

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	4 th
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	<p>Activities:</p> <ol style="list-style-type: none"> 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) <p>This course uses blended learning and SCL (small group discussion, case-based learning) method.</p>
Workload	<ol style="list-style-type: none"> 1. Lecture $2 \text{ SKS} \times 50 \text{ minutes} \times 16 \text{ meetings} = 1,600 \text{ minutes}$ $= 26.67 \text{ hours}$ $= 26.67 \text{ hours}$ $/30 \text{ hours}$ $= 0.89 \text{ ECTS}$ 2. Structural Assignment $2 \text{ SKS} \times 60 \text{ minutes} \times 16 \text{ meetings} = 1,920 \text{ minutes}$ $= 32.00 \text{ hours}$ $= 32.00 \text{ hours}$ $/30 \text{ hours}$ $= 1.07 \text{ ECTS}$ 3. Self Study $2 \text{ SKS} \times 60 \text{ minutes} \times 16 \text{ meetings} = 1,920 \text{ minutes}$ $= 32.00 \text{ hours}$ $= 32.00 \text{ hours}$ $/30 \text{ hours}$ $= 1.07 \text{ ECTS}$ <p>Total Workload = 3.02 ECTS</p>
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

<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes:</p> <p>CO-1: Appraise and select land and waters for aquaculture (PLO3-PI).</p> <p>CO-2: Design and construct aquacultural enclosure and supporting devices for hatchery and to grow out of cultivation (PLO5-P3).</p> <p>CO-3: Design and operate recirculating aquaculture and Biofloc system, and aquaculture waste management (PLO5-P3).</p> <p>Program Learning Outcomes:</p> <p>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.</p> <p>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.</p>
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Content	Course Learning Outcome
	<p data-bbox="639 264 699 293">CO1</p> <ol data-bbox="639 338 1299 439" style="list-style-type: none"> <li data-bbox="639 338 1299 367">1. Introduction: scope, definition, and importance) <li data-bbox="639 412 1066 441">2. Site selection for aquaculture <p data-bbox="639 483 699 512">CO2</p> <ol data-bbox="639 557 1369 1397" style="list-style-type: none"> <li data-bbox="639 557 1235 586">1. Design and construction of fish hatcheries <li data-bbox="639 609 1369 638">2. Design and construction of freshwater culture ponds <li data-bbox="639 660 1321 739">3. Design and construction of brackishwater culture ponds <li data-bbox="639 781 1321 860">4. Design and construction of brackishwater culture ponds continued <li data-bbox="639 902 1337 981">5. Design and construction of freshwater enclosures, e.g., pen, cage, net. <li data-bbox="639 1023 1342 1151">6. Design and construction of coastal enclosures net, e.g., stick, cage, basket, raft, oyster, and seaweed culture <li data-bbox="639 1193 1342 1272">7. Design and construction of coastal enclosures net: stick, basket, raft, and integrated culture <li data-bbox="639 1314 1206 1393">8. Design and construction of open sea enclosures/offshore, e.g., cage, net, raft <p data-bbox="639 1435 699 1464">CO3</p> <ol data-bbox="639 1509 1369 1794" style="list-style-type: none"> <li data-bbox="639 1509 1321 1538">1. Design and construction of ponds culture in RAS <li data-bbox="639 1561 1321 1639">2. Design and construction of supporting devices in RAS (sedimentation, filtration, aeration, etc.) <li data-bbox="639 1662 1369 1740">3. Design and construction of Biofloc technology (BFT) and Waste management <li data-bbox="639 1762 1273 1792">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

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