Master of Science Program in Fishery Science and Technology
(International Program)

General information

1. **Program** Master of Science Program in Fishery Science and Technology
(International Program

2. **Degree** Master of Science (Fishery Science and Technology)
M.S. (Fishery Science and Technology)

Curriculum Structure

❖ **Plan A1 (By Research)**

- Thesis	**not less than**	**36 credits**
- Core Courses	**not less than**	**2 credits (Do not count as credits)**
Seminar		2 credits (Do not count as credits)

❖ **Plan A2 (By Course work)**

- Thesis	**not less than**	**12 credits**
- Core Courses	**not less than**	**24 credits**
Seminar		2 credits
Fishery Resources and Food Security		3 credits
Research Methods in Fishery Science and Technology		3 credits
- Elective Course	**not less than**	**16 credits**

Elective Course: The students can select at least 12 credit courses from one module and a minimum of 4 credits from affiliated module.

1. <u>Module I Aquatic Biodiversity and Ecology e.g.</u>

01252511	Advanced Phycology	3(2-2-5)
01252516	Advanced Planktonology	3(2-2-5)
01252521	Physiology of Fish	3(2-2-5)
01252531	Primary Productivity and Trophic Status of Waters	3(2-2-5)
01252534	Hydro-ecological Functions in Freshwaters Ecosystem	3(2-2-5)
01252535	Applied Sediment Ecology for Benthic Status Assessment	3(2-2-5)
01252541	Biology of Seagrasses	3(3-0-6)
01252543	Ecology of Fish	3(2-2-5)
01252545	Early Life Histories of Freshwater Fishes	3(2-3-6)
01255511	Physiology of Marine Phytoplankton	3(3-0-6)
01255512	Physiology of Crustacean	3(2-2-5)
01255514	Adaptation of Fish	3(3-0-6)
01255521	Seagrass Community	3(3-0-6)
01255523	Ecology of Marine Phytoplankton	3(3-0-6)
01255524	Biogeography of Marine Zooplankton	3(3-0-6)
01255525	Marine Biological Diversity	3(3-0-6)
01255535	Marine Microbial Processes	3(3-0-6)
01255542	Behavior of Aquatic Animals	3(2-2-5)

01256596	Selected Topics in Fishery Science and Technology	1-3
01256598	Special Problems	1-3

2. <u>Module II Aquatic Resources and Environmental Management e.g.</u>

01252522	Aquatic Toxicology and Hazard Evaluation	3(2-2-5)
01253511	Coastal and Marine Fishery Management	3(3-0-6)
01253512	Fishery Resources and Management	3(3-0-6)
01253521	Inland Fishery and Environmental Management	3(3-0-6)
01253522	Integrated Coastal Zone Management	3(3-0-6)
01253531	Fishery Resource Economics	3(3-0-6)
01253532	Bioeconomics for Fishery Management	3(3-0-6)
01253534	Fishery Environmental Economics	3(3-0-6)
01253541	Risk Management in Fisheries	3(3-0-6)
01253551	Social Analysis for Fishery Management	3(3-0-6)
01253552	Social Impact Assessment in Fisheries	3(3-0-6)
01253561	Fishery Policy	3(3-0-6)
01253572	Geoinformatics Application in Fisheries Science	3(3-0-6)
01253573	Management Information System in Fisheries	3(2-2-5)
01255534	Biomarkers in Marine Environment	3(2-2-5)
01255547	Application of Informatics Data in Marine Technology	3(2-2-5)
01255548	Marine Biochemical Modeling Technology	3(3-0-6)

01255551	Remote Sensing in Oceanography	3(3-0-6)
01255552	Applied Radiochemistry to Oceanography	3(3-0-6)
01255553	Numerical Model in Oceanography	3(2-3-6)
01255554	Physical Processes in Coastal Oceanography	3(3-0-6)
01255555	Numerical Solution of Partial Differential Equation in Oceanography	3(2-2-5)
01255562	Estuarine Pollution	3(3-0-6)
01255563	Red Tide	3(2-2-5)
01255571	Marine Affair	3(3-0-6)
01255572	Sustainable Utilization of Marine Resources	3(3-0-6)
01255573	Environmental Impact Assessment in Marine Ecosystems	3(3-0-6)
01256596	Selected Topics in Fishery Science and Technology	1-3
01256598	Special Problems	1-3

3. <u>Module III Aquaculture Technology e.g.</u>

01251521	Advanced Freshwater Aquaculture	3(3-0-6)
01251522	Advanced Mariculture	3(3-0-6)
01251523	Hormone in Aquaculture	3(3-0-6)
01251524	Aquaculture Project Planning	3(3-0-6)
01251531	Immunology of Aquatic Animals	3(2-2-5)

01251532	Application of Chemicals and Drugs in Aquaculture	3(3-0-6)
01251541	Genetic Improvement of Aquatic Animals	3(3-0-6)
01251542	Aquatic Animal Genomics	3(3-0-6)
01251543	Bioinformatics in Aquaculture	3(2-3-6)
01251551	Water Quality Management in Aquaculture	3(2-2-5)
01251552	Soil Science for Aquaculture	3(3-0-6)
01251571	Aquatic Animal Nutrition	3(2-2-5)
01251572	Aquatic Animal Feed Processing Technology	3(2-2-5)
01252551	Algal Propagation	3(2-3-6)
01252571	Diseases of Aquatic Animals	3(2-2-5)
01252572	Parasites of Aquatic Animals	3(2-3-6)
01252574	Aquatic Animal Pharmacology	3(2-3-6)
01253533	Sustainable Aquaculture Management	3(3-0-6)
01256596	Selected Topics in Fishery Science and Technology	1-3
01256598	Special Problems	1-3

4. <u>Module IV Fishing Technology e.g</u>

01252561	Fish Population Dynamics	3(2-3-6)
01252562	Fisheries Stock Assessment	3(2-3-6)
01253563	Fishery Industrial Development	3(3-0-6)
01255541	Deep Sea Fisheries	3(3-0-6)

01255543	Responsible Fishing Technology	3(2-2-5)
01255546	Trap Fisheries	3(3-0-6)
01255564	Acoustic Techniques for Fisheries Resources Assessment	3(3-0-6)
01256596	Selected Topics in Fishery Science and Technology	1-3
01256598	Special Problems	1-3

5. <u>Module V Fishery Biotechnology e.g.</u>

01252514	Molecular Systematics in Fisheries	3(2-2-5)
01252515	Phylogeography in Fisheries	3(3-0-6)
01252552	Bioactive Substance from Algae	3(2-3-6)
01254531	Fishery Product Biotechnology	3(3-0-6)
01255531	Marine Natural Products	3(2-2-5)
01255532	Pigments in the Sea	3(3-0-6)
01255533	Marine Environmental Biotechnology	3(3-0-6)
01256596	Selected Topics in Fishery Science and Technology	1-3
01256598	Special Problems	1-3

6. <u>Module VI Fishery Post-harvest Technology e.g.</u>

01254521	Food Additives in Fish and Fishery Products	3(3-0-6)
01254523	Fish Oils	3(2-3-6)
01254524	Marine Biotoxins	3(3-0-6)

01254525	Protein in Fish and Fishery Products	3(3-0-6)
01254526	Fish Enzyme	3(2-3-6)
01254527	Marine Nutraceuticals and Functional Foods	3(3-0-6)
01254541	Food Safety and Quality Management Systems in Fish Processing Plant	3(2-3-6)
01254561	Instruments in Fishery Product Research	3(2-3-6)
01254571	Advanced Fish Processing	3(3-0-6)
01256596	Selected Topics in Fishery Science and Technology	1-3
01256598	Special Problems	1-3

Thesis **not less than 12 credits**

01256599	Thesis	1-12

Course details

01256511 Fishery Resources and Food Security 3(3-0-6)

Aquatic resource and ecosystem, Responsible fishing and aquaculture technology, Post harvest technology, Fisheries resources utilizations, Analysis and monitoring, Management and controls, Related policy and regulations, Case study, Field trip required.

01256591 Research Methods in Fishery Science and Technology 3(3-0-6)

Research principles and methods in fishery science and Technology, problem analysis for research topic identification, data collection for research planning, identification of samples and techniques, Analysis, interpretation and discussion of research result, Report writing for presentation and publication.

01256596 Selected Topics in Fishery Science and Technology 1-3

Selected topics in fishery science and technology at the master's degree level, Topics are subjected to change each semester.

01256597 Seminar 1

Presentation and discussion on current interesting topics in fishery science and technology at the master's degree level.

01256598 Special Problems 1-3

Study and research in fishery science and technology at the master's degree level and compiled into a report.

01256599 Thesis 1-36

Research at the master's degree level and compile into thesis.

Course details (Module)

01251521 Advanced Freshwater Aquaculture 3(3-0-6)

Freshwater aquaculture systems, Principle, advantage and disadvantage of each culturing system and the prospect of freshwater aquaculture development.

01251522 Advanced Mariculture 3(3-0-6)

Mariculture methods and systems, Principle, advantage and disadvantage of each culturing system and the prospect of mariculture development.

01251523 Hormone in Aquaculture 3(3-0-6)

Endocrine systems related to reproduction and growth of aquatic animals, hormone application and control in aquatic animals for aquaculture.

01251524 Aquaculture Project Planning 3(3-0-6)

Aquaculture project planning and aquaculture project evaluation

01251531 Immunology of Aquatic Animals 3(2-2-5)

Principles of immunology in aquatic animals, mechanisms of immune systems, preparation and application of vaccine and problems involved the usage of vaccine with economically valued aquatic animals.

01251532 Application of Chemicals and Drugs in Aquaculture 3(3-0-6)

Chemicals and drugs used in aquaculture for improving water quality and prevention and control of diseases, mode of action and effect of water quality on mode of action of chemicals and drugs, effect of chemicals and drugs on pond ecosystem.

01251541 Genetic Improvement of Aquatic Animals 3(3-0-6)

Principles of genetic improvement of aquatic animals, Genetic improvement by selection, mating system, hybridization, polyploidy induction, gynogenesis, genetic engineering method, and genetic marker-assisted selection.

01251542 Aquatic Animal Genomics 3(3-0-6)

Introduction to genomics, DNA marker technologies, gene mapping, and mapping of QTLs, Application of marker-assisted selection to genetic improvement of aquaculture stocks.

01251543 Bioinformatics in Aquaculture 3(2-3-6)

Importance of bioinformatics in aquaculture, studies of genes involved in aquaculture, gene structure, gene expression and regulation of gene expression, translation of gene to protein, protein properties, databases of genes and proteins involved in aquaculture, alignment of nucleotide and amino acid sequences, construction of phylogenetic trees, application of bioinformatics in aquaculture.

01251551 Water Quality Management in Aquaculture 3(2-2-5)

base : 01251452

Water quality criteria for aquaculture in both hatchery and grow-out phases, Prevention and control of water quality problems by water quality management.

01251552 Soil Science for Aquaculture 3(3-0-6)

A concept of soil science applied to pond aquaculture including physiochemical characteristics of soils for pond aquaculture management, soil organisms, nutrient cycling, sedimentation, soil sampling methods in aquaculture pond, and a brief introduction to pond soil analysis, pond bottom soil management for aquaculture.

01251571 Aquatic Animal Nutrition 3(2-2-5)

Aquatic animal nutrition and nutrient metabolism, Feed formulation, Nutrient requirement, Nutritional value evaluation, Feed quality and environmental impacts. Field trip required.

01251572 Aquatic Animal Feed Processing Technology 3(2-2-5)

Manufacturing process of aquatic animal feed, and quality control, aqua-feed manufacturing equipment, plant and storage systems. Field trip required.

01252511 Advanced Phycology 3(2-2-5)

base : 01252313

Survey and collection methods of alga resources, Ecology of algae, Techniques in species identification, Morphology and histology, Classification of algae, Evolution of algae. Field trip required.

01252514 Molecular Systematics in Fisheries 3(2-2-5)

Principles of classifications, species definitions, species concepts, DNA structures and compositions, heredity, specimen collection procedures for molecular biology analysis, nucleotides database, DNA extractions, DNA amplifications, DNA data processing, molecular phylogenetic analyses, phylogenetic tree construction from DNA sequence data, time-calibrated phylogenetic tree, specimen processing for publication, using specimens related to fisheries science in every topics.

01252515 Phylogeography in Fisheries 3(3-0-6)

Mechanisms of geographic distribution of fishery resources, phylogeographic hypotheses, molecular markers for phylogeographic analysis, estimation of genetic variation, genetic differentiation, statistical parsimony network and population structure analysis, intraspecific phylogeny, nested clade analysis, population expansion and contradiction, demographic history, applications of phylogeographic data for fishery resources management and conservation, case study in fisheries research.

01252516 Advanced Planktonology 3(2-2-5)

base : 01252312

Biology, ecology, community structure and distribution of plankton, environmental parameters effect on plankton community, population evaluations and species successions, experimental design and statistical analysis and interpretation techniques.

01252521 Physiology of Fish 3(2-2-5)

Organs systems and functions of fish, Food and growth, Environmental factors affecting fish living.

01252522 Aquatic Toxicology and Hazard Evaluation 3(2-2-5)

Types of toxicants and harmful media in aquatic ecosystem, Hazardous effects of toxicants and media on aquatic organisms, Hazard evaluation methods in waters.

01252531 Primary Productivity and Trophic Status of Waters 3(2-2-5)

Types of aquatic resources, hydro-ecological factors impacting primary productions, relationships in food chain, assessment of primary production and trophic status of aquatic resources, eutrophication and management approach.

01252534 Hydro-ecological Functions in Freshwaters Ecosystem 3(2-2-5)

Hydro-ecological factors, productions and energy transfer in food chain, distribution of living resources, status and problems of freshwaters, freshwaters conservative management approach, field trip required.

01252535 Applied Sediment Ecology for Benthic Status Assessment 3(2-2-5)

Sources, compositions, and categorizations of sediments, sediment research techniques, Physical, chemical, and biological factors of sediments, Production, decomposition, and nutrient cycling, Roles of sediments in benthic food chain, trophic status and pollution of benthic layers.

01252541 Biology of Seagrasses 3(3-0-6)

Characteristics, taxonomy, anatomy and morphology, photosynthesis, gas and nutrient exchanges, reproduction patterns, seagrass ecology, propagations and restorations, applications for environmental research.

01252543 Ecology of Fish 3(2-2-5)

Relationship between fishes and environmental factors, Diversity of fish in habitats, way of life and life history, Application of knowledge in fish ecology for fisheries. Field trip required.

01252545 Early Life Histories of Freshwater Fishes 3(2-3-6)

Reproductive mode of freshwater fishes, techniques and methodologies of fish larval identification, sampling techniques, population analysis and habitat requirement, inland water resources management, field trip required.

01252551 Algal Propagation 3(2-3-6)

Isolation, sterilization and propagation of freshwater and marine algae. Field trip required.

01252552 Bioactive Substance from Algae 3(2-3-6)

Type and properties of bioactive substance from algae, active mechanism, utilization, extraction technique and characterization.

01252561 Fish Population Dynamics 3(2-3-6)

base : 01252341

Population control factors, Sampling techniques for data collection in population dynamics, Growth, mortality and recruitment of population.

01252562 Fisheries Stock Assessment 3(2-3-6)

base : 01252561

Virtual population analysis, Selectivity of fishing gears, Fisheries stock assessment predication models, Estimation of Maximum Sustainable Yield (MSY), Assessment of economic lost of fisheries resources, Highly migratory fish stock assessment.

01252571 Diseases of Aquatic Animals 3(2-2-5)

base : 01252371

Aquatic animal diseases caused by bacteria, virus and fungi, Diseases protection and treatment, Cell and tissue culture for virus infection study.

01252572 Parasites of Aquatic Animals 3(2-3-6)

base : 01252371

Species identification, life history and relationship between parasites and environment, Impacts of parasites on aquatic animals, Protection and eradication of parasites.

01252574 Aquatic Animal Pharmacology 3(2-3-6)

Principles of pharmacology, mechanism and spectrum of action of drugs, study of pharmacokinetics, application of antimicrobials and disinfectants in treatment and prevention of aquatic animal's diseases, antimicrobial activity of herbal and algal extracts, and use of feed supplements for aquatic animals.

01253511 Coastal and Marine Fishery Management 3(3-0-6)

Definition and principle of fisheries management, Background and evolution of fisheries management philosophy, Basic concepts for coastal and marine fisheries management and models in fisheries, Case studies.

01253512 Fishery Resources and Management 3(3-0-6)

Structure of fisheries industry, important of fisheries industry, Fisheries in Thailand and the world, fishery resources and fisheries, concept and theory in fishery management, fishery management measures, laws, regulations and agreements in relation to fishery management in national and international level, Fishery management in Thailand and the world.

01253521 Inland Fishery and Environmental Management 3(3-0-6)

Freshwater ecosystem and environment, Concepts of inland fishery management and environmental management, Basic information required and tools for inland environmental management planning, Freshwater biodiversity conservation, Fish habitat restoration strategies, Inland fishery management measures, Laws and regulations involved in inland fishery, Case studies of inland fishery management.

01253522 Integrated Coastal Zone Management 3(3-0-6)

Need for integrated coastal zone management, related definitions and concepts, evolution of ICZM, coastal ecosystems and resources, utilization of coastal zone, preparation and considerations in ICZM, ICZM based on science and information, ICZM cycle, ICZM planning, case study. Field trip required.

01253531 Fishery Resource Economics 3(3-0-6)

Principle and theory in advanced fishery economics, Static fishery economics, Dynamic fishery resource economics, Multi-species fishery economics, Fishery resource value assessment and fishery economic models.

01253532 Bioeconomics for Fishery Management 3(3-0-6)

Integration of economic and fishery biology principles and concepts for developing a mathematical simulation model for aquaculture farm management, Linkage to fishery policy analysis for national fishery management. Case study.

01253533 Sustainable Aquaculture Management 3(3-0-6)

Definitions and aquacultural science, Production economic perspectives, Green technology for aquaculture management, Aquacultural standards and certifications, Aquacultural trade and non-tariff measures. Case study.

01253534 Fishery Environmental Economics 3(3-0-6)

Background and importance on fishery environment, Concept of externality cost for production and consumption processes, Application of Coase theorem for fishery, Impact analysis on different measures for resolving fishery environmental problems, Concepts and methods for fishery environmental valuation, Fisher environmental policy and policy impact assessment.

01253541 Risk Management in Fisheries 3(3-0-6)

Risk management, kind of risk, risk management framework, identify and risk analyses in fisheries: public sector and business sector, decision analysis and risk assessment in fisheries.

01253551 Social Analysis for Fishery Management 3(3-0-6)

Social aspects of fishery management, concepts, theory, implication and scope, Importance and need of social integrated system at different levels, individual, group and national on behavior, economics, culture, religions and measurement of changes in cooperation, alienation, world view, Impact of fishery sector management on social integrated system, for determination of policy on fishery development system.

01253552 Social Impact Assessment in Fisheries 3(3-0-6)

Cause and necessity of social impact assessment (SIA) in fishery, procedure and methodologies of social impact assessment, case studies in SIA of fishery development project and other government projects affected to fishery community, problems and difficulties of SIA in Thailand.

01253561 Fishery Policy 3(3–0-6)

Importance of fishery policy for fishery management, definitions and concepts related to fishery policy, national and international fishery policy, considerations in fishery policy development, fishery strategic planning, fishery policy analysis and evaluation, case study.

01253563 Fishery Industrial Development 3(3-0-6)

Fishery industrial development of the world and Thailand, Structure of Thai fishery industry, Concepts and theories of fishery management and economics for fishery development, Fishery industrial development project formulation and evaluation, Administration in fishery industrial system, Laws and regulation in fishery industry development. Field trip required.

01253572 Geoinformatics Application in Fisheries Science 3(3-0-6)

Map and geography, Geographic information system, Data in geographic information system, Spatial data, Vector and Raster data, Theory on remote sensing, Earth observation satellite data, Analysis of satellite images and interpretations, Integration of geographic information system and earth observation satellite data, Applications of geoinformatics in fisheries science and fishery resource management.

01253573 Management Information System in Fisheries 3(2-2-5)

Concept of management information system and decision support system, Organizational structure and information system, Importance of database system and network system, Strategic roles for information systems, Application of management information system in fishery business. Comparative study.

01254521 Food Additives in Fish and Fishery Products 3(3-0-6)

Classification, properties, and uses of food additives in fish and fishery products, safety and regulation related food additives, current issues in food additives.

01254523 Fish Oils 3(2-3-6)

Composition, qualitative and quantitative analytical methods of fish oils, commercial production and utilization in food industry, quality deterioration and prevention, nutritional properties of highly unsaturated fatty acids.

01254524 Marine Biotoxins 3(3-0-6)

Marine biotoxins, types, cause of origin, pharmacological and chemical characteristics, control and prevention of intoxication, research in marine toxins.

01254525 Protein in Fish and Fishery Products 3(3-0-6)

Compositions and structures of protein and amino acid, Linkages related to protein stability, Principle of protein separation and analysis, Protein modification, protein quality and reaction of protein occurring in food, Structures and compositions of fish muscle, Protein types, functional properties, denaturation and testing methods, Non protein nitrogen and fish protein products.

01254526 Fish Enzyme 3(2-3-6)

Type of enzyme in fish, Enzyme production, purification technologies, determination of purity and enzyme characterization, Utilization of enzyme in food and fishery products, field trip required.

01254527 Marine Nutraceuticals and Functional Foods 3(3-0-6)

Production of bioactive ingredients from marine, chemical property and biological activity, health benefit, efficiency and safety test, technology and innovation in nutraceuticals and functional foods, related regulation and law, labeling and claim, economics and marketing, current research.

01254531 Fishery Product Biotechnology 3(3-0-6)

Overview and scope of food biotechnology, basic principle of food fermentation, fish fermentation technology, fishery products derived from fermentation process, and genetic engineering, current issues in fishery product biotechnology. Field trip required.

01254541 Food Safety and Quality Management Systems in Fish Processing Plant 3(2-3-6)

Hazards and risk assessment of hazards in fish and fishery products, hazards control measure, quality and food safety management systems, audit method in fish processing plant. Field trip required.

01254561 Instruments in Fishery Product Research 3(2-3-6)

Principle and technique of instruments for fishery product research spectroscopy, chromatography, mass spectrometry, electrophoresis, electron and fluorescent microscope, centrifugation, light scattering, texture and rheological analysis in food industry.

01254571 Advanced Fish Processing 3(3-0-6)

Progress in food and fish processing technology, Waste and by-product utilization in food and seafood industry. Field trip required.

01255511 Physiology of Marine Phytoplankton 3(3-0-6)

Absorption mechanism of nutrients, accumulation and discharge of ions, nitrogen assimilation, calcification, silification, cells division and growth.

01255512 Physiology of Crustacean 3(2-2-5)

Physiology of crustsaceans, external structure and function, food and nutrition, excretory system, circulation system, reproduction system immune system, and environmental adaptation, focusing on economical species.

01255514 Adaptation of Fish 3(3-0-6)

The adaptation of fish for its movement, feeding, sensing, metabolism, reproduction and behaviors pertaining to habitats and distribution.

01255521 Seagrass Community 3(3-0-6)

The distribution of seagrasses over the world and in Thailand, species composition of seagrasses and important characteristics for seagrass identification, ecological roles of the seagrass community, organisms existing in the communities, environmental factors controlling distribution of organisms in the community, exploitation and sustainable management, including research methods of the seagrass community.

01255523 Ecology of Marine Phytoplankton 3(3-0-6)

Abundance, distribution, fluctuation, controlling factors, roles and significance to food chain.

01255524 Biogeography of Marine Zooplankton 3(3-0-6)

Zooplankton and their importance in an economical aspects, their significant roles in marine and coastal ecosystem, distribution patterns and factors influent their distribution.

01255525 Marine Biological Diversity 3(3-0-6)

Marine ecological concepts and principle, terms and definitions of marine biological diversity, mathematical models on distribution patterns of marine resources, measuring biological diversity and its potential for marine environmental monitoring and assessment, including relevant legislations and conventions.

01255531 Marine Natural Products 3(2-2-5)

Structures, important compositions and distribution of natural substances from marine organisms, Distribution of essential substances in marine organisms and natural resources, Pigments, nutrients, antibiotics, drugs and vitamin, Analytical method and utilization of marine natural products.

01255532 Pigments in the Sea 3(3-0-6)

Principle, visual mechanism and physiological function of pigments, Chemical structure, classification, biosynthesis and pathway of pigments in marine organisms, Physiology and behaviour of pigments in marine animals, Relations between pigments and marine environment, Determination and application of pigments in biotechnology.

01255533 Marine Environmental Biotechnology 3(3-0-6)

Principle of indicating environmental and ecosystem qualities from presence of special organisms, Using of biological indicators and biomonitors to measure and allow for distinguishing between different states of ecosystem, Marine toxicology, The assessment of ecosystem and environmental quality for evaluation of management measures and environmental stress

01255534 Biomarkers in Marine Environment 3(2-2-5)

Concept and fundamental of biomarkers, Influence of pollution on figure, behaviour and physiology of marine invertebrates, Potential and limitation of biomarkers for marine environmental monitoring. Field studies required.

01255535 Marine Microbial Processes 3(3-0-6)

Bioinformatics and gene regulation, Genetics of marine microorganisms emphasized on DNA repair and replication, Principle of symbiosis, signalling and pathogenesis, Cycles of nitrogen and carbon in marine microorganisms including probiotics, Relations between microorganism and host, Applications of marine microbial processes to biotechnology.

01255541 Deep Sea Fisheries 3(3-0-6)

Glossary, marine resources, fishing methods and techniques for deep sea fisheries, preservation and quality control, law of the sea.

01255542 Behavior of Aquatic Animals 3(2-2-5)

The comparative methods as well as various experimental approaches to study behavior of aquatic animals are presented, Emphasis on the integration of the physiological, ecological factors influencing behavior.

01255543 Responsible Fishing Technology 3(2-2-5)

Fishing gears and methods, behavior of aquatic animals against the fishing gear, code of conduct for responsible fisheries, selectivity of fishing gear- selectivity curves, application of fishing gear selectivity for aquatic resource management, modifications of fishing gear for responsible fisheries, research trend for sustainable fisheries development, field trip required.

01255546 Trap Fisheries 3(3-0-6)

Characteristics and importance of trap fisheries, trap fisheries in the world, Asia and Thailand, trap fishing methods, target species and the catches from trap fisheries, bait and lure of trap fishing, relationship between behavior of aquatic animals and trap fishing, oceanography for trap fisheries, stock assessment of trap fisheries, selectivity of trap, impacts and solutions of trap fisheries on aquatic animals and environment, development of trap fisheries in the future, related researches, field trip required.

01255547 Application of Informatics Data in Marine Technology 3(2-2-5)

Marine Informatics: needs, types and progressions, data acquisition, recording and reanalysis, numerical simulated data, meteorological and climatological data, operational oceanography data, data processing and presentation, practices by working with different types of actual data.

01255548 Marine Biochemical Modeling Technology 3(3-0-6)

Modeling of the air-sea processes, modeling of the biochemical processes in the water column, modeling of the sediment water interactions, ecological model construction, physical controls on biochemical models, recent technologies, future challenges and case studies.

01255551 Remote Sensing in Oceanography 3(3-0-6)

Remote sensing principles, instruments, data acquisition and applications in marine environmental studies.

01255552 Applied Radiochemistry to Oceanography 3(3-0-6)

The theory and application methods in radiochemistry useful for solving problems in oceanography and marine geochemistry.

01255553 Numerical Model in Oceanography 3(2-3-6)

Concepts of geophysical fluid dynamics and linear wave theory, basic of numerical method, case studies of numerical modelling in oceanography, statistical analysis of the numerical output and the observation data.

01255554 Physical Processes in Coastal Oceanography 3(3-0-6)

Coastal morphology, ocean processes in the surf zone, sediment transport, beach system, coastal catastrophes and hard structures and coastal modifications, coastal zone management, and field trip required.

01255555 Numerical Solution of Partial Differential Equation in Oceanography 3(2-2-5)

Differential equation, partial differential equations, finite difference approximations, stability of numerical solution, continuity equation and diffusion equation in the ocean.

01255562 Estuarine Pollution 3(3-0-6)

Study of the various types of pollutants and their effects on the estuarine environment, physiological effects on faunas, problems in aquaculture and their related effects, water quality or aquaculture purposes and monitoring programmes, detection, surveillance and abatement of estuarine pollution. Preventive and protective measure will be discussed.

01255563 Red Tide 3(2-2-5)

Studies on chemical, biological and physical processes effects on red tide mechanisms.

01255564 Acoustic Techniques for Fisheries Resources Assessment 3(3-0-6)

Principles and instruments of hydro-acoustic transceiver, Theory of propagation of hydro acoustic, Mathematical equations of hydro acoustic energy, Reflection coefficients of acoustic wave of fish, Process of quantity assessment of fish by hydro acoustic. Study trip.

01255571 Marine Affair 3(3-0-6)

Ocean interests, evolution of international law of the sea regime, maritime delimitation, fisheries and the Law of the Sea, regional co-operations, case studies in Southeast Asia and elsewhere.

01255572 Sustainable Utilization of Marine Resources 3(3-0-6)

Types, management principles and strategies for sustainable utilization on marine resources and their environments, monitoring methodology and criteria in resource and environmental assessment, including case studies and concepts for formulating their strategic plans.

01255573 Environmental Impact Assessment in Marine Ecosystems 3(3-0-6)

Marine and coastal ecosystems, marine geography and resources of Thailand, marine environmental laws and rules of assessment, cases study (small, medium and large projects) including the concepts of environmental impact assessment in the marine ecosystem and a variety of methods concerning various kinds of information: physics, biology, socio-economics, way of community life and human rights.