

Module Handbook of Genetics and Fish Breeding

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	Genetics and Fish Breeding is a compulsory course for students of Aquaculture Program Study. The learning materials include the scope of genetic science as the basis for breeding, the role of fish breeding in increasing aquaculture production and seed production, the principles and methods of fish breeding, engineering, and gene conservation. Students who have taken this course are expected to explain conventional fish breeding, fish breeding with a biotechnology approach, and fish breeding conventionally and with a biotechnology approach.
Module level, if applicable	Undergraduate
Code, if applicable	PIA 20192265
Subtitle, if applicable	Pemuliaan Ikan
Courses, if applicable	-
Semester(s) in which the module is taught	4 th
Person responsible for the module	Dr. Dini Wahyu Kartika Sari, S.Pi., M.Si.
Lecturer	Dr. Ir. Ignatius Hardaningsih, M.Si Dra. Tuty Arysuryanti, M.Sc., Ph.D. Dr. Dini Wahyu Kartika Sari, 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 $2 \text{ SKS} \times 50 \text{ minutes} \times 16 \text{ meetings} = 1,600 \text{ minutes}$ $= 26.67 \text{ hours}$ $= 26.67 \text{ hours}/30$ hours $= 0.89 \text{ ECTS}$ 2. Structural Assignment $2 \text{ SKS} \times 60 \text{ minutes} \times 16 \text{ meetings} = 1,920 \text{ minutes}$ $= 32.00 \text{ hours}$ $= 32.00 \text{ hours}/30$ hours $= 1.07 \text{ ECTS}$ 3. Self Study $2 \text{ SKS} \times 60 \text{ minutes} \times 16 \text{ meetings} = 1,920 \text{ minutes}$ $= 32.00 \text{ hours}$ $= 32.00 \text{ hours}/30$ hours $= 1.07 \text{ ECTS}$ <p>Total $= 3.03 \text{ ECTS}$</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	-

<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes:</p> <p>CO-1: Explain conventional fish breeding (PLO3-PI).</p> <p>CO-2: Explain fish breeding with biotechnology approach (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	<p>Course Learning Outcome</p> <p>CO1</p> <ol style="list-style-type: none"> 1. Concept of fish genetics 2. Concept of fish breeding 3. Inbreeding in a single mating 4. Heritability 5. Selection in breeding 6. Genetic variation 7. Techniques of molecular genetic 8. Introduction to bioinformatics <p>CO2</p> <ol style="list-style-type: none"> 1. GMO fish 2. Polyploidy 3. Gynogenesis 4. Androgenesis 5. Sex reversal – 1 (masculinization) 6. Sex reversal – 2 (feminization) 7. Mid term test 8. Final test
Study and examination requirements and forms of examination	<p>Lectures</p> <p>Quizzes, paper, presentation</p> <p>Midterm examination</p> <p>Final examination</p>
Media employed	<p>LCD</p> <p>Zoom</p> <p>Video</p> <p>Textbook</p>

Reading list	<p>Albert, B., Bray, D., Lewis, J., Raff, M., Robert, K., Watson, J.D. (2008). Molecular Biology of the Cell. 5th ed. Garland Publ. Inc., New York.</p> <p>Brown, T.A. (2002). Genomes. New York and London: Garland Science.</p> <p>Campbell, N.A., L.G. Mitchell, and J.B. Reece. 2008. Biology. 8th ed. The Benjamin Cummings Publ. Co. Inc., California (USA).</p> <p>Campbell, N.A., L.G. Mitchell, and J.B. Reece. 2008. Biology: Concept and Connection. The Benjamin Cummings Publ. Co. Inc., California (USA).</p> <p>Griffith, A.J.F., J.F.Miller, R.C. Lewontin, and W.M. Gelbart. 2008. Modern Genetics Analysis. W.H. Freeman & Co., New York (USA).</p> <p>Griffith, A.J.F., J.F.Miller, D.T. Suzuki, R.C. Lewontin, and W.M. Gelbart. 2008. An Introduction to Genetic Analysis. W.H. Freeman & Co., New York (USA).</p> <p>Hartl, D.L. and E.W. Jones. 2011. Genetics: Principles and Analysis. Jones & Bartlett Publisher, London.</p> <p>Hartwell, L., Hood, L., Goldberg, M.L., Reynolds, A.E., Silver, L.M., and Veres, R.C. 2000. Genetics: From Genes to Genomes. 1st ed. The Mc. Graw Hill Companies, Inc., USA.</p> <p>Klug, W.S. and R. Cummings, C.A. Spencer, and M.A. Palladino. 2012. Concept of Genetics. 10th.ed. Prentice Hall Inc., New Jersey (USA).</p> <p>Lewin, Benjamin (2006). Essential Genes. International Edition. Pearson Ed. Inc., USA.</p> <p>Passarge, E. 2001. Color Atlas of Genetics. 2nd.ed. Thieme Stuttgart, New York (USA).</p>
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	<p>Pasternak, J.J. 2005. An Introduction To Human Molecular Genetics. 2nd ed. A John Wiley & Sons, Inc., Hoboken, New Jersey.</p> <p>Robinson, R. 2003. Genetics. Volume 1, 2, 3, & 4. Macmillan Reference, USA.</p> <p>Suryo. 1997. Genetika. Gadjah Mada University Press, Yogyakarta.</p> <p>Suryo. 1997. Genetika Manusia. Gadjah Mada University Press, Yogyakarta.</p> <p>Tamarin, R.H. 1999. Principles of Genetics. 6th.ed. WCB. McGraw-Hill, New York (USA).</p> <p>Dunkam, R. A. 2004. Aquaculture and fisheries biotechnology genetic Approaches. CABI Publishing. Alabama, USA.</p> <p>Farrel, A.P. E. 2011. Encyclopedia of Fish Physiology from genome to environment. Elsevier.</p>
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