UNIVERSITAS DIPONEGORO

FACULTY OF FISHERIES AND MARINE SCIENCE

AQUACULTURE UNDERGRADUATE PROGRAM

Module Handbook Aquaculture

Table of Content

Semester I

Module Handbook Introduction of Fisheries and Marine Sciences

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

Module designation	Introduction of Fisheries and Marine Sciences
Module level, if applicable	1nd years
Code, if applicable	IPK21-301
Subtitle, if applicable	-
Courses, if applicable	Indonesia
Semester(s) in which the module is taught	1st semesters
Person responsible for the module	
Lecturer	
Language	Indonesia
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Lecturing in class, assignment, discussion, problem based learning
Workload	The total workload is 50 minute lecturing, discusiion in clasical class, and 50 minute load with assignment. For every semester totally 14 time x 100 minute for attendance for those activities.
Credit points	2 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	- Knowledge : The students understand the concepts and component of fisheries sciences for water resource management, aquaculture, capture fisheries and fishery products technology. - Skill : The students can analyze the case study of water resource management, aquaculture, capture fisheries and fishery products technology. - Competence : The students be able to understand the component of fisheries science and use it to comprehensive analyze.

Content	The concepts of fisheries sciences in the form of water resource management, aquaculture, capture fisheries and the use of fishery products.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	

Module Handbook English

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

Module designation	English
Module level, if applicable	1nd years
Code, if applicable	UNW00-006
Subtitle, if applicable	
Courses, if applicable	English
Semester(s) in which the module is taught	1st semesters
Person responsible for the module	
Lecturer	
Language	English
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Students are divided into 9 groups to present their project according to the given topic for 20 minutes each group along with class discussion. Each group presented about any subject or issues related to marine and fisheries science according to the students' department using English (TM: 13, 14, 15) (project-based learning).
Workload	Total workload is 2 x 50 minutes, 14 times per semester, (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	2 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	- Knowledge: Students understand the grammar, structure, and make a complex sentence that can be used for reporting case and idea, writing academic report. - Skill : Students understand and be able to understand the reading material, listening, and fluent in speaking for academic presentation and have good writing skill - Competence : Students understand and are able to do the TOEFL test (as one of the prerequisites for graduation), make simple, compound and complex sentences; able to write reports/papers/abstracts/research results related to Marine and Fishery Sciences in English; and able to present reports/papers/abstracts/research results using English.
Content	This Course Learn about how to make a sentence, noun and article, adjective and adverb, paralellel structure, simple sentence, parallel structure, subject verb agreement, degree of comparison. Toefl simulation test, Write a scientific paper, present a paper
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	1. Alexopoulos,C.J and Mims,C.W. 1979. Introductory Mycology, 3rd Edition. John-wiley and Sons. New York. 2. Cappuccino, J.G. and N. Sherman, 1987. Microbiology a Laboratory Manual; 2 th ED., California. The Benjamins Columning Publishing Company. 3. Hadioetomo RS.1993. Mikrobiologi Dasar dalam Praktek: Teknik dan Prosedur Dasar Laboratorium. Jakarta: Gramedia Utama. 4. Madigan et al. 2017. Brock Biologi Mikroorganisme. 14th edition. Penerbit Buku kedokteran EGC. 5. Madigan, M.T., Martinko, J.M., Parker, J. 1997. Biology of Microorganisms. Ed ke-8. New Jersey: Prentice-Hall. 6. Pelczar MJJr, Chan ECS. 1986. Dasar-dasar Mikrobiologi. Volume 1. Hadioetomo RS, Imas T, Tjitrosomo SS, Angka SL, penerjemah; Jakarta: UIPress. Terjemahan dari: Elements of Microbiology. 7. Setiabudy R, Kunardi L. 2003. Golongan tetrasiklin dan kloramfenikol. Di dalam: Ganiswarna SG, editor. Farmakologi dan Terapan. Ed ke-4. Jakarta: Gaya Baru. hlm 657-659. 8. Yuwono, T. 2005. Biologi Molekular. Erlangga: Laboratorium Mikrobiologi, Fakultas Pertanian, Universitas Gadjah Mada, Yogyakarta.

Module Handbook Bahasa Indonesia

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

Module designation	Bahasa Indonesia
Module level, if applicable	1nd years
Code, if applicable	UNW00004
Subtitle, if applicable	
Courses, if applicable	Indonesia
Semester(s) in which the module is taught	1st semesters
Person responsible for the module	Dra. Mirya Anggrahini Nimpuno, M.Hum.
Lecturer	Dra. Mirya Anggrahini Nimpuno, M.Hum.
Language	Indonesia
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Lecturing in class, assignment, discussion, problem based learning
Workload	The total workload is 50 minute lecturing, discusiion in clasical class, and 50 minute load with assignment. For every semester totally 14 time x 100 minute for attendance for those activities.
Credit points	2 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	- Knowledge : - Skill : Students practice making good and correct Indonesian, spelling and grammar, effective sentences, paragraphs and academic writing, proposal writing and scientific presentations - Competence :

Content	Students learn grammar, academic writing, effective spelling and sentences, paragraph writing, making bibliography, reviewing material and writing academic papers
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	

Module Handbook Biology

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

Module designation	Biology
Module level, if applicable	1nd years
Code, if applicable	IPK21-005
Subtitle, if applicable	
Courses, if applicable	Biology
Semester(s) in which the module is taught	1rd semesters
Person responsible for the module	Dr. Ir. Fajar Basuki, MS.
Lecturer	1. Dr. Ir. Fajar Basuki, MS. 2. Dr. Ir. Diana Rachmawati, M.Si. 3. Tristiana Yuniarti, S.Pi.M.Si. 4. Dewi Nurhayati, S.Pi.,M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Practical: 3 hours (170 minutes) per week 3. Self learning: 3 hours per week 4. Case studies: 1 hour per week; Forms of active participation: Case studies and structured report writing *Contact hours and class size separately for each teaching method: lecture, lesson, practical, project, seminar etc.*
Workload	Total workload is 2 x 50 minutes, 14 times per semester, (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	- Knowledge: understand the organization of living life which is supported by its constituent macromolecules, the importance of cell function in the survival of life, the meaning of bioenergetics in animals, the importance of cell function in maintaining the homeostasis of an organism, and the genetic inheritance system in organisms. - Skill : Students are able to explain the organization of living life which is supported by its constituent macromolecules, the importance of cell function in the survival of life, the meaning of bioenergetics in animals, the importance of cell function in maintaining the homeostasis of an organism, and the genetic inheritance system in organisms. - Competence : At the end of this course, students can explain the differences in structure, function, to the genetic inheritance system in plants and animals. Students are able to provide conclusions about the basics of life science from the structure, function, to the genetic inheritance system.
Content	This Course Learns the organization of living life which is supported by its constituent macromolecules, the importance of cell function in the survival of life, the meaning of bioenergetics in animals, the importance of cell function in maintaining the homeostasis of an organism, and the genetic inheritance system in organisms.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	● Campbell, N.A., Reece, J.B., Mitcell, L.B. 2002. Biologi: Jilid 1. Edisi ke-5. Jakarta: Erlangga. ● Campbell, N.A., Reece, J.B., Mitcell, L.B. 2002. Biologi: Jilid 2. Edisi ke-5. Jakarta: Erlangga. ● Campbell, N.A., Reece, J.B., Mitcell, L.B. 2002. Biologi: Jilid 3. Edisi ke-5. Jakarta: Erlangga. ● Yuwono, T. 2005. Biologi Molekular. Erlangga: Laboratorium Mikrobiologi, Fakultas Pertanian, Universitas Gadjah Mada, Yogyakarta.

Module Handbook Pancasila

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

Module designation	Pancasila
Module level, if applicable	1nd years
Code, if applicable	UNW00-006
Subtitle, if applicable	
Courses, if applicable	English
Semester(s) in which the module is taught	1st semesters
Person responsible for the module	Dr.Drs. Agus Sarono, M.H.
Lecturer	Dr.Drs. Agus Sarono, M.H.
Language	Indonesia
Relation to curriculum	Compulsory course
Type of teaching, contact hours	
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	2 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	- Knowledge: Students understand and be able to apply the Concepts and objectives of Pancasila and Citizenship. - Skill : Students conduct analysis related to Pancasila and citizenship issues. Students are able to actively discuss, and are able to provide solutions to these problems. Case discussions can be taken from books, journals, and cases published in online/print media (Case method). - Competence : Students competence to analyse regarding Pancasila and citizenship on various topics that have been studied

Content	- Pancasila values from kingdoms era until present - Philosophy of Pancasila - Pancasila as the nation's ideology - Implementation of Pancasila as the Ideology of the Nation - Ideological comparison - UUD 1945 - The progress of democracy in Indonesia - Human rights - Eopolitics and Archipelago Insight - Discussion of Pancasila case studies (case method)
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	

Module Handbook Biochemistry

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

Module designation	Biochemistry
Module level, if applicable	1nd years
Code, if applicable	IBP21-300
Subtitle, if applicable	
Courses, if applicable	Biochemistry
Semester(s) in which the module is taught	1rd semesters
Person responsible for the module	Dr. Ir. Diana Rachmawati, M.Si.
Lecturer	Dr. Ir. Diana Rachmawati, M.Si. Dr. Ir. Subandiono, M.App.Sc Tristiana Yuniarti S.Pi.,M.Si. Seto Windarto, S.Pi., M.Sc.,M.P.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 3 hours (170 minutes) per week ● Self learning: 3 hours per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	- Knowledge: understand about the concepts and processes of anabolism and catabolism; anabolism and catabolism in aquatic organisms, as well as the processes of anabolism and catabolism that occur in the culture environment. - Skill : students can analyze the nutritional content including protein, fat, carbohydrates, vitamins and minerals contained in food ingredients, and the nutritional sources of plants and animals - Competence : At the end of this course, students can analyze the concepts and processes of anabolism and catabolism; anabolism and catabolism in aquatic organisms, as well as the processes of anabolism and catabolism that occur in the culture environment.
Content	This Course Learns about the concepts and processes of anabolism and catabolism; anabolism and catabolism in aquatic organisms, as well as the processes of anabolism and catabolism that occur in the culture environment.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	● Colby. 1992. Ringkasan Biokimia Harper, Alih Bahasa: Adjie Dharma, Jakarta: EGC. ● Harper, H.A., Rodwell, V.W., Mayes, P.A. 1977. Review of Physiological Chemistry. Los Altos: Lange Medical Publications. ● Harjasasmita.1996. Ikhtisar Biokimia Dasar B. Jakarta:FKUI. ● Poedjiadi, S. 2007. Dasar-Dasar Biokimia. Bandung: UI Press. ● Toha. 2001. Biokimia, Metabolisme Biomolekul. Bandung: Alfabeta. ● Wirahadikusumah. 1985. Metabolisme Energi, karbohidrat, dan lipid. Bandung: Institut Teknologi Bandung.

Semester II

Module Handbook Fundamentals of Capture Fisheries Management

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

Module designation	Fundamentals of Capture Fisheries Management
Module level, if applicable	1nd years
Code, if applicable	IPP21-303
Subtitle, if applicable	
Courses, if applicable	Fundamentals of Capture Fisheries Management
Semester(s) in which the module is taught	2rd semesters
Person responsible for the module	Bogi Budi Jayanto, S.Pi.,M.Si.
Lecturer	1. Bogi Budi Jayanto, S.Pi.,M.Si. 2. Faik Kurohman, S.Pi.,M.Si. 3. Dr. Dian Wijayanto, S.Pi., M.M., M.S.E. 4. Ir. Imam Triarso, M.S. i.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Self learning: 3 hours per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 80 hours per semester, which consists of 150 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	2 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	- Knowledge: understand about fundamentals of capture fisheries technology and management and its relationship with other courses in each study program, such as fishing methods, fishing areas, fishing technology, fish behavior, handling of fishery products. - Skill : students can explain about fundamentals of capture fisheries technology and management and its relationship with other courses in each study program, such as fishing methods, fishing areas, fishing technology, fish behavior, handling of fishery products. - Competence : At the end of this course, students can analyze the basic concepts of capture fisheries management that can be used for efforts to increase the utilization of fishery resources which include; knowledge of fish resources, fishing gear, floating facilities, use of acoustic technology and environmentally friendly capture fisheries management.
Content	This Course studies about the basic concepts of capture fisheries management that can be used for efforts to increase the utilization of fishery resources which include; knowledge of fish resources, fishing gear, floating facilities, use of acoustic technology and environmentally friendly capture fisheries management.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	● Ayodhyoa, A.U. 1981. Metode Penangkapan Ikan. Bogor: Yayasan Dewi Sri. Brandt, A.V. 1984. Fish Catching Methods of the World. England: Fishing News Books Ltd. ● BPPI. 2009. Klasifikasi Alat Penangkap Ikan. Jakarta: Dirjen Perikanan Tangkap, Departemen Kelautan dan Perikanan Republik Indonesia. ● DKP. 2004. Statistik Perikanan Tangkap. Nomura, M., dan T. Yamazaki. 1975. “Fishing Techniques,” Compilation of Transcript of Lecturer Presented at the Training Department SEAFDEC. Tokyo: Japan International Corperation Agency. ● Sudirman. 2013. Mengenal Alat dan Metode Penangkapan Ikan. Jakarta: Penerbit Rineka Cipta. ● Sudirman dan A. Mallawa. 2012. Teknik Penangkapan Ikan. Edisi revisi. Jakarta: Penerbit Rineka Cipta.

Module Handbook Aquatic Ecology

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

Module designation	Aquatic Ecology
Module level, if applicable	1nd years
Code, if applicable	IPK21-004
Subtitle, if applicable	
Courses, if applicable	Aquatic Ecology
Semester(s) in which the module is taught	1rd semesters
Person responsible for the module	Dr. Ir. Suminto, M.Sc
Lecturer	1. Dr. Ir. Suminto, M.Sc 2. Dr. Vivi Endar Herawati, S.Pi.,M.Si. 3. Dicky Harwanto, S.Pi.,M.Sc. Ph.D. 4. Rosa Amalia, S.Pi.,M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Self learning: 3 hours per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 80 hours per semester, which consists of 150 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	2 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	Knowledge: students are able to understand about the meaning of aquatic ecosystem (ecosystem) ecology and terminology (scope) within ecosystem boundaries: stagnant waters (lakes/reservoirs/ponds), watersheds, estuaries, mangroves and the sea. Skill : students can explain and know about the meaning of aquatic ecosystem ecology and terminology (scope) within ecosystem boundaries: stagnant waters (lakes/reservoirs/ponds), watersheds, estuaries, mangroves and the sea. Competence : At the end of this course, students are able to understand, explain and know about the meaning of aquatic ecosystem ecology, abiotic and biotic factors and the zoning of aquatic environments, species, populations, communities, energy flows, biogeochemical cycles, structures and roles of ecosystems and their interactions.
Content	This course studies abiotic and biotic factors and the zoning of aquatic environments, species, populations, communities, energy flows, biogeochemical cycles, structures and roles of ecosystems and their interactions.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	1. Lactuconsina, H. 2020. Ekologi Perairan Tropis: Prinsip Dasar Pengelolaan Sumber Daya Hayati Perairan. Edisi Ketiga. Yogyakarta: Gadjah Mada University Press. 284p. 2. Rosmawati. 2011. Ekologi Perairan. Edisi kesatu. Jakarta: Hilliana Press. 113p. 3. Romimohtarto, K dan Sri Juwana., 2005. Biologi Laut. Ilmu Pengetahuan Tentang Biota Laut. Jakarta: Djambatan. 4. Nybakken, J. W., 1988. Biologi Laut Suatu Pendekatan Ekologis (Penerjemah M. Eidmen dan Koesoebiono). Jakarta: PT. Gramedia.

Module Handbook Introduction to Aquaculture

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

Module designation	Introduction to Aquaculture
Module level, if applicable	1st year
Code, if applicable	IBP21-301
Subtitle, if applicable	The principle of aquaculture
Courses, if applicable	Introduction to aquaculture
Semester(s) in which the module is taught	3rd semesters
Person responsible for the module	Prof. Dr. Ir. Sri Rejeki, MSc
Lecturer	1. Prof. Dr. Ir. Johanes Hutabarat, M.Sc 2. Prof. Dr. Ir. Budi Prayitno, M.Sc 3. Dr. Ir. Sarjito, M.App.Sc
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning ● Lecture and seminars: 100 minutes per week; Forms of active participation: lecture and discussion ● Self learning: 3 hours per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	*2* CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	Students are able various types of aquatic ecosystems for aquaculture activities, good and best aquaculture procedures, seed selection, cultivation, applied manipulations to increase production,

Content	- Definition and limitation regarding water quality management and its importance towards aquaculture field. - The relationship between the physical, chemical, and biological quality of an aquatic ecosystem in producing biomass - The dynamics control on water ecosystem in physical, chemical, and biological aspects - Mitigate the various pollution such as heavy metal and pesticide in a water quality for aquaculture
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom. Requirements: attendance ≥75% Grading: Assignments: 50% Mid-semester exam: 25% Final exam: 25%
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Fajar Basuki 2018 Pengantar Kuliah Manajemen Panti benih. https://budidayaikan1957.blogspot.com/2018/03/blog-post.html 2. Fajar Basuki 2018 Perencanaan Produksi Benih. https://budidayaikan1957.blogspot.com/2018/03/perencanaan-produksi-benih.html 3. Fajar Basuki 2018 Mekanisme Ovulasi pada Ikan. http://budidayaikan1957.blogspot.com/2018/10/materi-1-mk-froa-dan-mk-fri.html 4. Fajar Basuki 2018. Cara membuat laporan singkat. https://budidayaikan1957.blogspot.com/2018/03/cara-membuat-laporan-singkat-praktikum.html 5. Fajar Basuki 2018. Teknik dan manajemen TPI. https://budidayaikan1957.blogspot.com/2018/08/pelatihan-teknis-pengelolaan-budidaya.html 6. Reynaldo Patiño1 & Craig V. Sullivan2., 2002. Ovarian follicle growth, maturation, and ovulation in teleost fish *Fish Physiology and Biochemistry* 26: 57– 70, 2002 7. Ahmet Regaib Oğuz*1 and Güler Ünal. 2012. The Effects of 17β –Estradiol on Vitellogenin, Total Protein, Histochemical, and Some Morphological Indices on Chalcalburnus tarichi Indices on *Chalcalburnus tarichi* 8. Alberto Huberman. 2000. Shrimp endocrinology. A review. Aquaculture 191 2000 191-208 9. J.Joosse 1972. Endocrinology of reproduction in mollusks. General and Comparative Endocrinology**.** Volume 3, Supplement, 1972, Pages 591-601

Module Handbook Ichtyology

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

Module designation	Ichtyology
Module level, if applicable	1nd years
Code, if applicable	PIBP6-002
Subtitle, if applicable	
Courses, if applicable	Ichtyology
Semester(s) in which the module is taught	1rd semesters
Person responsible for the module	Dr. Ir. Basuki Fajar, M.S.
Lecturer	1. Dr. Ir. Basuki Fajar, M.S. 2. Tita Elfitasari, S.Pi., M.Sc.,Ph.D. 3. Rosa Amalia, S.Pi.,M.Si. 4. Dewi Nurayati, S.Pi.,M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Practical: 3 hours (170 minutes) per week 3. Self learning: 3 hours per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	Knowledge: understand the classification, structure and function of organs, reproductive processes, behavior, distribution and growth of fish. Skill : students can analyze various applications of ichthyology in fish systematics, fish reproduction, and fish physiology Competence : At the end of this course, students can explain the concept of fish systematics and the role of fish systematicians; describe several types of fish that live in Indonesian waters; explain the macro functions of the ten organ systems of the fish body with the modifications that occur in these organ systems
Content	This course studies the classification, structure and function of organs, reproductive processes, behavior, distribution and growth of fish.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Module Handbook Statistic

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

Module designation	Statistic
Module level, if applicable	2 th years
Code, if applicable	MPK 207
Subtitle, if applicable	This course
Courses, if applicable	This course equips students to know the basic principles of statistics for conduct the aquaculture experiment
Semester(s) in which the module is taught	4th semesters
Person responsible for the module	Dr. Ir. Sri Hastuti, Msi.,
Lecturer	1. Dr. Ir. Sri Hastuti, Msi., 2. Dr. Ir. Istiyanto S., MS., 3. Dr.Ir. Pinandoyo, MS., 4. Dr.Ir. Titik Susilowati, MS.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	● Lecture and seminars: 2 x 50 minute (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 3 x 50 minute (150 minutes) per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	After completing this course students will be able to solve various problems related to statistics, the use of formulas, menghintung regression, mamp guess the proportions and opportunities, permutations, able to compile statistical hypotheses, able to use table Z and Table T. Able to calculate the normality of data
Content	This course discusses the definition of statistics, usefulness, definition, use of rumus, opportunity, factorial understanding, permutations and combinations, understanding events, samples and events, Probability, average, standardization deviation, variants, Normal distribution, tables Z and t, estimation, lapse of trust, guessing, proportions, hypotheses, regression

Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Gomez, K. A. And A. A. Gomez. 1976. Statistical Procedure for Agricultural Research. With emphasis on rice. IRRI. Los Banos, Philiphines. 2. Steel, Robert G.D. and James H.Torrie. 1980. Statistical Principles and Procedures (Translation). Mc Graw – Hill, Inc. 3. Sudjana, 1994. Statistical Methods. Transito, Bandung. 4. Boediono, 2008. Theory and Application of Statistics and Probability, PT Remaja Rosdakarya Bandung

Module Handbook of Social Economy of Aquaculture

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

Module designation	**Social Economy of Aquaculture**
Module level, if applicable	2 nd years
Code, if applicable	PIBP6-012
Subtitle, if applicable	Studies the socio-economic conditions of the aqua-culturist community
Courses, if applicable	Social Economy of Aquaculture
Semester(s) in which the module is taught	2nd semesters
Person responsible for the module	Tita Elfitasari, S.Pi, M.Sc, Ph.D.
Lecturer	1. Tita Elfitasari, S.Pi, M.Sc, Ph.D. 2. Dr. Vivi Endar Herawati, SPi, MSi 3. Dr. Ir. Diana Rahmawati, MSi 4. Seto Windarto, S.Pi., M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Case studies: 1 hour per week; 4. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	*2* CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	Students are able to understand various social and economic conditions of aqua-culturist both individually and in groups, ranging from problems, obstacles, groups of aqua-culturist, capital, marketing and basic economic calculations
Content	The Problems, barriers, and conflicts of aqua-culturist. The financial problems and obstacles of aqua-culturist. The aqua-culturist groups and The financial management
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.

Media employed	Classical class with LCD projector, or online teaching by online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Suwasono, E., & Mulyaningtyas, R. D. (2020). Karakteristik Sosial Ekonomi Petani Pembudidaya Ikan Air Tawar Di Sleman Yogyakarta. *HABITAT*, *30*(3), 105-110. 2. Nikijuluw, V. P. (2001). Populasi dan sosial ekonomi masyarakat pesisir serta strategi pemberdayaan mereka dalam konteks pengelolaan sumberdaya pesisir secara terpadu. *Bogor (ID): Pusat Kajian Sumberdaya pesisir dan lautan, Institut Pertanian Bogor*. 3. Pandey, D. K., & Upadhayay, A. D. (2012). Socio-economic profile of fish farmers of an adopted model aquaculture village: Kulubari, West Tripura. *Indian Research Journal of Extension Education*, *2*, 55-58. 4. Olaoye, O. J., Ashley-Dejo, S. S., Fakoya, E. O., Ikeweinwe, N. B., Alegbeleye, W. O., Ashaolu, F. O., & Adelaja, O. A. (2013). Assessment of socio-economic analysis of fish farming in Oyo State, Nigeria. *Global Journal of Science Frontier Research Agriculture and Veterinary*, *13*(9), 45-55.

Semester III

Module Handbook Aquaculture Engineering

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

Module designation	Aquaculture Engineering
Module level, if applicable	2 th years
Code, if applicable	IBP21304
Subtitle, if applicable	
Courses, if applicable	Aquaculture Engineering
Semester(s) in which the module is taught	3th semesters
Person responsible for the module	Dicky Harwanto, S.Pi., M. Sc. PhD
Lecturer	1. Dicky Harwanto, S.Pi., M. Sc. PhD 2. Ristiawan Agung Nugroho, S.Pi, M. Si, 3. Dr. Ir. Sri Hastuti, M.S 4. Prof. Dr. Ir. Sri Rejeki, MSc
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Self learning: 3 hours per week ● Practical: 3 hours (150 minutes) per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Marine Ecology, 3. Marine Chemical and Physical

Module objectives/intended learning outcomes	- Knowledge : understand in General concept of Aquaculture Engineering; design concept of Marine Recirculation Aquaculture System (RAS) construction plan, and the production capacity - Skill : technical design of aquaculture engineering, marine recirculation contruction plan, and the production capacity - Competence : At the end of this course, students can design concept and production capacity of fresh water pond contruction plan, aquaculture construction plan coastal, and capacity of pond construction plan
Content	Course of Aquaculture Engineering provides and/or equips the students with the knowledge about various designs of aquaculture container construction designs including: pond. pool, KJA, RAS in accordance with the texture and hydro topographic; and calculate the production capacity of an aquaculture container as well as the apparatus for supporting the carrying capacity of the aquaculture container, such as pump, pipe and aeration system.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Reading list	● Stickney, R.R. 1994. Principles of Aquaculture. John Wiley and Sons, New York. ● Barrington, K., Chopin, T. and Robinson, S. 2009. Integrated multi-trophic aquaculture (IMTA) in marine temperate waters. In D. Soto (ed.). Integrated mariculture: a global review. FAO Fisheries and Aquaculture Technical Paper. No. 529 . Rome, FAO. pp. 7-46. ● Beveridge, M.C.M. 1996. Cage Aquaculture. 2nd Edition. Fishing News Books, Oxford. ● Ohno, M. and Critchley, 1997. Seaweed Cultivation and Marine Ranching. The Japan International Cooperation Agency. ● Lawson, T.B. 1995. Fundamental of Aquaculture Engineering. Chapman and Hall, New York. ● Shumway, S. 2011. Shellfish Aquaculture and the Environment. John Wiley & Sons, Inc. UK ● Zeeman, S. 2015. The Future of Aquaculture: IMTA Workshop of Aquaculture. Fisheries and Marine Science. Diponegoro University. ● Nugroho, R.A., Pambudi, L.T., Chilmawati, D., Haditomo, A.H.C. 2012. Aplikasi Teknologi Aquaponic Pada Budidaya Ikan Air Tawar Untuk Optimalisasi Kapasitas Produksi. Jurnal Saintek Perikanan Vol. 8. No. 1. ● Ardi, I. 2013. Budidaya Ikan Sistem Keramba Jaring Apung Guna Menjaga Keberlanjutan Lingkungan Perairan Waduk Cirata. Media Akuakultur Volume 8 Nomor 1. ● WWF Indonesia, I. 2011. Better Management Practices-Panduan Budidaya Ikan Nila Sistem karamba Jaring Apung. Versi 1. ISBN No 978 -979- 1461-16-0. WWF-Indonesia. ● Stickney, R.R. 2000. Encyclopedia of Aquaculture. John Wiley and Sons, New York. ● Howerton, R. 2001. Best Management Practices for Hawaian Aquaculture. Center for Tropical and Subtropical Aquaculture. Publication No.148.

Module Handbook The Physiology of Fish Reproduction

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

Module designation	The Physiology of Fish Reproduction
Module level, if applicable	2 th years
Code, if applicable	IBP21-306
Subtitle, if applicable	The concept of physiology of reproduction
Courses, if applicable	The Physiology of Fish Reproduction
Semester(s) in which the module is taught	3th semesters
Person responsible for the module	Dr. Ir. Fajar Basuki MS
Lecturer	1. Dr. Ir. Fajar Basuki MS 2. Dr. Ir. Titik Susilowati MSi.. 3. Tristianan Yuniarti SPi., MSi. 4. Ristiawan Agung Nugroho, S.Pi., M. Sc.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Self learning: 3 hours per week ● Practical: 3 hours (150 minutes) per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Biology 2. Basic of aquaculture 3. Ichtyology

Module objectives/intended learning outcomes	- Knowledge : understand in basic concepts of physiology of reproduction crustaceans and mollusca, and other aquatic organisms - Skill : Technical of the mechanism in the development of the gonads (sperms and eggs), the mechanism in the spawning, spermiation and ovulation, the mechanism of the follicle rupture, the oocyte excretion, the factors affecting fish ovulation, application reproduction hormone in the culture, rGH insertions - Competence : At the end of this course, Students are able to understand the definition of basic concepts of physiology of fish reproduction, study the endocrine and exocrine glands, hormone and reproductive mechanism in fish , crustaceans and mollusca, as well as hormone application on the cultured organisms.
Content	Course of basic concepts of physiology of fish reproduction, study the endocrine and exocrine glands, hormone and reproductive mechanism in fish , crustaceans and mollusca, as well as hormone application on the cultured organisms.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Module Handbook Histology

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

Module designation	Histology
Module level, if applicable	2nd year
Code, if applicable	**IBP21307**
Subtitle, if applicable	
Courses, if applicable	Histology
Semester(s) in which the module is taught	3rd semesters
Person responsible for the module	Dr. Ir. Desrina, M. Sc
Lecturer	1. Prof. DR. IR. S. Budi Prayitno, M. Sc (Budi) 2. Dr. Ir. Sarjito, M. AppSc (Jito) 3. A H Condro Haditomo, S.Pi, M.Si (Condro)
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Self learning: 3 hours per week ● Practical: 3 hours (170 minutes) per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Biology
Module objectives/intended learning outcomes	After completing histology course students will be able to distinguish about the structure and description of various normal tissues in fish cultivation

Content	This course covers the Basic recognize cells and tissue pieces, gill tissue structure, structure of skin tissue, movement organs (motile organs) and bones, structure of the type of cells composing the gastrointestinal tract, structure of the type of cells constituent digestive auxiliary organs, Circulation system, Endocrine organ tissue, Sensory organ tissue
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom. Requirements: attendance ≥75% Grading: Practicum and Assignments: 50% Mid-semester exam: 25% Final exam: 25%
Media employed	Classical class with LCD projector, or online teaching by online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Grizzle J.A. 1990. Histology of channel catfish. Auburn University 2. Mumford et al., 2007. Fish histology and histopathology. US Fish and Wildlife Service, 2007; available online for download 3. at: http://training.fws.gov/EC/Resources/Fish_Histology/histology.html. 4. Purushothaman et al. (2016), Morpho-histological characterisation of the alimentary canal of an important food 5. fish, Asian seabass (Lates calcarifer). PeerJ 4:e2377; DOI 10.7717/peerj.2377. 6. Other relevant materials (video, paper)

Module Handbook Basics of Aquatic Microbiology

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

Module designation	Basics of Aquatic Microbiology
Module level, if applicable	2nd years
Code, if applicable	IBP21-308
Subtitle, if applicable	
Courses, if applicable	Basics of Aquatic Microbiology
Semester(s) in which the module is taught	3rd semesters
Person responsible for the module	Prof. Ir. Slamet Budi Prayitno, M.Sc., Ph.D.
Lecturer	1. Prof. Ir. Slamet Budi Prayitno, M.Sc., Ph.D. 2. Dr. Ir. Sarjito, M.App.Sc 3. Dr. Ir. Desrina, M.Sc. 4. A.H. Condro Haditomo, S.Pi.,M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 3 hours (170 minutes) per week ● Self learning: 3 hours per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	- Knowledge: understand about taxonomy, morphology, metabolism, growth and reproduction of aquatic microorganisms (bacteria, viruses, fungi, and protozoa); isolation techniques and isolation media, as well as the role of microorganisms in the aquaculture environment and other organisms. - Skill : students can explain about taxonomy, morphology, metabolism, growth and reproduction of aquatic microorganisms (bacteria, viruses, fungi, and protozoa); isolation techniques and isolation media, as well as the role of microorganisms in the aquaculture environment and other organisms. - Competence : At the end of this course, students can analyze the basic concepts and growth of aquatic microbes which include taxonomy, morphology, metabolism, and reproduction of bacteria, viruses, fungi/fungi, and protozoa; isolation techniques and bacterial media, as well as the role of microorganisms in the environment and other organisms.
Content	This Course Learn about taxonomy, morphology, metabolism, growth and reproduction of aquatic microorganisms (bacteria, viruses, fungi, and protozoa); isolation techniques and isolation media, as well as the role of microorganisms in the aquaculture environment and other organisms.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Module Handbook Fish Nutrition

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

Module designation	Fish Nutrition
Module level, if applicable	2nd years
Code, if applicable	IBP21-309
Subtitle, if applicable	
Courses, if applicable	Fish Nutrition
Semester(s) in which the module is taught	3rd semesters
Person responsible for the module	Dr. Ir. Subandiyono, M.App.Sc.
Lecturer	1. Dr. Ir. Subandiyono, M.App.Sc. 2. Dr. Vivi Endar Herawati, S.Pi. M.Si. 3. Dr. Ir. Pinandoyo, M.Si. 4. Dr. Ir. Diana Rachmawati, M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 3 hours (170 minutes) per week ● Self learning: 3 hours per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	- Knowledge: understand about science and technology of fish nutrition (macro and micronutrient requirements, energy, and additives for cultured fish); the relationship between nutritional parameters, selection of ingredients, preparation of formulations and feed on efforts to increase the growth of aquaculture fish. - Skill : students can apply science and technology on the role and/or benefits of various nutritional and non-nutritive components and their needs for various types of fish that are important in aquaculture, both freshwater, brackish, and marine fish; as well as various factors that affect the quality of feed and their effects (either directly or indirectly, positive or negative) on the cultured organisms. Nutrient components include macronutrients and micronutrients, while non-nutritive components include non nutients and anti-nutrients. What is meant by fish includes finfish, crustaceans, bivalves, and gastropods. - Competence : At the end of this course, students can analyze fish nutrition (macro and micronutrient requirements, energy, and additives for cultured fish); the relationship between nutritional parameters, selection of ingredients, preparation of formulations and feed on efforts to increase the growth of aquaculture fish.
Content	This Course studies about science and technology of fish nutrition (macro and micronutrient requirements, energy, and additives for cultured fish); the relationship between nutritional parameters, selection of ingredients, preparation of formulations and feed on efforts to increase the growth of aquaculture fish.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	1. Lawrence, E. 1989. Biological Terms. 10th ed. Longman Sci. & Tehnical, Singapore. 645 p. 2. Lestari, S. F., S. Yuniarti, dan Z. Abidin. 2013. Pengaruh Formulasi Pakan Berbahan Baku Tepung Ikan, Tepung Jagung, Dedak Halus dan Ampas Tahu terhadap Pertumbuhan Ikan Nila (*Oreochromis sp.)*. Jurnal Kelautan, 6(1):36-46. 3. Lovell, T. 1989. Nutrition and feeding of fish. Van Nostrand reinhold, New York, 260 p. 4. Parker, R. 2001. Aquaculture Science, 2nd ed. Delmar, Thompson Learning, USA. 621 p. 5. Subandiyono dan Hastuti, S. 2016. Buku Ajar: Nutrisi Ikan. Fakultas Perikanan dan Ilmu Kelautan, Universitas Diponegoro. 246 p.

Module Handbook Information technology

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

Module designation	Information technology
Module level, if applicable	1st years
Code, if applicable	IBP 21310
Subtitle, if applicable	Information technology
Courses, if applicable	This course aims to introduce and further apply information technology in aquaculture
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	Drs. Suhartono, M.Kom.
Lecturer	1. Drs. Suhartono, M.Kom. 2. Drs. Eko Adi Sarwono, M.Kom. 3. Restiana Wisnu Aryati, S.Pi., M.Si. 4. Seto Windarto, S.Pi, M.Si., M.Sc. 5. Ristiawan Agung Nugroho, S.Pi., M.Si
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	● Lecture and seminars: 2 x 50 minute (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 3 x 50 minute (150 minutes) per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	Students are able to understand on: 1. Hardware and Software 2. Network System 3. Copy Right and Legacy in Information Technology 4. Management, Processing, Numeric/Data Processing Software 5. Presentation Technique 6. Information Technology Application in bio-informatics, Geographical Information System (GIS), Colour Management, Scientific Citation

Content	Students are able to understand about Hardware and Software, Network System, Copyright and Legacy of Information Technology, Management, Numerical/Data Processing Software, Presentation, Certain Applications and Utilization of Internet Applications to support learning and research in the field of Aquaculture, especially for Aquaculture students.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Module Handbook Entrepreunership

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

Module designation	Entrepreunership
Module level, if applicable	2 th years
Code, if applicable	UNW00007
Subtitle, if applicable	
Courses, if applicable	Entrepreunership
Semester(s) in which the module is taught	3th semesters
Person responsible for the module	Tita Elfitasari, S.Pi., M. Sc. PhD
Lecturer	1. Tita Elfitasari, S.Pi., M. Sc. PhD 2. Dr. Ir. Diana Rahmawati, M.Si. 3. Dr. Vivi Endar Herawati, S.Pi., M.Si. 4. Dr. Ir. Fajar Basuki, MS.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 2 hours per week 3. Case studies: 2 hour per week; 4. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 96 hours per semester, which consists of 220 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 120 minutes for response)
Credit points	2 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	

Module objectives/intended learning outcomes	- Knowledge : understand in model of entrepreneurial process, bussines prospect of aquaculture, creativity and innovation ideas in the bussines of aquaculture, the determination of the market - Skill : technical of aquaculture business plan, SWOT analysis of bussines - Competence : At the end of this course, students understand the concept of principles and processes of entrepreneurship, business prospects, and innovations in the field of aquaculture, as well as possess the ability to make the evaluation of the business comprehensively.
Content	Course Learn about the definition and concept of entrepreneurship, business prospects in the aquaculture of various aquaculture innovations, feasibility studies and business law.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	

Semester IV

Module Handbook Natural feed culture

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

Module designation	Natural feed culture
Module level, if applicable	2 th years
Code, if applicable	IBP21-315
Subtitle, if applicable	The basic concept culture of phytoplankton, zooplankton and annellids
Courses, if applicable	Natural feed culture (Budidaya Pakan Alami)
Semester(s) in which the module is taught	3th semesters
Person responsible for the module	Dr. Diana Chilmawati, S.Pi., M.Si.
Lecturer	1. Dr. Diana Chilmawati, S.Pi., M.Si. 2. Dr. Ir. Suminto, M.Sc. 3. Dr. Ir. Subandiyono, M.App.Sc. 4. Dr. Vivi Endar Herawati, S.Pi., M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Practical: 3 hours (150 minutes) per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1.Biology, 2.Aquatic ecology, 3. Basic of aquaculture management DDMBA,

Module objectives/intended learning outcomes	- Knowledge : understand in physiological and practical processes in fitoplankton (mikroalga, rotifer), zooplankton (artemia, moina, daphnia, copepod, spat bivalves) and annelida (lumbricus, tubifex, nereis) production. - Skill : technical culture procedures of live feeds for aquaculture (fitoplankton, zooplankton and annelida). - Competence : At the end of this course, students can design and practice culture of plankton (phytoplankton and zooplankton) and annelids, as well as enrichment techniques for natural food on a limited scale according to standard natural feed cultivation procedures.
Content	The Natural Feed Culture Course studies natural food in aquaculture which includes; cultivation of plankton (phytoplankton and zooplankton) and annelids and their enrichment techniques on a limited scale.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Hoff F.H and T.W.Snell. 1997. Plankton Culture Ma2nual 4th ed. San Antonio, Florida. 141 pp 2. Fulks W. And K.L. Main (Eds). 1991. Rotifer and Microalgae Culture System, Proceedings. The Oceanic Institute, Honolulu, Hawai. 364 pp. 3. J.R.Stein L. 1973. Phycological Methods. Academic Press. Toronto. 448 pp. 4. Hagiwara, A., T.W. Snell, E. Lubzens And C.S. Tamaru (Eds.). 1997. Live Food in Aquaculture (Developments in Hydrobiology). Kluwer Academic Press Publishers. 328 pp. 5. Riqulme C.E. and Y. Ishida. 1989. Interaction Between Microalgae and Bacteria in Coastal Seawater. Kyoto Univ. Publisher. 60 pp. 5. Mc Vey J.P. And J.R. Moore. 1983. Crustacean Aquaculture (CRC Handbook of Mariculture). Vol.1. CRC Press, Inc., Florida. 341 pp 6. Saouth R.G. And A. Whittick. 1993. Introduction of Phycology. 1st ed. Blackwell Scientific Publs. Oxford. 341 pp. 7. Suminto & K. Hirayama. 1993. Relation Between Diatom Growth and Bacterial Population in Semi Mass Cultur Tanks of Diatom. Bull. Of Fac. Fish., Nagasaki Univ. Nos.74/75 :37-41 8. Suminto & K. Hirayama. 1996. Effect of Bacterial Coexistence on The Growth of a Marine diatom Chaetoceros gracilis. Fish Sci. 62 : 40-43. 9. Suminto. 1996. Studies on Utilization of an Environmental Bacterium for Stable Mass Culture of The Marine Microalgae. Doctor Dissertation, 101 pp. 10. Suminto & K. Hirayama. 1997. Application of a Growth-promoting Bacteria for stable mass culture of Three Marine Microalgae. Hydrobiologia , 358: 223-230. 11. Borowitzka, M.A. & L.J. Borowitzka. 1988. Micro-Algal Biotechnology. Cambridge Univ. Press, 477 pp

Module Handbook Parasite and Fish Disease

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

Module designation	**Parasite and Fish Disease**
Module level, if applicable	2 th years
Code, if applicable	PKB 307P
Subtitle, if applicable	This course study about various types of fish diseases. Infectious disease that is caused by fungi, protozoa, worm, bacteria, virus, and Non-Infectious disease with clinical symptom, pathogen identification, life cycle, and how to prevent it. The course materials emphasize the tropical disease on fish.
Courses, if applicable	Parasite and fish disease
Semester(s) in which the module is taught	4th semesters
Person responsible for the module	Prof. Dr. Ir. Slamet Budi Prayitno, MSc Dr.
Lecturer	1. Prof. Dr. Ir. Slamet Budi Prayitno, MSc 2. Dr. Ir. Sarjito, M.AppSc. 3. Dr. Ir. Desrina, M.Sc 4. Alfabetian Harjuno Condro Haditomo, S.Pi., M.S
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	1. Lecture and seminars: 2 x 50 minute (100 minutes) per week; Forms of active participation: lecture and discussion 2. Practical: 3 x 50 minute (150 minutes) per week 3. Case studies: 1 hour per week; 4. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	Fisheries histology
Module objectives/intended learning outcomes	Students are able to understand: 1. General concept of parasite and fish disease 2. Non-Infectious disease concept based on environmental, feed, and genetic factors 3. Fisheries Parasitic Infectious disease concept 4. Fisheries Bacterial Infectious disease concept 5. Fisheries Viral Infectious disease concept 6. Shrimp Parasitic Infectious disease concept

Content	Non-Infectious Disease on fish, include environment , feed,genetic. Infectious Disease on fish, include pest (vector carrier, water animal and plant), parasite, bacteria, virus. Ectoparasite and Endoparasite on fish, include: Crustacean, Protozoa, Fungi, Monogenean, Digenean, Nematode. Causes of non-infectious diseases in fish originating from the environment, feed, and genetic factors include : environment (Hazardous environment, poisonous, and heavy metal), feed (Feed deficiency, vitamin, and mineral), genetic factors (Parental and genetic). An introduction to bacterial infectious disease and be able to understand the bacteria on freshwater fish, and seawater fish, include: MAS (*Aeromona hydrophilla*), Streptococcosis (*Streptococcus* sp), Mycobacterium, *Edwardsiella* sp, Vibriosis. An introduction to virus infectious disease on fish and various type of viruses, include: KHV, TiLV, VNN. An introduction to virus infectious disease on shrimp and various type of viruses, include: WSSV, TSV, IMNV, MBV
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom. Requirements: attendance ≥75% Grading: Practicum and Assignments: 50% Mid-semester exam: 25% Final exam: 25%
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Reading list	1. Austin B and Austin DA. 2007. Bacterial fish pathogens disease of farmed and wild fish. Fourth Edition. Springer. Published in Association with Praxis Publishing. Chichester, UK 2. Burton JR and Lanza GR. 1986. Aeromonas hydrophila densities in thermally-altered reservoir water and sediments. University of Texas at Dallas. D Reidel Publishing Company. USA 3. Chen, SC., A Adams, RH Richards. 1997. Extracellular products from Mycobacterium spp. in fish. J. of Fish Diseases 20: 19-25 4. Cipriano RC, Bullock GL, Pyle SW. 2001. Aeromonas hydrophila and Motile Aeromonad Septicemias of fish. United States Departement of The Interior Fish and Wildlife Service Division of Fishery Research Washington DC. 5. Evans, JJ., PH Klesius, CA Shoemaker. 2006a. An overview of Streptococcus in warmwater fish. Aquac. Health Int. 7: 10 -14. 6. Grabda, J. 1991. Marine Fish Parasitology. Polish Scientific Publisher. Warszawa 7. Haditomo, AHC. 2011. Pemberian Probiotik Pada Media Budidaya Untuk Pengendalian Aeromonas hydrophila Pada Ikan Mas (Cyprinus carpio). Thesis 8. Inglis V, Roberts RJ, Bromage NR. 1993. Bacterial diseases of fish. Institute of Aquaculture. Oxford Blackwell Scientific Publications. 9. Irianto A. 2005. Patologi ikan teleostei. Gajah Mada University Press, Yogyakarta. Hlm 83-145. 10. Kabata, Z. 1985. Parasites and Disease of Fish Control in The Tropic. Taylor and Francis, London and Philadelphia. 11. Kamiso, HN. 1996. Vibriosis pada ikan dan alternatif cara penanggulangannya. J. Perikanan UGM (GMU J.Fish Sci.) 1 (1): 78 - 86 12. Moeller, H. and Anders, K. 1986. Disease and Parasites of Marine Fishes. Verlag Moeller. Kiel. FRG. 13. Prayitno, S. B. 1998. Prinsip-Prinsip Diagnosa Penyakit Ikan. Badan Penerbit Universitas Diponegoro, Semarang, 14. Post. 1987. Handbook of Fish Diseases. Hal 81-84. 15. Robert RS 2000. Encyclopedia of Aquaculture. John Wiley & Sons. New York. 16. Robert JR. 2001. Fish pathology 3rd edition. Bailere, Tyndall, Cadar, Editor. England. hlm 300 -316. 17. Salati F. 1988. Vaccination against Edwardsiella tarda. Dalam : Fish Vaccination. New York: Ellis Academic Press. 135 – 151 18. Sheehan Brian et al. 2009. Streptococcal diseases in farmed tilapia. Aquaculture Asia pacific vol. 5 No. 6:26 - 29 19. Simkova, A. Desdevides, Y. Gelnar, M. and Morand, S. 2001. Morphometric Correlates of Host Specificity in Dactylogyrus Species (Monogenea) Parasites of European Cyprinid Fish. Cambridge University Press. UK. Parasitology (2001).

Module Handbook Organic Feed Culture

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

Module designation	Organic Feed Culture
Module level, if applicable	2 th years
Code, if applicable	IBP21315
Subtitle, if applicable	
Courses, if applicable	Organic Feed Culture/ Natural Feed Culture
Semester(s) in which the module is taught	4th semesters
Person responsible for the module	Dr. Ir. Suminto, M. Sc
Lecturer	1. Dr. Ir. Suminto, M. Sc (Course Coordinator) 2. Dr. Vivi Endar H. S.Pi., M. Sc. (Practicum Coordinator) 3. Dr. Ir. Subandiyono, M. App.Sc 4. Dr. Diana Chilmawati, S.Pi., M. Sc.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	1. Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning 2. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 3. Self learning: 3 hours per week 4. Practical: 3 hours (150 minutes) per week 5. Case studies: 1 hour per week; 6. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Biology, 2. Ecology waterfront, 3. DDMBA

Module objectives/intended learning outcomes	- Knowledge : understand in physiological and practical processes in fitoplankton (mikroalga, rotifer), zooplankton (artemia, moina, daphnia, copepod, spat bivalves) and annelida (lumbricus, tubifex, nereis) production. - Skill : technical culture procedures of live feeds for aquaculture (fitoplankton, zooplankton and annelida) and the enrichment technique of organic feed - Competence : At the end of this course, students are able to properly determine, design, practice and conduct the culture activities of plankton (phytoplankton and zooplankton), annelids, and the enrichment technique of organic feed
Content	Organic feed culture course studies the remains of organic feed in aquaculture business which includes; plankton (phytoplankton and zooplankton) and annelids culture, and the enrichment techniques.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or test with kulon
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Reading list

1. Hoff F.H and T.W.Snel. 1997. Plankton Culture Ma2nual 4th ed. San Antonio, Florida. 141 pp
2. Fulks W. And K.L. Main (Eds). 1991. Rotifer and Microalgae Culture Systems, Proceedings. The Oceanic Institute, Honolulu, Hawaii. 364 pp.
3. J.R.Stein L. 1973. Phycological Methods. Academic Press. Toronto. 448 pp.
4. Hagiwara, A. T.W. Snel, E. Lubzens And C.S. Tamaru (Eds.). 1997. Live Food in Aquaculture (Developments in Hydrobiology). Kluwer Academic Press Publishers. 328 pp.
5. Riqulme C.E. and Y. Ishida. 1989. Interaction Between Microalgae and Bacteria in Coastal Seawater. Kyoto Univ. Publisher. 60 pp.
6. Mc Vey J.P. And J.R. Moore. 1983. Crustacean Aquaculture (CRC Handbook of Mariculture). Vol.1. CRC Press, Inc., Florida. 341 pp
7. Saouth R.G. And A. Whittick. 1993. Introduction of Geometry. 1st ed. Blackwel Scientific Publs. Oxford. 341 pp.
8. Suminto & K. Hirayama. 1993. Relation Between Diatom Growth and Bacterial Population in Spring Mass Cultur Tanks of Diatoms . Bul. Of Fac. Fish., Nagasaki Univ. Nos.74/75 :37-41
9. Suminto & K. Hirayama. 1996. Effect of Bacterial Coexistence on The Growth of a Marine diatom *Chaetoceros gracilis.* Fish Sci. 62 : 40-43.
10. Suminto. 1996. Studies on Utilization of an Environmental Bacterium for Stable Mass Culture of The Marine Microalgae. Doctor Dissertation, 101 pp.
11. Suminto & K. Hirayama. 1997. Application of a Growth-promoting Bacteria for stable mass culture of Three Marine Microalgae. *Hydrobiologia* , 358: 223-230.
12. Borowitzka, M.A. & L.J. Borowitzka. 1988. Micro-Algal Biotechnology. Cambridge Univ. Press, 477 pp.

Module Handbook Management of Aquatic Environment

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

Module designation	Management of Aquatic Environment
Module level, if applicable	2 th years
Code, if applicable	IBP21-311
Subtitle, if applicable	
Courses, if applicable	This course explains the concept of carrying capacity of waters, the concept of habitat resilience, and water and soil use for aquaculture so that students are expected to be able to predict water productivity according to the carrying capacity and resilience of aquatic habitats and plan aquaculture environmental management based on the concept of carrying capacity and environmentally friendly
Semester(s) in which the module is taught	4th semesters
Person responsible for the module	Prof. Dr. Sri Rejeki, M.Sc.
Lecturer	1. Dicky Herwanto, S.Pi., M.Sc., PhD 2. Lestari L Widowati, MS 3. Rosa Amalia, MS
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	● Lecture and seminars: 2 x 50 minute (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 170 minutes per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	Students will be able to understand and explain the concept of carrying capacity of waters, the concept of habitat resilience, and use of water and soil for aquaculture so that students are expected to be able to predict water productivity according to the carrying capacity and resilience of aquatic habitats and plan aquaculture environmental management based on the concept of carrying capacity. capacity) which is environmentally friendly.
Content	Carrying Capacity, Habitat resilience and land and water use in public waters. Carrying capacity and use of water and soil in open public waters (rivers, lakes, reservoirs) and closed (ponds), coastal area (Brackish water ponds), marine ecosystem.

Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Mazor T., Runting R.K., Saunders M.I., Huang D., Friess D.A., Nguyen N.T.H., Lowe R.J., Gilmour J.P., Todd P.A., Lovelock C.E.Future-proofing conservation priorities for sea level rise in coastal urban ecosystemsBiol. Conserv., 260 (2021),p. 109190, 10.1016/j.biocon.2021.109190 2. NCCS (National Climate Change Secretariat) Coastal protection (2016)https://www.nccs.gov.sg/climate-change-and-singapore/domestic-actions/adapting-climate-change/coastal-protection (accessed 30 June 2017) 3. Pomeroy R.S., Parks J.E., Watson L.M.How is Your MPA Doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland and Cambridge (2004)

Module Handbook Basics of Fish Genetics

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

Module designation	Basics of Fish Genetics
Module level, if applicable	2 th years
Code, if applicable	IBP21-312
Subtitle, if applicable	This course learn about the basic of fisch genetics
Courses, if applicable	This course explains the basic concepts or principles of hatchery in fish, crustaceans and shellfish
Semester(s) in which the module is taught	4th semesters
Person responsible for the module	Dr. Ir. Fajar Basuki MS
Lecturer	1. Dr. Ir. Titik Susilowati, M.Si. 2. Ristiawan Agung Nugroho SPi., MSi. 3. Tristiana Yuniarti SPi., MSi
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	● Lecture and seminars: 2 x 50 minute (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 170 minutes per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	Students are able to understand: 1. Concept and function of Cells, Chromosomes, Alleles and DNA in fish breeding 2. Selection and Hybridization Concepts, and their application to the Tilapia case study 3. Concepts, Methods and Ethics in Genetic Manipulation (Chromosomal Manipulation and Trans-genetic) in Fish 4. Application of Fish Breeding in Aquaculture (Disease Management, Growth and Optimization of Fish Production)

Content	Selection:1. Individual selection, 2. Selection work procedure, 3. Character Analysis Tilapia Reproduction, 4. Growth Analysis and Fish Genetic Gain Nursery Results I-III 5. Growth Analysis and Fish Genetic GainValue of Magnification I. Hybridization in Fish includes:1. Individual selection, 2. Hybridization work procedures, 3. Character analysis Reproduction, 4. Analysis of Hybrid Seed Heterosis Effect Principles and mechanisms Ploidization method work (triploid, tetrapoid and haploid), 2. Principles and mechanisms Gynogenesis and Androgenesis Working principle and mechanismvarious genetic trans manipulations in fish, namely:1. Nuckleus Transplant, 2. Gene Transfer (Micro Injection, Electroporation,Sperm-carrier, Biolistic[particle bombardment],Lipofection and Viral vectors
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Beaumont and Hoar. 2003. Biotechology and Genetics in Fisheries and Aquaculture. Blackwell Science. 2. Dunham, R.A. 2004. Aquaculture and Fisheries Biotechnology – Genetic Approaches. CABI Publishing. UK. 3. Evett, Ian and Bruce Weir. 1998. Interpreting DNA Evidence. Sinauer Associates Inc. US. 4. Fujaya, Yushinta. 2002. Fisiologi Ikan-Dasar Pengembangan Teknologi Perikanan. Dirjen DIKTI. 5. Mustafa, S. (Editor). 1999. Genetics in Sustainable Fisheries Management. Fishing Mnews Books. 6. Lutz, C Greg. 2001. Practical Genetics for Aquaculture. Fishing News Books. Blackwell Science Ltd, Oxford, London. 252p. 7. Tave, Douglas. 1986. Genetics for Fish Hatchery Managers. AVI Publishing. US

Module Handbook Experimental Design

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

Module designation	**Experimental Design**
Module level, if applicable	2 th years
Code, if applicable	PKP 415P
Subtitle, if applicable	The course study about design concept for experimental in aquaculture
Courses, if applicable	Experimental design
Semester(s) in which the module is taught	4th semesters
Person responsible for the module	Dr. Ir. Sri Hastuti, Msi.,
Lecturer	1. Dr. Ir. Sri Hastuti, Msi., 2. Dr. Ir. Subandiyono, M.AppSc., 3. Prof.Dr.Ir. S. Budi Prayitno, MSc., 4. Dr.Ir. Agung Sudardoyo, MSc
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	1. Lecture and seminars: 2 x 50 minute (100 minutes) per week; Forms of active participation: lecture and discussion 2. Practical: 3 x 50 minute (150 minutes) per week 3. Case studies: 1 hour per week; 4. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-
Module objectives/intended learning outcomes	Students are able to compile experimental design concept either single factorial or 2 & 3 order factorial along with their variant test. Students are able to calculate the median of BNJ, BNT, Duncan, and non-parametric test Students are able to compile test hypotheses and analyse the test results

Content	The Single Factor Experiments with Completely Randomized Designs (RAL), Block Randomized Design (RAK), Balanced Incomplete Randomized Block Design (BIBD), Balanced Complete Randomized Block Design (BCBD), Latin Square Design and independent degree (Db), the advantages and disadvantages. Analysis and interpretation of BNJ, BNT, and Duncan. analysis of the experimental model of RAL and RAK. Analysis of non-parametric data
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Finney, D.J. 1960. An Introduction to The Theory of Experimental Design. The University of Chicago Press. 2. Gomez, K. A. And A. A. Gomez. 1976. Statistical Procedure for Agricultural Research. With emphasis on rice. IRRI. Los Banos, Philiphines. 3. Steel, Robert G.D and James H.Torrie. 1980. Prinsip dan Prosedur Statistika (Terjemahan).Mc Graw – Hill, Inc. 4. Sudjana, 1994. Desain dan Analisis Eksperimen. Transito, Bandung. 5. Sokal, Robert F dan F. James Rohl. F. 1981. Pengantar Biostatistika (Terjemahan, 1991). Gajah Mada University Press.

Semester V

Module Handbook Management of Freshwater Cultivation

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

Module designation	Management of Freshwater Cultivation
Module level, if applicable	3nd years
Code, if applicable	IBP21-318
Subtitle, if applicable	
Courses, if applicable	Management of Freshwater Cultivation
Semester(s) in which the module is taught	5rd semesters
Person responsible for the module	Prof. Dr. Ir. Sri Rejeki, M.Sc.
Lecturer	Prof. Dr. Ir. Sri Rejeki, M.Sc. Dr. Ir. Sri Hastuti, M.Si. Lestari Lakhsmi Widowati, S.Pi., M.Si. Ristiawan Agung Nugroho, S.Pi., M.Si
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning ● Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion ● Practical: 3 hours (170 minutes) per week ● Self learning: 3 hours per week ● Case studies: 1 hour per week; ● Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	- Introduction to Fisheries and Marine Sciences - Basics of Aquaculture

Module objectives/intended learning outcomes	- Knowledge: understand about site selection, holding systems, cultivation methods, include: water quality management; feeding and growth analysis; fish health and survival analysis; and harvesting, as well as analysis of aquaculture in freshwater ecosystems in a sustainable manner. - Skill : students can analysis the principle of site selection (location selection), governance of cultivation containers (holding system), cultivation breeding principles and techniques for freshwater aquaculture, cultivation enlargement for freshwater aquaculture, bussines analysis of freshwater aquaculture. - Competence : At the end of this course, students are able to understand the principle of site selection (location selection), governance of cultivation containers (holding system), cultivation breeding principles and techniques for freshwater aquaculture, cultivation enlargement for freshwater aquaculture, bussines analysis of freshwater aquaculture.
Content	Course management of freshwater cultivation learns about site selection, holding systems, cultivation methods, include: water quality management; feeding and growth analysis; fish health and survival analysis; and harvesting, as well as analysis of aquaculture in freshwater ecosystems in a sustainable manner.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Reading List	● Arthur, J.R., Bondad-Reantaso, M.G., Campbell, M.L., Hewitt, C.L., Phillips, M.J. and Subasinghe, R.P. 2009. Understanding and Applying Risk Analysis In Aquaculture: A Manual For Decision-Makers. FAO Fisheries and Aquaculture Technical Paper. No. 519/1. Rome, FAO. 113p. ● Bartley, D.M., Brugère, C., Soto, D., Gerber, P. and Harvey, B. (eds). 2007. Comparative Assessment of The Environmental Costs of Aquaculture and Other Food Production Sectors: Methods For Meaningful Comparisons. FAO/WFT Expert Workshop. 24-28 April 2006, Vancouver, Canada. FAO Fisheries Proceedings. No. 10. Rome, FAO. 241p. ● Beveridge, M.C.M., 2004. Cage Aquaculture. Blackwell Publishing Ltd ● Chopin, T., 2010. Integrated Multi-Trophic Aquaculture In Advancing The Aquaculture Agenda. Workshop Proceedings. Organisation For Economic Co-Operation And Development. pp 195-214 ● COFI (Committee of Fisheries). 2010. Climate Change and Aquaculture: Opportunities and Challenges For Adaptation and Mitigation. Sub-Committee on Aquaculture: Session 5th, Phuket, Thailand, 27 September – 1 October 2010. FAO. 9p. ● Deniz, H., 2010. Turkey: Best Practices in Aquaculture Management and Sustainable Development In Advancing The Aquaculture Agenda. Workshop Proceedings. Organisation For Economic Co-Operation And Development. pp 183-190 ● FAO. 2009. Environmental Impact Assessment and Monitoring In Aquaculture. FAO Fisheries and Aquaculture Technical Paper. No. 527. Rome, FAO. 57p. ● FAO. 2012. The State of World Fisheries and Aquaculture 2012. FAO Fisheries and Aquaculture Department. FAO of the United Nations. Rome, Italy. 207p. ● Halmar Halide, David McKinnnon, mark Rehbein, Linsay Trot dan Richard Brickman, 2008. Panduan Teknis Cads-Tool. Suatu Perangkat Pendukung Keputusan Dalam Akuakultur Karamba Jaring Apung. Pereangkat Lunak Untuk Pengelola Karamba Jaring Apung Di Laut Dan Air Tawar. Balai Riset Perikanan Akuakultur Air Payau. Pusat Riset Perikanan Akuakultur Badan Riset Kelautan Dan Perikanan Departemen Kelautan Dan Perikanan. 27 hal ● Midlen, A. and Redding, T.A. 1998. Environmental Management for Aquaculture. Chapman & Hall, London UK. 240p.

Module Handbook of Ornamental fish and Aquascape

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

Module designation	**MANAGEMENT OF ORNAMENTAL FISH AQUACULTURE**
Module level, if applicable	2 th years
Code, if applicable	PKB 052
Subtitle, if applicable	Studies the aquaculture technique of freshwater, brackish and marine ornamental fish and the culture technique of ornamental plants for aquarium
Courses, if applicable	Management of ornamental fish aquaculture
Semester(s) in which the module is taught	5th semesters
Person responsible for the module	Dr. Ir.Istiyanto S,MS.
Lecturer	1. Dr. Ir.Istiyanto S,MS.(Coordinator). 2. Dr. Ir.Pinandoyo,MSi 3. Dr. Ir.Sri Hastuti,M. Si 4. Dicky Harwanto,Spi,Msc,PhD
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Practical: 3 hours (150 minutes) per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 80%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of aquaculture 2. Fish nutrition

Module objectives/intended learning outcomes	Students are able to learn about the aquaculture technique of freshwater, brackish and marine ornamental fish, which includes understanding various types of ornamental fish, hatchery, maintenance of larvae, seed, feed, transport, disease, equipment, engineering and decoration of the aquarium. The culture technique of ornamental plants for aquarium, ornamental fish business. students are expected to properly master the culture management of ornamental fish, both the freshwater, brackish water, and sea water fish.
Content	Studies the aquaculture technique of freshwater, brackish and marine ornamental fish, which includes understanding various types of ornamental fish, hatchery, maintenance of larvae, seed, feed, transport, disease, equipment, engineering and decoration of the aquarium. The culture technique of ornamental plants for aquarium, ornamental fish business includes the opportunity for local, regional, inter-regional, inter-island, and export-import business, web site creation and internet access.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. Mills, D. 1988. How to keep freshwater fish: Tropical Aquarium Fishes. Chancellor Press. London; 2. Cleave, A. 1996. Aquarium Fish: A portrait of the animal world. Universal International Pty, Ltd. Australia. 3. Istiyanto.2000. Suksesi Karang dan upaya budidayanya dengan Ikan Klon. Penerbit Undip.Semarang.

Module Handbook Fish Health Management

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

Module designation	Fish Health Management
Module level, if applicable	3nd years
Code, if applicable	IBP21-231
Subtitle, if applicable	
Courses, if applicable	Fish Health Management
Semester(s) in which the module is taught	5rd semesters
Person responsible for the module	Prof. Ir. Slamet Budi Prayitno, M.Sc., Ph.D.
Lecturer	Prof. Ir. Slamet Budi Prayitno, M.Sc., Ph.D. Dr. Ir. Sarjito, M.App.Sc Dr. Ir. Desrina, M.Sc. A.H. Condro Haditomo, S.Pi.,M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Practical: 3 hours (170 minutes) per week 3. Self learning: 3 hours per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	Parasites and fish diseases

Module objectives/intended learning outcomes	- Knowledge: understand managament the health of aquaculture cultivation by conducting fish diagnosis and control and treatment of various aquaculture diseases, as well as improving the immune system and vaccination of fish in the aquaculture system - Skill : students can solve disease problems that occur in the aquaculture system, fish diagnosis, control and treatment of various aquaculture diseases, as well as improving the immune system and vaccination of fish in the aquaculture system. Competence : At the end of this course, students can manage the health of aquaculture cultivation by conducting fish diagnosis, controlling and treament of various aquaculture diseases, as well as improving the immune system and vaccination of fish in the aquaculture system.
Content	Learn the principles of fish health and environmental management, fish diagnosis, control and treatment of various diseases in aquaculture, as well as the immune system and vaccination of fish.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Reading List	1. Health Management in Aquaculture. Aquaculture Department Souteast Asian Fisheries Development Center. Tigbauan, Iloilo, Philippines. 2001.hlm. 180. 2. Nayak SK. 2010. Probiotics and immunity: A fish perspective. *Fish & Shellfish Immunology*, 29: 2-14. 3. Prayitno SM, Haditomo AHC, Desrina, Sarjito. 2017. Prinsip-Prinsip Diagnosa Penyakit Ikan dan Manajemen Kesehatan Ikan. Universitas Diponegoro. 4. Ringo E, Olsen RE, Gifstad TO, Dalmo RA, Almund H, Hemre GI, Bakke AM. 2010. Prebiotics in aquaculture: a review. doi: 10.1111/j.1365-2095.2009.00731.x *Aquaculture nutrition,* 16: 117-136. 5. Pusat Karantina Ikan: Badan Karantina Ikan, Pengendalian Mutu dan Keamanan Hasil Perikanan. 2014. *Pedoman cara karantina ikan yang baik*. Jakarta: Kementerian Kelautan dan Perikanan. Hlm. 41. 6. Hartman K, Petty D, Brown CM, Lehotia CJ. 2006. Aquaculture: Emergency Management and Quarantine of Aquaculture Facilities. Florida Department of Agriculture and Consumer Services. 7. Ristiyawan B, Snggoro S, Yulianti B. 2013. Peranan Implementasi Kebijakan Karantina Ikan dalam Pembangunan Perikanan Berkelanjutan. Prosiding Seminar Nasional Pengelolaan Sumberdaya Alam dan Lingkungan 8. Indonesia Marine and Fisheries Book. 2017. Ministry of Marine and Affairs and Fisheries

Module Handbook Management of Brackish Water Cultivation

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

Module designation	Management of Brackish water Cultivation
Module level, if applicable	3 rd years
Code, if applicable	IBP21-319
Subtitle, if applicable	Management of Brackish water Cultivation
Courses, if applicable	Management of Brackish water Cultivation
Semester(s) in which the module is taught	7th semesters
Person responsible for the module	Prof. Dr. Ir. Sri Rejeki, MSc
Lecturer	Prof. Dr. Ir. Sri Rejeki, MSc Dr. Ir. Suminto, M.Sc Dr. Ir. Titik Susilowati, MS Dr. Diana Chilmawati, M.Pi, MS .
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Practical: 3 hours (170 minutes) per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Water Quality Management

Module objectives/intended learning outcomes	Students are able to understand: 1. The principle of site selection 2. management of cultivation containers, 3. principles and techniques of breeding and 4. Growth out of cultivated biota: Fish, Crustaceans, Brackishwater Molluscs
Content	I. Introduction Students are able to explain the basic principles, potentials and roles of Brackish Water Aquaculture Management (MBAP) in the production of fish, crustaceans and molluscs (C2) General Introduction: 1. Basic principles, Scope, 2. Potential and role; Problems in developing Brackish II. Water Aquaculture Management 1. Site selection and cultivation biota 2. AMA (Associated Mangrove Aquaculture) 3. Management and technology as well as sustainable management of brackish water biota cultivation that is environmentally III. Management application and seeding technology for superior brackish water biota and how to get seeds/seeds for each design construction IV. Cultivation Biotechnical for sustainable Brackish Water Cultivation V. Leading sustainable brackwater fish rearing management and technology application
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	

Module Handbook Management of Marine Cultivation

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

Module designation	Management of Marine Cultivation
Module level, if applicable	3 rd years
Code, if applicable	IBP21-319
Subtitle, if applicable	Management of Marine Cultivation
Courses, if applicable	Management of Marine Cultivation
Semester(s) in which the module is taught	5th semesters
Person responsible for the module	Prof. Dr. Ir. Sri Rejeki, MSc
Lecturer	Dr. Ir. Subandiono, M.App.Sc Tita Elfitasarari, S.Pi, M.Sc., PhD Ristiawan Agung N, S.Pi, MS .
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Practical: 3 hours (170 minutes) per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Water Quality Management
Module objectives/intended learning outcomes	Students are able to understand: 1. The principle of site selection 2. Management of cultivation containers, 3. Principles and techniques of breeding and 4. Growth out of marine cultivated biota: Fish, Crustaceans, Molluscs

Content	Basic principles, Scope, Potential and role; Problems in the development of Marine Aquaculture Management Location criteria Selection of economically important biota (finfish,crustaceans, molluscs and seaweed) Determine the layout of the container (holding system) Finfish, Seaweed, Shelfish biotechnical, aquaculture management and governance, breeding principles and techniques and grow-out methods for sustainable marine aquaculture.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Covid-19 pandemic.

Reading list	1. Barrington, K., Chopin, T. and Robinson, S. 2009. Integrated multi-trophic aquaculture (IMTA) in marine temperate waters. In D. Soto (ed.). Integrated mariculture: a global review. FAO Fisheries and Aquaculture Technical Paper. No. 529. Rome, FAO. pp. 7–46. 2. Beveridge, M.C.M. 1996. Cage Aquaculture. 2nd Edition. Fishing News Books, Oxford 3. Direktorat Jenderal Perikanan. 2001. PETUNJUK TEKNIS BUDIDAYA IKAN LAUT DI JARING APUNG. Departemen Pertanian, Jakarta. 15 halaman 4. Gosling, Elizabeth. 2004. Bivalve Moluscs: Biology, Ecology and Culture. Fishing News Books, Blackwell Publishing, Oxford, UK. Pp. X + 443. 5. Gouper Culture in Floating Net Cage. Digital refs. 6. Howerton, R. 2001. Best Management Practices for Hawaian Aquaculture. Center for Tropical and Subtropical Aquaculture. Publication No. 148 7. James P. McVey. 2000. CRC Handbook of Mariculture. Vol. II. Finfish aquacukture. CRC Press, Boca Raton, Florida. 255 p. 8. John Mosig and Ric Fallu. 2004. Australian fish farmer: a practical guide to aquaculture. 2nd ed. Landlinks Press, VIC, Australia. 444 p. 9. Lawson, T.B. 1995. Fundamental of Aquaculture Engineering. Chapman and Hall, New York. 10. Masson, Kelly. 2012. Scallop Aquaculture Strategies Roadmap. ISIS, Sauder Scool of Business, University of British Columbia. 21p. 11. Ohno, M. and Critchley, 1997. Seaweed Cultivation and Marine Ranching. Japan International Cooperation Agency. 12. Pillay, T.V.R.. 1992. Aquaculture and the Environment. Second edition. FAO, Blackwell Publishing, Rome, Italy 196 p. 13. SEAFDEC. Marine cage culture of grouper. Digital refs 14. Shumway, S. 2011. Shellfish Aquaculture and the Environment. John Wiley & Sons, Inc. UK 15. Stickney, R.R. 2000. Encyclopedia of Aquaculture. John Wiley and Sons, New York. 16. Stickney, R.R. 1994. Principles of Aquaculture. John Wiley and Sons, New York.

	17. Sarkis, S.; Lovatelli, A. (comp. /Ed.). 2007. Installation and operation of a modular bivalve hatchery. *FAO Fisheries Technical Paper*. No. 492. Rome, FAO. 173p. 18. Shumway, Sandra. 2011. Shellfish Aquaculture and The Environment. Wiley-Blackwell, John Wiley & Sons Ltd, West Sussex, UK. Pp. xvii + 507. 19. Shumway, Sandra and GJ. Parsons (Editors). 2006. Scallops: Biology, Ecology and Aquaculture. Published by Elsevier B.V. Pp. xxxix + 1460. 20. Spencer, B.E. 2002. Molluscan Shellfish Farming. Fishing News Books, Blackwell Publishing, Oxford, UK. Pp. XVIII + 274. 21. Sturm, C. F., T. A. Pearce, and A. Valdés. 2006. *The Mollusks: A Guide to Their Study, Collection, and Preservation*. American Malacological Society, Pittsburgh, PA, U.S.A. Pp. xii + 445.

Module Handbook Management of Fish Feeding Management and Technology

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

Module designation	Management of Fish Feeding Management and Technology
Module level, if applicable	3 rd years
Code, if applicable	IBP21-319
Subtitle, if applicable	Management of Fish Feeding Management and Technology
Courses, if applicable	Management of Fish Feeding Management and Technology
Semester(s) in which the module is taught	5th semesters
Person responsible for the module	Dr. Ir. Subandiyono, M.App.Sc
Lecturer	Dr. Vivi Endar H., S.Pi., M.Si Prof. Dr. Ir. Johannes Hutabarat, M.Sc. Dr. Diana Chilmawati, S.Pi., M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Practical: 3 hours (170 minutes) per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Water Quality Management
Module objectives/intended learning outcomes	Students are expected to be able to explain the basic concepts and benefits feeding management and able to determine and/or apply various methods or techniques feeding on various aquaculture systems according to fish needs and conditions environment or water carrying capacity

Content	The Feeding Management course provides and/or provides knowledge about basic concept of feeding in various aquaculture systems; as well as methods and techniques of giving feed that is in accordance with the needs of fish and environmental conditions or the carrying capacity of the waters. Various internal factors (physiological, type of fish, stadia) in determining or set a feeding schedule for cultured organisms at the larval stage, juvenile, adult to brood stock Various external factors (conditions) environment/weather, HR, technology, profile cultivation system) in determining or set a feeding schedule for cultured organisms at the larval stage, juvenile to brood stock. Various types of natural feed are suitable, suitable, and commonly used in various cultivation activities of various types cultured organisms (fish, shrimp, bivalves, gastropod) Various biological phenomena (deposition nutrition, growth), physiological (pattern) blood glucose, efficiency and process use of feed), and ecological (waste) metabolic) in the application of management feeding from juvenile to brood stock. Prospects, roles and benefits of management. feeding in the cultivation system extensive, semi-intensive, supra-intensive, on various cultured organisms (fish, shrimp, bivalves, gastropod) Different types and/or forms of feed (pellet, scrumble, flour, paste, flake) which is used in various cultivation of various organisms culture (fish, shrimp, bivalves, gastropods) larval, juvenile, adult, to parent stages
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Reading list	1. Zhao, Siqi, Ming Zhu, Weimin Ding, Sanqin Zhao, and Jiabing Gu. (2020) “Feed requirement determination of grass carp (Ctenopharyngodon idella) using a hybrid method of bioenergetics factorial model and fuzzy logic control technology under outdoor pond culturing systems.” Aquaculture 521: 734970. 2. Hassan, Habib Ul, Qadeer Mohammad Ali, Naveed Ahmad, Zubia Masood, Md Yeamin Hossain, Karim Gabol, Wali Khan, M. Hussain, A. Ali, M. Attaullah and M. Kamal. (2020) “Assessment of growth characteristics, the survival rate and body composition of Asian sea bass Lates calcarifer (Bloch, 1790) under different feeding rates in closed aquaculture system.” Saudi Journal of Biological Sciences 28 (2): 1324-1330. 3. Zhang, Lu, Jianping Wang, and Qingling Duan. (2020) “Estimation for fish mass using image analysis and neural network.” Computers and Electronics in Agriculture 173: 105439. 4. Zhang, Lu, Wensheng Li, Chunhong Liu, Xinhui Zhou, and Qingling Duan. (2020) “Automatic fish counting method using image density grading and local regression.” Computers and Electronics in Agriculture 179: 105844. 5. Saberioon, Mohammadmehdi, and Petr Císař. (2018) “Automated within tank fish mass estimation using infrared reflection system.” Computers and Electronics in Agriculture 150: 484-492. 6. Shi, Chen, Qingbin Wang, Xinlei He, Xiaoshuan Zhang, and Daoliang Li. (2020) “An automatic method of fish length estimation using underwater stereo system based on LabVIEW.” Computers and Electronics in Agriculture 173: 105419. 7. A., Geoff L. Allan, and Igor Pirozzi. (2010) “Estimation of digestible protein and energy requirements of yellowtail kingfish Seriola lalandi using a factorial approach.” Aquaculture 307 (3-4): 247-259. [9] Li, Nan, Ruimei Wang, Jian Zhang, Zetian Fu, and 8. Reis, João, Romi Novriadi, Anneleen Swanepoel, Guo Jingping, Melanie Rhodes, and D. Allen Davis. (2019) “Optimizing feed automation: improving timer-feeders and on demand systems in semi-intensive pond culture of shrimp Litopenaeus vannamei.” Aquaculture 519: 734759. [8] Booth, Mark

Semester VI

Module Handbook Aquaculture Business

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

Module designation	Aquaculture Bussiness
Module level, if applicable	3 rd years
Code, if applicable	PKB 504P
Subtitle, if applicable	This course teaches knowledge of business principles and entrepreneurship, business tips and their application in the field of aquaculture.
Courses, if applicable	
Semester(s) in which the module is taught	6th semesters
Person responsible for the module	Tita Elfitasari, S.Pi, M.Sc, Ph.D.
Lecturer	Dr. Vivi Endar Herawati, SPi, MSi Dr. Ir. Diana Rahmawati, MSi Seto Windarto, S.Pi., M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Practical: 3 hours (170 minutes) per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Entrepreneurship
Module objectives/intended learning outcomes	Students are able to create and implement a comprehensive aquaculture business starting from product selection and branding, digital marketing and financial management as well as evaluating and determining achievement indicators.

Content	1. Introduction 2. Problems in the cultivation business 3. Selection of business products 4. Logo creation 5. Product/business branding 6. Evaluation planning (production, marketing, finance) 7. Create business achievement indicators 8. Marketing Management Planning both traditional and digital 9. Selection of appropriate marketing media 10. Advertising 11. Financial Management Planning 12. Capital 13. Cashflow 14. Visibility study
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. DiGiacomo, G; King, R and Nordquist, D. 2003. Building a sustainable Business: A guide to developing a Business Plan for Frams and Rural Businesses. Minnesota Institute for Sustainable Agriculture. USA. 2. Strombom, DB and Tweed, SM. 1992. Business Planning for aquaculture: Is it feasible?. Northeastern Regional Aquaculture Center – University of Massachusets. USA 3. Webster, D; Buttner, J; Flimlin, G. 2008. Planning for Success in your Aquaculture Business. Aquaculture Center – University of Maryland. USA. 4. Putut Har Riyadi dan Dian Wijayanto. 2012. Buku Ajar MANAJEMEN INDUSTRI PERIKANAN. UNDIP Press, Semarang.

Module Handbook Coastal Aquaculture Industry

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

Module designation	Coastal Aquaculture Industry
Module level, if applicable	3 rd years
Code, if applicable	IBP21-319
Subtitle, if applicable	This course provides provisions in dealing with some of the 4.0 academic demands in accordance with the scientific field in the Aquaculture study program in developing industry of aquaculture
Courses, if applicable	Coastal Aquaculture Industry
Semester(s) in which the module is taught	6th semesters
Person responsible for the module	Prof. Dr. Ir. Slamet Budi Prayitno, MSc
Lecturer	Dr. Pinandoyo Dr. Subandiyono Dr. Lestari Laksmi Widowati
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning 1. Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion 2. Self learning: 3 hours per week 3. Practical: 3 hours (170 minutes) per week 4. Case studies: 1 hour per week; 5. Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Enterpreneurship
Module objectives/intended learning outcomes	tudents can explain (C2) history, importance, various types of aquaculture industry, able to choose (C3) uperior commodity, designing or designing (C6) a coastal aquaculture tourism industry project, realizing (A3) the potential of the aquaculture industry 4.0.

Content	The Coastal Aquaculture Industry (IAP) course equips students with the history of aquaculture as a part-time business become an industry. The aquaculture industry is divided into various types and scales of business where each type and scale Every business has its own unique management challenges. At the end of the course, students are expected for an integrated coastal aquaculture tourism industry. Species and potential business should be develops and some aspects that must be considered in planning (condition, chain production and market).
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	1. A. Nasr,Allah, A. Gasparatos, A. Karanja, E.B. Dompreh, S. Murphy, C.M. Rossignoli, M. Phillips, H. Charo-Karisa. Employment generation in the Egyptian aquaculture value chain: implications for meeting the Sustainable Development Goals (SDGs). Aquaculture, 520 (2020), 10.1016/j.aquaculture.2020.734940 2. Y. Tanaka, A. Ashaari, F.S. Mohamad, N. Lamit. Bioremediation potential of tropical seaweeds in aquaculture: low-salinity tolerance, phosphorus content, and production of UV-absorbing compounds. Aquaculture, 518 (2020), 10.1016/j.aquaculture.2019.734853 3. AzmiAhmad[ab]Siti RozaimahSheikh Abdullah[a]Hassimi AbuHasan[a]Ahmad RaziOthman[a]Nur 'Izzatilsmail[a]. Aquaculture industry: Supply and demand, best practices, effluent and its current issues and treatment technology. https://doi.org/10.1016/j.jenvman.2021.112271

Elective

Module Handbook Seed Production Management

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

Module designation	Seed Production Management
Module level, if applicable	3 th years
Code, if applicable	IBP21-331
Subtitle, if applicable	
Courses, if applicable	Seed Production Management
Semester(s) in which the module is taught	5th semesters
Person responsible for the module	Dr. Ir. Fajar Basuki, MS.
Lecturer	Dr. Ir. Fajar Basuki, MS. Dr. Ir. Titik Susilowati M.Si. Ristiawan Agung Nugroho, S.Pi., M.Sc. Tristiana Yuniarti, S.Pi., M.Si.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion Self learning: 3 hours per week Practical: 3 hours (170 minutes) per week Case studies: 1 hour per week; Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture,

Module objectives/intended learning outcomes	Knowledge : understand in General concept of seed production, the selection hatchery location Skill : technical designing of business nursing fish seed household scale Competence : At the end of this course, students can explain and conduct the need of facilities and infrastructure in the hatchery, the management of the parent in producing the eggs, the procedures for producing natural feed as larvae feed and fish seed, the management of eggs and maintenance of larvae until it becomes a seed.
Content	This course covers the procedure of learning the concepts, design, facilities and infrastructure needs, the needs of broodstock, and Feed on a Hatchery.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	Fajar Basuki 2018 Pengantar Kuliah Manajemen Panti benih. https://budidayaikan1957.blogspot.com/2018/03/blog-post.html Fajar Basuki 2018 Perencanaan Produksi Benih. https://budidayaikan1957.blogspot.com/2018/03/perencanaan-produksi-benih.html Fajar Basuki 2018 Mekanisme Ovulasi pada Ikan. http://budidayaikan1957.blogspot.com/2018/10/materi-1-mk-froa-dan-mk-fri.html Fajar Basuki 2018. Cara membuat laporan singkat. https://budidayaikan1957.blogspot.com/2018/03/cara-membuat-laporan-singkat-praktikum.html Fajar Basuki 2018. Teknik dan manajemen TPI. https://budidayaikan1957.blogspot.com/2018/08/pelatihan-teknis-pengelolaan-budidaya.html Reynaldo Patiño1 & Craig V. Sullivan2., 2002. Ovarian follicle growth, maturation, and ovulation in teleost fish *Fish Physiology and Biochemistry* 26: 57– 70, 2002 Ahmet Regaib Oğuz*1 and Güler Ünal. 2012. The Effects of 17β –Estradiol on Vitellogenin, Total Protein, Histochemical, and Some Morphological Indices on Chalcalburnus tarichi Indices on *Chalcalburnus tarichi* Alberto Huberman. 2000. Shrimp endocrinology. A review. Aquaculture 191 2000 191-208 J.Joosse 1972. Endocrinology of reproduction in mollusks. General and Comparative Endocrinology**.** Volume 3, Supplement, 1972, Pages 591-601

Module Handbook Physiology Of The Nutrition Of The Culture Organism

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

Module designation	Physiology Of The Nutrition Of The Culture Organism
Module level, if applicable	4 th years
Code, if applicable	IBP21333
Subtitle, if applicable	
Courses, if applicable	Physiology Of The Nutrition Of The Culture Organism
Semester(s) in which the module is taught	7th semesters
Person responsible for the module	Dr. Ir. Subandiyono, MAppSc.
Lecturer	Dr. Ir. Subandiyono, MAppSc. Dr. Ir. Desrina, MSc. Prof. Dr. Ir. Johannes Hutabarat, MSc. Dr. Ir. Pinandoyo, MSi.
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion Self learning: 3 hours per week Practical: 3 hours (170 minutes) per week Case studies: 1 hour per week; Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	1. Basic of Aquaculture, 2. Fish Nutrition

Module objectives/intended learning outcomes	Knowledge : understand in the basic concepts of various processes, mechanisms, and systems of physiological changes over nutrition in various crucial organisms in the aquaculture, both freshwater and marine fish; and various factors affecting the level of feed nutrients utilization, the association with physiological characteristics of the culture organism. Skill : technical mechanisms of increasing feed nutrient utilization in fish of aquaculture Competence : At the end of this course, students are expected to be able to explain and implement the basic concepts of various processes, mechanisms, and systems of physiological changes over nutrition in various crucial organisms in the aquaculture, both freshwater and marine fish; and various factors affecting the level of feed nutrients utilization, the association with physiological characteristics of the culture organism.
Content	Course in the Physiology of Nutrition of the Culture Organism (FNOB) provides and/or equips the students with the knowledge about the basic concepts of various processes, mechanisms, and systems of physiological changes over nutrition in various crucial organisms in the aquaculture, both freshwater and marine fish; and various factors affecting the level of feed nutrients utilization, the association with physiological characteristics of the culture organism. The scope of the study was initiated ahead of the retrieval of the feed, ingestion of feed, the bio-physiological utilization process of feed nutrients in the fish body, until the excretion come out of the body. As a model fish focuses on the types of *finfish* and *crustaceans* with various *feeding habit* and *feeding behaviour*.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading list	

Module Handbook Geographic Information System

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

Module designation	Geographic Information System
Module level, if applicable	2 th years
Code, if applicable	IBP21-336
Subtitle, if applicable	System for Information Gepgrapgis and Remote Sensing
Courses, if applicable	Geographic Information System
Semester(s) in which the module is taught	6th semesters
Person responsible for the module	Prof. Dr. Ir. S. Budi Prayitno, MSc
Lecturer	Dr. Muhammad Helmi, S.Si., M.Si Lestari Lakhsmi W, MSi Restiana Wisnu A, MSi Dr. Vivi Endar H, MSi
Language	Indonesian
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion Self learning: 3 hours per week Practical: 3 hours (150 minutes) per week Case studies: 1 hour per week; Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 150 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	Water Quality Management Basics of Aquaculture
Module objectives/intended learning outcomes	Students are able to understand: basic concepts of GIS, spatial data used and applying GIS methods for planning, monitoring and management of aquaculture areas by integrating appropriate parameters

Content	GIS Aquaculture is an advanced science for aquaculture students, which relates to knowledge and application of GIS methods to support planning, monitoring and management of aquaculture activities
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or test with kulon. Requirements: attendance ≥75% Grading: Practicum and Assignments: 50% Mid-semester exam: 25% Final exam: 25%
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Module Handbook Management of Aquaculture Product

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

Module designation	Management of Aquaculture Product
Module level, if applicable	4 th years
Code, if applicable	IBP21337
Subtitle, if applicable	The concept of the management of aquaculture products
Courses, if applicable	Management of Aquaculture Product
Semester(s) in which the module is taught	7th semesters
Person responsible for the module	Tita Elfitasari, S.Pi., M.Sc., PhD.
Lecturer	Tita Elfitasari, S.Pi., M.Sc., PhD. Dr. Ir. Fajar Basuki, MS. AH Condro Haditomo, S.Pi.,M.Si. Seto Windarto, S.Pi., MP. M.Sc.
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), with practicum (online), online-learning Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion Self learning: 3 hours per week Practical: 3 hours (170 minutes) per week Case studies: 1 hour per week; Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture, lesson and 14 x 170 minute for practical)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	
Module objectives/intended learning outcomes	Knowledge : Students are expected to understand various techniques of the management of aquaculture species ranging from the broodstock to post-harvesting Skill : technical management of aquaculture species ranging from the broodstock to post-harvesting Competence : At the end of this course, students can design concept various techniques of the management of aquaculture species ranging from the broodstock to post-harvesting

Content	This course provides knowledge regarding the management of aquaculture products. Including the management of the broodstock, management and transportation of the broodstock, management of eggs and seeds, management and transportation of ornamental fish, and the post-harvesting management.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lectures for giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by , online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.

Module Handbook Fish Quarantine

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

Module designation	Fish Quarantine
Module level, if applicable	2nd years
Code, if applicable	IBP21-341
Subtitle, if applicable	
Courses, if applicable	Fish Quarantine
Semester(s) in which the module is taught	3rd semesters
Person responsible for the module	Prof. Dr. Ir. Slamert Budi Prayitno, M.Sc.
Lecturer	Prof. Dr. Ir. Slamert Budi Prayitno, M.Sc. Dr. Ir. Sarjito, M.App.Sc Dr. Ir. Desrina, M.Sc. Rosa Amalia, S.Pi.,M.Si.
Language	Indonesian
Relation to curriculum	Elective course
Type of teaching, contact hours	Face-to-face (TM)16 x 100 minutes (including midterm and final exams), online-learning Lecture and seminars: 2 hours (100 minutes) per week; Forms of active participation: lecture and discussion Practical: 3 hours (170 minutes) per week Self learning: 3 hours per week Case studies: 1 hour per week; Forms of active participation: Case studies and structured report writing
Workload	Total workload is 120 hours per semester, which consists of 250 minutes structured activities in a corporation per weeks (14 x 100 minute for attendance in class with teaching methods such as lecture and lesson)
Credit points	3 CU
Requirements according to the examination regulations	Minimum attendance at lectures is 75%: 12 attendance from total 16 times (according to UNDIP regulation).
Recommended prerequisites	-

Module objectives/intended learning outcomes	Knowledge: understand basic theories and concepts of fish, regulations on fish quarantine in Indonesia and other countries, fish installations, and management of invasive species. Skill : students can explain about various diseases of fish in the fish and their impact on fish production, local species/ingenous species. Student can explain Ministerial Decrees related to invasive foreign species, comparing them with invasive foreign species from several countries in Asia, Africa and Europe. Competence : At the end of this course, students can basic theories and concepts of fish, regulations on fish quarantine in Indonesia and other countries, fish installations, and management of invasive species.
Content	This Course studies basic theories and concepts of fish regulations on fish quarantine in Indonesia and other countries, fish installations, and management of invasive species.
Study and examination requirements and forms of examination	The exams design based on learning outcome by several methods such as quizzes, seminar and presentation. Classical method provides by lecturers by giving some questions and students requires to answer it through the hand writing or google classroom.
Media employed	Classical class with LCD projector, or online teaching by online class (kulon), Zoom meeting or Microsoft Teams during this Pandemi Covid-19.
Reading List	Pusat Karantina Ikan: Badan Karantina Ikan, Pengendalian Mutu dan Keamanan Hasil Perikanan. 2014. *Pedoman cara karantina ikan yang baik*. Jakarta: Kementerian Kelautan dan Perikanan. Hlm. 41. Hartman K, Petty D, Brown CM, Lehotia CJ. 2006. Aquaculture: Emergency Management and Quarantine of Aquaculture Facilities. Florida Department of Agriculture and Consumer Services. Ristiyawan B, Snggoro S, Yulianti B. 2013. Peranan Implementasi Kebijakan Karantina Ikan dalam Pembangunan Perikanan Berkelanjutan. Prosiding Seminar Nasional Pengelolaan Sumberdaya Alam dan Lingkungan. Indonesia Marine and Fisheries Book. 2017. Ministry of Marine and Affairs and Fisheries.