Fisheries Education and Training in Kasetsart University

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Abstract

General fisheries education in Thailand was originally initiated in 1926 when the government set up "The Department of Aquatic Animals Conservation". The Faculty of Fisheries, Kasetsart University that offered a degree in fisheries and other related fields was founded in 1943. The faculty bagan its academic instruction for a three-year curriculum leading to an associate degree in fisheries. Its curriculum was later panded to five years and the B.S. (Fisheries) was confered in 1955. Presently the curriculum requires four years for B.S. degree and other two years for M.S. degree either in Fisheries Science or Aquaculture. Details of admission requirements and procedure of each program are described.

Background

General fisheries education in Thailand was originally initiated in 1926 when the Government set up "The Department of Aquatic Animals Conservation" or "Krom Raksa Satnam" (in Thai). Dr.Hugh M. Smith, a former USA Commissionerof Fisheries, invited by the Thai Goverment to review the fisheries resources of the country and to suggest methods for their conservation and development. He was an adviser to the Thai Government, during those time, and was the first Director General.

In order to build up the Thai fisheries staff, the late Prince of Songkla personally supported three Thai students to study abroad in fisheries. These three students later contributed a great deal to modern fisheries education in Thailand. Two of them become Deans of the Faculty of Fisheries, Kasetsart University, the first University in Thailand that offered a degree in fisheries and other related fields.

The Faculty of Fisheries was founded in 1943 as a faculty of Kasetsart University. The faculty started its academic life with four departments, namely : Fishery Biology, Fishery Management, Fishery Products, and Aquaculture. For some years, the faculty began its academic instruction for a three-year curriculum leading to an associate degree in fisheries. Its curriculum was expanded to five-year in later year, and the Degree of Bachelor of Science in Fisheries was confered in 1955. Subsequently, the Department of Marine Science was affiliated the faculty as its fifth department in 1968.

At present, the curriculum requires four years in compliance with the policy set by the National Education Council starting with graduates of 1967-1968. Like other curricula, this curriculum is loosely controlled by the Ministry of University Affairs.

The faculty exists for the sole purpose of serving the nation by providing a broad education and professional training in fishery science with specialization in academic area of fishery management, fishery products, fishery biology, aquaculture and marine science through hard work, freedom of expression, logical thinking and decision-making in order to serve the need of the Department of Fisheries, Ministry of Agriculture and Cooperatives. In addition to recruit the competent fishery biologists for the DOF, the faculty also provided, biologists, teachers, and science administrators for other governmental agencies such as the Ministry of Education, the National Research Council, government enterprises, and private firms.

Degree Offered

Undergraduate Degree

Bachelor of Science (Fisheries)

Students admitted to study in the faculty must take general education courses which are concentrated in the first two years. In the subsequent years student must take core and specialized courses in the field of fisheries according to the requirements of the student's major department. In addition to the course work, students are required to demonstrate a satisfactory performance of at least 200 hours of major field practice.

The bachelor's degree achieved, student must complete of at least 146 credit-hours with a GPAof not less than 2.00 (C). Student who complete all 146 credit-hours but has a GPA less than 2.00 will get an associate degree in fisheries.

The undergraduate student must complete his program within 8 years from date of his entrance.

Graduate Degree

Master of Science (Fisheries Science)
Master of Science (Aquaculture)

The Faculty of Fisheries confers the Master's Degree of Science in Fisheies Science and Master's Degree of Science in Aquaculture only under the thesis arrangement. These two programs which offer advanced courses in fisheries sciecne and aquaculture are designed to provide students with specialized training and experience. In order to graduate Master's Degree in Fisheries Science, candidates must complete a minimum of 24-27 credits in their major courses, 9-12 credits in their minor ones which are closely related to fisheries. An additional 9 credits of the thesis is also required.

To graduate Master's Degree in Aquaculture, candidates must complete a minimum of 15 credits in their major courses, 9 credits in their minor ones which are closely related to aquaculture. An additional 12 credits of the thesis is also required.

A student can apply to do his thesis after completing at least 12 credits of approved course work. For graduation, the overall grade point average must beat least 3.0 and the student must pass comprehensive,EnglishLanguageandviva voce. The later will be held after the thesis committee has read his thesis.

The graduate student must complete his program within 5 years from the time of being accepted as a candidate by the Graduate School. Requests for an extension of time to complete a degree will be considered by the student's advisory committee, department head and Dean of the Graduate School.

Academic Year

The academic year is devided into two semesters of

sixteen weeks each, the first begins in the first week of June and ends in mid-October, the second, from mid-November through March. A summer session of six weeks is also conducted from April to May.

Medium of Instruction

Thai language is the officially medium of instruction at the Faculty. Graduate students whose native tongue is not Thai follow special lecture in English.

Grading System

Letter marks are used to show the academic standing of a student, with the following meaning and values:

Letter	Value	Letter	Valaue	Meaning
A	4.0	F	0	
B+	3.5	I		Incomplete
B	3.0	S		Satisfactory
C+	2.5	U		Unsatisfactory
C	2.0 (graduate passing grade)			
D+	1.5	N		Grade not reported
D	1.0	P		Pass

The student's grades are computed at the end of each semester. The student is graded for his/her work during the semester. This includes.

quizzes
term papers
book reports
assignments
recitation
class participation
attendance
midterm and final examinations

These requirements will vary from course to course.

Dismissal

Students will be dismissed from the University upon the following categories:

- A students who obtains a cumulative GPA of less than 1.50 at the end of any semester except the first semester of the Freshman Year.

- A student who obtains a cumulative GPA of less than

1.75 two consecutive semester except the first semester of the Freshman Year.

- A student who obtain a cumulative GPA of less than 2.00 for four consecutive semester except the first semester of the Freshwater Year.

Graduation with Honours

The University, is wishing to provide recognition to exceptidnal student, has an honours system. Students maintaining a high scholastic average are eligible for graduation with honours.

First Grade Honour : GPA 3.5 - 4.0
Second Grade Honour : GPA 3.24 - 3.49

Admission Requirements and Procedure

Undergraduate Program

To apply for undergraduate program in the Faculty of Fisheries, applicants must meet the requirements of the Ministry of University Affairs; i.e., Mathayom 6 (science) certificate (equivalent to grade 12) or its equivalent as issued by the Ministry of Education, clear record of good behavior, good physical and mental health. Students must also pass the nation wide entrance examination and are required a medical examination arranged by the Ministry of University Affairs. Details on admission is available in the University Entrance Examination Bulletin, Ministry of University Affairs.

Foreign student can also be admitted in some major fields which have classes conducted in English.

Graduate Program

To apply for graduate program in either Fisheries Science or Aquaculture, applicants must have a B.S. degree in Fisheries, Biology, Zoology orrelated recognized field with one or other of the following results :

1. An average grading of 75 percentage or a grade point average of not less than 2.5, or

2. In the event of a GPA of less than 2.5 but not less than 2.0, the grade point average for subject in the discipline for which Master's Degree training is applied should not be less than 3.0, which is comparable to 80 percentage, or

3. One who holds a bachelor's degree with the minimum GPA 2.0 along with the experience in the proposed discipline of at least 3 years. Students must contact the Graduate School of Kasetsart University for application regulation.

Applicants must meet the requirements of the Graduate School of Kasetsart University outlined above nd must pass the entrance examination arranged by the Admissions Committee.

Fees and Expenses

Current estimated tuition fees (per eredit hour), University fees (per year), and miscellaneous fees for programme leading to Bachelor's Degree in Fisheries are $ 80 per semester. For foreign students the Fees are double. All fees are payable at registration on the scheduled time and date.

All Fees and charges for programmes leading to Master's Degree in either Fisheries Science or Aquaculture are $ 160 per semester. For forign students the Fees are double and payable at registration on the scheduled time and date.

Board and Lodging

Domitory

Students attending the University may be housed at the University Campus. Applications for accommodation in the domitory or enquiries regarding accommodation should be applied to The Office of Student Services of the Kasetsart University.

City Boarding Houses

Students are responsible for finding their own accommodation. However, the officials from The Office of Student Services, personally, will assist students, as far as possible, in obtaining suitable boarding houses nearby.

Program of Studies

During the first two years all students pursue the same program of studies which provides them with the basic knowledge and a feel of all the disciplines offered in Fisheries. This program prepares the student with adequate knowledge for his/her Major selected.

Structure of the Curricula

Bachelor of Science (Fisheries)

(Total Minimum Requirements 146 Credits)

General Education 69 credits

1. Science and Mathematics 46 credits

   403112(4), 403113(4), 403221(5), 424111(3), 424112(3), 423113(3), 401114(3), 419211(3), 419214(1), 420119(4), 417111(4), 422111(3), 422312(3),

2. Language 9 Credits

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   355 (9)

3. Social Sciences 6 credits
110181(3), 453111(3),

4. Humanities 6 credits
361111(3)
Choose at least 1 course from the following:-
376111(3), 387102(3), 387121(3), 452111(3), 452112(3), 451111(3),

5. Physical Education 2 credits
175131(1), 175132(1)

Specific Requirements 74 credits

- Core Course 24 credits
253111(3), 253211(3), 253311(2), 252211(3), 252212(4), 254211(3), 251211(3), 255211(3)

- Major field: Choose one of the following majors

Aquaculture

Major Requirements 36 credits
251321(3), 251322(3), 251323(3), 251324(3), 251351(3), 251361(3), 251371(3), 251441(3), 251452(3), 251462(3), 251497(1), 252332(3), 416311(3), 416312(1)

Technical Electives 12 credits
Choose from the following courses:-
251496(1-3), 251498(1-3), 253321(2), 253381(3), 253382(2), 253411(3), 253421(3), 253481(4), 252331(4), 252432(3), 252433(3), 252441(3), 252442(3), 252444(3), 255413(3), 255431(3), 255432(3), 255433(3), 255441(3), 254311(3), 254371(3), 254423(3), 254472(3), 254473(3), 205101(1)

Fishery Biology

Major Requirements 38 credits
252331(4), 252332(3), 252341(3), 252434(3), 252442(3), 252443(3), 252451(3), 252497(1), 416311(1), 416312(1), 423414(4), 205101(1)

Technical Electives 12 credits
Choose from the following courses:-
252432(3), 252433(3), 252441(3), 252444(3), 252445(3), 252446(3), 252491(3), 252496(1-3), 252498(1-3), 253321(3), 253421(3), 253422(3), 253481(3), 253482(3), 253483(3), 254311(3), 254371(2), 254411(3), 254423(3), 254461(3), 254471(3), 254472(3), 254473(3), 251321(3), 251322(3), 251323(3), 251324(3), 251371(3), 251441(3), 251441(3), 251452(3), 255361(3), 255411(3), 255413(3), 255432(3), 255433(3), 255434(3), 255443(3), 255451(3), 255452(3), 255462(3), 423311(5), 423441(3), 423441(3), 423442(3), 403134(5), 402331(4), 402332(3), 402431(3), 403455(3), 403456(3), 402432(3), 402433(3),

Fisheries Management

Major Requirements 38 credits

253321(3), 253381(3), 253382(2), 253411(3), 253421(3),
253481(3), 253482(3), 253483(3), 253491(3), 253497(1),
252341(3), 252443(3), 422451(3), 132111(3)

Technical Electives 12 credits

Choose from the following courses:-

253412(3), 253422(3), 253496(1-3), 253498(1-3), 252331(4),
253332(3), 252431(3), 252432(3), 252433(3), 252441(3),
252442(3), 252444(3), 252445(3), 252451(3), 254311(3),
254371(3), 254411(3), 254423(3), 254461(3), 254471(3),
254472(3), 254473(3), 251321(3), 251322(3), 251323(3),
251324(3), 251325(3), 251371(3), 251452(3), 251462(3),
255351(3), 255352(3), 255361(3), 255413(3), 255441(3),
255462(3), 417281(2), 422481(3), 145111(3), 205101(1)

Fisheries Product

Major Requirements 38 credits

254311(3), 254371(2), 254411(3), 254421(3), 254422(3),
254423(3), 254461(3), 254471(3), 254472(3), 254473(3),
254497(1), 4023313), 402332(3), 052111(2),

Technical Electives 12 credits

Choose from the following courses:-

006256(3), 006257(3), 051462(3), 051463(3), 051464(3),
052341(2), 053111(2), 053241(3), 112111(3), 131331(3),
145111(3), 205101(1), 251321(3), 251322(3), 251323(3),
251324(3), 251351(3), 251371(3), 251462(3), 252331(4),
252332(3), 252341(3), 252431(3), 252441(3), 253321(2),
253382(2), 253411(3), 253481(3), 253482(3), 253483(3),
254496(1-3), 254498(1-3), 255431(3), 255432(3), 255433(3),
403134(5), 403231(4), 403331(2), 403332(3), 403451(3),
403455(3), 417281(2), 419434(4), 419436(4), 421312(3),
422461(3), 422481(3), 459271(3)

Marine Science

Major Requirements 38 credits

255351(2), 255352(3), 255361(3), 255411(3), 255413(3),
255451(3), 255461(3), 255462(3), 255497(3), 252311(3),
252341(3), 252443(3), 251322(3), 205101(1)

Technical Electives 12 credits

Choose from the following courses:-

255412(3), 255431(3), 255432(3), 255433(3), 255434(3),
255441(3), 255442(3), 255443(3), 255452(3), 255496(1-3),
255498(1-3), 253381(3), 253412(3), 253481(3), 252332(3),
252431(3), 252441(3), 252442(3), 252446(3), 252451(3),
251324(3), 251351(3), 254371(3), 254423(3), 254471(3),
254472(3), 254473(3)

Free electives 3 credits
Fisheries Training
Field practice of at least 200 hours

Master of Science (Fisheries Science)
(Total minimum requirements 45 credits)
Credits hours

Major Courses a minimum of 24 credits
Major Courses a minimum of 9 credits
Thesis 9 credits
Credits hours for major and minor courses must be for at least 36 credits

Major Courses

Choose at least 24 credits from the following:
252431(3), 252432(3), 252433(3), 252434(3), 252441(3),
252442(3), 252443(3), 252444(3), 252445(3), 252446(3),
252451(3), 255411(3), 255412(3), 255413(3), 255431(3),
255432(3), 255433(3), 255434(3), 255441(3), 255442(3),
255443(3), 255451(3), 255452(3), 255461(3), 255462(3),
253531(3), 252532(3), 252533(3), 252534(4), 252541(3),
252542(3), 252543(3), 252544(3), 252545(3), 252546(3),
252547(3), 252548(3), 252549(3), 252551(3), 252591(3),
252596(3), 252597(1), 252598(1-3), 255541(3), 255542(3),
255544(3), 255545(3), 255551(3), 255552(3), 255554(3),
255591(3), 255596(1-3), 255597(1), 255598(1-3)

Minor Courses at least 9 credits
Choose courses numbered above 400 offered in other departments. The study plan is subjected to the approval of Advisory Committee, Department Head and Dean of the Graduate School.

Thesis 9 credits
209599(1-9)

Master of Science (Aquaculture)
(Total minimum requirements 36 credits)
credits Hours

Major Courses a minimum of 15 credits
Minor Courses a minimum of 19 credits
Thesis 12 credits
Credit hours for major and minor courses must be for at least 24 credits

Major Courses
Choose at least 15 credits from the following :
402435(3), 423451(3), 009534(3), 252434(3), 252435(4),
422461(3), 251463(3), 251464(3), 251521(3), 251522(3),

251523(3), 251524(3), 251525(4), 251531(3), 251532(3), 251541(3), 251551(3), 251571(3), 251572(3), 251596(1-3), 251597(1), 251598(1-3)

Minor Courses at least 9 credits

Choose coures numbered above 400 offered in other departments. The study plan is subjected to the approval of the Advisory Committe, Department Head and Dean of the Graduate School.

Thesis 12 credits

251599 (1-12)

COURSES DESCRIPTION

AQUACULTURE (251)

251101 General Aquaculture 2(2-0)
Pre : 424111 or 424113
History of aquaculture; gerneral information on breeding and cultivation of fishes and other aquatic animals including pond construction, fertilization, feeding, and related problems.

251211 Principle of Aquaculture 3(3-0)
Pre : 253111
Introduction to aquaculture of the World; history and present status of aquaculture in Thailand; informations on soils, water, fertilizers, and feed as related to aquaculture; and species suitable for culturing purpose.

251321 Breeding and Nursing of Fresh water Fishes 3(2-2)
Pre : 251211
Philosophy of breeding of freshwater fish and other freshwater aquatic animals; principles, methods, and hatchery management.

251322 Breeding and Nursing of Marine Animals 3(2-3)
Pre : 251211
Principles and method on breeding, spawning, and nursing of marine shrimp, crab, fish, and other economic marine species.

251323 Freshwater Fish Culture 3(2-2)
Pre : 251211
Culturing methods for freshwater fish and other freshwater aquatic animals; and production, hervesting, transportation, and problems related to commercial scale culture of freshwater aquatic animals.

251324 Mariculture 3(3-0)
Pre : 251211
Culturing methods for marine shrimp, crab, molllusc, fish seaweed and other economic marine species.

251351 Water Qulity and Productivity of Fish Ponds 2(2-0)
Pre : 251221 or 403113
Water quality and productivity of fish ponds, nutrient cycle and relationship between quality and fish ponds productivity.

251361 Fishery Engineering 3(3-0)
Pre : 420119
Definition and water property in mechanics, statics, and dynamics. Analysis of dimension and similarity. Application of hydraulics for fisheries. Structural analysis and design of concrete structure, metal, and wood. Design and application of civil engineering for fisheries.

251371 Fish Feed and Feeding 3(2-2)
Pre : 251211 and 403113
Feed sources, their chemical compositions, and their selection for feed preparation; nutritional requirements of feed for body maintenance, growth, and reproduction of aquatic animals; and principles and practice in feeding as related to aquatic animal production.

251441 Principle of Aquatic Animal Genetics 3(3-0)
Pre : 416311 and 416312
Chromosome studies, inheritance of aqulitative and quantitative traits and application of genetics in aquaculture.

251452 Water Analysis 3(2-2)
Pre : 251351
Theories, instruments and methods for water analysis. Interpretation of water quality data and its application for aquaculture.

251462 Fish Pond Construction 3(2-3)
Pre : 251211
Principles and criteria for site selection for fish ponds. Surveying, mapping and construction of fish ponds and water system. Design of ponds and culturing facilities.

251496 Selected Topics in Aquaclture 1-3
Interestion topic in aquaculture for undergraduate level.

251497 Seminar 1,1

251498 Special Problems 1-3
Research and report for undergraduate level.

251521 Advanced Freshwater Aquaculture 3(2-0)
Freshwater aquaculture system. Application of culturing techniques of freswater fish and other economical species so better production can be achieved.

251522 Advanced Mariculture 3(3-0)
Culturing methods and culturing systems in mariculture. Principle, advantages and disadvantages of these methods and systems. Development plan of mariculture in the future.

251523 Hormone in Aquaculture 3(3-0)
Endocrine systems related to reproduction and growth of aquatic animals. Hormone application and controls in aquatic animals in aquaculture.

251524 Aquaculture Project Planning 3(3-0)
Systems of aquaculture project plannind and aquaculture project output evaluation.

251531 Immunology of Aquatic Animals 3(2-2)
Pre : 252332
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.

251532 Application of Chemicals and drugs in Aquaculture 3(3-0)
Chemicals and drugs used in aquaculture for improving water quality and prevention and control of diseases. Mode of action and effects of water quality on mode of action of chemicals and drugs. Effects of chemicals and drugs on pond ecosystem.

251541 Genetic Improvement of Aquatic Animals 3(2-2)
Principle of genetic improvement of aquatic animals. gentic imrpovement by selection, mating system, hybridization, polyploidy induction, gynogenesis and genetic engineering methods.

251551 Water Quality Management in Aquaculture 3(2-2)
Pre : 251452
Water quality criteria for aquaculture in both hatchery and grow-out phases. Prevention and control of water quality problems by water quality management.

251561 Aquaculture Machinery 3(2-2)
Working mechanism, effciency, selection, repair and maintenance of water pumps, aerators, bottom cleners and other machineries in aquatic farms. Modification and application of machinery for aquaculture.

251562 Pond and Hatchery Design 3(2-2)
design of ponds, hatcheries, water system, aeration system and other equipment for aquaculture.

251571 Aquatic Animals Nutrition 3(2-2)
Pre : 251371
Feed conversion and nutrient requirement of aquatic animals. Feed formulation, feed preparation and nutritional value evaluation.

251572 Aquation Animal Feed Technology 3(2-2)
Pre : 251371
Technology of aquatic animal feed productions and their quality controls. Model of aquatic animal feed preparation plant. There will be field trip during the semester to some fed preparation plants.

251596 Selected Topics is Aquaculture 1-3
Interesting topic in aquaculture for grasuale level.

251597 Seminar 1,1

251598 Special Problem 1-3
Research and report for graduate level.

251599 Thesis 1-12

FISHERIES BIOLOGY (252)

252211 Invertebrates for Fisheries 3(2-2)
Pre : 423113
Group, Species and General biology of Invertebrates, their sigrification for Fisheries.

252212 Ichthyology 4(3-3)
Pre : 423113
External and internal features of fishes; life histories, ecology, organ system and systematic identification of Elasmobranch and Teleosts.

252331 Fish Taxonomy 4(3-3)
Pre : 252212
Principles and procedures of inchthyological classification.

252332 Diseases and Parasites of Fishes 3(2-2)
Pre : 423113
Pathogenic organisms and diseases; prevention and treament of fish diseases.

252341 Principles of Aquatic Ecology 3(2-2)
Pre : 423113 and 401114
The natural environmental effects on aquatic organisms and their relationships and aquatic ecosystem. Field trip required.

252431 Phycology 3(2-3)
Pre : 401114
Morphology, distribution, utilization and classification of algae. Field trip required.

252432 Fish Discases 3(2-2)
Pre : 252332
Epizootiology, pathogenesis, isolation, culture, taxonomy and immunology of bacterial and viral diseases of fishes, including prevention and treatment.

252433 Fish Parasitology 3(2-2)
Pre : 252332
Morphology, taxonomy, life history, ecology and pathological effects of parasites on fishes including their control.

252434 Physiology of Aquatic Animals 3(2-3)
Pre : 423113
Physiology and osmoregulation of aquatic animals, functiuonal of organ systems and their realtion.

252441 Benthic Fauna 3(2-2)
Pre : 423113
Taxonomy and ecology of benthic animals. Their significance to fisheries and aquatic environment.

252442 Planktonology 3(2-3)
Pre : 423113 and 401114
Classification and morpholgy of marine and freshwater planktons, qualitative and quantitative studies including drief accounts of primary productivity. Field trip required.

252443 Fishery Biology 3(2-2)
Pre : 417112 and 252111
Biology of fish stocks and effects of fisheries on fish population.

252444 Aquatic Plants and Fisheries 3(2-2)
Pre : 4001114
The relationship between aquatic animals and aquatic plants, good and bad effects of aquatic plants to fisheries, aquatic plants control, and polluted water treated by aquatic plants. Field trip requried.

252445 Ecology of Freshwater 3(2-2)
Pre : 252341
Nutrient cycles, energy transfer, ecological factors, distribution of organisms and human effect on ecosystem, including the conservation of freshwater ecosystem. Field trip required.

252446 Primary Productivity of Water 3(2-2)
Pre : 403113
Primary productivity of water, including the trophic levels, interrelation of phytoplankton and zooplankton, and techniques of measurement. Field trip requried.

252451 Limnology 3(2-2)
Pre : 403113
Physical, chemical and biological aspects of lakes and other inland waters.

252452 Water Chemistry and Water Quality Management for Fisheries 3(3-0)
Pre : 403113
Fundamentals of water chemistry. Water pollution study and control. Chemistry and quality management of surface water, pond water and aquarium water.

252491 Research Methods in Fishery Biology 3(3-0)
Principles and methods of research in fisheries.

252493 Sampling Techniques for Fishery Researchers 3(3-0)
Pre : 422111
Construction and analysis of sampling designs for fishery survey investigations. Sampling techniques in fishery science.

252496 Selected Topic in Fishery Biology 1-3
Interesting tropics in fisheries for undergradute level.

252497 Seminar 1,1

252498 Special Problems 1-3
Research and report for undergraduate level.

252531 Advanced Phycology 3(2-3)
Pre : 252431 or 401421
Comphehensive survey of local algae, field collections; identification; study on morphology, history and ecology of algae of economic inportance; and phycological liturature study of special topics. Field trip required.

252532 Advanced Taxonomy of Fish 3(1-6)
Pre : 252331
Principles and procedures of classification and identification of ichthyological; construction and utilization of keys for identification of fishes. Field trip required.

252533 Evolution of Fish 3(3-0)
Pre : 252331
Origin; evolution; and classification of fishes, both living and extinct species.

252534 Fish Pathology 4(3-3)
Pre : 252332
General fish pathology and pathology of diseased fish caused by bacteria, tungi, parasites and some chemicals in aquatic environment.

252541 Fishery Resource Assessment 3(3-0)
Pre : 422111
Assessment of fishery resources of fishing ground and spawning ground surveys, by marking experiment and by estimating the primary production.

252542 Aquatic Toxicology and Hazard Evaluation 3(2-2)
Pre : 252441
Principles and methods of aquatic toxicological study and hazard evaluation; types of toxic chemicals and other pollutants found in aquatic systems and their hermful effects on aquatic organisms and ecosystem.

252543 Fish Population Dynamics 3(2-2)
Pre : 252443
Theory of the exploited fish populations dynamics.

252544 Advanced Planktonology 3(2-2)

Pre : 252442

Ecology of plankton; positive and negative effects of plankton production on other aquatic organisms and fisheries; methods of plankton culture. Field trip required.

252545 Ecology of Fishes 3(2-2)

Pre : 252331 and 252441

Interrelationship between fishes and biotic and abiotic environments; fundamental links in life cycles of fishes; development growth, feeding, reproduction and migration; habits and behaviors. Field trip require.

252546 Biology of Polluted Water 3(2-2)

Pre : 252441 and 252451

Various kinds of wastes; biological ecological changes of aquatic conditions due to domestic, industrial and agricultural waste discharge; use of organisms as an indicatior of water pollution; filed trip inclued.

252547 Estimation of Fish Population Parameter 3(2-2)

Pre : 252543

Estimation of fish population parameters using tagging esperiment data and fisheries statistics.

252548 Pesticides in Aquatic Environment 3(2-2)

Pre : 252451

Types of pesticides that cause hazards in aquatic system; movement and fate of pesticides in aquatic environment and their toxicological and ecological effects.

252549 Physiology of Fish 3(2-2)

Pre : 252452 or 423352

Anatomical systems and their functions in fish, including effects of ecological factors on ways of lives in fish.

252551 Advanced Limnology 3(2-2)

Pre : 252451

Principle and application of limnological technology; conparative studies of physical, chemical and biological properties of inland waters; phenomena and some problems in the modern linmology.

252591 Bioassay in Water Pollution Study 3(2-2)

Pre : 252451

Principles and methods of bioassy, measurements of response of aquatic oeganisms to pollutant and toxic substances.

252596 Selected Topics in Fishery Biology (Algae Culture) 1-3

Pre : 252431 or 401421

Techniques of isolation and methods of cultivation of freshwater and marine algae. Field trip required.

252597 Seminar 1,1
To be arranged.

252598 Special Problems 1-3
Research and report for graduate level.

252599 Thesis 1-9
Master thesis.

FISHERY MANAGEMENT (253)

253111 General Fisheries 3(2-0)
Fisheries in the country and aborad. Fishery resources and their use. Basic information on aquaculture, fish processings, marketing and transportation, fish institutes and fishery policy.

253211 Fishery Law and Regulations 3(3-0)
Fishery law and regulations in general. Law of fisheries rights in Thai waters. Law on fish marketing organization and wholesale activities. International law on fisheries.

253311 Fishery Literature 2(2-0)
Principles on literature review and report writing in the science of fisheries.

253321 Fishery Resource Conservation 2(2-0)
Pre : 253111
Back ground on fishery resource and related environments. Problems of resource degradation. Principles and mothods in fishery conservation. Field trip required.

253381 Principles of Aquafarm Management 3(3-0)
Pre : 253111 and 110181
General feature of aquafarm. Economic principles used in aquafarm management and planning. Business administration and aquafarm accounting. Evaluation and analysis of aquafarm business. Factors affecting cost and return in aquafarm implementation. Field trip required.

253382 Fish Marketing Organization and Wholesale Activities 2(2-0)
Basic on fish marketing organization and wholesale activities. Development and promotion of fish marketing in Thailand. Field trip required.

253411 Fishery Extension 3(3-0)
Pre : 253111
Principles on fishery extension. Planning and evaluation of extensional projects. Audio-visual aids for extension works. Field trip required.

253412 International Law of the sea 3(3-0)
Pre : 253211
Theory, concept and back ground of fishery resource use. Fishing zone and international law of the sea.

253421 Inland Water Improvement 3(2-2)
Pre : 252341
Princhiples and methods in water resource improvement of ficheries. Biophysical conditions of water resources. Planning, implementation and evaluation of water resource improvement projects.

253422 Water Resource Management for Fisheries 3(3-0)
Cycle and hydrology of water resources. Control and management of water resources for fisheries.

253481 Principles of Fishery Economics 3(3-0)
Pre : 102181
Importance of fishery resources to the economy. Economic principles on fishery resource management. Basic informations on fish marketing and fish price analysis. Field trip required.

253482 Principles of Fishery Management 3(3-0)
Pre : 252443
Management objectives and fishing grounds. Fish production and population statistics. Management and development of fisheries in Thailand. Management of fisheries in international waters.

253483 Fishery Project Planning 3(2-2)
Preparation, planning, control and evaluation on fishery projects. The use of microcomputer in fishery project planning.

253491 Research Methodology in Fishery Management 3(3-0)
Research methodology and issue analysis on fishery management.

253496 Selected Topics in Fishery Management 1-3
To be arranged

253497 Seminar 1,1
To be arranged

253498 Special Problems 1-3
Research and report for undergradute level.

253581 Advanced Fishery Economic 3(3-0)
Role of fishery as part of the whole economics production in a country. Analysis of fisheries economics models. Economics aspects of fishery requlations.

253852 Advanced Fishery Management 3(3-0)
Analysis and management of multi-stock fisheries in tropical areas and small scale fisheries, their problems, including shared fisheries, joint research and management.

253583 Advanced Aquafarm Management 3(3-0)
Analysis of aquafarming practices through case study method. Aquafarming and budgeting under changing economic, social and technologcial conditions using linear programming, game theory and simulation methods. Field trip required.

253584 Fishery Policy 3(3-0)
Basic concepts of fishery policy. Methods of policy programming and evalutions. Emphasize on Thai fishery policy.

253585 Fishery Resources and Management 3(3-0)
Types of fisheries resources, potential areas for aquaaculture and fishing industries, surplus production and harvestable parts of stock. Utilization and methods of requlations. Field trip required.

253586 Fisheries Administration 3(1-3)
Problems, policies, structure and organization in fisheries administration. Field trip required.

253596 Selected Topics in Fishery Management 1(1-3)
Interesting topics in fishery management. The topics will be changed in each semester. Field trip required.

253597 Seminar 1,1

253598 Special Problems 1-3
Research and report making for graduate level.

253599 Thesis 1-9

FISHERY PRODUCTS (254)

254211 Principles of Technology in Fisheries Products 3(3-0)
Pre : 403211
Utilization of fishery resources and their byproducts; chemical composition of fish; biochemical and microbriological changes in fish post-mortem; handing and sanitation; basic principles of fish preservation; fish inspection and quality control.

254311 Fish Microbiology 3(2-3)
Pre : 419214
Micro-organisms in fresh water; their activities related to the aquatic animals; classification of some bacteria isolated from fresh water and aquatic animals.

254371 Fish Preservation 2(2-0)
Pre : 254211
Principles of fish preservations. Factors affecting qualities of raw materials and finished products.

254411 Microbiology of Fishery Products 3(2-2)
Pre : 254311
Micro-organisms affecting to fish processing and fishery products. Coliform bacteria and other bacteria which relating to hygiene and standard of fishery products. Field trips required.

254421 Fishery Products Analysis I 3(2-2)
Pre : 403113 and 420119
Principles and procedure in analysing the composition of fishery products by chemical and physical menthods.

254422 Fishery Products Analysis II 3(2-2)
Pre : 254421
The chemical and sensory evaluation of fishery products; vitamin, amino acids analysis and the evaluation of biological value proteins in fishery products.

254423 Quality Control of Fishery Products 3(2-2)
Principles of quality control. Methods for determining quality of raw material and fishery products. Quality assurance and statistica analysis quality evaluation.

254461 Fish Processing Machines 3(2-2)
Fish processing machines and parts. Principles of machine operations. Fish processing plant design. Field trip required.

254471 Refrigeration of Aquatic Products 3(3-0)
Pre : 419214 and 420119
Principles of refrigeration, equipment and machinery, freezing/thawing process of aquatic products and others, cold storage design and load calculation, and factors affecting quality change, sanitation and standards, field trip to freezing plants.

254472 Fish Processing I 3(2-2)
Pre : 254371
Principles of fish processing. The use of chemical preservative, salting, drying, fermentation and irradiation in fish preservation. Field trips are sequired.

254473 Fish Processing II 3(2-2)
Pre : 254472
Fish preservation by thermal processing. Principles of food packaging. Field trip are required.

254496 Selected Topics in Fishery Products 1-3
Interesting topics in fishery products. Topic varies in each semester. Field trip included.

254497 Seminar 1,1

254498 Special Problems 1-3
Study on selected topic at a. B.S. level with a report submited.

254522 Seafood Nutrition 3(3-0)
Nutritional properties of aquatic organism; post harvest biochemical changes; effects of processing on nutritive values; safety of seafood.

254571 System Analysis and Management in Fish Processing Industry 3(2-3)
Using system dynamics; analytical techniques; charts and management to improve processing; planning design of plant layout and operation in fishery products processing industry.

254572 Advanced Fish-Processing 3(2-3)
Systematic review of new products; processes; energy conservation; waste treatment; by product utilization and management practices in seafood industry.

254573 Thermal Processing Technology of Fishery Products 3(2-3)
Thermal processing techniques of fishery products; heat penetration of fish in different packaging materials; heat resistance of microorganisms; calculations of time and temperature in pasteurization and steilization of fishery products.

254574 Fishery Products Development 3(3-0)
Development of fish processing and fishery products; technical problems and solutions in fish processing; marketing and standardization of fishery products.

254596 Selected Topics in Fishery Products 1-3

254598 Special Problems 1-3
Research and report for graduate level.

MARINE SCIENCES (255)

255211 Introduction to Marine Science 3(2-2)
Gerneral knowledges of the seas in relation to physical, chemical, biological and geological sciences. Field trip required.

255351 Meteorology 2(2-0)
Atmospheric struture. Themodynamics and heat balance, condensation hydrometers, air masses, weather fronts.

255352 General Oceanography 3(2-1)
Pre : 255211
Origin and nature of the oceans, physical and chemical properties of sea water and its role to biology. Field trip required.

255361 Fishing Gears 2(2-2)
Types of fishing gear and operation methods. Field trip required.

255411 Introduction to Marine Geology 3(2-2)
Pre : 255352
Thansformation of crust, continental shelf and coast, types of sediment and distribution, marine natural resources. Field trip required.

255412 Marine Microbiology 3(2-2)
Pre : 419214
Morphology and identification of marine microoganisms and plankton.

255413 Marine Biology 3(2-2)
Pre : 255211
Biology of marine animals and plants, their environments and utilization of marine resources. Field trip required.

255431 Natantia 3(2-2)
Pre : 255211
Taxonomy, ecology and culture of natantia, emphasis of enconomic local species. Field trip required.

255432 Reptantia 3(2-2)
Pre : 252221
The classification, ecological aspects of reptantia, emphasized on Thai economic species. Field trips required.

255433 Marine Molluse 3(2-2)
Pre : 252211
General characters, classification, evolution and ecological aspects of marine molluscs, including their economically improtant. Field trip required.

255434 Marine Fish Larvae 3(2-2)
Pre : 252211
General information, taxonomy and ecology of marine fish larvae. Field trip required.

255441 Biology of Brackishwater 3(2-2)
Pre : 255413
Classification estuaries, origin and its evolotion, analysis of estuaries systems, chemistry, physics, geology and biology including survey of characteristics and treatment of estuarine pollutions. Field trip required.

255442 Natural History of Marine Animals 3(2-2)
Pre : 255211
Life history and distribution of marine animals. Field trip required.

255443 Marine Pollution 3(2-2)
Pre : 255352
Kinds and resources of pollutants, their transportation and dispersion in water, sediment and marine organisms. Ecological effects on primary producer, consumers and man. Field trip required.

255451 Chemical Oceanography 3(2-2)
Pre : 403113 and 255352
Composition of sea water, changes in composition, chemical properties and analytical methods.

255452 Physical Oceanography 3(2-2)
Pre : 255352
Physical properties of the oceans and their circulations.

255461 Coastal Navigation 3(2-2)
Pre : 255352
Study of navigation instruments, position finding, direction, deviation and deviation error.

255462 Instruments and Methods in Oceanography 3(2-2)
Pre : 255211
Types of instruments and operation methods in oceanography. Field tripm required.

255496 Selected Topics in Marine Science 1-3
To be arranged.

255497 Seminar 1,1

255498 Special Problems 1-3
Research and report for undergraduate level.

255541 Behavior and Adaptation of Aquatic Animals 3(2-2)
Pre : 252221
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 and genetic factors influencing behavior.

255542 Marine Ecology 3(2-2)
Pre : 252341
Types of environment in the oceans emphasis on tropical sea; effect of environmental changes on breeding cycles, plankton, food chains, and population; application on ecological techniques to local problems. Field trips.

255543 Selected Topics in Marine Science 0(2-1)

255544 Ecology of Marine Phytoplankton 3(2-2)
Pre : 252341
Production, fluctuation, diversity, species succession, sinking and suspension will be discussed in relation to the available nutrients, light, temperature, and salinity, Problem and technique in measurement of primary production, Role and significance of phytoplankton to food chain.

255545 Estuarine Pollution 3(2-2)
Pre : 255441
Study of the various types of pullutants and their effects on the estuarine environment, physiological effects on fauna, problems in aquaculture and their related effects, water quality for aquaculture purposes and monitoring programmes; detection, surveilance and abatement of estuarine pollution. Preventive and protective measures will be discussed.

255551 Physiology of Crustacea 3(2-2)
Pre : 255432
Comprehensive understanding of mechanism and their function in relation to salts and water balance, active transport, excretion and endocrine system of crustaceans.

255552 Osmotic and Ionic Regulation in Aquatic Animals 3(2-2)
Pre : 255551
Physiology of aquatic influence of the marine origin of life on basic physiological processes and cell microstructure, effects of high pressure on physiological processes, bouyancy regulation in relation to pressure variation, diving problems of marine animals.

255554 Physiology of Marine Phytoplankton 3(3-0)
Pre : 255544
Physiological mechanism for floatation and sinking. Absorption, assimilation and function of some essential nutrients. Mechanism of calcification, silicification, photosynthesis and their relationship. Physical and chemial effevts on growth rate, the synthesis of protein, carbohydrate, chlorophy II and total pigment.

255591 Biological Equations and Interpretations 3(2-2)
Pre : 413312
Equations, reasons, origins, errors and interpretations of biological equation presentations. Methods of appropiate equation selections, and their facts of evidence.

255596 Selected Topics in Marine Science 1-3
To be arranged.

255597 Seminar 1,1

255598 Special Problems 1-3
Research and report for graduate level.

255599 Master Thesis 1-9

Nondegree Training

The Faculty of Fisheries has a number of good programs for training people those who would like to gain their knowledges either in theoretical or practical aspects in the field of fisheries and aquaculture. There are:

(1)	Identification of Plankton	3 weeks
(2)	Taxonomy of Fishes	4 weeks
(3)	Taxonomy of Economic Seaweeds	4 weeks
(4)	Cultivation of Economic Seaweeds	4 weeks
(5)	Fishery Post-Harvest Technology	4 weeks
(6)	Tropical Marine Mollusc	4 weeks
(7)	Diseases Diagnosis and Control in Aquaculture	7 weeks
(8)	Fishery Resource Management	7 weeks
(9)	Inland Aquaculture	8 weeks