Module Handbook of Aquacultural Engineering

A Module Handbook or collection of module descriptions that are also available for students to consult should contain the following information about the individual modules:

Module designation	Aquaculture Engineering is a compulsory course for the students of the Aquaculture Study Program in the fourth semester. This course consists of definition and scope, site selection, design and construction of aquaculture hatchery, design and construction of land-based aquaculture enclosures (freshwater ponds and brackish water ponds, tanks, raceways) and water-based aquaculture (freshwater and brackish-marine aquaculture: pen, cages, stick, basket, raft), aquaculture equipment/devices (pumps, feeding, water quality management, harvesting, and transportation), Recirculating Aquaculture Systems (RAS) (sedimentation, filtration, aeration, oxygenation, sterilization, and disinfection), waste management and Biofloc technology (BFT), innovation of digital technology in Aquacultural engineering.
Module level, if applicable	Undergraduate
Code, if applicable	PIA 20192261
Subtitle, if applicable	Rekayasa Akuakultur
Courses, if applicable	-
Semester(s) in which the module is taught	4th
Person responsible for the module	Dr. Susilo Budi Priyono, S.Pi., M.Si.
Lecturer	Prof. Dr. Ir. Rustadi, M.Sc. Dr. Ir. Bambang Triyatmo, M.P. Dr. Susilo Budi Priyono, S.Pi., M.Si.

Language	Indonesian
Relation to curriculum	Study Program, Compulsory
Type of teaching, contact hours	Activities: 1. Lecture offline and online (lecture, discussion, assignment; 50 min/meeting) 2. Examinations (mid-term and final exam) 3. Independent studies online platform (eLOK, eLISA) (quiz, examination, discussion, and private study) This course uses blended learning and SCL (small group discussion, case-based learning) method.
Workload	1. Lecture 2 SKS x 50 minutes x 16 meetings = 1,600 minutes = 26.67 hours = 26.67 hours /30 hours = 0.89 ECTS 2. Structural Assignment 2 SKS x 60 minutes x 16 meetings = 1,920 minutes = 32.00 hours = 32.00 hours /30 hours = 1.07 ECTS 3. Self Study 2 SKS x 60 minutes x 16 meetings = 1,920 minutes = 32.00 hours = 32.00 hours /30 hours = 1.07 ECTS Total Workload = 3.02 ECTS
Credit points	2 credit points
Requirements according to the examination regulations	Students must attend at least 70% of the total 14 class meetings to be eligible to take the final exams.
Recommended prerequisites	Fundamentals of Aquaculture

Module objectives/intended learning outcomes	Course Learning Outcomes: CO-1: Appraise and select land and waters for aquaculture (PLO3-PI). CO-2: Design and construct aquacultural enclosure and supporting devices for hatchery and to grow out of cultivation (PLO5-P3). CO-3: Design and operate recirculating aquaculture and Biofloc system, and aquaculture waste management (PLO5-P3). Program Learning Outcomes: PLO3-P1: To be able to explain sustainable fisheries and marine systems, including management and utilization of aquatic resources, socio-economics, fish culture, and processing of fishery products. PLO5-P5: To be able to provide an in-depth explanation of the theoretical concepts of techniques and management of aquatic organisms cultivation in fresh, brackish, and/or marine water that are productive, high quality, and sustainable using the latest technology, which includes preparation of infrastructure, management of water, fish-seeds, feed, health, and harvest.

Content	Course Learning Outcome
	CO1 1. Introduction: scope, definition, and importance) 2. Site selection for aquaculture CO2 1. Design and construction of fish hatcheries 2. Design and construction of freshwater culture ponds 3. Design and construction of brackishwater culture ponds 4. Design and construction of brackishwater culture ponds continued 5. Design and construction of freshwater enclosures, e.g., pen, cage, net. 6. Design and construction of coastal enclosures net, e.g., stick, cage, basket, raft, oyster, and seaweed culture 7. Design and construction of coastal enclosures net: stick, basket, raft, and integrated culture 8. Design and construction of open sea enclosures/offshore, e.g., cage, net, raft CO3 1. Design and construction of ponds culture in RAS 2. Design and construction of supporting devices in RAS (sedimentation, filtration, aeration, etc.) 3. Design and construction of Biofloc technology (BFT) and Waste management 4. Digital innovation in Aquaculture Engineering

Study and examination requirements and forms of examination	Lectures Quizzes, paper, presentation Midterm examination Final examination
Media employed	LCD Zoom Video Textbook

Reading list	Wheaton, F. W. 1977. Aquacultural Engineering. John Wiley and Sons, Inc. New York. 708 p. Murray K. R. dan Colt. 1996. Aquacultural Engineering. Journal of AES Vol. 15. Elsevier. Amsterdam Timmons, M.B. and Losordo, T. M. (eds.) 1994. Aquaculture Water Reuse Systems: Engineering Design and Management. Elsevier.Amsterdam.333 p. Pillay, T. V. R. 1974. Planning of Aquaculture Development, An Introductory Guide. The Press at Coombelands Limited, Surrey. 71 p. Beveridge, M.C.M., 1987. Cage Aquaculture. Fishing News Books Ltd. Farnham Surrey 351 p. Woynarovich, E. and L. Horvath, 1980. The Artificial Propagation of Warm-water finfishes. A manual for extension. FAO Fish.Tech.Pap., (201) : 183 p. NACA, SEAFDE dan FAO. 1986. Shrimp Hatchery Design, Operation, and Management Training Manual. 88 p. Chanratchakool, P., J.F. Turnbull, S. Funge-Smith dan C. Limsuwan. 1995. Health Management in Shrimp Ponds. Dept. of Fisheries. Kasetsart University Bangkok. 111 p.