chairman of Study Program : Dr. Ir. Fredinan Yulianda, M.Sc

Lecturers:

A. Division of Productivity and Aquatic Environment

Dr. Ir. Bambang Widigdo	Ir. Sigid Hariyadi, M. Sc
Dr. Ir. Enan M. Adiwilaga	Majariana Krisanti, S.Pi, M.Si
Dr. Ir. Hefni Effendi, M.Phil	Dr. Ir. Niken TM Pratiwi, M.Si
Prof. Dr. Ir. Kadarwan Soewardi	Dr. Ir. Yusli Wardiatno, M.Sc
Dr. Ir. Kardiyo Praptokardiyo	

B. Division of Ecology and Conservation of Aquatic Resources

Ir. Agustinus M. Samosir, M. Phil	Dr. Ir. Mohammad Mukhlis Kamal, M.Sc
Dr. Ir. Ario Damar, M.Si	Dr. Ir. Fredinan Yulianda, M.Sc
Prof. Dr. Ir. MF Rahardjo, DEA	Dr. Ir. Ridwan Affandi, DEA
Prof. Dr. Ir. Djamar TFL Batu, M.Agr	Dr. Ir. Sulistiono, M.Sc
Dr. Ir. ETTY Riani, MS	Prof. Dr. Ir. Rokhmin Dahuri, MS.
Dr. Ir. Yunizar Ernawati, MS	

C. Division of Fisheries Resource Management

Dr. Ir. Achmad Fahrudin, M.Si	Dr. Ir. Luky Adrianto, M.Sc
Dr. Ir. Isdradjad Setyobudiandi, M.Sc	Prof. Dr. Ir. Menofatria Boer, DEA
Prof.. Dr. Ir. Ismudi Muchsin Ismudi	Ir. Nurlisa A. Nurlisa A. Butet, M.Sc
Ir. Kiagus Abdul Aziz, M.Sc	Ir. Rahmat Kurnia, M.Si

Educational objectives:

The study program provides advanced knowledge and analytical methods to improve capability of the principles of physiology of aquatic biota, aquatic productivity and dynamics of water resources as a basis for assessing and solving management problems of water resources (freshwater, brackish, and sea).

Graduates Competency of Master Program (S2):

Ability to analyze in order to solve the problems in the field of water resource management through multi-scientific approach, which includes productivity of aquatic environment, bio-ecology of aquatic organisms, and fish stock assessment

Graduates Competency of Doctor Program (S3):

Ability in the development of novelty, the concept of science, technology, methodology, and model management through multi-scientific approach that includes aspects of water resource, productivity of aquatic environment, bio-ecology of aquatic organisms, and fish stock assessment

Minor Competency:

Minor 1: Management of Water Pollution (S2)

Ability to analyze through the application of approaches, methods and provisions in the field of management of water environment pollution.

Minor 2: Conservation of Aquatic Organism (S2)

Ability to analyze through the application of approaches, methods and provisions in the field of conservation of aquatic organism.

Minor 3 : Fisheries Resource Management (S2)

Ability to analyze through the application of approaches, methods and provision sin the field of fisheries resource management.

Minor : Management of Aquatic Biota (S3)

Ability to solve complex problems in the field of management through the implementation of biota approaches, methods and scientific principles related to eco-biology.

Curriculum:

Master of Science Program

Code	Subject	SKS	Semester
Compulsory Courses of the Graduate School six credits (14%)			
PPS	500	English Language	3 (3-0) Odd / Even
STK	511	Statistical Analysis	3 (2-3) Odd
Major Compulsory Courses 28 credits (65.1%)			
MSP	501	Aquatic Resources Research Methods	2 (2-0) Odd
MSP	511	Water Productivity	3 (2-3) Odd
MSP	521	Fish Eco-biology	3 (2-3) Even
MSP	531	Fish Population Dynamics	3 (2-3) Odd
MSP	612	Aquatic Resources Management	3 (3-0) Even

MSP	622	Aquatic Resources Conservation	3 (3-0)	Odd
MSP	633	Fisheries Resource Management	3 (2-3)	Odd
PPS	601	Colloquium	1	Odd / Even
PPS	690	Seminar	1	Odd / Even
PPS	699	Research and Thesis	6	Odd / Even
Major Options Course 9 credits (20.9%)				
Group A: Management of Water Pollution				
MSP	512	Management of Water Pollution	3 (2-3)	Even
MSP	522	Aquatic Animal physiology	3 (2-3)	Even
MSP	611	Aquatic eutrophication	3 (3-0)	Odd
Group B: Fishery Resources				
MSP	621	Eco-biology of Crustaceans and molluscs	3 (2-3)	Even
MSP	631	Fish Stock Assessment	3 (2-3)	Even
MSP	632	Models and Simulation of Fisheries	3 (2-3)	Odd
Total credits			43	

Minor Course				
Minor 1: Management of Water Pollution				
MSP	512	Water Pollution Management	3 (2-3)	
MSP	522	Aquatic Animal physiology	3 (2-3)	
MSP	611	Aquatic eutrophication	3 (3-0)	
Minor 2: Conservation of Aquatic Organism				
MSP	521	Fish Eco-biology	3(2-3)	
MSP	621	Eco-biology of crustaceans and molluscs	3 (2-3)	
MSP	622	Aquatic Resources Conservation	3 (3-0)	
Minor 3: Management of Fishery Resources				
MSP	531	Population Dynamics	3 (2-3)	
MSP	631	Fish Stock Assessment	3 (2-3)	
MSP	633	Fisheries Resource Management	3 (3-0)	

Doctoral Program

Code	Subject	SKS	Semester
Compulsory Courses of the Graduate School two credits (4.88%)			
PPS	702	Philosophy of Science	2 (2-0) Odd
Major Compulsory Courses 27 credits (65.85%)			
MSP	711	Aquatic Primary Productivity	3 (2-3) Odd
MSP	721	Reproductive Ecology and Growth of Fish	4 (3-3) Odd
MSP	731	Advanced Management of Fishery Resources	3 (2-3) Odd

MSP	733	Fish Succession and Adaptation	3 (3-0)	Odd
PPS	701	Colloquium	1	Odd / Even
PPS	790	Seminar	1	Odd / Even
PPS	799	Research and Dissertation	12	Odd / Even
Course Options Major 12 credits (29.27%)				
Aquatic Resources				
MSP	712	Secondary Water Productivity	3 (2-3)	Even
MSP	722	Advanced Aquatic Animal eco-physiology	3 (3-0)	Even
MSP	723	Reproduction and Growth of Molluscs & Crustaceans	3 (3-1)	Odd
MSP	732	Evaluation of Fishery Resources	3 (2-3)	Even
Total credits			41	

Minor Course offered				
Management of Aquatic organism				
MSP	721	Reproductive Ecology and Growth of Fish	4 (3-3)	
MSP	722	Advanced Aquatic Animal eco-physiology	3 (3-0)	
MSP	723	Reproduction and Growth Molluscs & Crustaceans	3 (3-1)	
MSP	733	Fish Succession and Adaptation	3 (3-0)	

Course Syllabus

MSP 501 Research Methods of Aquatic Resources 2 (2-0)

Application of scientific concepts and methods in various studies (exploration, development or verification) as well as problems in the field of management of aquatic resources and environment. Formulation of the problem and purpose of research, development theory and approach to the problem.

Staff

MSP 511 Water Productivity 3 (2-3)

Factors and processes determining the water productivity, including tropho-dynamic. Strategy of adaptation and succession in line with the growth rate of productivity of waters. The basic principle of applying a limiting factor.

Enan M. Adiwilaga

MSP 512 Management of Water Pollution 3 (2-3)

Concepts, methods, evaluation of analysis techniques, identification of types, sources, properties and processes of pollutants in waters. Evaluation of the level of pollution and the impact on water biota life. The basic principle of management planning and evaluation of prevention and control of various types of pollutants. Principles and concepts saprobik ecosystem. Factors and determinants of the trophic processes and saprobik related with organic material input. Structure, function and role of the biota (population and community) as indicators of the determinants of the saprobik. Methods and techniques of stability analysis of the level of community diversity and trophic relation-saprobik

Hefni Effendi
Sigid Hariyadi
Yusli Wardiatno
Mayariana Krisanti

MSP 521 Fish Eco-biology 3 (2-3)

The process of interaction with the environment of fish (Physico-chemical-biological) in respect of: spatial-temporal distribution and the living of fish, predation, intra-and interspecific competition, spawning, growth, food, behavior, and survival rate of fish.

Sulistiono
MF Rahardjo
Ridwan Affandi
Mohammad Mukhlis Kamal
Yunizar Ernawati

MSP 522 **Aquatic Animal
physiology** **3(2-3) 3 (2-3)**

The concept of interaction with the environment - aquatic animals, the influence of environmental variables on physiological processes of aquatic animals. The response of organisms to environmental changes (endocrine, structure, and behavior). Vitality linkage analysis of aquatic animals (fish, crustaceans, molluscs) with toxic materials through a process approach to absorption, distribution, and biotransformation. The strategy of adaptation in animals fresh water brackish, and sea.

Ridwan Affandi
Djamar TF Lumbanbatu
Etty Riani
Yunizar Ernawati

MSP 531 **Fish Population Dynamics** **3 (2-3)**

The dynamics of fish population (stock) that include growth, mortality, recruitment and reproduction. In addition, also include a variety of methods to estimate fish abundance.

Mennofatria Boer
Nurlisa A. Butet
KA Aziz

MSP 611 **Aquatic eutrophication** **3 (3-0)**

The concept and implications of ecology and eutrophication. Prediction and evaluation of the impact of eutrophication on water quality, aquatic productivity and potential fisheries resources. The benchmark functions and utilization management, control and restoration of aquatic eutrof.

Niken TM Pratiwi

MSP 612 **Aquatic Resources Management** **3 (3-0)**

Analytic conception and synthesis of water resources management on the basis of optimizing the balance of the dynamics of water resource potential. Evaluation of water resources management actions.

Kadarwan Soewardi
Niken TM Pratiwi
Taryono

MSP 621 Eco-biology of Crustaceans and molluscs 3 (2-3)

Distribution, growth, survival, spawning, and community structure of crustaceans and molluscs and its relation to physical factors, chemical and biological.

Etty Riani
Fredinan Yulianda

MSP 622 Aquatic Resources Conservation 3 (3-0)

Understanding ecological and biological processes and waters for the benefit of the conservation management of water resources.

Fredinan Yulianda
MF Rahardjo
Neviaty P. Zamani

MSP 631 Fish Stock Assessment 3 (2-3)

Stock estimation techniques, both analytical / structural, global or a combination thereof (holistic). The discussion is carried through simple models and models are more complex as *surplus yield* forecasting *models* and catchments as well as *dynamic pool models* needed in the management of fisheries resources Verification and validation of sustainable use of models to influence arrests of stock, and evaluation, and simulation for the management of fisheries resources.

Menofatria Boer
Kiagus Abdul Aziz
Achmad Fahrudin

MSP 632 Models and Simulation of Fisheries 3 (2-3)

Role of modeling and simulation in the management of fisheries resources. Elements and modeling procedures. Analytic models based on differential equations. Analytic model based on the assumption of dynamic equilibrium. Tracing model to experimental data. Models multi-component systems. Probabilistic modeling. The application of mathematical models for simulation management fisheries resources by using the computer.

Menofatria Boer
Kiagus Abdul Aziz
Rahmat Kurnia

MSP 633 Fisheries Resource Management 3 (3-0)

Identification and utilization of fishery resources fishery resources based on the concepts of ecosystem function and structure for fish life. Concept of the utilization and exploitation on the population level (life cycle, age, size of first spawning, rejuvenation and *yield / Recruit*) in different types of ecosystems is the basis for utilization, control and optimization settings for fish resources.

Luky Adrianto
Achmad Fahrudin
Kiagus Abdul Aziz

MSP 711 Aquatic Primary Productivity 3 (2-3)

Principles of primary productivity (chlorophyllen) and its role in various types of aquatic ecosystems. Limiting factors of physics, chemistry and biology of primary productivity. The various coefficients and indices in primary productivity spacio-temporal.

Enan M. Adiwilaga

MSP 712 Secondary Water Productivity 3(2-3)

Basic concepts and physiological trofodinamik in the assessment of secondary productivity of the various characteristics of the population or community water biota and environmental factors that influence it.

Yusli Wardiatno
Kardiyo Praptokardiyo

MSP 721 Reproductive Ecology and Growth of Fish 4 (3-3)

Evaluation process and the response of growth and reproduction of fish in relation to the water environment for sustainable use basis.

MF Rahardjo
Sulistiono

MSP 722 Advanced Water Animal Eco-physiology 3 (3-0)

Analyzing the response of aquatic animals to environmental changes through biochemical approaches, structures, and behavior. Analysing adaptation strategies of aquatic animals to their environment.

Ridwan Affandi
Djamar TF Lumban Batu

MSP 723 Reproduction & Growth of Molluscs and Crustaceans 3 (3-1)

Evaluation process and the response of growth and reproduction of molluscs and crustaceans for the basic utilization of water resources / fisheries

Etty Riani
Fredinan Yulianda
Isdradjad Setyobudiandi

MSP 731 Advanced Management of Fishery Resources 3 (2-3)

Level of exploitation of fisheries resources and utilization of fish resources in a rational way based on the concept of ecosystem function and structure. The principle of review of stock and carrying capacity of aquatic ecosystems based approach and model bioekonomik to changes of community structure / population in the utilization of the basis for the control and optimization settings for various types of fish resources waters (rivers, lakes, estuary, beach and sea).

Menofatria Boer
Luky Adrianto
Subhat Nurhakim

MSP 732 Evaluation of Fishery Resources 3(2-3)

Conception evaluation of fisheries resources for responsible fisheries management through quantitative tracking statistics, mathematics and informatics various methods of stock assessment / fishery (indirect method, direct methods, statistical methods, analytical methods and global, ecological approach, approaches and bio-engineering techniques and computational modeling.

Menofatria Boer
Luky Adrianto
Rokhmin Dahuri

MSP 733 Succession and Adaptation of Fish Population 3 (3-0)

Evaluation, life cycle and factors affecting distribution patterns and ecological biogeography. The principle of adaptation and natural succession, carrying capacity and population bioreproduksi patterns become the basis for the use, control and optimization settings for fish resources.

Isdradjad Setyobudiandi
Kadarwan Soewardi
Mohammad Mukhlis Kamal

STK 511 Statistical Analysis 3(2-3)

Search the diversity of models based on experimental data and surveys; the principles of experimental design; experiment berfaktor; various standard experimental design, analysis of variance and analysis of inflammation-gam. Regresi linear sederhana dan korelasi; regresi linear berganda; regresi non linear; uji sisa dan pencilan serta uji kesesuaian model. Simple linear regression and correlation, multiple linear regression; non-linear regression; residual and outlier test and conformance test models.

Menofatria Boer
Kiagus Abdul Aziz
Rahmat Kurnia

