

Faculty of Fisheries, Kasetsart University

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| Subject: | 01252535 Ecology of Sediment | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Bottom Sediments, Benthic Ecology | | |
| Lecturer: | Associate Professor Dr. Charumas Meksumpun (Principle laboratory building; room 108) (on Thursday; 1-3 pm) | | |
| Objective: | <ol style="list-style-type: none">1. To understand the sources, types, and function of sediments in the aquatic ecosystems2. To understand the inter-relation among the sediments and other abiotic and biotic resources in various types of aquatic ecosystems3. To apply the knowledge for conservation and remediation management of the aquatic resources | | |
| Class outline: | Sources, compositions, and categorizations of sediments. Sediment sampling techniques. Physical, chemical, and biological properties of aquatic sediments. Production, decomposition, and nutrient cycling. Roles of sediments on benthic community. Sediment organic pollution and remediation approach. | | |
| Class schedule: | <ol style="list-style-type: none">1. Introduction / the importance of sediments2. Sources and types of the sediments3. The survey and collection of the sediments4. The physical characteristics of the sediments5. The physical characteristics of the sediments6. The chemical characteristics of the sediments7. The chemical characteristics of the sediments8. The biological characteristics of the sediments9. The biological characteristics of the sediments10. Nutrient cycles in the benthic boundary layer11. Benthic production and food chain12. Benthic decomposition13. Human impacts and sediment pollution14. Sediment remediation and conservative management15. Paper seminar / open discussion | | |
| Important items: | Sediment Ecology and Conservative Management | | |
| Self-studies and advices | Data bases of US EPA, Website of Woods Hole Oceanographic Institute USA | | |
| Textbook: | The Ecology of Sediments (<i>Gray, 1981</i>) Sediments (<i>Meksumpun, 2005</i>) | | |
| Condition: | Principle of Aquatic Ecology | | |
| Assessment method: | <ol style="list-style-type: none">1) Mid-term and Final examination,2) Literature review, report, and seminar,3) Group discussions / class attention | | |
| Evaluation criteria: | Total > 50% = pass, class-group based criteria | | |
| Relevant matters: | Early diagenesis of benthic boundary layer | | |

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|--------------------------|---|--------------------|--|
| Subject: | 01255543 Marine Biological Diversity | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Biodiversity. Ecology, Marine Science | | |
| Lecturer: | Associate Professor Dr. Chittima Aryuthaka, Dr. Napakhwan Whanpetch, Dr. Yaowaluk Monthum (room no. and building) MS 5228, Marine Science building (contact hours) 8:30-16:30 Tel. 02-561-4288 | | |
| Objective: | Provide student with an understanding of concepts and principles of marine biological diversity, mathematical models on distribution of marine organisms, biodiversity index, Lawsand conventions for marine biodiversity | | |
| Class outline: | 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. | | |
| Class Schedule | <ol style="list-style-type: none">1. Introduction and description of marine biological diversity.2. Term and definitions of marine diversity.3. History of marine ecological concepts and principle.4. Distribution of marine organisms.5. Measuring of biological.6. Utilization and potential of marine biological diversity index for marine environmental monitoring and assessment.7. Law and relevant legislation and conventions for marine biological diversity | | |
| Important items: | | | |
| Self-studies and advices | 3 hrs./week | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion. | | |
| Assessment criteria: | | | |
| Relevant matters: | Conducted in English | | |

Faculty of Fisheries, Kasetsart University

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|--------------------------|---|--------------------|--|
| Subject: | 01253511 Coastal and Marine Fishery Management | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | | | |
| Lecturer: | Assistant Professor Dr. Jiraporn Trisak (room no. and building) (contact hours) | | |
| Objective: | <ol style="list-style-type: none">1. Understand general principles and objectives and of fisheries management2. Learn and understand principles and applications of fish population dynamics and fisheries stock assessment from classic case studies in fisheries3. Develop skill in analyzing data and information on fish and fisheries as well and in interpreting the results by providing scientific evidence. | | |
| Class outline: | 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. | | |
| Class schedule: | <ol style="list-style-type: none">1. Introduction: Review-Objective of fishery management; History of fisheries management; Modeling2. Growth, Mortality, Catch Process3. Biomass of a cohort4. Whale fishery5. 1st MIDTERM-In class (TBA), 1st Midterm Solution,6. Biomass Dynamic Models7. Biomass Dynamic Models (cont.), Fisheries Management Techniques & Tools8. Fisheries Management Techniques & Tools (cont.)9. Small Shoaling Pelagic Fisheries10. Small Shoaling Pelagic Fisheries (cont.), Review & Wrapping up11. 2nd MIDTERM-In class (TBA), 2nd Midterm Solution,12. MSY, MEY, and CPUE13. The Northern Prawn Fisheries14. Yield per Recruit Model, Tropical Penaeid Shrimp Fishery15. Spawner Recruit Model, FINAL-In class | | |
| Important items: | | | |
| Self-studies and advices | TBA | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation into Class and discussion. | | |
| Assessment criteria: | Grading: $\geq 91\%$ A, 86-90% B+, 81-85% B, 76-80% C+, 71-75% C, 66-70% D+, 61-65% D, $\leq 60\%$ F | | |
| Relevant matters: | Conducted in English | | |

Faculty of Fisheries, Kasetsart University

Subject: 01253512 Semester
Fishery Resources and Management Credit 3
(lecture-laboratory-self study: 3-0-6)

Key words:

Lecturer: Dr. Sansanee Wangvoralak
(Room no. 4108 at Department of Fishery Management)
(9.00-16.00 from Monday to Friday)

Objective: 1. Understanding of fishery resources and fishery management
2. Familiarity with legal and institutional considerations in national and international level

Class outline: 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.

Class schedule: 1. Important of fisheries industry and fisheries problems
2. Knowledge relevant to fishery management: water resource, fishery resources and structure of fisheries
3. Biology and ecology aspects for fishery management (1)
4. Biology and ecology aspects for fishery management (2)
5. Economic aspect relevant to fishery management
6. Concept and theory in fishery management (1)
7. Concept and theory in fishery management (2)
8. Present and discuss on self-study report
9. Fishery Governance (1)
10. Fishery Governance (2)
11. Fishery management measures
12. Coastal, Off-shore and oversea fishery resources Management
13. Laws, regulations and agreements in relation to fishery management in national and international level (1)
14. Laws, regulations and agreements in relation to fishery management in national and international level (2)
15. Fishery management in Thailand and the world

Important items:

Self-studies and advices

Textbook: Bavinck, M. et al. 2005 Interactive Fisheries Governance: A guide to better practice. Centre for Maritime Research. Amsterdam. FAO. 2000. Use of property rights in fisheries management. Food and Agriculture of the United Nations. Rome.
FAO. 2002. A fishery manager's guidebook. Food and Agriculture of the United Nations. Rome.
Kooiman, J., et al. 2005. Fish for Life: Interactive Governance for Fisheries. Amsterdam University Press. Amsterdam.
Pomeroy, R.S. and R. Guieb. 2006. Fishery Co-Management: A Practical Handbook. CABI Publishing, Massachusetts.
Chuenpagdee, R. (ed.). 2011. World Small-Scale Fisheries Contemporary Visions. Eburon Academic Publishers, Netherlands.

Condition:

Assessment method:

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| Assessment criteria: | A | 80-100 points |
| | B+ | 75-79 points |
| | B | 70-74 points |
| | C+ | 65-69 points |
| | C | 60-64 points |
| | D+ | 55-59 points |
| | D | 50-54 points |
| F | 0-49 points | |

Relevant matters:

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|--------------------------|---|--------------------|--|
| Subject: | 01253521 Fishery Resource Economics | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Fishery resource economics, Resource Economics | | |
| Lecturer: | Dr. Varunthat Dulyapurk Rm#4211 Department of Fishery Management, Faculty of Fisheries 9.00 – 16.00 (Mon-Fri) Appointment preferred. | | |
| Objective: | This course will familiarize students with the theory and application of economics to fishery resource problems and management schemes. | | |
| Class outline: | 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. | | |
| Class schedule: | <ol style="list-style-type: none">1. Mathematical Economics I2. Mathematical Economics II3. Microeconomics4. Fishery Resource Economics: Static optimization perspective I5. Fishery Resource Economics: Static optimization perspective II6. Fishery Resource Economics: Dynamic optimization perspective I7. Fishery Resource Economics: Dynamic optimization perspective8. Fishery Resource Economics: Schooling Fisheries I9. Fishery Resource Economics: Schooling Fisheries II10. Fishery Resource Economics: Search Fisheries I11. Fishery Resource Economics: Search Fisheries II12. Fishery Resource Economics: Multi-species Fisheries I13. Fishery Resource Economics: Multi-species Fisheries II14. Fishery Resource Economics: Impact Assessment I15. Fishery Resource Economics: Impact Assessment II | | |
| Important items: | none | | |
| Self-studies and advices | none | | |
| Textbook: | <ul style="list-style-type: none">• P.H. Neher. 1990. <i>Natural Resource Economics</i>. Cambridge University Press.• D. Leonard and N. Van Long. 1992. <i>Optimal Control Theory and Static Optimization in Economics</i>. Cambridge University Press.• Anderson, Lee G. 1986. <i>The Economics of Fisheries Management</i>. The John Hopkins University Press.• Cunningham, Stephen, Michael R. Dunn and David Whitmarsh. 1985. <i>Fisheries Economics an introduction</i>. St. Martin's Press. | | |
| Condition: | - | | |
| Assessment method: | Examinations, term paper and homework assignments. | | |
| Assessment criteria: | - | | |
| Relevant matters: | - | | |

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|--------------------------|---|--------------------|--|
| Subject: | 01251521 Advanced Freshwater Aquaculture | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Freshwater Aquaculture, Sustainable Aquaculture | | |
| Lecturer: | Dr. Suchart Ingthamjitr –Principal Instructor Assistant Professor Dr. Ruangvit Yoonpundh Mek Boonpharm Building, Department of Aquaculture Monday-Friday afternoon official hours 08.30-16.30 hours | | |
| Objective: | 1. To overview global aquaculture and freshwater aquaculture in Thailand 2. To understand principle of different freshwater aquaculture systems; constraints and challenges 3. To promote sustainable freshwater aquaculture development | | |
| Class outline: | Freshwater aquaculture systems. Principle, advantage and disadvantage of each culturing system and the prospect of freshwater aquaculture development. | | |
| Class schedule: | 1. Overview of freshwater aquaculture 2. Interactions between aquaculture and the environment 3. Systems carrying capacities and operation intensities 4. Species cultured and culture system development 5. Reductions in wastes from freshwater aquaculture 6. Nutritional strategies and present approach to waste management 7. Technologies for sustainable aquaculture development 8. Integrating aquaculture systems 9. Recirculating aquaculture systems 10. Organic aquaculture systems 11. The legal regime governing aquaculture 12. Aquaculture certification 13. Seminar : Project presentation assignment 14. Seminar : Project presentation assignment 15. Seminar : Project presentation assignment | | |
| Important items: | All topics | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Self-studies and advices | Reading textbooks involving sustainable aquaculture, freshwater aquaculture, and Journal of Aquaculture, etc. | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion. | | |
| Assessment criteria: | - | | |
| Relevant matters: | Conducted in English | | |

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|--------------------------|---|--------------------|--|
| Subject: | 01251523 Hormone in Aquaculture | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Aquaculture, Hormone, Growth | | |
| Lecturer: | Assistant Professor Dr. Oraporn Meunpol (Department of Aquaculture Bldg.) (0900-1600) | | |
| Objective: | 1. To understand roles of hormones in aquatic fauna 2. To study hormone manipulation in aquaculture | | |
| Class outline: | Endocrine systems related to reproduction and growth of aquatic animals. Hormone application and control in aquatic animals for aquaculture. | | |
| Class schedule: | <ol style="list-style-type: none">1. Roles and importance of hormones on aquatic fauna2. Hormone mechanisms3. Endocrine glands and their hormones4. Growth hormone, Thyroid hormones5. Feed controlled hormones6. Steroid hormones7. Reproductive hormones (1)8. Reproductive hormones (2)9. Other hormones: bioamines, stress, immunity, behaviour etc.10. Crustacean hormones: endocrine glands and their hormones11. Moulting hormones12. Crustacean hyperglycemic hormones13. Reproductive hormones14. Other hormones: steroids, pigment controlling hormones, pheromones, bioamines etc.15. Hormone application in aquaculture | | |
| Important items: | Hormone mechanisms, growth and reproductive hormone | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Self-studies and advices | | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion. | | |
| Assessment criteria: | | | |
| Relevant matters: | Conducted in English | | |

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|--------------------------|---|--------------------|--|
| Subject: | 01251532 Application of Chemicals and Drugs in Aquaculture | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | antimicrobial agents; disinfectants; aquaculture | | |
| Lecturer: | Dr. Nontawith Areechon Rm 315, Department of Aquaculture Monday till Friday 9.00-16.00 | | |
| Objective: | To learn about the principle of the application of disinfectants, antimicrobial agents and other compounds that can be applied in aquaculture. Students will be informed about mode of actions, residual effects and other information of each chemical. | | |
| Class outline: | 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. | | |
| Class schedule: | <ol style="list-style-type: none">1 : Relationship between aquaculture systems and disease outbreaks2 : Significant diseases in freshwater and brackish water aquaculture3 : Significant diseases in freshwater and brackish water aquaculture4 : Definitions and sources of drugs5 : Units and calculation methods for the drug applications in Aquaculture6 : Units and calculation methods for the drug applications in Aquaculture7 : Considerations for the effective applications of chemicals and drugs in aquaculture8 : Considerations for the effective applications of chemicals and drugs in aquaculture8 : Applications of disinfectants in aquaculture9 : Applications of disinfectants in aquaculture10 : Applications of disinfectants in aquaculture11 : Applications of anti-microbial agents in aquaculture12 : Applications of anti-microbial agents in aquaculture13 : Applications of other compounds in aquaculture: vitamins, probiotics, immunostimulants, algicide <i>etc.</i>14 : Applications of other compounds in aquaculture: vitamins, probiotics, immunostimulants, algicide <i>etc.</i>15 : Applications of other compounds in aquaculture: vitamins, probiotics, immunostimulants, algicide <i>etc.</i> | | |
| Important items: | | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Self-studies and advices | | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion. | | |
| Assessment criteria: | Overall performances from examination, report and other assignments | | |
| Relevant matters: | Conducted in English | | |

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|-----------------------------|--|--------------------|-------------------------------|
| Subject: | 01255583 Responsible Fishing Technology | Semester Credit | 2 nd semester 3 |
| Key words: | Tropical fisheries management, developing country, small-scale fishery, subsistent fishery, fishing effort, data-limited fishery, subsidy, supports, compensation, participatory approach, ODA, poverty alleviation | | |
| Lecturer: | Asst. Prof. Dr. Anukorn BOUTSON Assoc. Prof. Dr. Thanitha DARBANANDANA | | |
| Contact office: | Rm. 5118, Department of Marine Science, Faculty of Fisheries | | |
| Contact hours: | Tue 0900 – 1600, Wed 1300-1600 | | |
| Objective: | To let student understand; (1) Fishing gear and methods, (2) Bycatch and discards issue including others problems of capture fisheries such as IUU (3) Code of conduct for responsible fisheries (4) Behavior of aquatic animals against the fishing gear (5) Selectivity of fishing gear (6) Modification of fishing gear for responsible fisheries and (7) Topic for future studies. | | |
| Class outline: | Fishing gear and methods, Behavior of aquatic animals against the fishing gear, Bycatch and Discards Issue, IUU, Code of conduct for responsible fisheries, Selectivity of fishing gear-selectivity curves, Application of fishing gear selectivity, Modification of fishing gear for responsible fisheries, Topic for future studies, Field trip required | | |
| Class Schedule: | <ol style="list-style-type: none"> 1. Introduction 2. Classification of fishing gear, fishing gear and methods 3. Current status of capture fisheries 4. Problem of capture fisheries; overfishing, IUU, bycatch and discards issues, ghost fishing etc. 5. Behavior of aquatic animals against the fishing gear 6. Code of conduct for responsible fisheries 7. Selectivity of fishing gear-selectivity curves 8. Application of fishing gear selectivity 9. Modification of fishing gear for responsible fisheries 10. Topic for future studies 11. Presentations from students and discussions | | |
| Important items: | | | |
| Textbooks | Handout is prepared by the lecturer and students have to find relevant journal papers. | | |
| Self-studies and advices | Homework needs searching and summarizing journal papers and preparing for reporting on all items of lectures and laboratory (exercises). | | |
| Requisites to take subject: | Unconditional and no prerequisite | | |
| Assessment method: | Continuous assessment on the basis of reporting and participating into discussions | | |
| Assessment criteria: | Pass if satisfactory reporting and participating into discussions are no less than 60% of classes | | |
| Relevant matters | Conducted in English together with supplementary explanations in Thai occasionally | | |

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|--------------------------|---|--------------------|--|
| Subject: | 01252571 Diseases of Aquatic Animals | Semester Credit | 3 (lecture-laboratory-self study: 2-2-5) |
| Key words: | Diseases, Aquatic Animals | | |
| Lecturer: | Assistant Professor Dr. Niti Chuchird (room no. and building) FI 602 (contact hours) | | |
| Objective: | 1. To understand the disease process in aquatic animals 2. To understand the basic principles of diagnosis of diseases of aquatic animals 3. To understand the prevention and control of diseases of aquatic animals | | |
| Class outline: | Aquatic animal diseases caused by bacteria, virus and fungi. Diseases protection and treatment. | | |
| Class schedule: | 1. Class orientation, Introduction to disease, Basic disease terminology 2. Introduction to viral diseases 3. Introduction to bacterial and fungal diseases 4. Invertebrate defense system 5. Vertebrate immunity 6. Viral diseases of shrimp 7. Bacterial diseases of shrimp 8. Viral diseases of fishes 9. Bacterial diseases of fishes 10. Protozoa and parasites of shrimp 11. Protozoa and parasites of fishes 12. Non infectious diseases 13. Disease management 14. Water qualities 15. Chemical and drug use in aquaculture | | |
| Important items: | - | | |
| Textbook: | 1. Chanratchakool, P., J.F. Tumbull S.F. Smith, Ian H. MacRae and C. Limsuwan . 1998. Health Management in Shrimp Ponds. (3 rd Edition) Aquatic Animal Health Research Institute, Thailand. 111 p. (NAGA award from ICLARM) 2. Roberts, R. J. 2012. Fish Pathology, 4th Edition. Wiley-Blackwell. 590 p. | | |
| Self-studies and advices | - | | |
| Condition: | - | | |
| Assessment method: | Midterm examination 20% Assignment 20% Laboratory project 20% Final examination 40% | | |
| Assessment criteria: | Grade Lowest Cutoff A 80 B+ 75 B 70 C+ 65 C 60 D+ 55 D 50 F less than 50 | | |
| Relevant matters: | - | | |

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|---------------------------|---|--------------------|--|
| Subject: | 01254531 Fishery Product Biotechnology | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Biotechnology; Fish; Fishery Products | | |
| Lecturer: | Assistant Professor Dr. Yoawapha Waiprib Room no.803 Boon Indrambarya Building | | |
| Objective: | Upon successful completion of this course, students will 1. able to demonstrate a principal knowledge, and scope of biotechnology; 2. uire mastery with the major issues, concepts, and subject areas in food biotechnology; 3. uire mastery of sourcing and synthesizing information in aspects of biotechnology as it applies to fish and fishery products; 4. able to demonstrate sufficient knowledge about the occurrence and significance of biotechnology being used in fish and fishery products and be able to apply that knowledge for advanced analysis in the context of the food system, and regulatory aspects. | | |
| Class outline: | 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. | | |
| Class schedule: | 1. Overview and scope of food biotechnology 2. Traditional biotechnology 3. Modern biotechnology 4. Basic principles of fermentation 5. Downstream process 6. Fish fermentation 7-11. Fishery products derived from fermentation process 12. Fishery products derived from modern biotechnology 13. Food safety risk analysis of food derived from modern biotechnology 14. Current issues in fishery product biotechnology 15. Field trip | | |
| Important items: | Relationship of grading strategy and student learning outcomes: 1. Homework will require an understanding of lecture material and reading assignments. 2. Exams will require students to demonstrate mastery of course material and synthesize available information into practical demonstrations of food biotechnology concepts. 3. Case study will require the student to demonstrate their subject matter mastery, communication skill, and ability to obtain primary sources of best available information in an applied science interpretative challenge. | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Self-studies and advices: | | | |
| Condition: | Nil. | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion. | | |

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| Assessment criteria: | Grade scale: | |
| | A | >80% |
| | B+ | 75-79% |
| | B | 70-74% |
| | C+ | 65-69% |
| | C | 60-64% |
| | D+ | 55-59% |
| | D | 50-54% |
| | F | ≤49 |
| | Grading Breakdown: | |
| Homework and discussion | 20% | |
| Mid semester exam | 25% | |
| Final exam | 25% | |
| Case study | 30% | |
| Relevant matters: | Conducted in English. | |

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|--------------------------|--|--------------------|---|
| Subject: | 01254521 Food Additives in Fish and Fishery Products | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Food Additives; Fish; Fishery Products | | |
| Lecturer: | Assistant Professor Dr. Yoawapha Waiprib Room no.803 Boon Indrambarya Building | | |
| Objective: | Upon successful completion of this course, students will 1. be able to demonstrate a <i>principal</i> knowledge of food additive; 2. acquire mastery with the major issues, concepts, and subject areas in food additives being used in fish and fishery products; 3. acquire mastery of sourcing and synthesizing information in aspects of food safety as it applies to fish and fishery products; 4. be able to demonstrate sufficient knowledge about the occurrence and significance of major food additive used in fishery products and be able to apply that knowledge for advanced analysis in the context of the food system, and regulatory aspects. | | |
| Class outline: | Classification, properties, and uses of food additives in fish and fishery products, safety and regulation related food additives, current issues in food additives. | | |
| Class schedule: | <ol style="list-style-type: none">1. Classification of food additives2. Food preservatives3. Natural antimicrobial agents4. Acidulants5. Phosphates6. Sequestrants7. Emulsifiers8. Enzymes9. Coloring agents10. Flavoring agents11. Antioxidants12. Gums and phyco-colloids13. Nutritional additives and nutrition labeling14. Laws and regulations on use15. Current issues in food additives. | | |
| Important items: | Relationship of Grading Strategy and Student Learning Outcomes: <ol style="list-style-type: none">1. Homework will require an understanding of lecture material and reading assignments.2. Exams will require students to demonstrate mastery of course material and synthesize available information into practical demonstrations of food additive concepts.3. Case study will require the student to demonstrate their subject matter mastery, communication skill, and ability to obtain primary sources of best available information in an applied science interpretative challenge. | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Self-studies and advices | Online materials for self-studies: General standard for food additives (CODEX STAN 192-1995). http://www.codexalimentarius.net/gsfaonline/docs/CXS_192e.pdf | | |
| Condition: | Nil. | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion. | | |

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| Assessment criteria: | Grade scale: | |
| | A | >80% |
| | B+ | 75-79% |
| | B | 70-74% |
| | C+ | 65-69% |
| | C | 60-64% |
| | D+ | 55-59% |
| | D | 50-54% |
| | F | ≤49 |
| | Grading Breakdown: | |
| Homework and discussion | 20% | |
| Mid semester exam | 25% | |
| Final exam | 25% | |
| Case study | 30% | |
| Relevant matters: | Conducted in English. | |

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|--------------------------|--|--------------------|--|
| Subject: | 01254524 Marine Biotoxins | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | Biotoxins; Marine; Marine biotoxins; Toxins; Marine organisms; Risk and food safety management; Toxin analysis; Public health awareness | | |
| Lecturer: | Assistant Professor Dr. Kangsadan Boonprab Room 704; Boon Intrarumphun Building; Faculty of Fisheries, Kasetsart University Contact hours: Available any time; except lecture hours | | |
| Objective: | To know and realize the knowledge, current research, practical skill of the research and risk and food safety management related to class outline | | |
| Class outline: | Marine biotoxins, types, cause of origin, pharmacological and chemical characteristics, control and prevention of intoxication, research in marine toxins. | | |
| Class schedule: | <ol style="list-style-type: none">1. Guideline to the whole course outline; Lecturer contact; textbook for study; home work; report; current research seminar and presentation; criteria for evaluation; Pre-test2. (1) Introduction to Marine biotoxin science [concept, types and its risk and food safety management system]3. (2) Biotoxins related to invertebrates and planktons<ol style="list-style-type: none">(2.1) Echinoderms sponins/ gastropod tetramine4. (2.2) Paralytic Shellfish Poison5. (2.2) Paralytic Shellfish Poison (continue)6. (2.3) Amnestic Shellfish Poison7. (2.4) Diarrhetic Shellfish Poison8. (2.5) Palytoxin (2.6) Neurotoxin9. Mid-term examination10. (3) Biotoxins related to vertebrate<ol style="list-style-type: none">(3.1) Tetrodotoxins11. (3.2) Ciguatera toxins12. (3.2) Ichthyotoxins<ol style="list-style-type: none">(3.3) Glycerine and wax ester<ol style="list-style-type: none">(4) Marine animals with stings and bites<ol style="list-style-type: none">(4.1) Mollusc(4.2) Fish13. (5) Public health awareness and guideline : monitoring and licensing<ol style="list-style-type: none">(6) Research in Marine biotoxins<ol style="list-style-type: none">(6.1) Research technique in marine biotoxins<ol style="list-style-type: none">(6.1.1) Sample procurement(6.1.2) Toxicity assay (bioassay)(6.1.3) Other assay technique(6.1.4) Monitoring program14. (7) Current and interest research in Marine biotoxins15. Final-examination | | |
| Important items: | | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies. | | |
| Self-studies and advices | | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion. | | |

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| Assessment criteria: | 1) Scoring ratio [Total 100 Score] | |
| | 1.1) Self study; presentation and report | 15 Score |
| | 1.2) Home work (5 works) | 25 Score |
| | 1.3) Examination | |
| | 1.3.1) Midterm examination | 30 Score |
| | 1.3.2) Final examination | 30 Score |
| | 2) Grade evaluation: Score evaluation:- | |
| | A: 87-100 | |
| | B+: 78-86 | |
| | B: 60-77 | |
| C+: 55-59 | | |
| C: 50-54 | | |
| D+: 45-49 | | |
| D: 40-44 | | |
| F: 0-39 | | |
| Relevant matters: | Conducted in English | |

Faculty of Fisheries, Kasetsart University

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|--------------------------|--|--------------------|--|
| Subject: | 01254541 Food Safety and Quality Management Systems in Fish Processing Plant | Semester Credit | 3 (lecture-laboratory-self study: 2-3-6) |
| Key words: | Hazards and risk assessment, Hazards control measure, food safety management systems | | |
| Lecturer: | Assistant Professor Dr. Pongtep Wilaipun Room 710, Boon Indrambarya Building Contact hours: Tue.-Fri. 11.00-12.00 am. or by appointment | | |
| Objective: | 1. Summarize the hazards in fish and fishery products 2. To understand and practice in an important food safety and quality management systems | | |
| Class outline: | 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. | | |
| Class schedule: | 1. Introduction to fish and fishery product hazards 2. GMP in fish processing industry 3. GMP in fish processing industry (cont.) 4. SOP and SSOP 5. GMP audit 6. Risk assessment of fish and fishery products 7. Hazard analysis and critical control points (HACCP) 8. HACCP (cont.) 9. HACCP Audit 10. ISO 22000 11. ISO 9001 12. ISO 9001 (cont.) 13. ISO 9001 (cont.) 14. ISO/IEC 17025 15. ISO/IEC 17025 (cont.) | | |
| Important items: | Food safety management systems | | |
| Textbook: | Handout is prepared by lecturer. The lecturer will recommend the textbook for self-studies | | |
| Self-studies and advices | To be informed in the class | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation into class and discussion | | |
| Assessment criteria: | - Attendance and participation 5% - Self study report 10% - Mid-term examination 30% - Final examination 30% - Practical report 25% | | |
| Relevant matters: | Conducted in English | | |

Faculty of Fisheries, Kasetsart University

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|--------------------------|--|--------------------|--|
| Subject: | 01254551 Fishery Product Development | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | | | |
| Lecturer: | Dr. Nantipa Pansawat FI 707 Mon.-Fri. 8.30-16.30 hrs. Please call or email for appointment. | | |
| Objective: | This course will provide basic knowledge and tools in new food product development and its application, focusing on fishery product development. | | |
| Class outline: | Principles and process of food product development, idea generation and evaluation, new product assessment and evaluation, product introduction to the market, applied statistics for product development and guidelines for fishery product development. | | |
| Class schedule: | <ol style="list-style-type: none">1. Introduction: importance and dynamic of new food products2. Principles and process of food product development3. Idea generation and screening4. idea screening (cont.) and concept development5. Prototype product development6. Development of thermal process fishery products7. Development of surimi based products8. Development of frozen products and miscellaneous products9. Experimental design and planning for product development10. Applied statistics for product development11. Applied statistics for product development (cont.)12. Techniques in recipe and process development13. New product testing and evaluation14. Product launching and maintenance15. Term project presentation by students | | |
| Important items: | - | | |
| Textbook: | Handout is prepared by lecturer. Recommended textbooks for self-studies: Earle, M., R. Earle and A. Anderson. 2001. Food Product Development. Woodhead Publishing Ltd. Cambridge. 380 p. Hu, R. 1999. Food Product Design. Technomic Publishing Co., Inc. Lancaster. 225 p. | | |
| Self-studies and advices | Practice using statistical program for analyzing data. Follow trends and updates in new food products, market situation and consumer behavior. | | |
| Condition: | Nil | | |
| Assessment method: | Examination and continuously assessment on the report and participation in class and discussion. <ol style="list-style-type: none">1. Written examination (Midterm and final examination) 60%2. Assignment, term project report and presentation 40% | | |
| Assessment criteria: | Grade equivalents (A, B+, B,, F), consulting class average. | | |
| Relevant matters: | Conducted in English. | | |

Faculty of Fisheries, Kasetsart University

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|--------------------------|---|--------------------|---|
| Subject: | 01254581 System Analysis and Management in Fish Processing Industry | Semester Credit | 3 (lecture-laboratory-self study: 3-0-6) |
| Key words: | System analysis, management, fish processing | | |
| Lecturer: | 1. Dr. Jirawan Maneerote Office room: 715 Department of Fishery Products Office hours: To be announced 2. Associate Professor Wanchai Worawattanmetheekul Office room: 506 Department of Fishery Products Office hours: To be announced | | |
| Objective: | This course aims to introduce knowledge on principle of system analysis including mathematic model to improve the plant layout, plant design, PERT/CPM, linear programming, logistic and supply chain in fishery processing industry. | | |
| Class outline: | Principles of system analysis to improve processing, planning, design, control and effective operation in food and fish processing industry. | | |
| Class schedule: | 1. Introduction 2. Meaning of system analysis and operation 3. Plant layout and plant design 4. Mathematic model for plant layout and design 5. Tool and instrument for plant layout 6. PERT/CPM 7. Linear Program for operation system 8. Simplex and transportation 9. Job ordering 10. Control chart 11. Quality control and management in fish processing industry 12. Fish processing industry management 13. Logistic and supply chain 14. Term project/Presentation 15. Presentation | | |
| Important items: | - | | |
| Textbook: | Park, C.S. 2001. Contemporary Engineering Economics. 3 rd Edition. Addison Wesley. California, USA. In addition to the above, the students will be provided with handouts by the lecturer. | | |
| Self-studies and advices | Require textbooks can be borrowed in the university library. Other software packages can be download trial version from internet. | | |
| Condition: | Attendance will be checked regularly. The university rule on this shall be applied, in which unexcused absence from class of more than 20% of total time, will be grounds for disallowing student from taking the final exam. Late student be marked as such. Avoiding plagiarism. | | |
| Assessment method: | Assessment will be by means of written exams, presentation and assignment. A grade of 50% warrants a pass. | | |
| Assessment criteria: | Grade distribution: Midterm examination 30% Assignments 10% Final examination 30% Term projects (defend) 10% Report 15% Attend class 5% | | |
| Relevant matters: | - | | |

Faculty of Fisheries, Kasetsart University

Subject: 01256598 Selected Topics in Fishery Science and Technology Semester Credit 3 (lecture-laboratory-self study: 3-0-6)

Key words:

Lecturer: Assistant Professor Dr. Methee Kaewnern, Assistant Professor Dr. Wanwimol Klaypradit
Department of Fishery Management
Mon-Fri 8.30-16.30

Objective: 1. To offer the ability to seek knowledge and apply it to fishery research field

Class outline: Study and research in aquaculture at the master's degree level and compile into a written report.

Class schedule:

1. Creative problem solving and decision making
2. Propose the research plan
3. Conduct research at selected Kasetsart Fishery Station
4. Conduct research at selected Kasetsart Fishery Station
5. Conduct research at selected Kasetsart Fishery Station
6. Conduct research at selected Kasetsart Fishery Station
7. Conduct research at selected Kasetsart Fishery Station
8. Conduct research at selected Kasetsart Fishery Station
9. Conduct research at selected Kasetsart Fishery Station
10. Conduct research at selected Kasetsart Fishery Station
11. Conduct research at selected Kasetsart Fishery Station
12. Conduct research at selected Kasetsart Fishery Station
13. Conduct research at selected Kasetsart Fishery Station
14. Presentation and discussion
15. Presentation and discussion

Important items:

Textbook:

Self-studies and advices

Condition:

Assessment method: Assess from participated activities; literature review, report, discussion and presentation.

Assessment criteria:

Relevant matters:

Faculty of Fisheries, Kasetsart University

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|--|---|--------------------|---|
| Subject: | 01252551 Algal Propagation | Semester Credit | 3 (lecture-laboratory- self study: 3-0-6) |
| Key words: | freshwater algae, seaweed, cultivation, propagation | | |
| Lecturer: | Assoc. Prof. Dr. Anong Chirapart | | |
| Contact office | Algal Bioresources Research Center, Department of Fishery Biology, Faculty of Fisheries, Kasetsart University Email: ffishanc@ku.ac.th | | |
| Contact hours | | | |
| Objective: | To the knowledge and understanding on practical techniques about the algal propagation. | | |
| Class outline: | This course contains both lecture and laboratory exercises on isolation, sterilization and propagation of freshwater and marine algae. | | |
| Class schedule: | <ol style="list-style-type: none">1. Introduction: Classification and Objective of algal cultivation2. Nutrient requirement of algae3. Medium preparation<ul style="list-style-type: none">- Medium for freshwater algae- Medium for marine algae4. Techniques for microalgal propagation<ul style="list-style-type: none">- Isolation of microalgae- Physical and chemical methods for microalgae purification- Purification examination and sterilization5. Techniques for macroalgal propagation<ul style="list-style-type: none">- Collection of macroalgae- Isolation of macroalgae- Physical and chemical methods for macroalgae purification- Purification examination and sterilization for macroalgae6. Determination of algal growth7. Mass cultivation and utilization | | |
| Laboratory exercise : | <ol style="list-style-type: none">1. Medium preparation for algal culture2. Techniques for single cell isolation3. Techniques for purification4. Techniques for unialgal, axenic and pure cultures | | |
| Important items Self-studies and advices | <ol style="list-style-type: none">1) Students need to do reading the relevant publication and probably make some presentation or report.2) All lab exercises require reports, please prepare nicely and DO NOT copy your friend reports!3) White coat and laptop are required for lab exercises. | | |
| Textbook: | Introduction to applied phycology Aquaculture in Tropical Areas Phycological Method Algal Physiology and Biochemistry Seaweed Cellular Biotechnology, Physiology and Intensive Cultivation Seaweed Cultivation and Marine Ranching Algal Culture Techniques | | |
| Requisites to take subject: | - | | |
| Assessment method: | <ol style="list-style-type: none">1. Attend class and section, and participate in discussions.2. Develop a study outline for readings and lead discussion section at least once during the course | | |

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| | 3. Reports, take-home midterm and final, including short-answer and essay questions |
| Assessment criteria: | Pass if satisfactory participating, reporting and testing at more than 50% of classes |
| Relevant matters: | Conducted in both Thai and English |

Faculty of Fisheries, Kasetsart University

Subject: 01252552 Semester 3
Bioactive substance from algae Credit (lecture-laboratory-
self study: 3-0-6)

Key words: Bottom Sediments, Benthic Ecology

Lecturer: Dr. Jantana PRAIBOON

Contact office (room no. and building)

Contact hours

Objective: To let student understand: (1) principle of bioactive compound from algae (micro- and macro-algae), bioactive active activity, utilization, extraction and characterization of active compound algae and (2) practice in laboratory on relating topic

Class outline: -

Class schedule:

1. Introduction
2. Type of Bioactive substance from algae
3. Proprieties and Mechanism of bioactive compound from algae
 - 3.1 Antioxidation
 - 3.2 Antivirus
 - 3.3 Anticoagulant
 - 3.4 Antitumor/Anticancer
 - 3.5 Antimicrobial
 - 3.6 Others
4. Utilization of bioactive compound from algae
 - 4.1 Food and Feed
 - 4.2 Aquaculture
 - 4.3 Pharmaceutical and Medical
 - 4.4 Cosmetic
 - 4.5 Agriculture
 - 4.6 Other
5. Extraction technique
6. Purification technique
 - 6.1 Column chromatography
 - 6.2 Gel filtration chromatography
7. Characterization technique
 - 7.1 Thin Layer Chromatography
 - 7.2 High Performance Liquid Chromatography
 - 7.3 Gas Chromatography
 - 7.4 FT-IR spectroscopy
 - 7.5 NMR spectroscopy

Laboratory exercise:

1. Sample preparation
2. Solvent extraction
3. Aqueous extraction
4. Chromatography technique
5. Chemical analysis
- 6.. Antioxidant activity
7. Other bioactive activity (depending on discussion)

Important items

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| Self-studies and other advices | <ol style="list-style-type: none"> 1) Students need to do reading the relevant publication 2) Students need to make some presentation or report. |
| Textbooks | <p>Bioactive Marine Natural Products. Marine Natural Products -Diversity and Biosynthesis Marine Products for Healthcare Methods of Analysis for Functional Foods and Nutraceuticals</p> |
| Requisites to take subject: | - |
| Assessment method: | <ol style="list-style-type: none"> 1. Attend class and section, and participate in discussions. 2. Develop a study outline for readings and lead discussion section at least once during the course 3. Reports, take-home midterm and final, including short-answer and essay questions |
| Evaluation criteria: | <ol style="list-style-type: none"> 1) Attend class and section and participate in discussions. 2) Develop a study outline for readings and lead discussion section at least once during the course 3) Reports, take-home midterm and final, including short-answer and essay questions. |
| Relevant matters: | Conducted in both Thai and English |

Faculty of Fisheries, Kasetsart University

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|-----------------------------|--|--------------------|---|
| Subject: | 01252514 Molecular Systematics in Fisheries | Semester Credit | 3 (lecture-laboratory- self study: 3-0-6) |
| Key words: | Species, Taxonomy, Diversity, Evolution, Phylogeny | | |
| Lecturer: | Dr. Narongrit Muangmai, E-mail: ffinrm@ku.ac.th | | |
| Contact office | Faculty of Fisheries 6 th floor, Kasetsart University | | |
| Contact hours | | | |
| Objective: | This course will explore the principle and concept of general and molecular systematics, with emphasis on fishery examples. The course also will deal with method for collection of molecular data and principles of phylogenetic analysis. | | |
| Class outline: | This course contains both lecture and laboratory exercises, which will feature isolation and amplifying of DNA as well as phylogenetic analyses. | | |
| Class schedule: | <ol style="list-style-type: none">1. Introduction and Background: Species concept and Systematics2. Systematic data3. Molecular data4. Collection method for systematics research5. DNA database6. DNA isolation7. PCR method8. Sequencing9. Assessing quality of data10. Phylogenetic analyses (distance method)11. Phylogenetic analyses (Maximum Likelihood), continued12. Phylogenetic analyses (Bayesian Inference), continued13. Species delimitation14. Dating analyses15. Presentation of phylogenetic results | | |
| Laboratory exercise: | <ol style="list-style-type: none">1. DNA isolation form algae and aquatic plants2. DNA isolation from marine animals3. Searching DNA database4. PCR amplification5. Submission molecular data6. Phylogenetic analyses7. Dating analyses | | |
| Important items | | | |
| Self-studies and advices | <ol style="list-style-type: none">1) Students need to do reading the relevant publication and probably make some presentation or report.2) All lab exercises require reports, please prepare nicely and DO NOT copy your friend reports!3) White coat and laptop are required for lab exercises. | | |
| Textbook: | Baum, David A. and Smith, Stacey D. <i>Tree thinking: an introduction to phylogenetic biology</i> <i>Hall Barry, G.</i> <i>Phylogenetic Trees Made Easy: A How-To Manual</i> <i>Nei, Masatoshi and Kumar, Sudhir</i> <i>Molecular Evolution and Phylogenetics</i> | | |
| Requisites to take subject: | | | |

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| Assessment method: | 1) Attend class and section and participate in discussions. 2) Develop a study outline for readings and lead discussion section at least once during the course 3) Reports, take-home midterm and final, including short-answer and essay questions. |
| Assessment criteria: | Pass if satisfactory participating, reporting and testing at more than 50% of classes |
| Relevant matters: | Conducted in both Thai and English |

Faculty of Fisheries, Kasetsart University

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|-----------------------------|--|--------------------|---|
| Subject: | 01255571 Marine Affairs | Semester Credit | 3 (lecture-laboratory- self study: 3-0-6) |
| Key words: | Ocean interests, Maritime delimitation, Maritime conflicts of uses | | |
| Lecturer: | Assistant Professor Dr. Suchai Worachananant, Ph.D., Kasetsart University E-mail: suchai.w@ku.th | | |
| Contact office | (room no. and building) | | |
| Contact hours | | | |
| Objective: | This course will explore the principle and concept of law of the seas and maritime interest as well as the conflicts arose among various stakeholders. | | |
| Class outline: | This course contains lecture including the concepts of: 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. | | |
| Class schedule: | <ol style="list-style-type: none">1. Introduction and Background2. Evolution of international law of the sea regime3. Maritime delimitation4. fisheries and the Law of the Sea5. case studies in Southeast Asia and elsewhere | | |
| Important items: | | | |
| Self-studies and advices | <ol style="list-style-type: none">3) Students need to do reading the relevant publication4) Students need to make some presentation or report. | | |
| Textbook: | Marine Affairs | | |
| Requisites to take subject: | - | | |
| Assessment method: | <ol style="list-style-type: none">1. Attend class and section, and participate in discussions.2. Develop a study outline for readings and lead discussion section at least once during the course3. Reports, take-home midterm and final, including short-answer and essay questions | | |
| Assessment criteria: | Pass if satisfactory participating, reporting and testing at more than 50% of classes | | |
| Relevant matters: | Conducted in both Thai and English | | |

Faculty of Fisheries, Kasetsart University

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|-----------------------------|--|--------------------|---|
| Subject: | 01255572 Sustainable Utilization of Marine Resources | Semester Credit | 3 (lecture-laboratory- self study: 3-0-6) |
| Key words: | Sustainable Utilization, Marine Protected Areas, Recreational uses of marine resources | | |
| Lecturer: | Assistant Professor Dr. Suchai Worachananant, Ph.D., Kasetsart University E-mail: suchai.w@ku.th | | |
| Contact office | (room no. and building) | | |
| Contact hours | | | |
| Objective: | This course will explore the principle and concept of the use of marine environment specifically for non-destructive purposes, course is also designed to provide basic understanding on the tools and methods use for preservation of resources. | | |
| Class outline: | This course contains lecture including the concepts of: 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. | | |
| Class schedule: | 1.Types of marine environment 2. Management principles and strategies for sustainable utilization on marine resources 3. Monitoring methodology 4. Monitoring criteria in resource and environmental assessment 5. Case studies and concepts for formulating their strategic plans. | | |
| Important items: | | | |
| Textbook: | - | | |
| Self-studies and advices | 1) Students need to do reading the relevant publication 2) Students need to make some presentation or report | | |
| Requisites to take subject: | | | |
| Assessment method: | 1) Attend class and section, and participate in discussions. 2) Develop a study outline for readings and lead discussion section at least once during the course 3) Reports, take-home midterm and final, including short-answer and essay questions. | | |
| Assessment criteria: | Pass if satisfactory participating, reporting and testing at more than 50% of classes | | |
| Relevant matters: | Conducted in both Thai and English | | |