

Module Handbook

Department of Biology
Faculty of Mathematics and Natural Sciences
Mulawarman University



Introduction

This Module Handbook for the Bachelor of Biology Programme at the Faculty of Mathematics and Natural Sciences, Mulawarman University, has been developed to serve as an essential academic reference for students, lecturers, academic advisors, and external stakeholders. It provides comprehensive and structured information on all modules offered throughout the programme, including course descriptions, learning objectives, teaching methods, assessment strategies, and their alignment with the Programme Learning Outcomes (PLOs).

The development of this handbook is based on the principles of Outcome-Based Education (OBE), in which each module is systematically designed to contribute directly to the achievement of intended learning outcomes. This ensures that students acquire the necessary knowledge, skills, and attitudes to meet the graduate profile and are well-prepared for professional, academic, and societal challenges.

The content and format of this handbook are structured to meet the quality assurance requirements of both the Indonesian National Higher Education Standards (SN-Dikti) and the international accreditation standards of ASIIN. The module descriptions are aligned with the European Qualifications Framework (EQF) Level 6 and incorporate the Subject-Specific Criteria (SSC-10) for Life Sciences, ensuring international comparability and recognition.

This document also includes an overview of the curriculum structure, thematic clusters, course mapping with Programme Learning Outcomes, as well as special programmes such as internships, community service, final projects, and elective modules including those under the Merdeka Belajar – Kampus Merdeka (MBKM) scheme.

We hope this Module Handbook will serve as a useful academic guide that promotes transparency, coherence, and continuous quality improvement in the implementation of the Biology study programme.



Warm regards,

Dr. Jusmaldi, M.Si.

Head of Biology Study Programme

Program Overview

01 Profile of the Biology Study Programme

The Bachelor of Science in Biology at the Faculty of Mathematics and Natural Sciences, Universitas Mulawarman, was officially established by Decree No. 2811/D/T/2001, dated 30 August 2001, and signed by the Director General of Higher Education, Satryo Soemantri Brodjonegoro. The programme admitted its first cohort of students in August 2001.

Accredited nationally with the highest rating (“A”) by the National Accreditation Board for Higher Education (BAN-PT) through Decree No. 3417/SK/BAN-PT/Akred/S/IX/2019, the programme demonstrates its commitment to academic excellence and continuous quality improvement.

The Biology Programme offers a comprehensive curriculum grounded in tropical forest biodiversity and environmental studies, aligned with national and international standards. It prepares graduates to pursue careers in research, education, environmental consultancy, biotechnology, and other life science-related fields.

02 Vission

To become an excellent Biology Study Programme that applies biological concepts based on the biodiversity of humid tropical forests and their environments to support the advancement of applied sciences in fulfilling human needs and enhancing human well-being.

03 Mission

- 1.To serve as a pioneering educational institution that fosters a new generation of biology graduates who uphold ethics, respect the rights of all forms of life, and demonstrate the ability to collaborate within their communities.
- 2.To conduct biological research on humid tropical forests and their environments in order to explore and discover new knowledge, thereby supporting the advancement of applied sciences.
- 3.To implement community service activities aimed at applying research findings related to tropical forest biology for the benefit of society.
- 4.To establish and maintain partnerships with national and international institutions to enhance the implementation of the Tri Dharma of Higher Education: education, research, and community service.

04 Program Educational Objectives (PEO)

1. To produce graduates in the field of biology with a Bachelor of Biology (S1) qualification who are excellent, professional, skilled, and sensitive to the conservation of tropical rainforests and their environment. (PEO 1)
2. To master basic concepts and conduct biological research, enabling the observation and analysis of natural phenomena in tropical rainforests and their ecosystems. (PEO 2)
3. To engage in community service, applying research results and being able to develop biological science and technology in productive activities for the benefit of society. (PEO 3)
4. To establish collaborations with national and international institutions with an environmental perspective on sustainable tropical rainforest conservation. (PEO 4)

05 Graduate Profile of the Bachelor of Biology Programme

The graduate profile of the Biology Study Programme is formulated based on several key references: the Indonesian Qualifications Framework (IQF) Level 6 for Biology Education, current market demands in the biological sciences, the vision, mission, and objectives of the programme, and the results of surveys conducted with alumni and employers.

Graduate profiles reflect the broad and interdisciplinary competencies cultivated throughout the programme and are presented below.

Profile	Description Profile	Code
Practitioner	Actively contributes to the development of biological sciences, demonstrates sensitivity in identifying challenges related to technological advancement and environmental sustainability, and is capable of applying biological knowledge creatively and innovatively to solve problems. This includes planning, implementing, and supervising the sustainable use of natural resources, conservation efforts, and other biological applications in a professional context.	PL1
Lecturer / Academic	Demonstrates the ability to pursue further studies in biology or related fields to enhance academic qualifications and contribute to the advancement of knowledge. Equipped to engage in academic or professional activities in line with the demands of the Industrial 4.0 and Society 5.0 eras.	PL2
Researcher	Capable of solving biology-related problems in specific domains through procedural approaches and by utilizing appropriate laboratory instruments, thus contributing to research and scientific innovation.	PL3
Entrepreneur	Able to develop and produce environmentally friendly biological products by utilizing the potential of humid tropical forest resources and ecosystems, based on sustainable and procedural approaches.	PL4

06 Learning Outcomes (Program Learning Outcomes / PLOs)

The Program Learning Outcomes (PLOs) of the Biology Programme are derived from the graduate profiles and formulated through alignment with national regulations, professional associations, and academic standards. These outcomes comply with the Indonesian Qualification Framework (KKNI) and the National Higher Education Standards (SN-Dikti), and are periodically reviewed every 4–5 years to reflect scientific, technological, and societal developments.

The PLOs are categorized into four domains:

- **Attitude:** Reflects ethical behavior, cultural values, and national identity.
- **General Skills:** Includes transferable skills such as communication, teamwork, and problem-solving.
- **Specific Skills:** Focuses on technical and professional competencies in biological sciences.
- **Knowledge:** Encompasses mastery of concepts, theories, and methods in biology.

In addition, the Biology Programme incorporates institutional distinctiveness by emphasizing learning outcomes related to tropical rainforest ecosystems and the environment, aligning with Universitas Mulawarman's academic identity and regional relevance. These outcomes distinguish graduates at both national and international levels.

Aspect	Code	Description
Attitude	PLO 1	Demonstrate responsible behavior, discipline, effective communication, and the ability to work both independently and collaboratively, grounded in religion, Pancasila values, and ethics.
General Skills	PLO 2	Apply logical, critical, systematic, and innovative thinking in the development or implementation of science and technology within their area of expertise, with attention to environmental sustainability.
	PLO 3	Employ scientific methods and ethical reasoning to solve problems and make informed decisions based on data analysis within the biological sciences.
Specific Skills	PLO 4	Identify problems related to tropical rainforest biodiversity and the environment and present integrated biological solutions using relevant scientific methods and technology.
	PLO 5	Proficiently use and apply instruments relevant to biological research in a responsible, honest manner while upholding environmental conservation principles.
Knowledge	PLO 6	Master the fundamental principles of biology and core scientific disciplines comprehensively, in line with developments in modern biology.
	PLO 7	Understand theoretical concepts of biology from molecular to organismal levels, and their applications in managing and utilizing tropical rainforest biodiversity and its environment.

05 Curriculum Structure

SEMESTER I

No.	Courses Code	Courses	Credits	Type	ECTS	FLO
1.	MU0000802W002	Pancasila	2	C	3.2	1
2.	MU0000802W006	Basic Cultural and Social Sciences	2	C	3.2	1
3.	PA0700603W001	Elementary Calculus	3	C	4.8	1
4.	PA0700603W002	Basic of Biology	3	C	4.8	1, 3, 5, 7
5.	PA0700603W004	Basic of Physics	3	C	4.8	1, 2, 4, 6
6.	230702603W001	English	3	C	4.8	1, 2, 4, 6
7.	PA0700603W003	Basic of Chemistry	3	C	4.8	1, 2, 4, 6
8.	230702603W002	Plant Morphology	3	C	4.8	1, 3, 4, 5, 8

SEMESTER II

No.	Courses Code	Courses	Credits	Type	ECTS	FLO
1.	MU0000803W000	Religion	3	C	4.8	1
2.	MU0000802W004	Indonesian Language	2	C	3.2	1
3.	MU0000802W003	Civic Education	2	C	3.2	1
4.	230702604W003	Animal Anatomy and Histology	4	C	6.4	1, 3, 5, 7
5.	230702603W004	Animal Systematics I	3	C	4.8	1, 2, 4, 6
6.	230702603W005	Plant Systematics I	3	C	4.8	1, 2, 4, 6
7.	230702603W006	Plant Anatomy and Embryology	3	C	4.8	1, 2, 4, 6
8.	230702602W007	Cell and Molecular Biology	2	C	3.2	1, 3, 4, 5, 6

SEMESTER III

No.	Courses Code	Courses	Credits	Type	ECTS	FLO
1.	PA0700603W005	Basic of Statistic	3	C	4.8	1, 2, 4, 6
2.	230702603W008	Microbiology	3	C	4.8	1, 2, 5, 6
3.	230702603W009	Genetics	3	C	4.8	1, 2, 4, 6
4.	230702603W010	Animal Systematics II	3	C	4.8	1, 2, 4, 6
5.	230702603W011	Plant Systematics II	3	C	4.8	1, 2, 4, 6
6.	230702603W014	Animal Physiology	3	C	4.8	1, 2, 4, 6
7.	230702602W013	Introduction of Biotechnology	2	C	3.2	1, 3, 4, 6
8.	230702602W023	Evolution	2	C	3.2	1, 2, 4, 6, 7

SEMESTER IV

No.	Courses Code	Courses	Credits	Type	ECTS	FLO
1.	230702603W022	Microbial Physiology and Genetics	3	C	4.8	1, 2, 4, 5, 6, 7
2.	230702603W020	Animal Embryology and Reproduction	3	C	4.8	1, 2, 4, 6
3.	230702603W015	Plant Physiology	3	C	4.8	1, 3, 4, 7
4.	230702602W012	Entrepreneurship	2	C	3.2	1, 2
5.	230702602W016	Microtechniques	2	C	3.2	1, 2, 3, 5, 7
6.	230702603W017	Mycology	3	C	4.8	1, 2, 4, 5, 6, 7
7.	230702603W018	Ecology	2	C	3.2	1, 3, 4, 7
8.	230702603W019	Biochemistry	3	C	4.8	1, 3, 5, 6

SEMESTER V

No.	Courses Code	Courses	Credits	Type	ECTS	FLO
1.	230702602W021	Research Methodology	2	C	3.2	1, 3, 5, 6
2.		Elective Course	3	E		

SEMESTER VI

No.	Courses Code	Courses	Credits	Type	ECTS	FLO
1.	MU0000803W007	Community Services	4	C	6.4	1, 2
2.		Elective Course	3	E		

SEMESTER VII

No.	Courses Code	Courses	Credits	Type	ECTS	PLO
1.	230702600W024	Undergraduate Thesis	6	C	9.6	1, 2, 4, 6, 7

SEMESTER VIII

No.	Courses Code	Courses	Credits	Type	ECTS	PLO
1	230702600W024	Undergraduate Thesis	6	C	9.6	1, 2, 4, 6, 7

ELECTIVE COURSES OF FIRST SEMESTER

No.	Courses Code	Courses	Credits	Type	ECTS	PLO
1	230702602P025	Environmental Impact Assessment	2	E	3.2	1, 3, 5, 6
2	230702602P026	Entomology	2	E	3.2	1, 2, 4, 6
3	230702603P027	Technique of Molecular Biology Analysis	3	E	4.8	1, 3, 5, 7
4	230702603P028	Phytohormon	3	E	4.8	1, 3, 4, 6
5	230702602P029	Internship	2	E	3.2	1, 2, 4, 6
6	230702602P030	Physiological of Animal Reproduction	2	E	3.2	1, 2, 4, 6
7	230702603P031	Tropical Rainforest Aquaculture	3	E	4.8	1, 3, 5, 6
8	230702602P032	Histopathology	2	E	3.2	1, 3, 4, 5, 7
9	230702603P033	Biology of Dipterocarpaceae	3	E	4.8	1, 2, 4, 5, 7
10	230702602P034	Ethnobiology	2	E	3.2	1, 3, 4, 6
11	230702603P035	Mammalogy	3	E	4.8	1, 3, 4, 5, 7
12	230702603P036	Population Genetics	3	E	4.8	1, 3, 5, 7
13	230702603P037	Phytophysiology	3	E	4.8	1, 3, 4, 6
14	230702602P038	Special Topics Supporting Thesis	2	E	3.2	1, 3, 5, 7
15	230702602P039	Water Resources Tropical Management	2	E	3.2	1, 3, 4, 6
16	230702602P040	Bioremediation	2	E	3.2	1, 3, 4, 7
17	230702603P041	Food Microbiology	3	E	4.8	1, 2, 4, 5, 6, 7
18	230702603P042	Industrial Microbiology	3	E	4.8	1, 2, 4, 5, 6, 7
19	230702603P043	Ecology of Wet Tropical Forest Restoration	2	E	3.2	1, 3, 4, 6
20	230702603P044	Tropical Rainforest Biodiversity Conservation	2	E	3.2	1, 2, 4, 6
21	230702603P045	Insect Ecology	2	E	3.2	1, 2, 4, 6
22	230702603P046	Phytochemistry	2	E	3.2	1, 3, 5, 7
23	230702603P047	Seeds Physiology	2	E	3.2	1, 3, 4, 6
24	230702603P048	Occupational Health and Safety	2	E	3.2	1, 3, 5, 7
25	230702603P049	Biomedical Sciences	2	E	3.2	1, 2, 4, 6
26	230702603P050	Aquatic Ecology	2	E	3.2	1, 3, 4, 6
27	230702603P051	Arthropods	3	E	4.8	1, 3, 4, 6
28	230702603P052	Herpetology	2	E	3.2	1, 3, 4, 6
29	230702603P053	Medicinal Plant	2	E	3.2	1, 3, 5, 7
30	230702603P055	Stem Cell Biology	2	E	3.2	1, 3, 4, 7
31	230702603P086	Microbial Biodiversity and Ecology	2	E	3.2	1, 2, 4, 5, 6, 7
32	230702603P088	Soil Sciences	2	E	3.2	1, 2, 4, 6
33	230702603P087	Beeches Biology	2	E	3.2	1, 2, 4, 6

ELECTIVE COURSES OF SECOND SEMESTER

No	Courses Code	Courses	Credits	Type	ECTS	PLO
1	230702802P054	Biological Pest Control	2	E	3.2	1, 3, 4, 6
2	230702802P055	Ecotoxicology	2	E	3.2	1, 2, 4, 6
3	230702802P056	Palynology	3	E	4.8	1, 3, 4, 6
4	230702802P057	Biogeography	2	E	3.2	1, 2, 4, 6
5	230702802P058	Quantitative Ecology	3	E	4.8	1, 3, 5, 7
6	230702802P059	Ornithology	3	E	4.8	1, 2, 4, 6
7	230702802P060	Dendrology	3	E	4.8	1, 3, 4, 6
8	230702802P061	Environmental Microbiology	3	E	4.8	1, 3, 5, 7
9	230702802P062	Bioinformatics	2	E	3.2	1, 3, 5, 7
10	230702802P063	Microbial Molecular Genetics	3	E	4.8	1, 3, 4, 5, 6, 7
11	230702802P064	Plant Tissue Culture	3	E	4.8	1, 3, 5, 7
12	230702802P065	Tropical Plant Breeding	3	E	4.8	1, 2, 4, 6
13	230702802P066	Plant Ecophysiology	2	E	3.2	1, 3, 4, 6
14	230702802P067	Endocrinology	2	E	3.2	1, 2, 5, 7
15	230702803P068	Enzymes Biotechnology	3	E	4.8	1, 2, 4, 5, 6, 7
16	230702802P069	Parasitology	2	E	3.2	1, 2, 4, 6
17	230702803P070	Ethology	3	E	4.8	1, 2, 4, 7
18	230702803P071	Conservation Genetics	3	E	4.8	1, 2, 4, 6
19	230702803P072	Fish Reproductive Biology	3	E	4.8	1, 2, 4, 6
20	230702803P073	Ichthyology	3	E	4.8	1, 2, 4, 6
21	230702803P074	Morphometrics	3	E	4.8	1, 2, 4, 6
22	230702802P038	Special Topics Supporting Thesis	2	E	3.2	1, 3, 5, 7
23	230702803P075	Animal Domestication	3	E	4.8	1, 2, 4, 6
24	230702802P076	Plant Ecology	2	E	3.2	1, 2, 4, 7
25	230702802P077	Plant Nutrition	2	E	3.2	1, 3, 5, 7
26	230702802P078	Plant Growth Analysis	2	E	3.2	1, 3, 4, 6
27	230702802P079	Nutrigenomics	2	E	3.2	1, 3, 5, 7
28	230702802P080	Aquatic Animal Physiology	2	E	3.2	1, 2, 4, 6
29	230702802P081	Water Quality Monitoring	2	E	3.2	1, 2, 4, 6
30	230702802P082	Management of Wet Tropical Soils	2	E	3.2	1, 2, 4, 6
31	230702802P029	Internship	2	E	3.2	1, 2, 4, 6
32	230702802P083	Cytogenetics	2	E	3.2	1, 3, 5, 7
33	230702802P084	Immunology	2	E	3.2	1, 3, 4, 7

Within eight semesters, students are expected to complete a minimum of 144 credits, consisting of 100 credits from compulsory courses and a minimum of 44 credits from elective courses. The course distribution in the Biology Study Program comprises 102 courses, categorized as follows:

1. University Compulsory Courses (15 credits): 6 courses
2. Faculty Compulsory Courses (15 credits): 5 courses
3. Study Program Compulsory Courses (70 credits): 27 courses
4. Elective Courses (154 credits available): 64 courses

01

First Semester





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Module Description

Title	Basic Biology
Code, if applicable	PA0700603W002
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Dr. Jusmaldi, S.Si, M.Si, and Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. After completing the Basic Biology course, students are expected to master fundamental biological concepts ranging from cells to ecosystems, apply the steps of the scientific method, and demonstrate proficiency in science process skills (minds-on and hands-on activities) to explore potential and solve problems related to the tropical rainforest environment of Kalimantan Island.



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Content	The Basic Biology course is a foundational subject that covers core biological concepts, including biology as a science, theories on the origin of life, cell structure and function, metabolism (including transport, photosynthesis, and respiration), genetics, biodiversity and nomenclature, evolution, structure and function of plant and animal tissues and organs, ecology, organismal behavior, biotechnology, and the steps of the scientific method. This course is accompanied by various science process skills (minds-on and hands-on activities) that are applied to solve problems in the field of biology and its applications.
Examination forms	Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practical sessions (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Campbell, Neil A., Jane B. Reece, and Lawrence G. Mitchell. 2003. <i>Biologi</i>. Benjamin Cummings: California.2. Kimball, J.W. 1989. <i>Biologi Jilid I, II, III</i>. Edisi Kelima. Cetakan Kedua. Penerbit Erlangga: Jakarta.3. Villee, C.A., Walker, Jr W.F., Barnes, R.D. 1999. <i>Zoologi Umum Edisi ke Enam</i>. Cetakan Kedua, Ahli bahasa: Nawang Sari Soegiri. Penerbit Erlangga: Jakarta.4. Luria. 1981. <i>A View of Life</i>. Benjamin Cumming: California.



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Module Description

Title	Basic Chemistry
Code, if applicable	PA0700603W003
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none">1. Analyze and apply fundamental principles of chemistry as a foundation for studying chemistry-related sciences logically, accurately, and systematically.2. Perform basic chemical calculations.3. Experiments will use occupational health and safety (OHS) principles with accuracy, systematic procedures, discipline, and responsibility in laboratory practices.



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Content	This course provides an in-depth study of matter and its transformations, atomic structure, the periodic table of elements, inorganic chemistry, stoichiometry, chemical kinetics, molecular structure and covalent bonding, molecular orbitals in chemical bonding, hydrocarbon compounds, functional groups of organic compounds, and the fundamentals of biomolecules.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Practical sessions (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Keenan, C.W., Kleinfelter, D.C. dan Wood, J.H, 1980, <i>Kimia Untuk Universitas</i>. Penerbit Erlangga: Jakarta.2. Chang, R., 2005. <i>Kimia Dasar dan Konsep-Konsep Inti</i>. Erlangga: Jakarta.3. Brady, J.E., 1999. <i>Kimia Universitas Asas & Struktur</i>. Binarupa Aksara: Jakarta.4. Petrucci, R.H. 1987. <i>Kimia Dasar</i>. Erlangga: Jakarta.



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Module Description

Title	Basic Physics
Code, if applicable	PA0700603W004
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p style="text-align: center;">= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p style="text-align: center;">= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p style="text-align: center;">-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Upon completing this course, students can apply their knowledge of quantities and units, kinematics, dynamics, work and energy, momentum, impulse, torque, rigid body equilibrium, waves, fluids, heat, gases, and thermodynamics to solve relevant physics-related problems.



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Content	The Basic Physics course is designed to introduce the fundamental laws of physics, including particle kinematics, particle dynamics, work and energy, momentum, impulse, torque, rigid body equilibrium, waves, fluids, heat, and gases. The course emphasizes conceptual understanding of physical phenomena through simple mathematical explanations and introduces examples of real-world applications of these concepts.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Practical sessions (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Abdullah, M. Fisika Dasar I, 2016. Buku elektronik2. D. Halliday, R. Resnick, J. Walker. 2013. Fundamental of Physics, 10th Edition. Wiley.3. D. C. Giancoli. 2010. Physics: Principles with Application, 6th Edition. Addison-Wesley.4. Resnick, R., & Halliday, D. 1966. Physics. John Wiley & Son.5. Giancoli, D.C. 1884. General Physics. Prentice Hall



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Module Description

Title	Elementary Calculus
Code, if applicable	PA0700603W001
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester
Teaching methods	Contextual learning methods using Problem-Based Learning (PBL), complemented by discussions and practical sessions.
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester. One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can explain fundamental mathematical concepts (intervals, inequalities, absolute values, functions, limits and continuity, derivatives, and integrals). 2. Students can apply basic mathematical techniques to solve elementary mathematical problems. 3. Students can implement fundamental mathematical concepts and techniques to solve applied problems.



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Content	This course covers the real number system, coordinate systems and functions, limits, continuity, derivatives, applications of derivatives, and fundamental concepts of integrals. The learning methods include lectures, discussions, question-and-answer sessions, exercises, and laboratory practice.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Practical session (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Leithold, L. (1986). (terjemahan M. Margha). Kalkulus dan ilmu ukur analitik. Jilid I. PT Bina: Jakarta2. Verberg, Dale, Purcell, Edwin, and Rigdon, Steve. (2006). Calculus (9th Edition). Pearson Publisher: USA3. Stewart, James. (2015). Calculus 8th edition, Brooks-Cole.



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Module Description

Title	English
Code, if applicable	230702603W001
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none">1. Students can listen and comprehend the meaning of spoken English.2. Students can express ideas and thoughts in English.3. Students can talk in English.4. Students can distinguish between nouns, verbs, adjectives, and adverbs in English.



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Content	To equip students with the ability to write and communicate scientifically, particularly in Biology, using English. The course develops the four fundamental English skills within biological contexts: reading, listening, speaking, and writing.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Quiz (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Adamson, Donald D. (2003). <i>Grammar and TOEFL</i>. Longman: New York.2. BSCS. (2006). <i>English Curriculum Study</i>. North Carolina: BSCS



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Module Description

Title	Evolution
Code, if applicable	230702602W023
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Dr. Syafrizal, M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester.
Teaching methods	Case-based learning (CBL), and Interactive Learning (IL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quarters, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none">1. Explain the basic concepts of evolution, the history of evolutionary thought, and the evidence supporting evolution.2. Explain the mechanisms of evolution, including natural selection, mutation, gene flow, and genetic drift.3. Describe the process of speciation and the concept of phylogenetics.4. Be able to explain molecular evolution and genomics.5. Explain human evolution and the evolution of social behavior.



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Content	This course covers the basic concepts of evolution, the history of evolutionary thought, evidence for evolution, natural selection, mutation, gene flow, genetic drift and bottleneck effects, sexual selection, speciation, phylogenetic reconstruction, molecular evolution, human evolution, coevolution, evolution and ecology, adaptation and phenotype evolution, and social evolution.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Quiz (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Futuyma, D. J. (2013). "Evolution," Sinauer Associates.2. Ridley, M. (2004). "Evolution," Blackwell Publishing3. Campbell, N. A., & Reece, J. B. (2005). "Biology," Pearson Benjamin Cummings.4. Hartl, D. L., & Clark, A. G. (2007). "Principles of Population Genetics," Sinauer Associates.5. Nei, M., & Kumar, S. (2000). "Molecular Evolution and Phylogenetics," Oxford University Press.



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Module Description

Title	Basic Social and Cultural Sciences (ISDB)
Code, if applicable	MU0000602W006
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester
Teaching methods	Case-based learning (CBL) and cooperative learning (CpL) approaches.
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester. One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none">1. After completing this course, students can explain and discuss the definition of culture and its scope.



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Content	This course discusses the definition of culture and its scope, which can serve as a reference for students in establishing a conceptual foundation or source of reference for studying and analyzing a particular culture.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Quiz (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Bahari, Nooryan. 2014. <i>Kritik Seni</i>. Pustaka Pelajar: Yogyakarta. 2. Elly M. Setiadi et al. 2006. <i>Ilmu Sosial Budaya Dasar Edisi Kedua Cetakan Ke-6</i>. Kencana: Jakarta. 3. Koentjaraningrat. 2009. <i>Pengantar Ilmu Antropologi</i>. Rineka Cipta: Jakarta. 4. Kuntowijoyo. 2006. <i>Budaya dan Masyarakat</i>. Tiara Wacana Yogya: Yogyakarta. 5. Liliweri, Alo. 2014. <i>Pengantar Studi Kebudayaan</i>. Nusa Media: Bandung. 6. Nuraeni, Heny Gustini, et al. 2013. <i>Studi Budaya di Indonesia</i>. CV Pustaka Setia: Bandung. 7. Ranjabar, Jacobus. 2013. <i>Sistem Sosial Budaya Indonesia Suatu Pengantar</i>. Penerbit Alfabeta: Bandung.



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Module Description

Title	Pancasila
Code, if applicable	MU0000602W002
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester.
Teaching methods	Case-based learning (CBL) and cooperative learning (CpL) approaches.
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Ability to analyze, think reason, and demonstrate a critical attitude in addressing issues within society, the nation, and the state. 2. Possess intellectual capacity and responsibility in identifying problems and providing solutions based on the values of Pancasila. 3. Explain the fundamental truths establishing Pancasila as a suitable ideology for the diverse Indonesian nation (Bhinneka Tunggal Ika). 4. Implement and preserve Pancasila's values in real-life situations. 5. Possess the character of a scholarly and professional individual who upholds Pancasila and is committed to the sustainability and glory of the Unitary State of the Republic of Indonesia. 6. Demonstrate a disciplined and responsible character.



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Content	This course presents discussions on Pancasila as the foundational values and ideological basis of the state, as well as the constitutional system of the Republic of Indonesia through historical, juridical, and philosophical perspectives. It also explores Pancasila as a paradigm and its actualization in the life of the society, the nation, and the state. Accordingly, the course content includes the background and objectives of Pancasila education, the history of Indonesia's struggle for independence, the formulation and ratification process of Pancasila as the foundation of the state, Pancasila as the fundamental values of national life, Pancasila as political ethics, Pancasila as an ideology, and the actualization of Pancasila in various aspects of life.
Examination forms	Individual assignment, Quiz, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Quiz (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. AMW. Pranrka. 1985. <i>Sejarah Pemikiran tentang Pancasila</i>, CSIS Jakarta. 2. Suprayogi, et al. 2018. <i>Pendidikan Pancasila</i>, UNNES: Semarang Press. 3. Dardji Darmodihardjo, et al. 1978. <i>Santiaji Pancasila</i>. Usaha Nasional: Surabaya. 4. Darmodiharjo, D. 1983. <i>Pancasila Dalam Beberaoa Persektif</i>. Aries Lima: Jakarta



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6. Ismail, F. 1999, *Ideologi Hegemoni dan Otoritas Agama*. Tiara Wacana: Yogyakarta.
7. Hardiman, F., B. 1990. *Kritik Ideologi*. Kanisus Yogyakarta.
8. Sosronegoro, H. 1990. *Beberapa Ideologi dan Implementasinya dalam Kehidupan Kenegaraan*. Yogyakarta Liberty: Yogyakarta.
9. Kaelan. 1992. *Pancasila Yuridis Kenegaraan*. Fakultas Filsafat UGM.
10. -. 1992. *Filsafat Pancasila*. Fakultas Filsafat UGM.
11. Dipoyudo, K. 1984. *Pancasila Arti dan Pelaksanaannya*, CSIS: Jakarta.
12. Laboratorium Pancasila UNNES Malang. 1979. *Pokok-pokok Pembahasan Pancasila Dasar Filsafat Negara RI*. Usaha Nasional: Surabaya.
13. -. 1990. *Pendidikan Pancasila di Perguruan Tinggi*, UNNES Malang.
14. Yamin, M. 1952. *Proklamasi dan Konstitusi RI*.
15. Moerdiono, et al. 1996. *Pancasila Sebagai Ideologi*, BP-7 Pusat: Jakarta.
16. M. Taopan. 1992. *Keunggulan Pancasila Sebagai Filsafat Kenegaraan*. Citra Aditya Bakti: Bandung.
17. -. 1993. *Pengkajian dan Pengembangan Butir-Butir Nilai Pancasila*. Citra Aditya Bakti: Bandung.
18. Marsilam Simanjuntak, 1994, *Pandangan Negara Integralistik*, Pustaka Utama Grafiti.
19. Mohammad Noor Syam. 1984. *Filsafat Pendidikan dan Dasar Filsafat Pendidikan Pancasila*. Usaha Nasional: Surabaya.
20. Muzayin AR. 1992. *Idologi Pancasila*. Golden Trayon Press: Jakarta.
21. Notonagoro. 1982. *Beberapa Hal Mengenai Fasafah Pancasila*. Pantjuran Tudjuh: Jakarta.



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22. -, 1984. *Pancasila Secara Ilmiah Populer*. Bina Aksara: Jakarta.
23. Nugroho Notosusanto. 1983. *Naskah Proklamasi Yang Otentik dan Rumusan Pancasila Yang Otentik*, PN Balai Pustaka: Jakarta.
24. -, 1983, *Proses Perumusan Pancasila Dasar Negara*, PN Balai Pustaka: Jakarta.
25. Padmo Wiyono. 1984. *Membudayakan UUD 1945*. IND-HILL-CO, Jakarta.
26. SA Kodhi dan Soejadi. 1989. *Filsafat Ideologi dan Wawasan Bangsa Indonesia*. Penerbitan UAJ: Yogyakarta.
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29. Soerjanto Poeswardojo. 1989. *Filsafat Pancasila*, Gramedia. Jakarta.
30. Soeprapto, t, th., *Pancasila Sebagai Ideologi Terbuka Dalam Menghadapi Liberalisme Perdagangan Internasionalisme*. BP-7 Pusat. Jakarta.
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32. -. 1984. *Filsafat Sosial dan Politik Pancasila*. Andi Offset. Yogyakarta.
33. -. 1981. *Mengenal Filsafat Pancasila Pendekatan Melalui Metafisika Logika Etika*. Bagian Penerbitan FE UII. Yogyakarta.
34. Susanto Tirtoprodjo. 1961. *Sejarah Pergerakan Nasional Indonesia*. PT Pembangunan: Jakarta.
35. Suyahmo. 2014. *Filsafat Pancasila*. Magnum: Yogyakarta.



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Module Description

Title	Plant Morphology
Code, if applicable	230702603W002
Semester(s) in which the module is taught	1 st semester
Person responsible for the module	Dr. Hj. Ratna Kusuma, M.Si and Dr. Ir. Samsurianto, M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 1 st semester
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can explain the scope of Plant Morphology and its relevance to other related courses. 2. Students can describe the characteristics of roots, including taproots, fibrous roots, and their modifications. 3. Students can explain the morphological forms of stems, branching patterns, and stem modifications. 4. Students can describe the characteristics of simple and compound leaves, additional organs, and their modifications. 5. Students can explain the characteristics of flowers, floral reproductive organs, floral formulas and diagrams, types of inflorescences, and pollination. 6. Students can explain the fertilization process, fruit characteristics, and fruit classification. 7. Students can describe the characteristics of seeds and embryos. 8. Students can explain the process of germination.



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Content	This course examines the theories and concepts related to plants' external parts, focusing on Angiosperms' external structure. The course covers the characteristics of roots, including taproots, fibrous roots, and their modifications; stem morphology, branching patterns, and stem modifications; the characteristics of simple and compound leaves, additional structures, and their modifications; the characteristics of flowers, floral reproductive organs, floral formulas and diagrams, types of inflorescences, and pollination; the process of fertilization, fruit characteristics and classification; as well as the characteristics of seeds, embryos, and germination.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Practical sessions (10%) 3. Affective assessment (10%) 4. Mid-term exam (30%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Charles B. Beck. 2010. <i>An Introduction to Plant Structure and Development</i>. Cambridge University Press: Cambridge. 2. Estiti B. Hidayat. 1995. <i>Anatomi Tumbuhan Berbiji</i>. ITB Press: Bandung. 3. Tjitrosoepomo. G. <i>Morfologi Tumbuhan</i>. Gadjah Mada University Press: Yogyakarta. 4. Nugroho L. Hartanto, Purnomo, Issirep Sumardi. 2010. <i>Struktur & perkembangan tumbuhan</i>. Penebar Swadaya: Jakarta



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| | <p>5. Fahn, A. 1990. Anatomi tumbuhan. (penerjemah: Ahmad Soediro et al) Gajah Mada University Press. Yogyakarta</p> |
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02

Second Semester





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Module Description

Title	Animal Anatomy and Histology
Code, if applicable	230702604W003
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Dr. Retno Aryani, S.Si, M.Si and Prof. Rudy Agung Nugroho, Ph.D
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 159 hours in one semester, which consists of: - 400 minutes for lectures, - 240 minutes for structural activities, - 240 minutes for individual study
Credit points	4 credit points (equivalent to 6,4 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can apply scientific methods and ethics in solving problems and making informed decisions based on data and information analysis in animal anatomy and histology. <i>(CPL 3)</i> 2. Students can use instruments, supervise, and evaluate the completion of practicum tasks and experiments related to animal anatomy and histology. <i>(CPL 5)</i> 3. Students can master theoretical concepts in animal anatomy and histology, including identifying and explaining tissues, topography, and the development of organ systems both macroscopically and in microscopic preparations. They will also identify the structural components of organs within vertebrate animal body systems, while demonstrating discipline and responsibility per academic norms and ethics, particularly in managing and utilizing biodiversity in wet tropical forests and their environments. <i>(CPL 1, 7)</i>



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Content

The course of Animal Anatomy and Histology is a fundamental subject in studying the structure and developmental anatomy of vertebrate animals. The body structure of animals evolves from simple structures to more complex ones, with vertebrate animals being studied across the classes of Pisces, Amphibia, Reptilia, Aves, and Mammalia. In developmental biology, cells gather to form tissue structures, which then combine to form organs. Organs that work together to perform functions form systems, and the collection of these systems makes up an individual organism.

In the study of Animal Anatomy and Histology, structure and function are inseparable. Learning is carried out through morphological observation to understand the structure and function of external body organs. To further understand the structure of vertebrate animals, dissection (sectio) is performed to expose the internal organs. By opening the body, the internal organs can be observed, and their arrangement relative to each other, known as topography, can be studied.

The observation is not limited to anatomy and morphology; it also includes microscopic observation of the cells and tissues that make up the animal body using prepared slides. The animal body consists of a collection of cells, tissues, and systems, which, when analyzed from outside to inside, include the integumentary system, the locomotion system (bones and muscles), the digestive system (digestive tract and digestive glands), the respiratory system, the circulatory system (heart, blood vessels, and lymphatic vessels), the reproductive system, the excretory system, the nervous and sensory systems, and the endocrine or hormonal system.



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Examination forms	Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Practical sessions (20%) 2. Affective assessment (10%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Hildebrand, M. 1982. <i>Analysis of Vertebrate Structure 2nd Edition</i>, John Wiley & Sons. New York. 2. Kent, G.C. 1983. <i>Comparative Anatomy of the Vertebrates</i>. C.V. Mosby Company. St. Louis 3. Weichert, C.K. 1970. <i>Anatomy of the Chordates 4th Edition</i>. Mc. Graw Hill International Book Company. Auckland. 4. Weichert, C.K. 1984. <i>Element of Chordate Anatomy 4th Edition</i>. Mc. Graw Hill Publishing Company Limited. New Delhi. 5. Junquiera, Carneiro dan Kelly. 1995. <i>Functional Histology. A Text and Colour Atlas</i>. Churchill Livingstone. 6. Freeman dan Baracegidle. 1989. <i>An Advanced Atlas of Histology</i>. Heinmaun Educational. 7. Nugroho, R.A., Aryani, R., Manurung, H., Rudianto, R., Prahastika, W., Juwita, A., Alfarisi, A.K., Pusparini, N.A.O., Lalong, A. 2020. Acute and Subchronic Toxicity Study of the Ethanol Extracts from <i>Ficus deltoidea</i> Leaves in Male Mice. <i>Open Access Macedonian Journal of Medical Sciences</i>, 8(A):76-83. 8. Nugroho, R.A., Puspa, N.C.S., Aryani, R., Prahastika, W., Rudianto, R., Manurung, H. 2020. Subchronic Toxicity Test of Indian Almond (<i>Terminalia catappa</i>) Leaves Water Extract on The Liver Histology of Mice



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 10. Sardi, N.I., Aryani, R., Nugroho, R.A., Sari, Y.P., Manurung, H., Rudianto, R. 2022. Effects of ant-nest plant (*Myrmecodia pendens*) bulb extract on histology of intestinal, liver and proximate fillet of Sangkuriang catfish (*Clarias gariepinus* Var). *AIP Conference Proceedings*. 2668, 020002 (2022); <https://doi.org/10.1063/5.0111711> Published Online: 11 October 2022.
 11. Aryani, R., Nugroho, R.A., Manurung, H., Pusparini, N.A.O., Prahastika, W., Rudianto, R. 2022. Subchronic toxicity of *Ficus deltoidea* jack. leaves on the histology of ventriculus and intestinum tenue male mice. *AIP Conference Proceedings*. 2668, 020005 (2022); <https://doi.org/10.1063/5.0111944> Published Online: 11 October 2022.



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Module Description

Title	Animal Systematics I
Code, if applicable	230702603W004
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Dr. Nova Hariani, M.Si and Drs. Sus Trimurti, M.P
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can explain the fundamental principles of animal classification, taxonomy, and nomenclature, focusing on animal diversity. 2. Students can apply the methods of Cooperative Learning (CpL) and Collaborative Learning (CbL) to analyze and identify animal species and classify animals into appropriate taxonomic groups. 3. Students can demonstrate using interactive learning (IL) strategies to explore the evolutionary relationships among different animal groups. 4. Students can conduct laboratory work (LW) to study the morphology and characteristics of various animal species and interpret the results in the context of systematics. 5. Students can perform field observation/field practice (FO) to collect and identify animal specimens, applying field-based methods to understand the diversity and distribution of animal species.



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	<p>6. Students can synthesize knowledge of animal systematics and apply this understanding to solve real-world problems, demonstrating critical thinking and scientific inquiry.</p>
Content	<p>This course focuses on understanding the principles of taxonomy and nomenclature and their application to invertebrate animals. Students will learn about the properties, characteristics, and relationships of major invertebrate groups and their position in the taxonomic hierarchy. The course also covers the life cycles, distribution areas, and the significance of selected examples of invertebrates for humans.</p>
Examination forms	<p>Individual assignment, Practical sessions, Mid-term exam, and final exam</p>
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Practical sessions (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)



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Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Barnes RSK, P Calow, PJW Olive. 1993. The Invertebrates. A New Synthesis. Second Edition. Blackwell Scientific Publications. Cambridge University Press.2. Brusca RC, GJ Brusca. 1990. Invertebrates. Sinaur Associates, Inc. Sunderland: Massachusetts.3. Dharma 1988. Siput dan Kerang Indonesia I (Indonesian Shell). PT. Sarana Graha. Jakarta.4. Dharma 1992. Siput dan Kerang Indonesia II (Indonesian Shell). PT. Sarana Graha. Jakarta.5. Hickman, C.P., L.S. Roberts., A. Larson. 1995. Integrated Principles of Zoology. Ninth Edition. Updated Version. Brown Publishers. Dubuque Iowa.6. Hickman, C.P., L.S. Roberts., A. Larson. 2006. Integrated Principles of Zoology. Ninth Edition. Updated Version. Brown Publishers. Dubuque Iowa.7. Pechenik JA. 2000. Biology of the Invertebrates. Fourth Edition. United States of America: McGraw-Hill International Editions.8. Strorer, T.I., R.L. Usinger., R.C. Stebbins., J.W. Nybakken. 1979. General Zoology. Sixth Edition. McGraw-Hill Book Company. New York9. Suwignyo S, B Widigdo, Y Wardianto, M Krisanti. 1998. Avertebrata Air. Jilid 2. Institut Pertanian Bogor, Fakultas Perikanan dan Ilmu Kelautan . Bogor.10. Hariani, N. dan F. Patang. 2017. Taksonomi Hewan I. Petunjuk Praktikum. Jurusan Biologi, FMIPA-UNMUL.11. Hariani, N. dan F. Patang. 2017. Entomologi. Petunjuk Praktikum. Jurusan Biologi, FMIPA-UNMUL.



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Module Description

Title	Animal Systematics II
Code, if applicable	230702603W010
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Dr. Jusmaldi, M.Si., Dr. Lariman, M.Si., and Dijan Sunar Rukmi, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 ^d semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Practice (LW), and Field Observation/Field Practice (FO)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO): Upon completing the Animal Systematics II course, students will be able to implement their knowledge of vertebrate animal systematics and its supporting aspects, including identification, taxonomy (based on morphological structure, anatomy, DNA barcode, and bioecological characteristics), to identify and classify vertebrate animals. This knowledge will support managing and utilizing biodiversity in tropical rainforest ecosystems and their environments.</p>



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Content	The Animal Systematics II course is a compulsory course that covers the basic concepts of vertebrate animal systematics, including the fundamentals of taxonomy and classification based on body structure (morphology, anatomy, and DNA barcode), characteristics of the classes Chondrichthyes, Osteichthyes, Amphibia, Reptilia, Aves, and Mammalia, ecological characteristics (habitats and distribution), and their roles, especially for species found in Indonesia. Student proficiency is assessed through theoretical mid-term exams (UTS), final exams (UAS), practical mid-term exams (UTS), practical final exams (UAS), and assignments (practical reports and individual reports).
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Practical sessions (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Campbell, et al. 2011. Biology 9 Edition. San Francisco: Pearson Benjamin Cummings. 2. Gill, F.B. 2007. Ornithology. Third Edition. New York: W.H. Freeman and Company. 3. Hickman, C P, Roberts, L.S, Larson, A. 2001. Integrated Principles of Zoology 9 Edition. New York: McGraw-Hill. 4. Iuliis, Gerardo D., and Pulerà, Dino. 2007. The Dissection of Vertebrates A Laboratory Manual. Academic Press is an imprint of Elsevier. California.



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5. Jasin, M. 1992. Zoologi Vertebrata. Sinar Wijaya. Jakarta
6. MacKinnon, J., Phillipps, K., dan van Balen, B. 2010. Panduan Lapangan: Burung-Burung di Sumatera, Jawa, Bali dan Kalimantan. Bogor: Burung Indonesia.
7. Miller, H. 2001. Zoology Fifth Edition. New York: Mc.Graw Hill.
8. Storer, T.I., Usinger, R.L., Stebbins R.C. and Nybakken, J.W. 1979. General Zoology Sixth Edition. New York: McGraw-Hill.
9. Rukmi, DS., Jusmaldi, Lariman. 2017. Penuntun Praktikum Taksonomi Vertebrata. Jurusan Biologi, FMIPA-UNMUL.
10. Jusmaldi, Aditya Setiawan & Nova Hariani. 2019. Keanekaragaman dan Sebaran Ekologis Amfibi di Air Terjun Barambai Samarinda, Kalimantan Timur. Berita Biologi LIPI, Vol. 18 No.3.
11. Jusmaldi, Nova Hariani & Noberta Doq. 2019. Keanekaragaman, potensi dan status konservasi iktiofauna di Anak Sungai Mahakam Hulu, Kalimantan Timur. Jurnal Iktiologi Indonesia, Vol. 19 No.3.
12. Helda Sason, Jusmaldi & Medi Hendra. 2018. Keanekaragaman Avifauna di Objek Wisata Alam Air Terjun Berambai, Samarinda Kalimantan Timur. Celebes Biodiversitas Jurnal Sains & Pendidikan Biologi: Vol. 2 No. 1.
13. Sajidah Salsabila Annisa, Rachmat Budiwijaya Suba & Jusmaldi. 2022. The Diversity of Mammals in the Wehea-Kelay Landscape, East Kalimantan, International Journal of Research and Scientific Innovation (IJRSI) |Volume IX, Issue IX, September 2022, ISSN 2321-2705.



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Module Description

Title	Buddhist Religious Education
Code, if applicable	MU0000603W001
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	General Education Teaching Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Cooperative Learning (CpL)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can internalize and practice the teachings of their religion. 2. Students can embody and practice behaviors such as honesty, discipline, responsibility, care (cooperation, teamwork, tolerance, peace), politeness, responsiveness, and proactivity, and demonstrate attitudes as part of the solution to various issues when interacting effectively with the social and natural environment, as well as positioning themselves as a reflection of the nation in global interactions. 3. Students can understand, apply, analyze, and evaluate factual, conceptual, procedural, and metacognitive knowledge based on their curiosity about science, technology, arts, culture, and humanities, with a perspective on humanity, nationalism, statehood, and civilization related to the causes of phenomena and events, and apply procedural knowledge in a specific



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	<p>field of study by their talents and interests to solve problems.</p> <p>4. Students can process, reason, present, and create in concrete and abstract realms related to developing what they have learned independently in school, acting effectively and creatively, and using methods according to scientific principles.</p>
Content	This course covers the study of how to live mindfully in everyday life according to Buddhist teachings; developing disciplined behavior in effort, attention, and right concentration as part of the Noble Eightfold Path; the concept of meditation with clear insight; and addressing life's challenges through Buddhist teachings.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Quiz (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)



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Reading list

1. Ajhan Sumedho. n.d.. *The four noble truths. Hertfordshire*: Amaravati Publications.
2. Arifin, H.M. 1990. *Menguak Misteri Ajaran Agama-Agama Besar*. Jakarta: Golden Trayon Press.
3. Batchelor, S. 2012. A secular Buddhism. *Journal of Global Buddhism*. Vol. 13.
4. Baumann, M. 2001. *Global Buddhism: Developmental Periods, Regional Histories, and a New Analytical Perspective*. *Journal of Global Buddhism*. Vol. 2.
5. Buddhadasa Bhikkhu. 1988. *Buddhadhamma for university students*. Bangkok: Dhamma Study and Practice Group.
6. Chan, K.S. 2006. *Buddhist Course*. Kuala Lumpur.
7. Chan Khoon San. Chin, K. 2000. *Buddhism as an Education*. Ceylon: Buddha Darma Education Association Inc.
8. Chin, K. 1996. *To Understand Buddhism*. Ceylon: Buddha Darma Education Association Inc.
9. Daing, U.T. 1995. *Cittanupassana and vedananupassana (2nd ed.)*. Yangon: U Aung Chi.
10. Departemen Agama RI. 1991. *Pengkajian dan Pengembangan Kerukunan Hidup Beragama di Indonesia*. Jakarta: Balitbang Departemen Agama RI.
11. Dewaraja, L.S. 2000. *Kedudukan Wanita dalam Agama Buddha*. Jakarta: FPM Sekolah Tri Ratna.



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Module Description

Title	Catholic Christian Religious Education
Code, if applicable	MU0000603W001
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	General Education Teaching Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Cooperative Learning (CpL)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students master the concepts of humanity, religion, Jesus Christ, and the Church, as well as their relationships from a Catholic faith perspective, which are manifested in attitudes and actions within the context of national life and the state, in line with the framework of the Unitary State of the Republic of Indonesia (NKRI).



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Content	This course discusses the concepts of humanity, religion, Jesus Christ, the Church, and the role of the Church in society from the perspective of the Catholic faith. It focuses on forming Catholic students' character as citizens of Indonesia who are devoted to God Almighty, aware of their service duties, and demonstrate attitudes and behaviors in alignment with Christian values. This is reflected in their responsible actions towards the continuity of national life and love for the integrity of God's creation, including physical, social, cultural dimensions, and local wisdom/Indonesian values.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Quiz (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	-



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Module Description

Title	Cell and Molecular Biology
Code, if applicable	230702602W007
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Dr. Hetty Manurung, S.Si., M.Si and Dr. Yanti Puspita Sari, S.Si., M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Interactive Learning (IL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none">1. Apply scientific methods and ethics in solving problems and making decisions based on data and information analysis in cell and molecular biology expertise (CPL3).2. Identify issues related to the biodiversity of tropical rainforest ecosystems and provide alternative solutions through the integrated application of cell and molecular biology knowledge, using scientific methods and relevant technologies (CPL4).3. Master the theoretical concepts of cell and molecular biology by identifying and explaining the structure, function, and activities within the cell; the evolution and history of cell discovery; plasma membrane (structure and membrane transport), nucleus, ribosomes, cytosol, cytoskeleton, organelles of the cytoplasmic membrane (endoplasmic reticulum, Golgi apparatus, lysosomes), energy-converting organelles (mitochondria and chloroplasts); biosynthesis of compounds within the cell, catalysis, and energy; intracellular transport; intercellular communication systems in both animal and plant cells; extracellular matrix; and apply this



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	knowledge with discipline and responsibility, by academic norms and ethics, for the management and utilization of biodiversity in tropical rainforest ecosystems and their environments (CPL1, 7).
Content	The course on Cell and Molecular Biology is a foundational subject that focuses on the structure, function, and activities within the cell; the evolution and history of cell discovery; plasma membrane (structure and membrane transport), nucleus, ribosomes, cytosol, cytoskeleton, cytoplasmic membrane organelles (endoplasmic reticulum, Golgi apparatus, lysosomes), energy-converting organelles (mitochondria and chloroplasts); biosynthesis of compounds within the cell, catalysis, and energy; intracellular transport; intercellular communication systems in both animal and plant cells; and the extracellular matrix.
Examination forms	Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Mid-term exam (40%) 3. Final exam (50%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Alberts, B., Bray, D., Johnson, A., Lewis, J., Raff, M., Roberts, K., and Walter, P. 1998. <i>Essential Cell Biology: An introduction to the molecular biology of the cell</i>. Garland Publishing, Inc. New York & London. 2. Karp, G. 1999. <i>Cell and molecular biology : Concept and experiments</i>. 2nd Ed. John Wiley and Sons, Inc. Canada. Chapter 8 3. Lodish, Harvey, et al. <i>Molecular cell biology</i>. Vol. 3. New York: Scientific American Books, 1995.



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| | <ol style="list-style-type: none">4. Alberts, Bruce. Molecular biology of the cell. Garland science, 2017.5. Papachristodoulou, Despo, et al. Biochemistry and molecular biology. Oxford University Press, 2014. |
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Module Description

Title	Civic Education
Code, if applicable	MU0000602W003
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Cooperative Learning (CpL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can critically and objectively explain the background and objectives of Civic Education (PKn) in higher education, and recognize the values of Pancasila as the orientation of PKn to guide the work of university graduates. 2. Students can describe national identity and the history of the birth of Indonesian nationalism, and demonstrate character as a national identity. 3. Students can express the importance of the constitution for the country, critically accept the 1945 Constitution (UUD 1945) as Indonesia's constitution, and demonstrate constitutional behavior in the nation-state. 4. Students can analyze the relationship between the state and its citizens, evaluate and perform their rights and duties in a balanced manner. 5. Students can analyze the meaning of democracy, articulate the essence of Indonesian democracy, and assess the implementation of democracy in Indonesia.



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	<ol style="list-style-type: none"> 6. Students can express and demonstrate constitutional behavior in the life of the nation-state. 7. Students can analyze the meaning of Indonesia as a rule-of-law state, apply legal principles in their lives as citizens, and support human rights (HAM) in Indonesia. 8. Students can analyze the concept of the Indonesian archipelago (wawasan nusantara) as the geopolitical perspective of the Indonesian nation. 9. Students can identify the elements of Indonesia's national resilience and analyze national integration strategies.
Content	This Civic Education course addresses contextual issues related to PKn, develops a positive attitude, and encourages behavior that supports the spirit of nationalism and love for the country. It also focuses on fostering positive attitudes and behavior that support a democratic, civilized society, and emphasizes developing legal awareness and respect for diversity.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Quiz (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)



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Reading list

1. Achmad Sanusi. 2006. *Memberdayakan Pilar Demokrasi dalam Pendidikan Nilai Moral dalam Dimensi Pendidikan Kewarganegaraan*. Bandung: Laboratorium PKn UPI.
2. Aidul Fitriacida Azhari. 2005. *Menemukan Demokrasi*. Surakarta: Universitas Muhammadiyah Surakarta.
3. Anderson, Benedict. 2001. *Imagined Communities: Komunitas-komunitas Terbayang*. Yogyakarta: Pustaka Pelajar.
4. Armaidly Armawi. 2012. Karakter Sebagai Unsur Kekuatan Bangsa. Makalah disajikan Workshop dalam Pendidikan "Karakter bagi Dosen Pendidikan Kewarganegaraan di Pergu-2 September 2012 di Hotel Bintang Griya Wisata Jakarta
5. As'ad Said Negara Ali Pancasila: Jalan 2009 Kemaslahatan. Berbangsa. Jakarta: LP3ES.
6. Asshiddiqie, Jimly. 2010. *Pengantar Ilmu Hukum Tata Negara*. Jakarta: Raja Grafindo Persada.
7. Bagir, Zainal Abidin. 2011. *Pluralisme Kewargaan, Arah Baru Politik Keragaman di Indonesia, Mizan dan CRCS*. Bandung: Yogyakarta.
8. Baidhawiy, Zakiyuddin. 2005. *Pendidikan Agama Berwawasan Multikultural*. Jakarta: Erlangga.



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Module Description

Title	Hindu Religious Education
Code, if applicable	MU0000603W001
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	General Education Teaching Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Cooperative Learning (CpL)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. To be devout to God Almighty, demonstrate religious attitudes, uphold human values, have a spirit of nationalism and patriotism, respect cultural, spiritual, and belief diversity, as well as differing opinions, comply with the law and discipline, and be able to collaborate while showing concern for society and the environment. 2. To understand, apply, and analyze factual, conceptual, and procedural knowledge based on curiosity about science, technology, arts, culture, and humanities, with a broad perspective on humanity, nationalism, statehood, and civilization, related to the causes of phenomena and events, and to apply procedural knowledge in a specific field of study according to their talents and interests to solve problems. 3. To independently process, reason, and present concrete and abstract matters related to the development of what has been learned in school, and to use methods based on scientific principles. 4. To practice the teachings of Hinduism in life.



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Content	This course explores the nature and values of Yajña as presented in the Ramayana, the teachings of Upaweda, the essence of Padewasan (Wariga) in the life of Hindus, Catur Asrama, and the philosophy of Dharsana as part of Hindu philosophy.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Quiz (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Astana, I Made, C.S. Anomdiputra, <i>Kautilya (Canakya) Asthasastra</i>, Paramita, Surabaya. 2003 2. Awanita, Made, <i>Agama Hindu (Modul Orientasi Pembekalan Calon PNS)</i>, Proyek Pembibitan Calon Tenaga Kependidikan Biro Kepegawaian Sekretariat Jendral Deprtement Agama RI. Jakarta 2003. 3. Bagus Wirawan, A.A, dkk, <i>Dharma Agama dan Dharma Negara</i>, Balai Pustaka, Depansar, 1995. 4. Dicki Hartoko, <i>Manusia dan Seni</i>, Kanisius, Yogyakarta, 1991. 5. Donder, I Ktut, <i>Acarya Sista Guru dan Dosen Yang Bijaksana</i>, Pramita. Surabaya, 2008. 6. Edi Sedyawati, <i>Saiwa dan Buddha di Masa Jawa Kuno</i>, Widya Dharma, 2009. 7. Nala, I Gusti Nugrah dan IGK Adia Wiratmadja, <i>Murddha Agama Hindu</i>, Upada Sastra, Jakarta, 1996. 8. Redenda S, I.B., <i>Ekonomi dan Politik Dalam Artha Sastra</i>, PT. Mabhakti, Denpasar, 2007.



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| | <ol style="list-style-type: none">9. Saraswati, Sri Chandrasekharendra. <i>Peta Jalan Veda. Terj. Media Hindu</i>. Jakarta. 2009.10. Sharma, <i>Mengapa? Tradisi dan Upacara</i>, Surabaya: Pramita, 2007 |
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Module Description

Title	Indonesian Language
Code, if applicable	MU0000602W004
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Cooperative Learning (CpL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Understand and use the Indonesian language in scientific written communication. 2. Utilize various forms of formal written communication based on Standard Indonesian Grammar and Indonesian Spelling. 3. Be able to write various forms of formal written communication, particularly scientific writing.



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Content	The Indonesian Language course is designed to equip students to understand and use the Indonesian language in scientific written communication. This course teaches students the various forms of formal written communication based on Standard Indonesian Grammar and Indonesian Spelling. The ultimate goal of this course is for students to be able to write multiple forms of formal written communication, particularly scientific writing.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Quiz (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Rahayu, Triawati, dkk. 2016. Mahir Berbahasa Indonesia. Yogyakarta: PBSI, FKIP, UAD. 2 J. R. Reitz. Foundations of Electromagnetic Theody Addison Wesley Pub. 1993.2. Ramlan, M., dkk. 1997. Bahasa Indonesia yang Salah dan yang Benar. Yogyakarta: Andi Offset



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Module Description

Title	Islamic Religious Education
Code, if applicable	MU0000603W001
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	General Education Teaching Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Cooperative Learning (CpL)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can internalize the meaning of piety (taqwa) toward Allah SWT and reflect it through good moral character in daily life. 2. Students can describe and analyze Islam's essence and general objectives in accordance with the values and teachings directly derived from the Qur'an and Sunnah. They can also define and analyze <i>qauliyah</i> (textual) and <i>kauniyah</i> (natural) verses and apply them in everyday life. 3. Students can derive wisdom from various Islamic commands and prohibitions, and demonstrate compliance with all religious obligations while avoiding what is forbidden. 4. Students can correctly perform basic religious practices such as ablution (wudhu), prayer (shalat), pilgrimage rituals (hajj), and similar acts of worship. 5. Students can resolve practical jurisprudential (fiqh) issues encountered in daily life.



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Content	This course presents discussions on the essential concept of human nature, a comprehensive understanding of <i>Dienul Islam</i> , Islamic creed (<i>aqidah</i>), the concept of law, morality (<i>akhlak</i>), science and technology (IPTEK), radicalism in the name of religion, child protection, and marriage from an Islamic perspective.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Quiz (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Tim Dosen MKAI MPK-Unmul, Pendidikan Agama Islam, Semarang: Akademika, 2016 2. M. Kholid Muslih, et.al. Worldview Islam, Unida Gontor: 2018 3. Abul A'la Al-Maududi, Khilafah Dan Kerajaan, Bandung: Mizan, 1984. 4. Ahmad Kosasih, HAM dalam Perspektif Islam: Menyingkap persamaan dan perbedaan antara Islam dan Barat. Jakarta: Salemba Diniyah, 2003. 5. Amir Mualim dan YUSDANI, Konfigurasi Pemikiran Hukum Islam. Yogyakarta: UII Press, 2001. 6. Departemen Agama RI, Islam Untuk Disiplin Ilmu Hukum, Sosial Dan Politik. Jakarta: 1996. 7. Departemen Agama RI, Islam Untuk Disiplin Ilmu Hukum. Jakarta: 2000. 8. Departemen Agama RI, Suplemen Buku Daras pendidikan Agama Islam Pada Perguruan Tinggi Umum. Jakarta;1998.



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9. H. Abdoer Raoef, Alqur'an Dan Ilmu Hukum. Jakarta: Bulan Bintang, 1970.
10. Lili Rasyid dan Arief Sidharta, Filsafat hukum Mazhab Dan Refleksinya. Bandung: Remaja karya, 1989.
11. Maulana Muhammad Ali, Islamologi. Jakarta: Darul Kutubil Islamiyah, 1996.
12. Mohammad Daud Ali, Pendidikan Agama Islam. Jakarta: PT Raja Grafindo Persada, 2000.
13. Muhammed Abed Al-Jabiri, Syura: Tradisi Partikularitas Universalitas, Yogyakarta: LKIS, 2003.
14. T.M. Hasbi Ash-Shiddieqy, Falsafah Hukum Islam. Jakarta: Bulan Bintang, 1975.
15. T.M. Hasbi Ash-Shiddieqy, Pengantar Hukum Islam. Jakarta: Bulan Bintang, 1980.
16. Iberani; Mengenal Islam, jakarta: Elkahfi, 2003.
17. Mohammad Daud Ali, hukum Islam; Pengantar Ilmu Hukum dan Tata hukum Islam di Indonesia, Jakarta: PT. Raja Grafindo Persada, 1999.
18. Mohammad Tahir Azhary, Negara Hukum: Suatu studi tentang Prinsip-Prinsipnya Dilihat dari segi hukum Islam, implementasinya Pada Periode Negara Madinah dan Masa kini, Jakarta: Bulan Bintang, 1992



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Module Description

Title	Plant Anatomy and Embryology
Code, if applicable	230702603W006
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Dr. Linda Oktavianingsih, M.Si and Dr. Yanti Puspitasari, M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <p>Upon completing this course, students are expected to explain the theories and concepts related to plant anatomy and embryology, including the basic concepts of plant development and the origins of plant organs. They will learn about the characteristics and development of vegetative organs, including the anatomical structure of leaves, stems, roots, and additional organs in plants. Students will also be able to understand and analyze the basic concepts, principles, and procedures of plant embryology, along with the supporting aspects, and apply their knowledge of plant embryology in the tropical rainforest areas of Kalimantan Island.</p>



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Content	The Plant Embryology course studies plant anatomy and embryology, including the development and origin of plant organs, characteristics, and the development of vegetative organs, such as the anatomical structure of leaves, stems, roots, and additional organs in plants. This course also covers the reproductive processes in mosses, ferns, and seed plants, including sporogenesis, gametogenesis, embryogenesis, the structure of sporangia and gametangia, and the development of gametophytes and sporophytes. It also includes the development of endosperm, polyembryony, seed structure, and the application of plant embryology knowledge in everyday life, along with crossbreeding and propagation through somatic embryos.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Practical sessions (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Bhojwani, S.S. & Bhatnagar, S.P. 1979. The Embriology of Angiosperms. Third Ed. Bombay, Bangalore, Calcutta, Vikas Publishing House PVT Ltd 2. Jonry, B. M. 1984. Embriology of Angiosperm. Berlin, Heidelberg, New York, Tokyo: Springer-Verlag 3. Pandey, B.P. 1995. Embriology of Angiosperm First Edition. Ramnagar, New Delhi: S Chand & Company Ltd



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| | <p>4. Batygina, T.B. 2009. Embryology of Flowering Plants Terminology and Concepts, Vol III, Science Publisher, NH, USA</p> |
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Module Description

Title	Plant Systematics I
Code, if applicable	230702603W005
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Dr. Linda Oktavianingsih, M.Si and Dr. Medi Hendra, M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <p>Upon completing this course, students will be able to explain, identify, and analyze various forms of life from the plant kingdom. They will understand basic concepts of classification, forms of inheritance, and the life cycles of Cryptogamae plants. Students will be able to describe the characteristics, vegetative forms, reproduction methods, and life cycles of Cyanophyta, Chlorophyta, Phaeophyta, Rhodophyta, Hepaticopsida, Anthocerotopsida, Bryopsida, Psilophyta, Lycophyta, Arthrophyta, and Filicophyta. Additionally, students will learn methods for preserving collected plant specimens and identifying Cryptogamae plants in relation to local wisdom.</p>



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Content	This course covers various forms of life in the plant kingdom, basic concepts of classification, inheritance patterns, and life cycles of Cryptogamae plants. Students will study the characteristics, vegetative forms, reproductive methods, and life cycles of Cyanophyta, Chlorophyta, Phaeophyta, Rhodophyta, Hepaticopsida, Anthocerotopsida, Bryopsida, Psilophyta, Lycophyta, Arthrophyta, and Filicophyta. The course also includes methods for preserving collected specimens and identifying Cryptogamae plants.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Practical sessions (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Gupta, J.S. 1981. <i>Text Book of Algae</i>. Oxford & IBH Publishing Co. New Delhi 2. Lane, T.R.1976. <i>Life The Individual The Species</i>. The C.V. Mosby Company. Saint Louis. 3. Pandey, S.N., Misra S.P., Trivedi P.S. 1977. <i>A Text Book of Botany Vol I & II</i>. Vikas Publishing House PVT LTD. New Delhi. 4. Pudjoarianto, Agus et al. 1995. <i>Taksonomi Tumbuhan</i>. Fakultas Biologi UGM. Yogyakarta. 5. Smith, G.M. 1955. <i>Cryptogamic Botany Vol I & II</i>. Mc Graw-Hill Book Company Inc. New York. 6. Simpson, M.G.1953. <i>Plant Systematics</i>. Elsevier Academic Press



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7. Tjitrosoepomo, G. 1989. *Taksonomi Tumbuhan*. Gajah Mada University Press.
8. Tjitrosoepomo, G. 2011. *Taksonomi Tumbuhan (Schizophyta, Thallophyta, Bryophyta, Pteridophyta)*. Yogyakarta: Gajah Mada University Press.



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Module Description

Title	Plant Systematics II
Code, if applicable	230702603W011
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Dr. Medi Hendra, M.Si and Dr. Linda Oktavianingsih, M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 ^d semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Practice (LW), and Field Observation/Field Practice (FO)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Respect cultural diversity, perspectives, religions, beliefs, and the opinions or original findings of others during discussions on the theories, concepts, principles, and basic procedures in the material of Plant Systematics II. 2. Apply adherence to laws and discipline in societal and national life within taxonomy, which has its own set of rules in plant nomenclature. Internalize values, norms, and academic ethics in mastering the material of Plant Systematics II. 3. Take responsibility for group work outcomes and conduct supervision and evaluation of the completion of practical tasks in Plant Systematics II. 4. Possess intrinsic motivation to continuously follow the developments in biosystematics by applying logical, critical, systematic, and innovative thinking through critical analysis of the latest articles in



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	systematics that follow advancements in the scientific field.
Content	The Plant Systematics II course introduces students to the understanding, skills, and reasoning abilities related to the biodiversity of tropical seed plants and their classification. Students' understanding, skills, and reasoning abilities are developed through explanations, discussions, presentations, observations, interpretations, identification, dendrogram creation, and assignments, including reading, summarizing, collecting and creating herbaria, drawing, and writing popular scientific articles about the life cycle of selected Pinophyta and Magnoliophyta.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments (10%) 2. Practical sessions (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Cronquist, A. 1981. An Integrated System of Classification of Flowering Plants. New York : Columbia University Press. 2. Keng H. 1978. Order and Families of Malayan Seed Plants. Singapore: Singapore University Press. 3. Simpson, M.G. 2006. Plants Systematics. Elsevier Academic Press. 4. Singh, G. 2010. Plants Systematics: An Integrated Approach. Enfield: Science Publishers



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5. Vasishta. 1981. Textbooks for Degree Students : Gymnosperms.
6. Tim Pembimbing Phanerogamae. (2009). Petunjuk Praktikum Botani Phanerogamae Biologi FMIPA UNMUL.
7. Oktavianingsih L, Suharyanto E, Daryono BS, Purnomo (2019). Morphological characters variability of taro (*Colocasia* spp.) in Kalimantan, Indonesia based on phenetic analysis approach. *SABRAO J. Breed. Genet.* 51(1): 37-56.
8. Rahman SN, Oktavianingsih L, Hendra M, 2022. Karakterisasi Morfologi Anggrek *Vanda* spp. di Rumah Koleksi UPTD Balai Benih Induk Tanaman Pangan dan Hortikultura Batuah Loa Janan, Kutai Kartanegara. Prosiding Seminar Nasional Biologi 4 (Bioteknologi dan Penerapannya dalam Penelitian dan Pembelajaran Sains. PT. Nasya Expanding Managemen. Pekalongan.
9. Juniarti A, Hendra M, Oktavianingsih L. 2022. Karakterisasi Morfologi Buran (*Xanthosoma* spp.) di Kabupaten Penajam Paser Utara (PPU), Kalimantan Timur, Indonesia : Peran Genetika Molekuler dalam Perspektif Konservasi Keanekaragaman Hayati. PT. Nasya Expanding Managemen. Pekalongan.
10. Husdiati, Hendra M, Oktavianingsih L. 2022. Distribusi Pandanus di Pulau Wangi-wangi Kabupaten Wakatobi Sulawesi Tenggara. *Jurnal Pro-Life*, 9(2), 466-472.
11. Oktavianingsih, Linda., Suharyanto, E., Daryono, B. S., Purnomo. 2017. Traditional Usages of Taro (*Colocasia* spp.) by Ethnic Communities in Borneo. *Journal Biosaintifika*. Vol.9(2):248-256.



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Module Description

Title	Protestant Christian Religious Education
Code, if applicable	MU0000603W001
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	General Education Teaching Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Cooperative Learning (CpL)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students master the concepts of humanity, religion, Jesus Christ, and the Church, along with their interrelations from the perspective of the Catholic faith, which are reflected in their attitudes and actions within the context of national life and citizenship by the framework of the Unitary State of the Republic of Indonesia (NKRI).



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Content	This course provides a discussion on the concepts of humanity, religion, Jesus Christ, the Church, and a Church that engages with society, from the perspective of the Catholic faith. It aims to shape the character of Catholic students as Indonesian citizens who are devoted to God Almighty, aware of their calling to serve, and committed to demonstrating Christian values through responsible attitudes and behavior. The course also emphasizes the importance of preserving the integrity of God's creation in the physical, social, cultural, and local wisdom dimensions within the Indonesian context.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Practical sessions (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	-



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Module Description

Title	Scientific Writing
Code, if applicable	190702602W002
Semester(s) in which the module is taught	2 nd semester
Person responsible for the module	Dr. Hetty Manurung, S.Si., M.Si and Dr. Yanti Puspita Sari, S.Si., M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 2 nd semester
Teaching methods	Case-Based Learning (CBL) and Interactive Learning (IL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none">1. Students will be able to understand the basic principles of scientific writing, including structure, style, and clarity, and apply these principles in writing research papers, reports, and articles.2. Students can develop and refine their writing skills by drafting, revising, and editing, ensuring the final document adheres to academic standards.3. Students will learn to adapt their scientific writing to different audiences, including writing for specialized scientific journals, general public communication, and presenting findings in scientific conferences.4. Students can effectively communicate their research ideas and findings in written format and oral presentations, demonstrating confidence and professionalism in delivering scientific information.



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Content	This course introduces and provides students with an understanding of how to write scientific documents, including proposals, practical reports, research papers, theses, and publication articles. Additionally, students are taught to think scientifically, rationally, and empirically.
Examination forms	Individual assignment, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Mid-term exam (40%)3. Final exam (50%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Sestak, Z. How to write a paper. Ed. George M. Hall. BMJ, 2003.2. Lilleyman, J. S. "How to write a scientific paper--a rough guide to getting published." Archives of disease in childhood 72.3 (1995): 268.3. Rosenfeldt, Franklin L., et al. "How to write a paper for publication." Heart, Lung and Circulation 9.2 (2000): 82-87.4. Gastel, Barbara, and Robert A. Day. How to write and publish a scientific paper. ABC-CLIO, 2016.5. Gustavii, Björn. How to write and illustrate a scientific paper. Cambridge University Press, 2017.

03

Third Semester





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Module Description

Title	Animal Physiology
Code, if applicable	230702603W014
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Prof. Rudy Agung, M.Si., Ph.D. Dr. Retno Aryani, M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 rd semester.
Teaching methods	Case-based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing this course, students they able to conduct self-evaluation of group performance and make improvements in preparing papers and practicum reports in animal physiology. They are also capable of producing academic work, such as writing papers, maintaining learning journals, and analyzing articles by utilizing available natural resources and relevant information and communication technologies.</p>



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Content	This course introduces students to the study of animal physiology, covering topics such as cell membranes and their activities, the physiology of the respiratory system, circulatory system, immunity, muscles and movement, sensory systems, excretion, nervous system, nutrition and metabolism, as well as growth and aging processes in animals, specially higher animals.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Seeley, R R, Stephens, T.D, Tate, P. 2006. Anatomy and Physiology. McGraw Hill, NY 2. Fox, S.I. 2004. Human Physiology. 8th. Ed. McGraw Hill Company. New York 3. Schmidt-Nielsen, K.1997. Animal Physiology. Adaptation & environment. 5th. Cambridge University Press. Cambridge. New York. Post Chester. Melbourne. Sydney 4. McCorry, L. K. 2008. Essentials of Human Physiology for Pharmacy, Second Edition. CRC Press. 5. Rastogi, S. C. 2007. Essentials of Animal Physiology. New Age International (P) Limited, Publishers. 6. Arumugam, N., Mariakuttikan, A. 2015. Animal Physiology. Saras Publication



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7. Christopher D. Moyes, 2016. Principles of Animal Physiology, 3rd Edition Queens University Patricia M. Schulte, University of British Columbia
8. Nugroho, R.A., Aryani, R., Manurung, H., Rudianto, R., Prahastika, W., Juwita, A., Alfarisi, A.K., Pusparini, N. A. O., Lalong, A. 2020. Acute and Subchronic Toxicity Study of the Ethanol Extracts from *Ficus deltoidea* Leaves in Male Mice. Open Access Macedonian Journal of Medical Sciences, 8(A):76-83.
9. Nugroho, R.A., Aryani, R., Manurung, H., Anindita, D.F., Hidayati, F.S.N., Prahastika, W., Rudianto, R. 2020. Effects of the Ethanol Extracts of *Ficus deltoidea* leaves on the Reproductive Parameters in Male Mice. Open Access Macedonian Journal of Medical Sciences. 2022 Jan 18; 10(A):146-152.



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Module Description

Title	Basic Microbiology and Microbial Taxonomy
Code, if applicable	210702603W008
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Ervinda Yuliatin, M.Si. Imam Rosadi, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 rd semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing this course, students will be able to understand the basic concepts of microbiology, including the characteristics and roles of microorganisms. They will learn basic techniques for studying microbes, become familiar with microbial taxonomy, and gain proficiency in conventional and modern microbial identification techniques. Additionally, students will understand the role of microorganisms in maintaining ecological balance in the environment.</p>



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Content	This compulsory course covers the concepts of microbiology, the properties and roles of microorganisms in daily life, the application of microbiological concepts, basic laboratory techniques and procedures for studying microbes, microbial characterization, and the interactions of microorganisms within ecosystems.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (20%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Cappucino, I.G., and Sherman, N. 1982. Microbiology: A. Laboratory Manual. Sydney: Addison-Wesley Publishing Company. 2. Dwidjoseputro, D. 1984. Dasar-Dasar Mikrobiologi. Jakarta: Djambatan. 3. Fardiaz, S.1989. Penuntun Praktek Mikrobiologi Pangan. Bogor : Peberbit IPB. 4. Hadioetomo, R.S. 1985. Mikrobiologi Dasar dalam Praktek. Jakarta : PT. Gramedia. 5. Hastuti, Utami Sri. 2012. Petunjuk Kegiatan Praktikum Mikrobiologi. Malang: UMM Press. 6. Jutono. 1980. Pedoman Praktikum Mikrobiologi Umum (Untuk Perguruan Tinggi). Yogyakarta : Departemen Mikrobiologi Fakultas Pertanian Universitas Gajah Mada. 7. Tortora, Gerard J, Berdlle R Funke, and Christine L. Caf�. 2004. Microbiology – an Introduction. San Fransisco: Pearson Education, Inc.



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8. Urry, L.A., M.L Cain, S. A. Wasserman, P.V. Minorsky, R. Orr, and N.A Campbell. 2021. Campbell Biology, 12th Edition. San Fransisco: Pearson Education, Inc.
9. Willey, J.M., L.M. Sherwood, C.J. Woolverton. 2008. Microbiology, Seventh Edition. New York: McGraw-Gill.
10. Kim, S. 2015. Handbook of Marine Microalgae, Biotechnology Advances. USA: Janice Audet.
11. Tim Mikrobiologi. 2022. Mikrobiologi dan Sistematika Mikrobia. Jurusan Biologi: FMIPA Universitas Mulawarman.



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Module Description

Title	Basic Statistics
Code, if applicable	PA0700603W005
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Dr. Nova Hariani, M.Si and Drs. Sus Trimurti, M.P
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 rd semester
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Apply theoretical and procedural concepts in the field of statistics. 2. Understand the fundamentals of statistical methods. 3. Analyze problems in the relevant field and exhibit integrity in testing and interpreting data.



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Content	This compulsory course is worth three credits, consisting of 2 credits of theory and one credit of practical work. In this course, students will learn methods for data processing using descriptive statistics, probability theory, probability distributions such as binomial, hypergeometric, Poisson, and normal distributions, random sampling, and statistical sampling distributions. The course also covers the basic inference concepts, including estimation and hypothesis testing.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Practical sessions (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Sudjana. 2005. Metode Statistik. Tarsito: Bandung2. Walpole, R.E. 2006. Pengantar Statistika Edisi 3. PT. Gramedia Pustaka Utama: Jakarta3. Supranto, J. 2000. Statistika: Teori dan Aplikasi Jilid 1 Edisi ke 6. Ertangga: Jakarta



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Module Description

Title	Genetics
Code, if applicable	230702603W009
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Drs. Sus Trimurti, M.P and Muhammad Fauzi Arif, M.Sc.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 rd semester
Teaching methods	Case-Based Learning (CBL) and Laboratory Practice (LW)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <p>Students will be able to explain the basic concepts of genetics, genetic material, and gene expression. They will understand the structure and function of chromosomes, the cell cycle, and meiosis. Students will also learn about autosomal inheritance, inheritance of linked genes, sex-linked gene inheritance, pedigree analysis, crossing over, allele frequency and genotype frequency determination, inbreeding in single-mating, and modern techniques in genetics.</p>



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Content	The Genetics course covers the basic concepts of genetics, genetic material, the process of gene expression, the structure and function of chromosomes, the cell cycle, and cell division. The course also discusses inheritance and Mendelian principles, the development of Mendelian inheritance, chi-squared tests and probability theory, sex determination, sex linkage, sex-limited and sex-influenced gene expression, pedigree analysis, gene linkage and crossing over, chromosome mapping, and allele and genotype frequency determination.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practical sessions (20%)2. Affective assessment and Assignments (10%)3. Mid-term exam (20%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Booker, R. J. 2015. Genetics Analysis & Principles. Mc. Graw Hill2. Russell, P. J. 2014. Genetics: A Molecular Approach. Pearson3. Waddington, C.H. 2016. An Introduction to Modern Genetics. Routledge.4. Campbell, N.A., L.G. Mitchell, and J.B. Reece. 2006. Biology. Concept and Connection. The Benjamin Cummings Publ.Co.Inc., California (USA)



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Module Description

Title	Introduction to Biotechnology
Code, if applicable	230702602W013
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Imam Rosadi, S.Si., M.Si. Muhammad Fauzi Arif, M.Sc.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 rd semester.
Teaching methods	Lectures, Discussions, and Question-Answer Sessions. Learning Model: Think Talk Write (TTW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation: 1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester. 1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Cognitive Domain Students can analyze biological problems comprehensively based on the knowledge of biotechnology. 2. Psychomotor Domain Students can apply scientific methods and implement research steps according to the topic or problem. 3. Affective Domain Students exhibit logical thinking based on scientific method principles and avoid unethical behavior in research.



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Content	The Introduction to Biotechnology course is an elective that covers the concepts of biotechnology, including the basics of genes, genomes, proteins, recombinant DNA technology, and its applications in microbial, animal, health, plant, forensic, aquatic, and bioremediation biotechnology. The course also includes the study of biotechnology regulations and ethics, particularly in Indonesia. Student mastery is assessed through assignments, the mid-term exam (UTS), and the final exam (UAS) in theory.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Mid-Term exam (15%) 2. Affective assessment (10%) 3. Final exam (25%) 4. Case study (25%) 5. Project-Based learning (PjBL) (25%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Clark DP and Pazdernik NJ. 2009. Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press. USA. 2. Thieman WJ and Palladino MA. 2013. Introduction to Biotechnology 3rd ed. Pearson Education, Inc. USA. 3. Walker JM and Raply R. 2009. Molecular Biology and Biotechnology 5th ed. Royal Society for Chemistry. UK. 4. Rosadi, I., Karina, K., Rosliana, I., Sobariah, S., Afini, I., Widyastuti, T. and Barlian, A., 2019. In vitro study of cartilage tissue engineering using human adipose-derived stem cells induced by platelet-rich plasma and cultured on silk fibroin scaffold. Stem cell research & therapy, 10(1), pp.1-15.6.



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Module Description

Title	Microbiology
Code, if applicable	230702603W008
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Ervinda Yuliatin, S.Si M.Si Imam Rosadi, M.Si
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 3 rd semester
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester. One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO): Upon completing this course, students will understand the basic concepts of microbiology, including the characteristics and roles of microorganisms, basic techniques for studying microbes, and an understanding of microbiological taxonomy. They will also learn both conventional and modern techniques for microbial identification and understand the role of microorganisms in maintaining the balance of ecosystems in the environment.</p>



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Content	This compulsory course covers the concepts of microbiology, the properties and roles of microorganisms in daily life, the application of microbiological concepts, basic laboratory techniques and procedures for studying microbes, microbial characterization, and the interactions of microorganisms within ecosystems.
Examination forms	Individual assignment, Practical sessions, Mid-term exam, and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignments / Case Studies (15%) 2. Project (15%) 3. Practical sessions (20%) 4. Affective assessment (10%) 5. Mid-term exam (15%) 6. Final exam (25%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Cappucino, I.G., and Sherman, N. 1982. Microbiology: A. Laboratory Manual. Sydney: Addison-Wesley Publishing Company. 2. Dwidjoseputro, D. 1984. Dasar-Dasar Mikrobiologi. Jakarta: Djambatan. 3. Fardiaz, S.1989. Penuntun Praktek Mikrobiologi Pangan. Bogor: Peberbit IPB. 4. Hadioetomo, R.S. 1985. Mikrobiologi Dasar dalam Praktek. Jakarta: PT. Gramedia. 5. Hastuti, Utami Sri. 2012. Petunjuk Kegiatan Praktikum Mikrobiologi. Malang: UMM Press. 6. Jutono. 1980. Pedoman Praktikum Mikrobiologi Umum (Untuk Perguruan Tinggi). Yogyakarta : Departemen Mikrobiologi Fakultas Pertanian Universitas Gajah Mada.



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8. Urry, L.A., M.L Cain, S. A. Wasserman, P.V. Minorsky, R. Orr, and N.A Campbell. 2021. Campbell Biology, 12th Edition. San Fransisco: Pearson Education, Inc.
9. Willey, J.M., L.M. Sherwood, C.J. Woolverton. 2008. Microbiology, Seventh Edition. New York: McGraw-Gill.
10. Kim, S. 2015. Handbook of Marine Microalgae, Biotechnology Advances. USA: Janice Audet
11. Tim Mikrobiologi. 2022. Mikrobiologi dan Sistematika Mikrobia. Jurusan Biologi: FMIPA Universitas Mulawarman.

04

Fourth Semester





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Module Description

Title	Biochemistry
Code, if applicable	230702603W019
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Lecturer Team
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW),
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation: 1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester. 1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students can apply biochemistry concepts regarding the structure and function of macromolecules. 2. Students understand the various types of structures and functions of macromolecules. 3. Students can explain the structure and function of multiple macromolecules both theoretically and practically. 4. Students can apply the properties of macromolecule structure and function in their research.



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Content	This course covers the four biomolecules (proteins, lipids, carbohydrates, and nucleic acids), focusing on their structure, function, and applications. The biomolecule structure section includes the physicochemical structure and properties of proteins, nucleic acids, carbohydrates, and lipids. Additionally, the course explores the structure and properties of biomembranes and transport processes. Beyond the structure and function of biomolecules, the course also covers metabolism, including an introduction to metabolism, carbohydrate metabolism, the citric acid cycle, respiration, lipid metabolism, and amino acid metabolism.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignment (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Mathews C.K. & Van Holde K.E. 2000. <i>Biochemistry</i>. Third Edition. The Benjamin Cumming Publishing 2. Nelson, D.L. & Cox, M. M., 2000. <i>Lehninger Principles of Biochemistry</i>, Worth Publisher Inc, New York 3. Stryer L., Jeremy M. B., Tymoczko J. L., 1998. <i>Biochemistry</i>. Fifth Edition. WH Freeman & Co. New York 4. Devlin M.T, 1997. <i>Textbook of Biochemistry with Clinical Correlation</i>, 4th ed. John Wiley & Sons INC, New York



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| | <p>5. Albert, B., Bray, D., Lewis, J., Raff, M., Robert, K. And Watson, J. D. 1998. <i>Essential Cell Biology of The Cell: an Introduction to the Molecular Biology of the Cell</i>, Garland Publishing</p> |
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Module Description

Title	Biostatistics
Code, if applicable	PA0700603W001
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Imam Rosadi, M.Si. Dr. M. Faturahman, M.Si. Dr. Darnah Andi Nohe, M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study
Credit points	2 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Students will be able to understand the differences between the concepts of statistics, statistical analysis, and biostatistics, as well as the framework of statistical thinking and common errors in using statistics. They will comprehend statistical data, types, collection methods, and presentation techniques. Students will learn about different types of variables, populations, and samples, and how to use statistical data to present quantitative and qualitative data.</p> <p>The course will cover Descriptive Statistics: Central Tendency Measures such as Mean, Median, Mode, and Midrange; Descriptive Statistics: Dispersion Measures such as Range, Variance, Standard Deviation, Coefficient of Variation, Standard Error of the Mean, and Confidence Interval Estimation for the Mean. Students will understand</p>



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	<p>the basics of Probability, Probability Distributions such as Binomial and Normal Distributions, and Normal Distribution Standardization.</p> <p>Students can apply the Normal Curve and explain various types of hypotheses. They will also perform calculations for Hypothesis Testing of Differences between Two Means using paired and unpaired t-tests, Analysis of Variance (ANOVA) for more than two means with one independent variable (one-way ANOVA), and ANOVA for more than two means with two independent variables (two-way ANOVA). Additionally, they can conduct Post-Hoc Tests such as BNT, BNJ, and Duncan's Multiple Range Test (DMRT), data transformations, correlation and simple regression tests, covariance analysis, and non-parametric statistics.</p> <p>Students will gain proficiency in using statistical software for hypothesis testing, including data analysis programs such as Excel and SPSS.</p>
Content	<p>This course covers the basics of biostatistics, including: the definition of statistics; the statistical thinking framework; data types, collection, and presentation (data presentation); Descriptive Statistics for Measures of Central Tendency: Mean, Median, Mode, Midrange; Descriptive Statistics for Measures of Dispersion (Spread): Range, Variance, and Standard Deviation; Confidence Interval Estimation for the Mean, Standard Error of the Mean; Presentation of Quantitative and Qualitative Data in Tables and Graphs; Basics of Probability; Probability Distributions: Binomial, χ^2, Normal; Standardization of the Normal Distribution; Application of the Normal Curve; Populations and Samples; Sampling Distributions; Estimation; Hypothesis Testing: One-Tailed and Two-Tailed; Hypothesis Testing for Differences between Two Means: Paired and Unpaired t-tests with equal variances, Homogeneity of Variance Test (F-max); Testing</p>



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	Differences Among More Than Two Means: Analysis of Variance (ANOVA) with one independent variable (one-way ANOVA); Analysis of Variance with two independent variables (two-way ANOVA); Post-hoc Tests such as BNT, BNJ, Duncan's Multiple Range Test (DMRT), and Scott-Knott; Principles of Data Transformation; Simple and Multiple Correlation and Regression; Partial Regression; Principles and Steps in Analysis of Covariance; Normality, Homogeneity of Variance, and Linearity Tests; Non-parametric Statistics: Chi-square (χ^2) Test, Wilcoxon Test, Kruskal-Wallis Test; Use of Computers for Data Presentation and Statistical Testing: Excel and SPSS Programs.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Assignment (20%) 3. Mid-term exam (20%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Djarwanto, Ps. 1991. Statistik Nonparametrik. Yogyakarta: BPFE. 2. Gaspersz, Vincent. 1991. Metode Perancangan Percobaan. Bandung: Penerbit CV. Armico 3. Hadi, Sutrisno. 1983. Analisis Regresi. Yogyakarta: UGM. 4. Hadi, Sutrisno. 1986. Statistik 1, 2, dan 3. Yogyakarta: UGM. 5. Hanafiah, Ali Kemas. 1995. Rancangan Percobaan: Teori dan Aplikasi. Jakarta: PT.RajaGrafindo Persada.



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Module Description

Title	Ecology
Code, if applicable	0702532
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Dr. Jusmaldi, S.Si., M.,Si. Dijan Sunar Rukmi, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Lecture, Discussion, and Q&A (Question and Answer).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing the Ecology course, students will be able to explain the basic concepts of ecology, including the history of ecological development, the organizational structure of life, the influence of environmental factors, microhabitats, ecological niches, adaptation, population structure and dynamics, interactions within communities, the structure and function of ecosystems, bioenergetics concepts, productivity, biogeochemical cycles, succession, and the characteristics of aquatic and terrestrial ecosystems in the tropical rainforest environment of Kalimantan Island.</p>



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Content	This is a compulsory course that provides an in-depth study of the history and development of ecology as a scientific discipline, the scope of ecology, the concept of the organizational structure of life, the influence of environmental factors on organisms (tolerance range and limiting factors, ecological indicators/bioindicators), the concepts of habitat, microhabitat, ecological niches, population structure, characteristics, and dynamics, community interactions, the structure and function of ecosystems, bioenergetics concepts, biogeochemical cycles, succession processes, and the characteristics and management of aquatic and terrestrial ecosystems. The course is delivered through lectures, discussions, and practical sessions.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Barbour, M.G. 1980. <i>Terrestrial Plant Ecology</i>. California: B. Cummings. 2. Begon, M, J.L. Harper and C.R. Townsend. 1986. <i>Ecology: Individuals, populations and communities</i>. Oxford: Blackwell. 3. Dharmawan, A. Ibrohim, Hawa T, Suwono, H. Susanto, P. 2004. <i>Ekologi Hewan</i>. Malang: UM Press 4. Kendeigh. S.C. 1980. <i>Ecology with special reference to animals and man</i>. New Jersey: Prentice Hall.



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5. Mueller, D. Dombois & H. Ellemberg. 1974. *Aims and Methods of Vegetation Ecology*. New York, London, Sydney, Toronto. John Wiley.
6. Odum. F.P 1983. *Basic ecology*. Philadelphia : Saunders.
7. Syafei, E.S. 1990. *Pengantar Ekologi Tumbuhan*. Proyek Pembinaan Tenaga Kependidikan. FMIPA-ITB.
8. Odum, E. P. 1977. *Ecology. Second Edition*. Holt Rinehearat and Winston. London.
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Module Description

Title	Entrepreneurship
Code, if applicable	230702602W012
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Dr. Ratna Kusuma, M.Si. Dr. Lariman, M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Problem-Based Learning (PBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students can understand the theories and concepts related to becoming an entrepreneur. 2. Students can explain the concept of change, thinking, and creative thinking. 3. Students can explain the importance of action-oriented thinking. 4. Students can explain the concept of risk-taking in entrepreneurship. 5. Students can understand leadership theories and concepts. 6. Students can explain the concept of "Factor X" in entrepreneurship. 7. Students can explain efforts in business marketing, financial management, and business financing. 8. Students can explain the theories and concepts of starting a new business and business planning.



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Content	This course studies theories and concepts related to soft skills, aspects of business management, simple business plans, and business planning.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Practicum (20%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Hisrich. J.D. 1996. Entrepreneurship. Starting, Developing and Managing New Ventures.2. Soesarsono. 1998. Kewiraswastaan. Fakultas Teknologi Pertanian. IPB. Bogor.3. Soesarsono dan Ma`mun Sarma. 2002. Sekilas Kewirausahaan Tantangan Mandiri. LP3IPB. Bogor.



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Module Description

Title	Conservation of Biodiversity in Wet Tropical Forests
Code, if applicable	230702602P044
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Dr. Fatmawati Patang, S.Si., M.Si. Dr. agr. Budiman, M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Problem-Based Learning (PBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can understand the issues and threats in tropical biodiversity conservation, the factors leading to rarity and extinction, the methodologies for analyzing these problems, and the strategies for the preservation and sustainable utilization of tropical biodiversity. 2. Students can understand international conventions and biodiversity-related regulations in various countries. 3. Students can understand the multi-functional management of areas with high biodiversity value.
<p>Content</p>	<p>This course explores the issues and threats in tropical biodiversity conservation, including the factors that lead to rarity and extinction, and methodologies for analyzing these problems. It also covers the preservation and sustainable use of tropical biodiversity, international conventions, biodiversity-related regulations in various countries, and the multi-functional management of areas with high biodiversity value.</p>



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Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Reviewing relevant journal articles (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Azlan, J. M. 2003. The diversity and conservation of mustelids, viverrids and herpestids in a disturbed forest in Peninsular Malaysia. <i>Small Carnivore Conservation</i>, 29: 8-9.2. Bruenig, E. 1996. Conservation management of tropical rainforest: an integrated approach to sustainability. CAB International, Wallingford, UK.3. Hickman, C.P., Jr., L. S. Roberts, A. Larson. 2003. Animal Diversity, Digital Textbook, 3rd ISBN: 0-07-234903-4 Description: ©2003 / Softcover / 464 pages Publication Date: June 2002.4. Istiadi, Y., D. Priatna, dan N. Panekanan. 1994. Inventarisasidan analisis populasi jenis-jenis mamalia dan burung di pegunungan Müller, Kalimantan Barat-Kalimantan Timur (Ekspedisi Kapuas-Mahakam, 1994). Unpublished report. KOMPAS-GRAMEDIA, Jakarta, Indonesia.5. MacKinnon, J. K. dan K. Phillipps. 1993. A field guide to the birds of Borneo, Sumatra, Java, and Bali. Oxford University Press, Oxford, UK.6. World Conservation Monitoring Centre. 1992. Global Biodiversity, Status of the Earth's Living Resource, Chapman and Hall, London.



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Module Description

Title	Microtechnique
Code, if applicable	230702602W016
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Dr. Retno Aryani, M.Si. Dr. Linda Oktavianingsih, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students can apply logical, critical, systematic, and innovative thinking to master the material of microtechnique (CPL 2). 2. Students can apply scientific methods and ethics in solving problems and making informed decisions based on data and information analysis in the field of microtechnique (CPL 3). 3. Students can explain the correct procedures for preparing microscopic specimens from animals and plants, and master basic knowledge of various laboratory tools made of metal and glass, along with their proper usage. This includes introducing and handling chemicals, laboratory safety and security, laboratory work practices, microscope maintenance, and specimen preparation techniques such as smear, supravital staining, squash, paraffin embedding, wholemounts, and recognition of immunohistochemistry methods. Additionally,



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	<p>students will prepare preserved spore specimens of ferns, perform wood tissue maceration, and analyze and interpret laboratory specimens with discipline and responsibility by academic norms and ethics, while managing and utilizing the biodiversity of wet tropical forests and their environments (CPL 1, 5, 7).</p>
Content	<p>This compulsory course introduces laboratory tools in microtechnique, their functions, purposes, and the effects of using various reagents. It covers the methods for making blocks and sectioning, staining, embedding, mounting, and different techniques for preparing microscopic specimens from animals and plants.</p>
Examination forms	<p>Individual assignment, Mid-term exam and final exam</p>
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)</p>
Reading list	<ol style="list-style-type: none"> 1. Kiernan, J. A. 1981. Histological and histochemical methods. Theory and practice perganon press. Oxford. 2. Parkin, J.T. 1993. Fixing and Embedding Speciment for Elementary Microscopy. Western University Training Centre. 3. Suntoro, H. 1983. Metode Pewarnaan (Histologi dan Histokimia). Bhratara Karya Aksara. Jakarta. 4. Berlyne, G.P. and JP.Miksche.1976. Botanical Microtechnique and Cytochemistry. The IOWA State University. Press Ames, Iowa.



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5. Nugroho, R.A., Aryani, R., Manurung, H., Rudianto, R., Prahastika, W., Juwita, A., Alfarisi, A.K., Pusparini, N.A.O., Lalong, A. 2020. Acute and Subchronic Toxicity Study of the Ethanol Extracts from *Ficus deltoidea* Leaves in Male Mice. *Open Access Macedonian Journal of Medical Sciences*, 8(A):76-83.
6. Nugroho, R.A., Puspa, N.C.S., Aryani, R., Prahastika, W., Rudianto, R., Manurung, H. 2020. Subchronic Toxicity Test of Indian Almond (*Terminalia catappa*) Leaves Water Extract on The Liver Histology of Mice (*Mus musculus*). *Bioeduscience*. ISSN: 2614-1558, Volume: 4, Edisi: 2.
7. Nugroho, R.A., Aryani, R., Manurung, H., Anindita, D.F., Hidayati, F.S.N., Prahastika, W., Rudianto, R. 2020. Effects of the Ethanol Extracts of *Ficus deltoidea* leaves on the Reproductive Parameters in Male Mice. *Open Access Macedonian Journal of Medical Sciences*. 2022 Jan 18; 10(A):146-152.
8. Sardi, N.I., Aryani, R., Nugroho, R.A., Sari, Y.P., Manurung, H., Rudianto, R. 2022. Effects of ant-nest plant (*Myrmecodia pendens*) bulb extract on histology of intestinal, liver and proximate fillet of Sangkuriang catfish (*Clarias gariepinus* Var). *AIP Conference Proceedings*. 2668, 020002 (2022); <https://doi.org/10.1063/5.0111711> Published Online: 11 October 2022.
9. Aryani, R., Nugroho, R.A., Manurung, H., Pusparini, N.A.O., Prahastika, W., Rudianto, R. 2022. Subchronic toxicity of *Ficus deltoidea* jack. leaves on the histology of ventriculus and intestinum tenue male mice. *AIP Conference Proceedings*. 2668, 020005 (2022);



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	<p>https://doi.org/10.1063/5.0111944 Published Online: 11 October 2022.</p>
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Module Description

Title	Mycology
Code, if applicable	230702603W017
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Dr.rer.nat Bodhi Dharma, M.Si. Ervinda Yuliatin, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation or Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing this course, students will have knowledge and skills in identifying various types of fungi found in tropical environments and the ability to classify fungi effectively. Additionally, students are expected to develop the ability to study and analyze the general physiological properties of fungi through practical work and course materials provided during the lectures.</p>



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Content	This compulsory course covers the history and development of mycology, the utilization of fungi, particularly for human benefit, and the negative impacts of fungi in human environments. It also addresses the physiological, genetic, and ecological properties of fungi and the groups that are ancestors of the fungal kingdom. The course includes discussions on fungi as part of the biological sciences, covering topics such as the system of nomenclature and descriptions of the major phyla, including Chytridiomycota, Zygomycota, Glomeromycota, Ascomycota, Basidiomycota, along with closely related groups.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Alexopoulos C.J., Mims C.W., and Meredith M. Blackwell. 1996. <i>Introductory Mycology</i>, 4th Edition. John Wiley and Sons Publisher. New Jersey. U.S.A. ISBN: 978-0-471-52229-4. 2. Stevens, Russell B. 1974. <i>Mycology Guidebook</i>. University of Washington Press. Seattle. U.S.A 3. FAO. 2005. <i>Handbook of Mycological Methods</i>. Project GCP/INT/743/CFC. (http://www.fao.org/fileadmin/user_upload/agns/pdf/coffee/Annex-F.2.pdf) 4. Silva D.M, Batista L.R, Rezende E.F, Fungaro M.H, Sartori D, and E. Alves 2011. Identification of Fungi of the Genus <i>Aspergillus</i> Section Nigri Using



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- Polyphasic Taxonomy. *Braz J Microbiol.*;42(2):761-73. DOI: 10.1590/S1517-838220110002000044.
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 6. Oren, Aaron. 2010. *Microbial Systematics*. In: *Handbook of Environmental Engineering, Vol. 10: Environmental Biotechnology*. L.K. Wang *et al.* (Eds). Springer Science Business Media, LLC. DOI: 10.1007/978-1-60327-140-0_3
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 9. Blackwell M., Hibbett D.S., Taylor J.W., and J.W Spatafora. 2006. *Research Coordination Networks: a phylogeny for kingdom Fungi (Deep Hypha)*. *Mycologia*. 98(6):829-37. DOI: 10.3852/mycologia.98.6.829.
 10. Hibbett D, M. Binder, J.F. Bischoff, et al. 2007. A higher-level phylogenetic classification of the Fungi. *Mycological research*. 111 (2007): 509–547. <https://doi:10.1016/j.mycres.2007.03.004>.
 11. Spatafora JW, Aime MC, Grigoriev IV, Martin F, Stajich JE, Blackwell M. 2017. The fungal tree of life: from molecular systematics to genome-scale phylogenies. *Microbiol Spectrum* 5(5): FUNK-0053-2016. <https://doi:10.1128/microbiolspec.FUNK-0053-2016>.



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13. Bunyard, B.A. 2022. *The Lives of Fungi: A Natural History of Our Planet's Decomposers*. Princeton University Press, New Jersey, U.S.A. Ebook ISBN 978-0-691-23035-1.



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Module Description

Title	Plant Physiology
Code, if applicable	230702603W015
Semester(s) in which the module is taught	4 th semester
Person responsible for the module	Dr. Hetty Manurung, S.Si., M.,Si. Dr. Dwi Susanto, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 4 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students can apply scientific methods and ethics in solving problems and making informed decisions based on data and information analysis within plant physiology (CPL 3). 2. Students can identify problems and present alternative solutions by applying knowledge in plant physiology (CPL 4). 3. Students can master the theoretical concepts in plant physiology by identifying and explaining theories and ideas related to physiological processes in plant growth, cell structure and plant organization, plant cells and water, the role of water in the plant, essential nutrients for plants, plant enzymes, plant metabolism: photosynthesis and cellular respiration, the role and function of plant hormones, growth and development, plant movement, photoperiodism, dormancy, and aging, all while adhering to academic



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	norms and ethics in the management and utilization of biodiversity in wet tropical forests and their environments (CPL 1, 7).
Content	The course on plant physiology is fundamental to studying the physiological processes within plants. It covers theories and concepts related to physiological processes in plant growth, plant cell structure and organization, plant cells and water, the role of water for the overall plant, essential nutrients for plants, plant enzymes, plant metabolism: photosynthesis and cellular respiration, the role and function of plant hormones, growth and development, plant movement, photoperiodism, dormancy, and aging.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Gardner, F.P., Pearce, R.B and R.L. Mitchel.1991. Fisiologi Tanaman Budidaya (alih bahasa; Herawati Susilo dan Subiyanto). Jakarta. Universitas Indonesia Press. 2. Hopkins, W.G. 1999. Introduction to Plant Physiology. New York. John Wiley & Sons, Inc. 3. Manurung et al. 2019. Growth, phytochemical profile, and antioxidant activity of cultivated tabat barito (<i>Ficus deltoidea</i> Jack) under drought stress. International Journal of Biosciences 4(1): 366-378. http://dx.doi.org/10.12692/ijb/14.1.366-378.



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5. Salisbury, F.B and C.W. Ross. 1992. Plant Physiology. 4th Ed. California. Wadsworth Publ. Co
6. Sitompul, S.M dan B. Guritno. 1995. Analisis Pertumbuhan Tanaman. Yogyakarta: Gadjah Mada Univ. Press.
7. Taiz L and Zeiger E. 1991. Plant physiology. Tokyo. The Benyamin/Cumming Publising Company Inc.

05

Fifth Semester





Module Handbook Department of Biology Mulawarman University

Module Description

Title	Animal Reproduction and Embryology
Code, if applicable	230702603W015
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Prof. Rudy Agung, M.Si., Ph.D. Dr. Retno Aryani, M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 5 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students can be devoted to God Almighty and demonstrate a religious attitude while participating in the endocrinology course. 2. Students can appreciate cultural diversity, perspectives, religions, beliefs, and the original opinions or findings of others when engaging in discussions on theories, concepts, principles, and basic procedures in animal reproduction and development. 3. Students can apply logical, critical, systematic, and innovative thinking to master the material on animal reproduction and development. 4. Students can take responsibility for achieving group work outcomes and supervise and evaluate the completion of practicum tasks and experiments related to endocrinology.



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	<ol style="list-style-type: none"> 5. Students can self-evaluate group performance and improve in preparing papers and practicum reports on animal endocrinology. 6. Students are intrinsically motivated to continuously follow developments in endocrinology by applying logical, critical, systematic, and innovative thinking through critical analysis of articles. 7. Students can produce academic work by writing papers, maintaining learning journals, analyzing articles, and creating specimens by utilizing available natural resources and relevant information and communication technologies.
Content	<p>This course covers aspects of animal reproduction and embryology, including observing sexual characteristics, reproductive systems, gametes and gametogenesis, and reproductive mechanisms, with the climax of the reproductive process being fertilization. The course also covers the role of hormones, blastulation, gastrulation, organogenesis, morphogenesis, twinning, and developmental abnormalities. This course focuses on animal/human reproduction, with a brief discussion of reproduction in other organisms at the beginning of the course as a comparative knowledge of diversity.</p>
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)



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Reading list

1. Feduccia, a. And e. Mc. Crady. 1997: toorey's morphogenesis of The vertebrates. John wiley & sons. Inc. New york.
2. Gilbert, s.f. 1991: developmental biology. Third edition. Sinauer Associates, inc.publ. Sunderland, massachusetts. Hildebrand, m. 1995: analysis of vertebrate structure. John Wiley & sons. New york.
3. Kardong, k.v. 2000: vertebrates. Comparative anatomy, function Evolution. Mc. Graw hill. Boston.
4. Kent, g.c and I. Miller. 1997: comparative anatomy of the Vertebrates wm. C. Brown publ. Dubuque
5. Walter, he, and I. P. Sayles. 1961: biology of the vertebrates. A Comparative study of man and his animal allies. The Macmillan co., New york.
6. Nugroho, R. A., 2016. Reproduksi Perkembangan Hewan. Chaya Atma, Yogyakarta.



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Module Description

Title	Microbial Physiology and Genetics
Code, if applicable	210702603W025
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr.rer.nat Bodhi Dharma, M.Si. Ervinda Yuliatin, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing this course, students will understand microbial cells' physiological and genetic basis that enable microorganisms to adapt to their environments and survive in harsh conditions. Additionally, students are expected to gain a deeper understanding of the function of membranes, the photosynthetic system of green bacteria, major metabolic pathways and their derivatives, and the use of living substrate nutrients. In terms of genetics, students are expected to become familiar with the chromosomes and genomes of fungi and bacteria, including the description of plasmids, linear plasmids, horizontal genetic transfer systems, and the mating system of fungi.</p>



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Content	This course is a compulsory course that covers the physiological and genetic basis of microbial cells, which are essential for the ability of microorganisms to adapt to their environments and survive in harsh conditions. The course also delves deeper into the function of membranes, the photosynthetic system of green bacteria, major metabolic pathways and their derivatives, and the utilization of living substrate nutrients. In the genetic aspect, the course discusses the chromosomes and genomes of fungi and bacteria, an overview of plasmids, linear plasmids, horizontal genetic transfer systems, and fungi mating systems.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Crueger, W. and A. Crueger. 1993. <i>Biotechnology: A Textbook of Industrial Microbiology</i>. Science Tech. Inc. Madison. USA. 2. Gottschalk, Gerhardt. 1986. <i>Bacterial Metabolism</i>. 2nd Ed. Springer Series in Microbiology. Springer-Verlag New York Inc. U.S.A. DOI: 10.1007/978-1-4612-1072-6. 3. Griffin, D.H. 1994. <i>Fungal Physiology</i>. 2nd Ed. J. Wiley & Sons, Inc., New York. USA. ISBN 0 471 59586. 4. Hinnebusch, J. and K. Tilly. 1993. Micro Review: Linear plasmids and chromosomes in bacteria. <i>Molecular Microbiology</i>: 10(5), 917-922.



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5. Meinhardt, F. and R. Klassen. 2007. Microbiology Monographs Series: Microbial Linear Plasmids. (Series Editor: Alexander Steinbüchel). Springer Verlag. Berlin. Germany. DOI 10.1007/978-3-540-72025-6.
6. Meinhardt F., Schaffrath, R., and M. Larsen 1997. Microbial linear plasmids. Appl Microbiol Biotechnol. 47(4):329-36.
7. Sørensen, S.J., Bailey, M., Hansen, L.H., Kroer, N. and S. Wuertz. 2005. Studying plasmid horizontal transfer in situ: a critical review. Nature Reviews Microbiology. 3: 700 – 710.
8. Stanbury, P.F., Whitaker, A., and S.J. Hall. 2017. Principles of Fermentation Technology. 3rd Ed. Elsevier Ltd-Butterworth-Heinemann. Oxford-Cambridge. UK
9. Summers D.K. 1996. Plasmid Replication and its Control. In: The Biology of Plasmids. Blackwell Science Ltd. ISBN: 978-0-632-03436-9.
10. Stan-Lotter, H. 2012. Adaption of Microbial Life to Environmental Extremes: Novel Research Results and Application. Helga Stan-Lotter and Sergiu Fendrihan (Eds.). Springer Wien New York. U.S.A. ISBN 13: 978-3-211-99691-1



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Module Description

Title	Protistology
Code, if applicable	210702603W027
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Nova Hariani, M.Si. Dr. Lariman, M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 5 th semester.
Teaching methods	Lectures, reading assignments, questioning, discussions, reviews, and practical work.
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students will be able to understand the principles of taxonomy. 2. Students will be able to explain the principles of nomenclature for animal-like protists and classify them accordingly. 3. Students will be able to apply basic techniques for preparing slides and observing the body structure of animal-like protists. 4. Students will be able to explain and differentiate the life processes of animal-like protists, including food acquisition, ecology, reproduction, and metabolism. 5. Students will be able to describe and explain the interactions between animal-like protists and their environment. 6. Students will be able to explain the role of plant-like protists in life. 7. Students will be able to explain the principles of nomenclature for plant-like protists.



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	<ol style="list-style-type: none">8. Students will be able to classify plant-like protists.9. Students will be able to apply basic techniques for preparing slides and observing the body structure of plant-like protists.10. Students will be able to explain and differentiate the life processes of plant-like protists, including food acquisition, ecology, reproduction, and metabolism.11. Students will be able to describe and explain the interactions between plant-like protists and their environment.12. Students will be able to explain the role of plant-like protists in life.13. Students will be able to explain the principles of nomenclature for fungus-like protists.14. Students will be able to classify fungus-like protists.15. Students will be able to apply basic techniques for preparing slides and observing the body structure of fungus-like protists.16. Students will be able to explain and differentiate the life processes of fungus-like protists, including food acquisition, ecology, reproduction, and metabolism.17. Students will be able to describe and explain the interactions between fungus-like protists and their environment.18. Students will be able to explain the role of fungus-like protists in life.
Content	Protists are a branch of biology that fundamentally studies a group of organisms, the first or simplest eukaryotic organisms, which can be categorized as unicellular or multicellular microorganisms. The topics discussed include animal-like protists, plant-like protists, and fungus-like protists, based on their characteristics. The course covers their life processes, including how they obtain food,



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	ecology, reproduction, physiology, and classification of each type of protist.
Examination forms	Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Reviewing relevant journals (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Norman D Levine. 1995. Protozoologi Veteriner. Gadjah Mada University Press.2. Hickman, C.P., Robert, L., dan Larson, A. 2001. Integrated Principles of Zoology. New York: The Mc Graw-Hill.3. Kavanagh, K. 2005. Fungi "Biology and Application. England: John Wiley & Sons, Ltd.4. Penuntun Praktikum Mikrobiologi Dasar. 2018. Jurusan Pendidikan Biologi. Laboratorium MIPA FITK. IAIN. Ambon.5. Bold, H.C. dan Wayne, M.J. 1985. Introduction to the Algae (Second edition). Englewood Cliffs: Prentice Hall, Inc.6. Graham, L., dan Wilcox, L. 2000. Algae. New York: Prentice-Hall Inc.7. Gupta. Algae.8. Miller, Harley. 2001. Zoology. Fifth edition: New York: The Mc Graw-Hill.9. Saptasari, M., Prasetyo, T.I., dan Mahanal, S. 2007. Botani Tumbuhan Bertalus Alga. Malang: Universitas Negeri Malang.10. Smith. Cryptogamic Botany (1,2), Freshwater Algae in The United State.



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Module Description

Title	Research Methodology
Code, if applicable	230702602W021
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Fatmawati Patang, M.Si. Dr. Dwi Susanto, M.Si.
Language	Indonesian
Relation to curriculum	This course is compulsory and is offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), and Collaborative Learning (CbL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation: 1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester. 1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students can explain the principles and ethics in research. 2. Students can formulate research problems and develop research hypotheses. 3. Students can explain various research methods. 4. Students can collect, process data, and interpret the results logically and systematically. 5. Students can prepare a research proposal and present it.



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Content	This course, students will learn about the principles and research methods used for their thesis or final project research. Students will study the definition of knowledge, science, philosophy, and ethics in research, identification, selection, and formulation of research problems; citation of references; formulation and presentation of hypotheses; designing data collection methods; collecting and analyzing data; writing research reports; and preparing research proposals.
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Cochran, G., W., (1977). Sampling techniques, third edition, New York: Jhon Willey & Sons. 2. Fowler, J., and Cohen, I., (1990), Practical Statistics for Field Biology, Buckingham: Open University Press. 3. Gomez, A. K. and Gomez, A.A., (Terjemahan), (1995). Prosedur Statistik untuk Penelitian Pertanian. Depok: Universitas Indonesia 4. Nazir, M., (1999) Metode Penelitian, Jakarta: Ghalia Indonesia. 5. Morrison, D. A. (1993), An Introduction to Experimental Design, Sydney: Departemen of Applied Biology- university of Technology Sydney.



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6. Steel, G., D., R., and Torrie, H. J., (1984), Principles and Procedures of Statistics, A Biometrical Approach, second edition Singapore: McGraw-Hill International Book Company
7. Sudjana, (1988), Disain dan Analisis Eksperimen, Bandung: Tarsito
8. Sugandi, (1988), Rancangan Percobaan, Yogyakarta: UGM-Press
9. Zar, H. J., (1984), Biostatistical Analysis, Second Edition, London: Prentice-Hall International Editions
10. Bowen, M. 2009. The Little Book of Plagiarism: What It Is and How to Avoid it.
<http://www.plagiarism.stir.ac.uk/> accessed on 20 April 2015.

06

Sixth Semester





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Module Description

Title	Community Service Program
Code, if applicable	MU0000603W007
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	The Field Supervisor from the LP2M (Lembaga Pengabdian kepada Masyarakat) of Mulawarman University
Language	Indonesian
Relation to curriculum	This course is mandatory and offered in the 6 th semester.
Teaching methods	Lecture, Discussion, Discovery Learning, Self-Directed Learning, and Small Group Discussion.
Workload	For this course, students are required to meet a minimum of 158 hours in one semester, which consists of: <ul style="list-style-type: none">- Community Engagement and Observation,- Report Writing and Documentation,- Group Meetings/Discussions.
Credit points	4 credit points (equivalent to 6,4 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>After completing this course, students will be able to:</p> <ol style="list-style-type: none"> 1. Carry out community service activities under the Kuliah Kerja Nyata (KKN) program by applying the theories learned during their studies on campus to real-life situations in the community. 2. Adapt the knowledge gained on campus to assist the community in solving existing problems and creating breakthroughs to address issues within the community.



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	<ol style="list-style-type: none">3. Collaborate with fellow students from different faculties at Universitas Mulawarman during KKN, actively solving programs tailored to the community's needs based on identified local issues.
Content	This course covers the key topics students must master before participating in the KKN (Kuliah Kerja Nyata) activities with community partners. The material provided aligns with the student's field of study. It will be delivered during the preparatory phase of the program, focusing on competencies to address various community issues in the KKN partner area. Students are also expected to collaborate with other departments to develop multidisciplinary programs to solve community problems.
Examination forms	Activity Assessment, Report, and Additional Outcomes
Study and examination requirements	<ol style="list-style-type: none">1. Activity Participation Assessment (35%)2. Final KKN Report (35%)3. Additional Outcomes (30%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	-

07

Seventh Semester





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Module Description

Title	Thesis
Code, if applicable	230702606W024
Semester(s) in which the module is taught	7 th - 8 th semester
Person responsible for the module	Academic Supervisor
Language	Indonesian
Relation to curriculum	This specialized course is a final requirement for obtaining a bachelor's degree and is offered in the 7 th - 8 th semester.
Teaching methods	Research, material presentation, discussion, question and answer.
Workload	For this course, students are required to meet a minimum of 239 hours in one semester, which consists of: <ul style="list-style-type: none">- 300 minutes for lectures,- 360 minutes for structural activities,- 360 minutes for individual study.
Credit points	6 credit points (equivalent to 9,6 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students will be able to identify and formulate research problems in biology critically and systematically based on relevant scientific literature. 2. Students can design and conduct biological research using appropriate scientific methods, including data collection, analysis, and accurate interpretation. 3. Students can write a thesis report in the form of a scientific paper that adheres to scientific writing standards and effectively presents their research findings. 4. Students will be able to evaluate and provide solutions to problems encountered during the research process, considering ethical aspects, sustainability, and the relevance to advancing biological science.
Content	This course focuses on writing and composing an independent scientific paper as a final bachelor's degree requirement.
Examination forms	Presentation and Final Defense



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Study and examination requirements	<ol style="list-style-type: none">1. Proposal Seminar (20%)2. Research Results Seminar (40%)3. Final Defense (40%)
Media employed	-
Reading list	<ol style="list-style-type: none">1. Buku Pedoman Penyusunan Skripsi dan Tesis Fakultas Matematika dan Ilmu Pengetahuan Alam.

08

Electives Courses





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Module Description

Title	Animal domestication
Code, if applicable	230702603P075
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Lariman, M.Si. Drs. Sus Trimurti, MP.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Interactive learning (IL) and laboratory practice (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can apply conservation and management approaches for faunal biodiversity resources, emphasizing domestication practices within the tropical rainforest ecosystems of Kalimantan.
Content	<p>This course discusses knowledge on animal domestication, including theories of classification and their historical background, various taxonomic characteristics, the concept of species, an overview of nomenclature, the fundamentals and application of scientific naming, examples of domesticated animals, the benefits of domesticated animals, and the various types of animal domestication.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Practicum (20%) 2. Affective Assessment (10%) 3. Mid-Semester Examination (30%) 4. Final Examination (40%)



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Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Alikodra, S, Hadi. 1990. Pengelolaan Satwa Liar. Bogor. Departemen Pendidikan dan Kebudayaan Direktorat Jenderal Pendidikan Tinggi Pusat Antara Universitas Ilmu Hayati Institut Pertanian Bogor.2. Jamsari. 2007. Bioteknologi Pemula, Prinsip Dasar Teknik Analisis Molekuler. Unri-Press. 180 halaman.3. Jamsari, 2008. Pengantar Pemuliaan, Landasan Biologis, Genetis dan Molekuler. Unri Press.4. Lewin, B. 2000. Genes. Oxford-University Press. 990 pp.5. Watson, J.D., J. Tooze, D.T. Kurtz. 1983. Recombinant DNA, A short course. Scientific American Book. 260 pp.6. Marshall, G., D. Walters. 1994. Molecular Biology in Crop Protection. Chapman & Hall. 283 pp.7. Suzuki, D.T., A.J.F. Griffith, J. H. Miller, R.C. Lewontin. 1989. An Introduction to Genetic Analysis. W.H. Freeman and Company. 768 pp.8. Kempken, F and R. Kempken. 2000. Gentechnik bei Pflanzen. Springer-Verlag. Berlin. 245 pp.9. Nevers, P. 1991. Pflanzenzüchtung aus der Nähe gesehen. Max-Planck-Institut für Züchtungsforschung. 87 pp.10. Brown, T.A. 2007. Genomes 3. Garland Science Publishing.11. Clarck, D.P. 2005. Molecular Biology, Understanding the genetic revolution. Elsevier Academic Press. USA.



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Module Description

Title	Animal Reproductive Physiology
Code, if applicable	230702602P030
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Reni Kurniati, S.Si., M.Si. Dr. Retno Aryani, M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<ol style="list-style-type: none"> 1. Be devoted to God Almighty and demonstrate a religious attitude while participating in the endocrinology course. 2. Respect cultural diversity, perspectives, religions, beliefs, and the opinions or original findings of others during discussions on theories, concepts, principles, and basic procedures in the field of animal reproduction and development. 3. Apply logical, critical, systematic, and innovative thinking to master the material on animal reproduction and development. 4. Take responsibility for group work outcomes and supervise and evaluate practical assignments and experiments related to endocrinology. 5. Conduct self-evaluation of group performance and improve writing papers and practical reports in animal endocrinology.



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	<ol style="list-style-type: none"> 6. Have intrinsic motivation to keep up with developments in endocrinology by applying logical, critical, systematic, and innovative thinking through critical analysis of articles. 7. Be capable of producing written work, learning journals, analyzing articles, and creating preservation methods by utilizing available natural resources, relevant information, and communication technologies.
Content	This course provides knowledge, understanding, and insight into the scope of reproductive physiology in vertebrates and invertebrates. It explains the physiological processes related to reproduction and presents the application of reproductive physiology in society.
Examination forms	Practical sessions, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Coad, Jane. (2001). Anatomy and Physiology for midwives. Mosby, London 2. Fisiologi Ternak, Herwintono dan I.D. Rahayu, Fapetrik UMM 3. Life: The Science of Biology, 4th Edition, by Sinauer Associates and WH Freeman 4. Knobil, Ernst. Knobil and Neill's physiology of reproduction. Vol. 2. Gulf Professional Publishing, 2006. 5. Saladin, Kenneth S., and Leslie Miller. Anatomy & physiology. New York (NY): WCB/McGraw-Hill, 1998.



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Module Description

Title	Aquatic Animal Physiology
Code, if applicable	230702602P080
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Prof. Rudy Agung Nugroho, M.Si., Ph.D. Dr. Retno Aryani, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can conduct self-evaluation of group performance and make improvements in preparing papers and practicum reports on aquatic animal physiology. 2. Students can also produce academic work by writing papers, maintaining learning journals, and analyzing articles by utilizing available natural resources and relevant information and communication technologies.
Content	<p>This course discusses the physiology of aquatic animals, the importance of studying it, and its scope. Topics include sensory systems, cell-to-cell communication, osmoregulation, circulation, respiration, digestion, growth, reproduction, embryology, egg and larval development, environmental influences, and physiological responses.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.



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Study and examination requirements	<ol style="list-style-type: none">1. Reviewing relevant journals (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Val, A. L., and Randall, D. J. eds. (2005). <i>Fish physiology: the physiology of tropical fishes</i> (Vol. 21). Elsevier.2. Richards, J. G., Farrell, A. P., and Brauner, C. J. (Eds.). (2009). <i>Fish physiology: hypoxia</i> (Vol. 27). Academic Press.3. Baldisserotto, B. (Ed.). (2019). <i>Fish osmoregulation</i>. CRC Press.4. Shadwick, Robert E., and George V. Lauder, eds. <i>Fish physiology: fish biomechanics</i>. Vol. 23. Elsevier, 2006.5. Satchell, G.H. (1991). <i>Physiology and form of fish circulation</i>. Cambridge University Press.6. Conceicao, L., and Tandler, A. (Eds.). (2018). <i>Success Factors for Fish Larval Production</i>. John Wiley & Sons.7. Shadwick, R. E., Farrell, A. P., & Brauner, C. J. (Eds.). (2015). <i>Physiology of Elasmobranch Fishes: Internal Processes</i>. Academic Press.



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Module Description

Title	Aquatic Ecology
Code, if applicable	230702602P050
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Fatmawati Patang, M.Si. Dr. Nova Hariani, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester. One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Increased piety towards God Almighty through the study of various living organisms. 2. Students can understand and explain several ecological concepts in aquatic environments, emphasizing the totality of patterns of relationships between organisms and their marine environments. 3. Students can understand and explain the basic concepts of aquatic ecosystems, types of aquatic ecosystems, their biotic and abiotic components, the processes of interaction involved in aquatic ecosystems, the utilization of organisms in marine environmental management, and the use of aquatic habitats as aquaculture areas. 4. Students can master the basic concepts of Aquatic Ecology, including marine ecosystems, estuaries, rivers, and lakes. The interactions between abiotic factors (pH, temperature, turbidity, salinity, DO, COD, conductivity, etc.) and biotic factors (planktonic



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	<p>organisms, nekton, and benthos) within ecosystems enable students to understand and explain limiting factors, the impact of human activities, and environmental monitoring techniques.</p> <p>5. Students can make informed decisions based on information and data analysis, and can independently or collaboratively select various alternative solutions in Aquatic Ecology.</p>
Content	<p>This course covers marine ecosystems, estuaries, rivers, and lakes. It examines the interactions between abiotic factors (such as pH, temperature, turbidity, salinity, DO, COD, conductivity, etc.) and biotic factors (including planktonic organisms, nekton, and benthos) within ecosystems. The course is designed to help students understand and explain limiting factors, the impact of human activities, and environmental monitoring techniques.</p> <p>The course includes research methods, using aquatic habitats for aquaculture and environmental management, and conserving freshwater and marine resources. Ecological studies are accompanied by various process skills (minds-on activities and hands-on activities) that will be used to solve problems in ecology and its applications. The learning process is delivered through presentations, discussions, and direct field observations or practical work.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)



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Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Allan, J. D. 1995. <i>Stream Ecology</i>. Kluwer Academic Publ. Dordrecht, Boston, London.2. Barnes, R. S. K., and Mann, K. H. 1994. <i>Fundamentals of Aquatic Ecology</i>. Blackweel Scientific Publ. London.3. Dodds, W. K. 2002. <i>Freshwater Biology. Consept and Enviromental Applications</i>.4. Academic Press. San Diego California, USA5. Giller, P. S., and B. Malmqvist. 2003. <i>Biologi of Streams and River: Biologi of habitat</i>6. Oxford University Press. Great Britain.7. Goldman, C. R. and A. J. Horne. 1983. <i>Limnology</i>. International Student ed. McGraw Hill International Book Company. Singapore, Sydney, Tokyo.8. James, A. 1990. <i>Biological Indicators of Water Quality</i>. John Willey & Sons. New York.9. Kennish, M. J. 1991. <i>Ecology of Estuaries: Enthropogenic Effect</i>. CRC Press. Boca Raton Ann Arbor. London.10. Krebs, C J. 1989. <i>Ecological Methodology</i>. Harper Collins Publishers, New York.11. Krenkel, P A. 1990. <i>Water Quality Magement</i>. Academic Press. London.12. Nybakken, J W. 1991. <i>Biologi Laut</i>. Gramedia. Jakarta.13. Odum, E P. 1996. <i>Dasar Dasar Ekologi</i>. Gadjah Mada Univ. Press. Yogyakarta.14. Wetzel, R G. 1983. <i>Limnologi</i>. Saunders College Publ. London.



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Module Description

Title	Arthropods
Code, if applicable	23070260P051
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Nova Hariani, M.Si. Dr. Fatmawati Patang, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can understand the main characteristics of the Arthropod phylum. 2. Students can analyze the primary classification of Arthropoda. 3. Students can understand and explain the adaptations and evolutionary success strategies of Arthropoda. 4. Students can understand and identify arthropods in ecosystems and their role in human health. 5. Students can understand and identify arthropods based on morphology and taxonomy.
<p>Content</p>	<p>This course studies Arthropoda, focusing on their morphological characteristics, classification, adaptations, evolution, interactions in natural habitats, ecosystems, and their role in human health. The course also highlights the significant role of Arthropoda in biology and reproductive systems. It includes case studies on the distribution of</p>



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	Arthropoda as disease vectors and the impact of environmental changes on their populations.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Individual assignment (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Barnes, R. D. 1982. Invertebrate Zoology/Saunders College Publishing.2. Ruppert, E. E., R. S Fox, R. D. Barnes. 2004. Invertebrate Zoology: A fundamental evolutionary approach. Brooks Cole.3. Campbel, N. A., J. B Reece, L. A Urry. 2008. Biology. Benjamin Cummings.



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Module Description

Title	Benthic Biology
Code, if applicable	230702602P087
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Teaching Team
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can understand the basic concepts and principles of benthic ecology. 2. Students can identify benthic organisms based on morphology and taxonomy. 3. Students can understand the adaptation strategies of benthic organisms in terms of morphology and taxonomy. 4. Students can apply sampling methods and analyze benthic data.
<p>Content</p>	<p>This course explores the role of benthos in aquatic ecosystems, the potential of benthos for aquaculture, the history and development of benthic biology, and career opportunities in benthic biology. It also covers the habitat and communities of benthos in rivers, lakes, and oceans; the morphological, physiological, and behavioral adaptations of benthic fauna; feeding mechanisms and diet of benthic animals; benthic population dynamics;</p>



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	benthic research techniques; and the taxonomy of several benthic species.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective Assessment (10%) 2. Individual assignment (10%) 3. Practicum (20%) 4. Mid-Semester Examination (20%) 5. Final Examination (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none"> 1. Barnes, R. Sk., and R. N. Hughes. 1999. An introduction to marine ecology. Third ed. Blackwell Science. Ltd. Great Britain. 2. Giller, P. S., and B. Malmqvist. 2003. Biology of streams and river: biology of habitat. Oxford University Press. Great Britain. 3. Rossano, E. M. 1966. Diagnosis of stream environmental with IBI-J (in Japanese and English). Museum of stream and lake. Sankaido Publisher, Tokyo, Japan. 4. Rosenberg, D. M., and V. H Resh. 1993. Freshwater biomonitoring and benthic macroinvertebrates. Chapman & Hall. New York. London. 5. William, D. D. and B. W Felmate. 1982. Aquatic Insect. C.A.B. International Reddwood Press Ltd. Milksham.



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Module Description

Title	Biogeography
Code, if applicable	230702602P057
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Linda oktavianingsih, M.Si Dr. Dijan Sunar Rukmi, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation / Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Students can explain the basic concepts of plant and animal geography, ecological factors and the distribution of vegetation and animals, the spatial distribution of vegetation and animal regions, types of plant communities, biological resources and their distribution, as well as the dynamics of plant and animal communities on the Earth's surface and their benefits.



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Content	<p>The Biogeography course examines the geographic distribution of species and various ecosystems over geological time. It covers concepts and information related to ecology, evolutionary biology, geology, and geography. Biogeographical research integrates diverse disciplines, including physiology, ecology, organismal distribution, and climatological phenomena, applied at geological and evolutionary scales.</p> <p>A significant portion of this course emphasizes practical activities in the laboratory, including hands-on dissections to observe topographic and morphological differences macroscopically and microscopically. By the end of the course, students are expected to actively develop their competencies by exploring how natural and artificial life forms—both plant and animal species—are distributed across space and time, and by analyzing their interrelationships with humans.</p>
Examination forms	Practical sessions, Individual assignment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Practicum (20%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)



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Reading list

1. Nicholas Polunin, 1990. *Pengantar Geografi Tumbuhan dan Beberapa Ilmu Serumpun*. Yogyakarta : UGM Press.
2. Loveles, A.R. 1989. *Prinsip - prinsip Biologi Tumbuhan untuk Daerah Tropis II*. Jakarta : Gramedia
3. Dirjen Kehutanan. 1976 *Pedoman Infentarisasi Flora dan Ekosistem* : Bogor
4. Mas'ud Yunus. 1984 & 1985. *Dasar-dasar Ilmu Kehutanan I 7 II*. Ujung Pandang : BKS Intim
5. Otto Soemarwota. 1987. *Ekologi Lingkungan dan Pembangunan*. Bandung : Djambatan
6. Hadi Kastowo. 1982. *Zoologi*. Bandung : Alurni
7. Brown, J.H. and A.C. Gibson, 1983, *Biogeography*, The CV Mosby Company London
8. Cox C.B. and P.D. Moore, 1993, *Biogeography An Ecologycal and Evolution*, Black Well Scientific Publiction
9. Huggett R.J., 1998, *Fundamentals of Biogeography*, Routledge, London
10. Pielou E.C., 1979, *Biogeography*, John Wiley & Sons, New York
11. Vander PIJL, 1990, *Azaz-azaz Pemencaran Tumbuhan Tinggi*, Gama Press



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Module Description

Title	Bioinformatics
Code, if applicable	230702602P062
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Rudy Agung Nugroho, M.Si., Ph.D Imam Rosadi, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), and Interactive Learning (IL).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing this course, students will be familiar with bioinformatics in various biodiversity-related fields, including food, animal, plant physiology, and microbiology. They will also master bioinformatics techniques relevant to these fields and gain proficiency in applying these techniques in research.
Content	This elective course covers bioinformatics and its applications in biology and related fields, particularly in Biodiversity, food, microbiology, animal and plant physiology, and biotechnology.
Examination forms	Field Practice, Individual assessment, Mid-term exam, and Final exam



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Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Axevanis, Andreas D., and BF Francis Ouellette. Bioinformatics: a practical guide to the analysis of genes and proteins. Vol. 43. John Wiley & Sons, 2004.2. Orengo, Christine, David T. Jones, and Janet M. Thornton. Bioinformatics: genes, proteins and computers. Garland Science, 2003.3. Marshall, Christina. "Textbook of Computational Biology and Bioinformatics." (2016).4. Keerthikumar, Shivakumar. "An Introduction to Proteome Bioinformatics." Proteome Bioinformatics. Humana Press, New York, NY, 2017. 1-3.5. Shaik NA, Hakeem KR, Banaganapalli B. "Essentials of Bioinformatics, Volume I" Springer Nature Switzerland AG, Switzerland, 20196. Sofi MY, Shari A, Masoodi KZ. :Bioinformatics for Everyone." Academic Press, Elsevier, UK, 20217. Agostino M. "Practical Bioinformatics." Garland Science Taylor & Francis Group, US, 2013



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| | 8. Claverie JM, Notredame C. "Bioinformatics for Dummies Second Edition." Wiley Publishing, Canada, 2007 |
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Module Description

Title	Biological Pest Control
Code, if applicable	230702602P054
Semester(s) in which the module is taught	3 th semester
Person responsible for the module	Dr. Fatmawati Patang, M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and is offered in the 3 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), Field Observation / Field Practice (FO), and Case-based learning (CBL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS)



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	<p>Details:</p> <p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<ol style="list-style-type: none">1. Upon completing this course, students can explain the history and scope of biological control.2. Upon completing this course, students will be able to describe the role of biological control in managing plant pathogens.3. Upon completing this course, students can explain the mechanisms of direct antagonism.



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4. Upon completing this course, students can explain the mechanisms of indirect antagonism.
5. Upon completing this course, students will be able to understand the concept and process of biological agent exploration.
6. Upon completing this course, students can describe examples of biological control agents.
7. Upon completing this course, students can describe examples of biological control agents. (*Note: Duplicate of point 6; may need to be revised*)
8. Upon completing this course, students can explain the scope of biological control in managing plant pests.
9. Upon completing this course, students can explain the history of biological control of plant pests.
10. Upon completing this course, students can describe the ecological basis of biological control of plant pests.
11. Students can explain parasitoids' biology and host relationships after completing this course.
12. Upon completing this course, students can explain the biology and impact of predators.
13. Upon completing this course, students can explain insect pathology in biological control.



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	<p>14. Upon completing this course, students can describe application methods and the evaluation of biological control.</p> <p>15. Upon completing this course, students will be able to explain the role of biological control in Integrated Pest Management (IPM).</p>
Content	<p>Biological control is an applied aspect of ecology, and therefore requires an ecological way of thinking. Students learn to understand ecosystem theory and stability, and actively apply various methods to maintain or restore that stability. This course includes manipulating the population size of ecosystem components and their habitats. Furthermore, the practices involved in biological control are key issues that students must master, particularly identifying the right time, conditions, and contexts in which specific control actions should be taken.</p>
Examination forms	<p>Practical sessions, Individual assignment, Mid-term exam, and Final exam</p>
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)</p>



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Reading list

1. Barbosa P (ed). 1998. Conservation Biological Control. San Diago. Academic Press.
2. Bellows TS, Fisher TW (ed). 1999. Hand Book of Biological Control: Principles and application of biological control. Tokyo. Academic Press.
3. Borror, D.J. and Dwight, M.D. 1965. 1965. An Introduction to The Study of Insecs. Rihart and Company, New York
4. Campbell, R. 1989. biological control of microbial plant pathogens. Cambridge Univ. Press. Cambridge- New York-Port Chester-Melbourne- Sydney.
5. Elzibga, Ricard, J., Fundamebtal of Entomology. Prentice hall of India Private Limited. New Delhi
6. Huffaker CB, Messenger PS (ed). 1976. Theory and Practice of Biological Control. London: Academic Press
7. Kalshoven, L.G.E. (1981). *The Pest of Crops in Indonesia*. Jakarta : PT Ichtiar Baru-VanHoeve
8. Untung, K. (1992). Poengendalian Hama Terpadu. UGM Press
9. Norris RF, Caswell-Chen EP, Kogan M. 2003. Conseptis in Integrated Pest Management. New Jersey. Prentice Hall.
10. Pracaya, (1991). *Hama dan Penyakit Tanaman*. Jakarta: Penerbit Swadaya.



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| | <ol style="list-style-type: none">11. Pedigo, L.P. (1991). <i>Entomology and Pest Management</i>. New York: Mac-Milan Publishing Company.12. Solomon, M. (1976). <i>Population Dynamics</i>. The Institute of Biology's Studies in Biology no. 18. ., London: Edward Arnold (Publishers) Ltd. |
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Module Description

Title	Biomedical Science
Code, if applicable	230702602P049
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Prof. Rudy Agung Nugroho, M.Si., Ph.D. Dr. Retno Aryani, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can contribute to community life based on religious values, Pancasila, and ethics by demonstrating responsibility, discipline, effective communication, and the ability to work independently and in teams (CPL1/S1/PLO1). 2. Students can apply logical, critical, systematic, and innovative thinking in developing or implementing science and technology relevant to their field, while considering environmental sustainability (CPL2/KU2/PLO2). 3. Students can identify biodiversity-related problems in wet tropical forests and their environments, and present alternative solutions by applying integrated biological knowledge using scientific methods and relevant technologies (CPL4/KS1/PLO4).



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	4. Students can master the principles of biological science and fundamental science comprehensively, keeping up with developments in modern biology (CPL6/P1/PLO6).
Content	This course explores molecular biology, the relationship between nutrients and genes, and their connection to current biomedical science research using animal models.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none"> 1. Lock, M., & Gordon, D. (Eds.). (2012). <i>Biomedicine examined</i> (Vol. 13). Springer Science & Business Media. 2. Deisboeck, T., & Kresh, J. Y. (Eds.). (2007). <i>Complex systems science in biomedicine</i>. Springer Science & Business Media. 3. Burri, R. V., & Dumit, J. (Eds.). (2007). <i>Biomedicine as culture: instrumental practices, technoscientific knowledge, and new modes of life</i> (Vol. 6). Routledge. 4. Liu, E. T., & Lauffenburger, D. A. (Eds.). (2009). <i>Systems biomedicine: concepts and perspectives</i>. Academic press. 5. Kalitzkus, V., & Twohig, P. (Eds.). (2006). <i>Bordering biomedicine</i> (Vol. 29). Rodopi. 6. Möller, D. P. (Ed.). (1990). <i>Advanced simulation in biomedicine</i>. Springer-Verlag. 7. Lin, C. (Ed.). (2012). <i>Biomedicine</i>. BoD–Books on Demand.



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Module Description

Title	Bioremediation
Code, if applicable	230702602P040
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Hetty Manurung, S.Si., M.Si. Muhammad Fauzi Arif, S.Si., M.Sc.
Language	Indonesian
Relation to curriculum	This course is elective and is offered in the 7 th semester.
Teaching methods	Problem-Based Learning (PBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), Field Observation / Field Practice (FO) and Case-based learning (CBL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS)



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	<p>Details:</p> <p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing this course, students will be able to understand the principles and applications of bioremediation, identify target compounds for bioremediation and explain the microbial mechanisms involved in their degradation, and recognize environmental factors that influence the effectiveness of bioremediation. Students will also be able to design and demonstrate a bioremediation project work plan and apply bioremediation</p>



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	<p>approaches to address pollution issues in coastal and marine environments, surface water, groundwater, and soil. Furthermore, students can evaluate the advantages and limitations of various bioremediation technologies, understand relevant environmental laws and regulations, and develop scientific writing and presentation skills by preparing and delivering a scientific article on bioremediation.</p>
Content	<p>This course the principles and concepts of bioremediation and biodegradation, the mechanisms of pollutant biodegradation for bioremediation purposes, and the various factors influencing these processes. It also covers target compounds for bioremediation, types and methods of bioremediation, bioremediation project work plan development, environmental laws and regulations related to bioremediation, and monitoring programs designed to evaluate the effectiveness of bioremediation efforts.</p>
Examination forms	<p>Practical sessions, Individual assignment, Mid-term exam, and Final exam.</p>
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Practicum (20%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)</p>



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Reading list

1. King, R. B., M. Long and J.K. Sheldon, 1992, Environmental Bioremediation, LewisPublisher, London.
2. Sheehan, D. 1997. Bioremediation Protocols. Humania Press. Totowa. New Jersey.
3. Eweis, J.B., Ergas, S.J., Chang, D.P.Y. and Schroeder, E.D. (1998) "Bioremediation Principles", McGraw-Hill
4. Cookson JR, J.T (1995) "Bioremediation Engineering", McGraw-Hill, Inc.
5. Committee on In Situ Bioremediation, Water Science and Technology Board, Commission on Engineering and Technical Systems, and National Research Council (1993) "In Situ Bioremediation" National Academy Press, Washington, USA.
6. International Journals of: Applied and Environmental Microbiology, Environmental Science and Technology, Bioresource Technology, Environment International, Marine & Pollution Bulletin, Marine Environmental Research, International Biodeterioration & Biodegradation



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Module Description

Title	Cell Genetics
Code, if applicable	230702602P083
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Muhammad Fauzi Arif, M.Sc.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Student Centered Learning (SCL), Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can comprehensively analyze problems based on cell genetics knowledge and its applications.
<p>Content</p>	<p>This course provides foundational knowledge and understanding of Mathematics, Statistics, Physics, Chemistry, Genetics, and Biotechnology as applied to biological systems. Topics include basic concepts, principles, and theories related to the structure, function, engineering, diversity, reproduction, and evolution of living systems. The course also addresses the role of biologists in society at large and within the scientific community, along with their professional responsibilities and scientific ethics concerning the societal impacts of scientific advances in biology.</p> <p>Additionally, the course develops Intellectual Skills, including the ability to analyze and solve problems, design activities in the field of biology, integrate and evaluate</p>



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	information and data from various sources, and Practical Skills, such as utilizing scientific literature, maintaining adequate documentation, and preparing and presenting scientific technical reports.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Individual assignment (20%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Booker, R. J. 2015. Genetics Analysis & Principles. Mc. Graw Hill.2. Russell, P. J. 2014. Genetics: A Molecular Approach. Pearson.3. Karp, G. 2014. Cell Biology. Wiley.4. Waddington, C.H. 2016. An Introduction to Modern Genetics. Routledge.5. Campbell, N.A., L.G. Mitchell, and J.B. Reece. 2006. Biology. Concept and Connection. The Benjamin Cummings Publ.Co.Inc., California (USA).



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Module Description

Title	Dendrology
Code, if applicable	230702603P060
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Dwi Susanto, M.Si Dr. Medi Hendra, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Interactive Learning (IL), Laboratory Work (LW), and Field Observation or Field Practice (FO)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing the Ornithology course, students will understand the concepts of bird diversity and biology (including morphology, anatomy, physiology, reproduction, behavior, and distribution), and recognize their importance to humans based on observations in the laboratory and surrounding environment. Students will also be able to communicate their findings in writing and orally.



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Content	This course covers the concepts of biodiversity, biology, and ecology of birds (members of Aves). It also discusses the benefits of birds for life and the methods used in bird research. The material is delivered using a student-centered approach, with practical activities and assignments as research projects.
Examination forms	Field Practice, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Lawrence, G. H. 1991. Taxonomy of Vascular Plat. MacMillan Publishing Co, Inc. New York.2. Tjitrosoepomo, G. 1991. Taksonomi Tumbuhan (Spermatophyta). Gajah Mada University Press. Yogyakarta.3. Tjitrosoepomo, G. 1985. Morfologi Tumbuhan. Gajah Mada University Press. Yogyakarta4. Samingan, T. 1985. Dendrologi. Gramedia. Jakarta.5. Keng, H. 1978. Orders and Families of Malayan Seed Plant. Singapore University Press. Singapore.6. Anonim. 2008. Statistik Kehutanan Indonesia. Departemen Kehutanan Republik Indonesia.



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| | <ol style="list-style-type: none">7. Arif, A.2001. Hutan dan Kehutanan. Penerbit Kanisius. Yogyakarta.8. Jurnal dan prosiding terkait Jurnal, prosiding yang terkait. |
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Module Description

Title	Dipterocarp Biology
Code, if applicable	230702603P033
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Medi Hendra, S.Si., M.Si. Dr. Dwi Susanto, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing the elective course in Dipterocarp Biology, students will be able to explain the general characteristics and systematics of dipterocarps, their distribution and ecological spread, cultivation and silviculture practices, potential uses, and conservation efforts for the Dipterocarpaceae family. Students will also gain proficiency in applying instruments related to the study of dipterocarp biology, while considering the principles of biodiversity conservation in tropical rainforest ecosystems and their environments.</p>



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Content	This elective course covers the general characteristics, systematics, reproduction and flowering, distribution and ecological spread, cultivation and silviculture, potential uses, and conservation issues related to the species of trees in the Dipterocarpaceae family.
Examination forms	Practical sessions, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (20%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Newman, M.F., P.F. Burgess & T.C. Whitmore. 1999. Pedoman Identifikasi Pohon-pohon Dipterocarpaceae di Pulau Sumatera. PROSEA Indonesia. Bogor 2. Newman, M.F., P.F. Burgess & T.C. Whitmore. 1999. Pedoman Identifikasi Pohon-pohon Dipterocarpaceae di Pulau Jawa Sampai Nugini. PROSEA Indonesia. Bogor 3. Newman, M.F., P.F. Burgess & T.C. Whitmore. 1999. Pedoman Identifikasi Pohon-pohon Dipterocarpaceae di Pulau Kalimantan. PROSEA Indonesia. Bogor 4. Sutisna U., T. Kalima & Purnadjaja. 1998. Pedoman Pengenalan Hutan di Indonesia. Yayasan PROSEA, Bogor 5. Soerianegara, I & Lemmens RHMJ. (Eds.) 1994. Plant Resources of South-East Asia. No 5 (1) Timber Trees: Major Commercial Timbers. PROSEA, Bogor. 6. Dayanandan, S., Ashton, P.S., Williams, S.M. & Primack, R.B. 1999. Phylogeny of the tropical tree family Dipterocarpaceae based on nucleotide sequences of the chloroplast <i>rbcl</i> gene. American



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Journal of Botany 86(8): 1182–1190. Full text PDF reference page

7. Ducouso, M., Béna, G., Bourgeois, C., Buyck, B., Eyssartier, G., Vincelette, M., Rabevohitra, R., Randrihasipara, L., Dreyfus, B. & Prin, Y. 2004. The last common ancestor of Sarcolaenaceae and Asian dipterocarp trees was ectomycorrhizal before the India-Madagascar separation, about 88 million years ago. *Molecular Ecology* 13(1): 231–236. doi: 10.1046/j.1365-294X.2003.02032.x Full text PDF from ResearchGate reference page
8. Sosef, M.S.M. 2010. *Trillesanthus*, a validly published name to replace the African genus *Marquesia* (Dipterocarpaceae). *Blumea-Biodiversity, Evolution and Biogeography of Plants* 55(1): 88–90. doi: 10.3767/000651910X499286
9. Tropicos.org 2015. Dipterocarpaceae Published on the internet. Accessed: 2015 Feb. 5.



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Module Description

Title	Ecology of Wet Tropical Forest Restoration
Code, if applicable	230702602P043
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Medi Hendra, M. Si. Dr. Syafrizal, M.P.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 5 th semester.
Teaching methods	Problem-Based Learning (PBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can understand ecosystem restoration, the concept of restoration ecology and its subfields, analyze the differences between restoration, rehabilitation, reclamation, and revegetation, and recognize the basic ecological principles in restoring degraded ecosystems. 2. Students can apply various restoration methods in post-mining sites and other degraded lands.
<p>Content</p>	<p>This course discusses the basic concepts and the urgency of plant ecology, the influence of biotic and abiotic environmental factors on plant populations, plant community structure, the dynamics of plant community structure, the role of plant communities in terrestrial and aquatic ecosystems in responding to environmental pollution and climate change, as well as the interrelationship between plant communities, culture, and landscape diversity.</p>



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Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Practicum (20%)3. Mid-term exam (15%)4. Final exam (25%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Jordan, W. R, M.R.Gilpin, & J.B.Abat. 1986. Restoration Ecology: Synthetic approach to ecological research2. Young, T. P, D.A.Peterson, & J.J.Clary. 2005. The Ecology of Restoration: historical links, emerging issue & unexplored realms. Ecology Letters 8: 662-6733. Young, T. P. 2000. Restoration & Conservation Biological Conservation 92: 72-83.



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Module Description

Title	Endocrinology
Code, if applicable	07025370
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Rudy Agung Nugroho, M.Si., Ph.D Imam Rosadi, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing this course, students can self-evaluate group performance and improve in preparing papers and practical reports in endocrinology. They will also be capable of producing academic work by organizing documents, learning journals, and analyzing articles, utilizing available natural resources and relevant information, and communication technologies.</p>



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Content	Endocrinology is the study of the function of endocrine glands, focusing on the properties and mechanisms of action of various endocrine glands that regulate the body of both animals and humans. This course covers the properties and functioning of the endocrine system and the interaction between different endocrine glands. Additionally, the course discusses the basic principles of endocrinology, including: the structure and morphology of hormone-producing organs; classification of hormones; hormone synthesis, metabolism, and transport; molecular mechanisms of hormone action and hormone-receptor interactions; physiology of hormones; and the explanation of various disorders related to the function of endocrine glands, such as growth disorders caused by hormonal influences.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Reviewing relevant journal articles (10%)2. Practicum (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)



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Reading list

1. Melmed, Shlomo. Williams textbook of endocrinology. Elsevier Health Sciences, 2016
2. Nugroho, R. A., 2016. Dasar-dasar Endokrinologi. Mulawarman Press, Samarinda
3. Felig, Philip, and Lawrence A. Frohman. *Endocrinology & metabolism*. McGraw-Hill Professional, 2001.
4. Norris, David O., and James A. Carr. Vertebrate endocrinology. Academic Press, 2013.



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Module Description

Title	Entomology
Code, if applicable	210702602P026
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Nova Hariani, M.Si. Drs. Sus Trimurti, MP.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing the Entomology course, students will be able to understand the definition of entomology and its supporting aspects. They will develop an understanding of the benefits and various services provided by insects. They will be able to apply their knowledge of insects, their functions, and roles in the tropical rainforest areas of Kalimantan Island.</p>



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Content	The course covers the principles of taxonomy and nomenclature and their application to insects (Insecta). Students will learn about the characteristics, properties, and relationships of the most crucial insect groups, their position within the taxonomic hierarchy, their life cycles, distribution areas, and their significance to humans, with examples of selected species.
Examination forms	Practical sessions, Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Borror, D.J., C. A. Triplehorn and N. F. Johnson. 1992. Pengenalan Serangga, ed. 6. Terjemahan drh. Soetiyono Partosoejono MSc. Gajah Mada Univ. Press. 2. Borror, D.J. and R. E. White. 1987. A Field Guide to the Insects. National Audubon and National Wildlife Federation USA. 3. Comstock, J. H. 1959. An Introduction to Entomology, Ninth Edition. Comstock Pub. Company, Inc. Ithaca, New York. 4. Imms A. D. 1964. A General Textbook of Entomology. Chapman and Hall LTD. London. 5. Kerkut GA, Gilbert LI. 1985. Comprehensive Insect Physiology Biochemistry and Farmacology. Oxford. Pergamon Press. 6. Wigglesworth VB. 1972. The Principle of Insect Physiology (7th eds). Chapman and Hall.



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7. Gullan, P. J and P. S Cranston. 2010. The Insect. An Outline of Entomology. Wiley-Blackwell. A John Wiley & Sons, Ltd. MEDIA
8. Hariani, N. dan F. Patang. 2017. Entomologi. Petunjuk Praktikum. Jurusan Biologi, FMIPA-UNMUL.
9. Budiman, Nurmiati, Hariani, N. 2015. Diversitas Serangga Permukaan Tanah Pada Lokasi Budidaya Padi Sasak Jalan Di Loa Duri Kabupaten Kutai Kartanegara. Jurnal Bioprospek.
10. Hariani, N., Ahmad, I dan Rahayu., R.2011. Efisiensi Makan Spodoptera exigua (Lepidoptera: Noctuidae) pada Bawang Daun, Sawi Hijau dan Seledri di Laboratorium. Jurnal Natur Indonesia 14(1).
11. Nisita, RA. Hariani,N. dan Trimurti, S. Keanekaragaman odonata di kawasan bendungan lempake, sungai karang mumus dan sungai berambai samarinda. Jurnal Pendidikan, Biologi dan Terapan. 5 (2). Hal. 123-141.



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Module Description

Title	Environmental Impact Analysis
Code, if applicable	230702602P025
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Syafrizal, MP.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 7 th semester
Teaching methods	Problem-Based Learning (PBL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study
Credit points	2 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <ol style="list-style-type: none"> 1. Students can explain the concept of Environmental Impact Analysis, its role in development, the legal basis of Environmental Impact Analysis, its characteristics, screening and scoping procedures, methods for identifying significant impacts, forecasting and evaluating impacts, preparing Terms of Reference documents, conducting environmental impact analysis, and understanding RKL (Environmental Management Plan) and RPL (Environmental Monitoring Plan). 2. Students can develop the potential of tropical forest resources for sustainable use. 3. Students can identify species, evaluate conditions, and estimate the potential of biodiversity resources. 4. Students can apply knowledge and technology in practice.



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	5. Students demonstrate independence in applying science and technology in tropical rainforest biodiversity conservation to support sustainable use.
Content	This course covers the basic concepts and uses of Environmental Impact Analysis, regulations related to Environmental Impact Analysis, types of Environmental Impact Analysis documents, stages of document preparation, methodologies for data collection and analysis of environmental components, methods for forecasting impact magnitude, methods for evaluating significant impacts, environmental quality standards for physical and chemical elements, preparation of Andal documents, Environmental Management Plans (RKL), and Environmental Monitoring Plans (RPL)
Examination forms	Individual assignment, Practical sessions, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignment (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Suratmo, F.G. 2004. Analisis Mengenai Dampak Lingkungan. Gajah Mada University Press. Yogyakarta. 2. Fandeli. Chafid. 2001. Analisis Mengenai Dampak Lingkungan, Prinsip Dasar dan Pemapannya Dalam Pembangunan. Penerbit Liberty. Yogyakarta. 3. Keputusan Menteri Negara Lingkungan Hidup Nomor 11 Tahun 2006, tentang Pedoman Penyusunan AMDAL.



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4. Kementerian Lingkungan Hidup, Peraturan Perundang-undangan, Jilid I, (Peraturan Pemerintah RI No. 27 Tahun 1999).
5. Larry W Canteer, Environmental Impact Assessment, Mc Graw Hill.
6. Peraturan Pemerintah Republik Indonesia Nomor 41 Tahun 1999, tentang Pengendalian Pencemaran Udara.
7. Lampiran Keputusan Kepala Badan Pengendalian Dampak Lingkungan Nomor: Kep-56 Tahun 1994 tentang Pedoman Mengenai Ukuran Dampak Penting.
8. Kepala Badan Pengendalian Dampak Lingkungan, Nomor: 09 Tahun 2000 tentang Pedoman Penyusunan Analisis Mengenai Dampak Lingkungan Hidup, Kepala Badan Pengendalian Dampak Lingkungan.
9. Peraturan Pemerintah Republik Indonesia, Nomor 27 tahun 1999, tentang Analisis Mengenai Dampak Lingkungan Hidup.
10. Undang-Undang Nomor 23 tahun 1997 tentang Pengelolaan Lingkungan Hidup (UUPLH)
11. Lampiran Keputusan Kepala Badan Pengendalian Dampak Lingkungan Nomor: Kep-56 Tahun 1994 tentang Pedoman Mengenai Ukuran Dampak Penting.
12. Canter, L.W., 1977. Environmental Impact Assessment. Mc Graw Hill Book Company. New York.
13. United Nations Environment Programme, 1988. Environmental Impact Assessment. Basic Procedures for Developing Countries. Regional Office for Asia and The Pacific.
14. Chapman. D.H., And Pratt, F.P., 1961 Method analysis for Soil, Plants and Waters. Division of Agricultural Sciences University of California.



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15. Canter, L.W., and Hill, L.G., 1979. Handbook of Variables for Environmental Impact Assessment. Ann Arbor Sciences Publisher Inc. Michigan.
16. Canter, L.W., 1982. Environmental Impact Assessment Mc Graw Hill Book Company. New York.
17. Colinvaux, P., 1986, Ecology. John Wiley and Sons, Inc. New York.
18. Dombos, D.M. dan Ellenberg, E.H. 1974. Aims And Methods of Vegetation Ecology. John Wiley and Sons Publisher, International Edition. New York.
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20. Munn, R.E., 1979. Environmental Impact Assessment Principles And Procedure. John Wiley and Sons. Chichester.
21. Tanjung, S.D., 1989 Pengamatan Terhadap Flora Dan Fauna. Kursus Lanjutan AMDAL.
22. Cheremisinoff, P.N., and Mozessi, A.C., 1980. Environmental Assessment and Impact Statement. Handbook. Ann Arbor Science. Publisher Inc/The Butterworth Group. Michigan.
23. Diuinker, P.N., and Beanlands, G.E., 1983. Ecology And Environmental Impact Assessment. An Annotated Bibliography. Institute For Resources and Environmental Studies. Dalhousie University.
24. Soemarwoto, O., 1989. Analisis Dampak Lingkungan. Gajah Mada University Press. Yogyakarta.
25. Jain, L.K., Urban, L.V., dan Stanceys, G.S., 1981. Environmental Impact Analysis. A New Dimension in Decision Making. Second Edition. Van Nastrand Reinhold environmental engineering series.



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Module Description

Title	Environmental Microbiology
Code, if applicable	07025364
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Ervinda Yuliatin, S.Si., M.Si Dr. Samsurianto, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Field Observation or Field Practice (FO), Problem-Based Learning (PBL), Project-Based Learning (PjBL), and Laboratory Work (LW), .
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing the Environmental Microbiology course, students are expected to understand the basic concepts of Environmental Microbiology, its environment, and its role in addressing environmental issues. Students should be able to describe the biogeochemical cycles in nature, which play a crucial role in maintaining ecological balance. They will understand microbes' characteristics, roles, and habitats in soil, air, water, and other extreme environments. Additionally, students will be able to explain how microbes</p>



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	act on various sources of pollutants, understand microbial diversity and interactions in natural ecosystems, and recognize their role as water quality indicators.
Content	This is an elective course that covers the basic concepts of Environmental Microbiology and its history, biogeochemical cycles in the environment, microbes in terrestrial environments (soil), microbes in the air (aeromicrobiology), microbes in aquatic environments, microbes in extreme environments, microbes in pollution sources, microbial diversity and interactions in natural ecosystems, microbes as indicators of water quality, field lectures (upstream-downstream clean water management in Samarinda City), case studies on solving wastewater pollution control problems, and heavy metal remediation in soil, as well as a project on the potential of <i>Bacillus</i> spp. in remediating polluted soil and water.
Examination forms	Field Practice, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Willey, J.M., L.M. Sherwood, C.J. Woolverton. 2008. <i>Microbiology, Seventh Edition</i>. New York: McGraw-Gill.



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2. Saxena, S. 2015. *Applied Microbiology*. India: Springer.
3. Pepper, I.L., C.P. Gerba, and T.J. Gentry. 2015. *Environmental Microbiology, Third Edition*. USA: Elsevier
4. Pepper, I.L., and C.P. Gebra. 2005. *Environmental Microbiology: A Laboratory Manual, Second Edition*. USA: Elsevier
5. McKinney, R.E. 2004. *Environmental Pollution Control Microbiology*. USA: Taylor & Francis Group, LLC
6. Suharjono & E. Yuliatin. Bacteria Communities of Coffee Plant Rhizosphere and Their Potency as Plant-Growth Promoting. *Biodiversitas*. DOI: 10.13057/biodiv/d231136



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Module Description

Title	Enzyme Biotechnology
Code, if applicable	230702603P068
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr.rer.nat. Bodhi Dharma, S.Si., M.Si Rudy Agung Nugroho, M.Si., Ph.D
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing this course, students will be familiar with enzymes, their biochemistry, enzyme immobilization methods, and their technological applications in various fields of life sciences, including food science and organism physiology. Students will master enzyme laboratory techniques and enzyme analysis methods, understand the concepts of biotechnology and microbial bioprospecting methods for enzyme production, and gain expertise in enzyme production optimization techniques. Additionally, students will understand and master genetic engineering</p>



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	and metabolic engineering methods to enhance industrial enzyme production by model microorganisms.
Content	This elective course covers enzyme biochemistry, enzyme immobilization methods, and enzyme technologies used in various biological fields, particularly biodiversity, biosensors, organism physiology, food science, medicine, and industry. The course also includes enzyme bioprospecting from organisms, especially microorganisms, as well as enzyme biotechnology and enzyme engineering to enhance the activity and quantity of enzymes produced through fermentation and in vivo processes.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journal articles (20%) 2. Practicum (10%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Kuswanto, K. R. "Teknologi Enzim." PAU Pangan dan Gizi, Universitas Gadjah Mada, Yogyakarta (1991). 2. Buchholz, K., and U.T. Bornscheuer. "Enzyme Technology: History and Current Trends," in <i>Applied Bioengineering: Innovations and Future Directions 5</i> (Tashiomi Yoshida ed.), (2017).



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3. Minteer, Shelley D. *Enzyme stabilization and immobilization*. Springer New York, (2017).
4. Wingard, Lemuel B., Ephraim Katchalski-Katzir, and Leon Goldstein, eds. *Immobilized enzyme principles: applied biochemistry and bioengineering*. Vol. 1. Elsevier, (2014).
5. Vandamme, Erick J., and José Luis Revuelta, eds. *Industrial Biotechnology of Vitamins, Biopigments, and Antioxidants*. John Wiley & Sons, (2016).
6. Maggio, Edward T. *Enzyme immunoassay*. CRC Press, (2018).
7. Crueger W. and A. Crueger. "Biotechnology: A Textbook of Industrial Microbiology." Science Tech. Inc. Madison. USA. (1993).
8. Gohel, V., Duan, G., and V. Maisuria. "Industrial Enzyme Applications in Biorefineries for Starchy Materials," in P. Shukla and B.I. Pletschke (eds.), *Advances in Enzyme Biotechnology*. Springer Asia, New Delhi., India. (2013).
9. Kawarabayasi, Y. "Improvement of Thermostable Enzyme with Sugar Metabolic Activity by Targeted Mutagenesis," in P. Shukla and B.I. Pletschke (eds.), *Advances in Enzyme Biotechnology*. Springer Asia, New Delhi., India. (2013).



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Module Description

Title	Ethnobiology
Code, if applicable	230702602P034
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Medi Hendra, S.Si., M.Si. Dr. Linda Oktavianingsih, M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Field Observation/Field Practice (FO)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing this course, students can explain, identify, and analyze the formation of sub-disciplines such as ethnobotany, ethnozoology, ethnoecology, ethnophysiology, and ethnofermentation related to local wisdom</p>



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Content	The Ethnobiology course is an elective that covers the introduction, definition, and history of ethnobiology, ethical codes, the subjects of ethnobiology, and the sub-disciplines of ethnobiology: ethnobotany, ethnozoology, and ethnoecology, as well as other sub-disciplines like ethnophysiology and ethnofermentation. The course discusses the traditional use of plant and animal species for food, health, cosmetics, clothing, shelter, household items, rope-making, weaving, dyes, ceremonial or ritual purposes, and safety.
Examination forms	Individual assignment, Practical sessions, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Assignment (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Azlan, J. M. 2003. The diversity and conservation of mustelids, viverrids and herpestids in a disturbed forest in Peninsular Malaysia. <i>Small Carnivore Conservation</i> 29:8-9. 2. Bruenig, E. 1996. Conservation management of tropical rainforest: an integrated approach to sustainability. CAB International, Wallingford, UK. 3. Cotton, C.M (1996) <i>Ethnobotany: principles and applications</i>. John Wiley. London. 4. Cunningham, A.B (2001) <i>Applied ethnobotany: people, wild plant use and conservation</i>. Earthscan. London 5. Dodson, Michael (2007). http://www.un.org/esa/socdev/unpfii/documents/6_se



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6. Fajar Bagus Ekanda Saputro. 2012. Pelestarian Kearifan Lokal Masyarakat Desa Pakraman Tenganan Pegringsingan Dalam Pengelolaan Hutan. PS Sosiologi Fakultas Sospol Universitas Jember.
 7. Fakhurrozi, Yulian
<http://repository.ipb.ac.id/handle/%2012345678> Date: 2011. Etnobiologi Masyarakat Adat Talang Mamak di Dusun Tua Datai Dalam Penggunaan Zona Pemanfaatan Tradisional Taman Nasional Bukit Tigapuluh
 8. Hill, F.A.1982. Economic botany. New York-Toronto-London: McGraw Hill Book Company Inc
 9. Iskandar J. Iskandar BS 2015. Studi Etnobotani Keanekaragaman tanaman pangan pada Sistem Huma Dalam Menunjang Keamanan Pangan Orang Baduy. Pros Sem Nas Masy Biodiv Indon, Volume 1 (6): 1265-1272
 10. Muthiah, Jadda; Setiawan, Nugroho Ari; Ernawati, Elis; Gustina, Irwani; Abdullah, Edi URI: <http://repository.ipb.ac.id/handle/123456789/20182> Date: 2009Kruszelnicki, Karl. Great Myth Conception (Mitos-mitos Besar yang Keliru). Sydney: HarperCollins Publishers, 2004.
 11. Simpson, B.B. & Ogorzaly, M.C.1986. Economic Botany Plants in Our World. New York: McGraw Hill Book Company Inc.
 12. Oktavianingsih, Linda., Suharyanto, E., Daryono, B. S., Purnomo. 2017. Traditional Usages of Taro (*Colocasia* spp.) by Ethnic Communities in Borneo. Journal Biosaintifika. Vol.9(2):248-256



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Module Description

Title	Ethology
Code, if applicable	230702603P070
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Drs. Sus Trimurti, M.P. Dijan Sunar Rukmi, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW) and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing this course, students will deeply understand core biology. They will be able to work independently or in teams for tasks they are responsible for, master information and communication technology, and apply logical, critical, systematic, and innovative thinking in the development or implementation of science and technology, while incorporating and applying humanistic values in the field of biology.



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	<p>Students will be capable of making informed decisions in problem-solving within the field of biology based on data and information analysis. They can apply biological knowledge to everyday life (biology and you/biology and everyday life).</p> <p>Furthermore, students will have a broad understanding of biology and the latest developments in biology (today's biology). They will be able to apply mathematical, scientific, and technological knowledge to solve problems they encounter.</p>
Content	<p>This course cognitively emphasizes the development of students' ability to observe animal behavior phenomena and analyze the causes of these phenomena, both proximally and ultimately. From an affective perspective, this course focuses on fostering attitudes and values in students after observing and analyzing animal behavior phenomena.</p>
Examination forms	<p>Practicum, Individual assessment, Mid-term exam, and Final exam</p>
Study and examination requirements	<ol style="list-style-type: none"> 1. Practicum (20%) 2. Affective assessment (10%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)</p>



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Reading list

1. Salomon, Eldar P., *et al.* 2008. *Biology 8th edition*. Thomson, Belmont.
2. Barnard, Chris. 2004. *Animal Behavior; Mechanism, Development, Function and Evolution*. England: Pearson Prentice Hall.
3. Manning, Aubrey. 1973. *An Introduction to Animal Behavior*. London: William Clowes & Sons.
4. Camhi, Jeffrey M. 2005. *Neuroethology*. Sunderland: Sinauer Associates Inc.
5. Marler P, Hamilton WJ. 1966. *Mechanisms of Animal Behavior*. New York: John Wiley & Sons Inc. Urquhart, G.M.; Armour, J.; Duncan, J.L.; Dunn, A.M.; Jennings, F.M. 2001. *Veterinary Parasitology*. Second Edition. Blackwell Publishing.
6. Walker, A (1994). *Arthropods of Humans and Domestic Animals*. Chapman & Hall



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Module Description

Title	Fieldwork Practice
Code, if applicable	230702602P029
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Fieldwork Supervisor
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Discovery learning, small group discussion, and self-directed learning.
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students will be able to identify and analyze environmental and biodiversity issues in the field through a scientific approach relevant to the biology discipline. 2. Students will be able to apply field research methods and appropriate sampling techniques in biological studies and process the collected data systematically and critically. 3. Students can collaborate effectively with interdisciplinary teams in field observations, research, and problem-solving activities in biology. 4. Students can write scientific reports and present fieldwork results, integrating theory and practice that support conservation, natural resource utilization, or sustainable environmental management.
Content	This course focuses on field studies conducted at companies, NGOs, government institutions, state-owned enterprises (BUMN), or partnerships with the Biology S1



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	program, concentrating on Environmental Science, Life Sciences, and other multidisciplinary fields.
Examination forms	Presentation
Study and examination requirements	<ol style="list-style-type: none">1. Attendance during fieldwork (35%)2. Scientific Paper (35%)3. Scientific Paper Presentation (30%)
Media employed	-
Reading list	<ol style="list-style-type: none">1. Prodi Biologi FMIPA UNMUL. 2023. <i>Buku Panduan PKL</i>.2. Fakultas MIPA Unmul. 2023. <i>Panduan Praktek Kerja Lapangan (PKL)</i>.



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Module Description

Title	Fish Reproductive Biology
Code, if applicable	230702603P072
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Jusmaldi, S.Si., M.Si Dr. Lariman, M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW) and Cooperative Learning (CpL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing the Fish Reproductive Biology course, students can implement fish resource management and conservation strategies, focusing on fish reproduction, particularly in the aquatic environments of the tropical rainforests of Kalimantan.</p>
<p>Content</p>	<p>This course introduces students to the study of fish reproductive biology, including fish sexuality, gonadal maturity stages, gonadal maturity index, fecundity, spawning patterns, migration, the beginning of life cycles,</p>



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	age, growth patterns, survival, and mortality. The learning process is delivered through lectures, discussions, assignments, and practical laboratory work.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Effendie, M.I., 2002. Biologi Perikanan, Cetakan kedua (edisi revisi), Yayasan Pustaka Nusantara, Yogyakarta2. Wootton, R.J. 1990. Ecology of Teleost Fishes (Fish and Fisheries Series 1). Chapman & Hall, London



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Module Description

Title	Biological Pest Control
Code, if applicable	230702603P054
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Fatmawati Patang, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and is offered in the 5 th semester.
Teaching methods	Problem-Based Learning (PBL), Project-Based Learning (PjBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), Field Observation / Field Practice (FO) and Case-based learning (CBL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS)



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	<p>Details:</p> <p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing the Food Microbiology course, students are expected to understand the fundamental roles of beneficial and contaminating microorganisms in food. They should be skilled in identifying and designing appropriate scientific methods for developing local food diversification using beneficial microbes, capable of conducting analysis and synthesis to propose solutions to microbial</p>



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	<p>contamination in food materials, and understand the critical importance of biosafety and biosecurity in the food industry. Additionally, students acquire the practical laboratory skills and demonstrate proficiency in observing the processing of functional foods from Kalimantan that utilize microbial applications.</p>
Content	<p>This course is an elective course in the field of microbiology that covers the history and fundamental concepts of food microbiology, microbial physiology and growth factors in food materials, microorganisms responsible for food contamination, the application of microbes in functional food commodities, an introduction to biosecurity and biosafety in the food industry, principles and techniques of natural food preservation, the fundamentals of food fermentation related to the digestive system, and case studies on the relationship between food and the gut microbiome.</p>
Examination forms	<p>Practical sessions, Individual assignment, Mid-term exam, and Final exam</p>
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Practicum (20%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)</p>



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Reading list

1. Hill, CJ, Francesca de F., Ian B. J. 2019. Diet, Health, and the Gut Microbiota. ASM Press.
2. Liu, D. 2019. Handbook of Foodborne Disease. CRC Press: Taylor & Francis Group.
3. El-Mansi, E.M.T, C.F.A. Bryce, B. Dahhou, S. Sanchez, A.L. Demain, A.R. Allman. 2012. Fermentation Microbiology and Biotechnology. USA: Taylor & France
4. Perkins, E. 2016. Food Microbiology: Fundamental, challenges and health implications. USA: Nova Publisher
5. Copper, G. 2018. Food Microbiology. USA. Library Press
6. Doyle, M.P and R.L Buchman. 2013. Food Microbiology: Fundamentals and Frontiers, 4th Edition. USA: ASM Press
7. Adam, M.R and M.O Moss. 2008. Food Microbiology, 3th Edition. UK: RSC Publishing
8. Hutkins, RW. 2006. Microbiology and Technology of Fermented Foods. USA: Blackwell Publishing



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Module Description

Title	Genetic Conservation
Code, if applicable	230702603P071
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Jusmaldi, S.Si., M.Si Muhammad Fauzi Arif, M.Sc.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW) and Cooperative Learning (CpL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing the Genetic Conservation course, students will be able to understand the fundamental concepts of genetic conservation, including: the importance of germplasm and its preservation methods, the mechanisms of genetic diversity, the principles of genetics for conservation, evolution within populations, and various applications of molecular markers in determining conservation strategies.</p>



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Content	This course covers the basic concepts of genetic conservation, including genetic conservation and its benefits, the importance of germplasm and its preservation methods, mechanisms of genetic diversity, the principles of genetics for conservation, examples of evolution in large populations due to selection and mutation and their conservation, examples of evolution in large populations due to migration and its conservation, examples of evolution in small populations due to mutation and selection, genetic processes in small populations, causes, mechanisms, and consequences of habitat and population fragmentation, taxonomy, and management units in conservation, and various molecular markers for determining conservation strategies. In addition to theory, students actively review journals related to genetic conservation, present their findings, and participate in practical laboratory work.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)



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Reading list

1. Ford-Lloyd, B and Jackson, M. 1986. Plant Genetic Resources: an introduction to their conservation and use. Edward Arnold Pty. Ltd., London.
2. Frankham, R., Ballou, J.D., Briscoe, D.A. 2002. Introduction to Conservation Genetics. Cambridge University Press.
3. Smith, B.T., Wayne, R.K. 1996. Molecular Genetic approaches in Conservation. Oxford University Press, New York, USA
4. Adam, P. 1993. The conservation and utilization of genes from endangered and extinct plant : DNA bank net. Gene conservation and exploitation



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Module Description

Title	Herpetology
Code, if applicable	230702602P052
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Lariman, M.Si. Drs. Sus Trimurti, M.P.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester. One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can implement management and conservation steps for herpetofauna resources in the tropical rainforest environments of Kalimantan.
Content	<p>This course covers knowledge of herpetology, classification theories, and its history, various taxonomic characteristics, the concept of species, an overview of nomenclature, the fundamentals and application of nomenclature, the classification of several orders within herpetofauna, the distinguishing features between each order of amphibians and reptiles, and the benefits of animals included in the herpetofauna.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Practicum (20%) 3. Mid-term exam (30%) 4. Final exam (40%)



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Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	1. Perhimpunan Herpetologi Indonesia. (2017). <i>Daftar Amfibi Indonesia</i> . Bogor: LIPI.



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Module Description

Title	Histopathology
Code, if applicable	230702602P032
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Retno Aryani, S.Si., M.Si. Prof. Rudy Agung Nugroho, Ph.D.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester.
Teaching methods	Method: Lecture, Discussion & Question-Answer Learning Model: Think Talk Write (TTW)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Upon completing the Histopathology course, students will be able to use instruments, identify issues related to histopathology, and develop theoretical concepts in biology and their applications in histopathology. Students can differentiate tissue and organ structures in higher animals, understand pathological changes caused by toxins, and use microscopes to identify cell types and histological changes in preparations. They will also gain knowledge of the basic theory of tissues and pathology, organ anatomy, and histology of tissues and functions related to toxicology. Furthermore, students will apply this knowledge with discipline and responsibility, by academic norms and ethics, in managing and utilizing the biodiversity of tropical rainforests and their environments.</p>



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Content	This course provides fundamental knowledge about the structure of various tissues and organs in the body of animals, focusing on the concepts of normality, disease, etiology, pathogenesis, disease classification, pathological signs of reversible and irreversible injury, cell adaptation, xenobiotic exposure pathways, and their effects on the body. The course also provides examples of specific pathological changes (histopathology) that may be caused by toxins, and skills in using microscopes to identify cell and tissue types in histological preparations. Student proficiency will be assessed through theoretical mid-term exams (UTS), final exams (UAS), practical mid-term exams (UTS), final practical exams (UAS), and assignments (practical reports and individual reports).
Examination forms	Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Mid-term exam (20%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Kumar, V., Abbas, Fausto, Mithcell, Robbin. 2007. Basic Pathology, 8th ed. W.B. Saunders, Philadelphia. 2. Junqueira, L., Carneiro, J., and Kelley, R.O. 1998. Histologi Dasar (Alih bahasa Jan Tambayong), edisi 8, Penerbit EGC, Jakarta. 3. Martini, F.H. 2001. Fundamentals of Anatomy & Physiology, 5th ed., Prentice Hall, New Jersey, pp. 144-1071. 4. Thomas, C. 1979. Color Atlas and Texbook of Histopathology, 7th ed. Year Book Medical Publisher, Inc. Chicago.



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5. Nugroho, R.A., Aryani, R., Manurung, H., Rudianto, R., Prahastika, W., Juwita, A., Alfarisi, A.K., Pusparini, N.A.O., Lalong, A. 2020. Acute and Subchronic Toxicity Study of the Ethanol Extracts from *Ficus deltoidea* Leaves in Male Mice. *Open Access Macedonian Journal of Medical Sciences*, 8(A):76-83.
6. Nugroho, R.A., Puspa, N.C.S., Aryani, R., Prahastika, W., Rudianto, R., Manurung, H. 2020. Subchronic Toxicity Test of Indian Almond (*Terminalia catappa*) Leaves Water Extract on The Liver Histology of Mice (*Mus musculus*). *Bioeduscience*. ISSN: 2614-1558, Volume: 4, Edisi: 2.
7. Nugroho, R.A., Aryani, R., Manurung, H., Anindita, D.F., Hidayati, F.S.N., Prahastika, W., Rudianto, R. 2020. Effects of the Ethanol Extracts of *Ficus deltoidea* leaves on the Reproductive Parameters in Male Mice. *Open Access Macedonian Journal of Medical Sciences*. 2022 Jan 18; 10(A):146-152.
8. Sardi, N.I., Aryani, R., Nugroho, R.A., Sari, Y.P., Manurung, H., Rudianto, R. 2022. Effects of ant-nest plant (*Myrmecodia pendens*) bulb extract on histology of intestinal, liver and proximate fillet of Sangkuriang catfish (*Clarias gariepinus* Var). *AIP Conference Proceedings*. 2668, 020002 (2022); <https://doi.org/10.1063/5.0111711> Published Online: 11 October 2022.
9. Aryani, R., Nugroho, R.A., Manurung, H., Pusparini, N.A.O., Prahastika, W., Rudianto, R. 2022. Subchronic toxicity of *Ficus deltoidea* jack. leaves on the histology of ventriculus and intestinum tenue male mice. *AIP Conference Proceedings*. 2668, 020005 (2022); <https://doi.org/10.1063/5.0111944> Published Online: 11 October 2022.



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Module Description

Title	Ichthyology
Code, if applicable	230702603P073
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Lariman, M.Si. Dr. Jusmaldi, S.Si., M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW) and Cooperative Learning (CpL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing the Ichthyology course, students can implement fish resource management and conservation strategies, focusing on fish biology, particularly in the aquatic environments of the tropical rainforests of Kalimantan.
Content	The Ichthyology course studies fish, including anatomy, function, organ mechanisms, and their development, as well as the factors influencing the functioning of the 10 systems. These systems include: the integumentary



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	system, the muscular system (flesh muscles), the skeletal system, the digestive system, the circulatory system (blood circulation), the respiratory system (breathing), the excretory and osmoregulatory systems, the nervous system, the hormonal system, and the reproductive system.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Practicum (20%) 2. Affective assessment (10%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Moyle, P. 2000. <i>Fishes An Introduction to Ichthyologi</i>. University of California 2. Kottelat, M. et al. 2002. <i>Freshwater Fishes of Western Indonesia and Sulawesi</i>. Periplus Editions. Jakarta 3. Tim Ichtiologi.1989. <i>Ichtiologi</i>. Fakultas Perikanan IPB. Bogor. 4. Sanin, H. 1984. <i>Taksonomi dan Kunci Identifikasi Ikan</i>. Binacipta. Jakarta. 5. Effendie, M.I., 2002. Biologi Perikanan, Cetakan kedua (edisi revisi), Yayasan Pustaka Nusantara, Yogyakarta 6. Wootton, R.J. 1990. Ecology of Teleost Fishes (Fish and Fisheries Series 1). Chapman & Hall, London



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7. Secor, D.H., Dean, M., Campana, S.E. 1995. Recent Developments in Fish Otolith Research. The Bell W. Baruch Library in Marine Science Number 13, University of South Carolina Press, Colombia
8. Jusmaldi, Duryadi D, Affandi R., Rahardjo, M.F and Gustiano R. 2019. Reproductive biology of silurid catfishes *Ompok miostoma* (Vaillant 1902) in Mahakam River East Kalimantan. Gustiano. *Jurnal Iktiologi Indonesia*, Vol. 19 No. 1
9. Lariman*, Sus Trimurti, 2020. Study of Fish Diversity in Various Conditions of Water Level in Batu Bumbun Reservate of Middle Mahakam Regency of Kutai Kartanegara, East Kalimantan, Indonesia. *Scholars International Journal of Chemistry and Material Sciences*.



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Module Description

Title	Immunology
Code, if applicable	230702602P084
Semester(s) in which the module is taught	3 rd semester
Person responsible for the module	Imam Rosadi, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 3 rd semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can explain the mechanisms and immune system functions in animals and humans.
Content	<p>This course covers fundamental concepts in immunology, including specific and non-specific immune responses, antigen-antibody interactions, vaccination, immune responses to pathogens (bacteria, viruses, fungi, and parasites), monoclonal antibody production, and immunotherapy.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Individual assignment (20%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).



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Reading list

1. Lydyard P. M, Whelan, A, and Fanger, M. W. 2014. *Immunology*. New York: Taylor & Francis.



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Module Description

Title	Industrial Microbiology
Code, if applicable	230702603P042
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. rer. nat Bodhi Dharma, M.Si Ervinda Yuliatin, S.Si, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and is offered in the 5 th semester.
Teaching methods	Problem-Based Learning (PBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW) and Case-based learning (CBL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS)



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	<p>Details:</p> <p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing the Food Microbiology course, students are expected to understand the fundamental roles of beneficial and contaminating microorganisms in food. They should be skilled in identifying and designing appropriate scientific methods for developing local food diversification using beneficial microbes, capable of conducting analysis and synthesis to propose solutions to microbial contamination in food materials, and understand the critical</p>



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	<p>importance of biosafety and biosecurity in the food industry. Additionally, students acquire the practical laboratory skills and demonstrate proficiency in observing the processing of functional foods from Kalimantan that utilize microbial applications.</p>
Content	<p>This course is an elective course in the field of microbiology that covers the history and fundamental concepts of food microbiology, microbial physiology and growth factors in food materials, microorganisms responsible for food contamination, the application of microbes in functional food commodities, an introduction to biosecurity and biosafety in the food industry, principles and techniques of natural food preservation, the fundamentals of food fermentation related to the digestive system, and case studies on the relationship between food and the gut microbiome.</p>
Examination forms	<p>Practical sessions, Individual assignment, Mid-term exam, and Final exam</p>
Study and examination requirements	<ol style="list-style-type: none">1. Journal Review Assignment (10%)2. Practicum (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)</p>



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Reading list

1. Stanbury P.F., Whitaker A., and S. J. Hall. 2017. Principles of Fermentation Technology. 3rd Ed. Elsevier Ltd-Butterworth-Heinemann. Oxford-Cambridge. UK
2. Crueger W. and A. Crueger. 1993. Biotechnology: A Textbook of Industrial Microbiology. Science Tech. Inc. Madison. USA
3. Baltz R. H., Davies J.E., and A.L. Demain. 2010. Manual of Industrial Microbiology and Biotechnology. 3rd Ed. ASM Press-American Society for Microbiology. Washington, DC. USA
4. Waites, M.J., N.L. Morgan, J.S. Rockey, G. Higton. 2001. Industrial Microbiology, An Introduction. Blackwell Science. Edinburgh. UK
5. Villadsen, J. 2016. Fundamental Bioengineering. Advanced Biotechnology Series. Vol. 1. S. Y. Lee, J. Nielsen and G. Stephanopoulos (Series Eds). Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany.
6. Germany.Stan-Lotter H. 2012. Adaption of Microbial Life to Environmental Extremes: Novel Research Results and Application. Helga Stan-Lotter and Sergiu Fendrihan (Eds.). Springer Wien, New York. U.S.A. ISBN 13: 978-3-211-99691-1.



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Module Description

Title	Insect Ecology
Code, if applicable	230702602P045
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Nova Hariani, S.Si., M.Si. Drs. Sus Trimurti, MP.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can explain the principles and concepts of insect ecology. 2. Students can understand basic knowledge of insect populations and population control, as well as the physical and biological factors that influence insect life, including insect feeding habits and types of food. 3. Students can apply insect collection methods and techniques and analyze insect diversity.
<p>Content</p>	<p>This course examines insect life and ecological concepts, including ecosystems, communities, populations, and species. It covers insect populations, population control, ecological characteristics of insects, and the physical and biotic factors that influence insect life. The course also introduces insect sampling methods, collection techniques, insect environmental analysis, and strategies for insect population control.</p>



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Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective Assessment (10%)3. Mid-Semester Examination (30%)4. Final Examination (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Price, P. W. 1882. Insect ecology. Second Edition. A wiley-Interscienc. Publication. New York. London. Sydney. Toronto. 514.2. Odum, E. P. 1971. Fundamentals of Ecology. 3 rd Saunders. Philadelphian.3. Tarumengkeng, C. R. 1992. Dinamika Pertumbuhan Populasi Serangga.4. Dasar-dasar Ekologi, Penerjemah Ir. Tjahjono Samingan, M.Sc., Yogyakarta. GM University Press.5. Herlina S dkk 2021. Pengantar Ekologi Serangga. Universitas Sriwijaya (UNSRI)/Unsri Press. Palembang.



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Module Description

Title	Mammalogy
Code, if applicable	230702603P035
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Jusmaldi, M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 7 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation: 1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester. 1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Students will understand mammalian biology, including general characteristics, external body structure, digestive system, reproduction, behavior, distribution, evolution, and diversity of mammals, as examined through classification systems. Students will also recognize the significance of mammals to humans based on laboratory observations and the surrounding environment. They will be able to communicate these findings both in writing and orally.</p>



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Content	This course covers the biodiversity, biology, and ecology of mammals. Additionally, the course explores the benefits of mammals for life and the research methods used in mammalogy. The material is delivered using a student-centered approach, with practical activities and assignments in research projects.
Examination forms	Practical sessions, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Mid-term exam (50%) 2. Field Practice and Final Exam (50%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Voughan TA, 1986. Mammalogy. Sounder College Publishing. United States of America . 599 p 2. Payne J, Francis CM, Phillipps K, Kartikasari SN. 2000. Panduan lapangan Mamalia di Kalimantan Sabah, Sarawak & Brunai Darusalam The Sabah Society dan Wildlife Conservation. Jakarta Indonesia. 386 hal. 3. Petocz r.1994. Mamalia darat Irian Jaya . PT Gramedia Pustaka Utama. Jakarta 163 hal. 4. Rowe R. 1996. The Pictorial Guide to The Living Primates. Pongonian Press. USA. 5. Sari MDP, Jusmaldi & Sudiastuti. 2018. Karakteristik Morfologis dan Histologis Saluran Pencernaan Kelelawar Pemakan Buah (<i>Cynopterus brachyotis</i>) di Objek Wisata Alam Air Terjun Berambai, Samarinda Kalimantan Timur. Celebes Biodiversitas Jurnal Sains & Pendidikan Biologi : Vol. 2 No. 1



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Module Description

Title	Medicinal Plants
Code, if applicable	230702603P053
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Hj. Ratna Kusuma, M.Si. Muhammad Fauzi Arif, M.Sc.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Case-Based Learning (CBL)
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester



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	<p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can identify medicinal plants and understand their use in treating diseases. 2. Students can recognize phytochemical aspects and integrate this knowledge with health treatments.
Content	This course studies the utilization of plants to improve health, introduces plants that are beneficial for health, and explores the phytochemical compounds found in these plants that have medical applications.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective Assessment (10%) 2. Individual assignment (20%) 3. Mid-Semester Examination (30%) 4. Final Examination (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).



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Reading list

1. Suleria H. A. R, Goyal, M. R, Air, H. B. U. 2022. *Bioactive Compounds from Multifarious Natural Foods for Human Health*. CRC Press: USA.
2. Ahmad, I., Aqil, F., and Owais. 2006. *Modern Phytomedicine*. Wiley-VCH Verlag: Germany.
3. Novak, J., and Bluthner, W. D. *Medicinal, Aromatic, and Stimulant Plants*. Springer: Switzerland.



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Module Description

Title	Microbial Biodiversity and Ecology
Code, if applicable	230702602P086
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. rer. nat Bodhi Dharma, S.Si., M.Si. Ervinda Yuliatin, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can master the basic concepts of microbial biodiversity and ecology. 2. Students can identify microbial biodiversity, habitats, and their potential in specific ecosystems. 3. Students can master the basic techniques for analyzing microbial biodiversity from specific habitats and ecosystems using molecular genetics concepts and tools, both in silico and in vitro. 4. Students can characterize the role of microbial communities in biogeochemical cycles, biomineralization, and biodegradation. 5. Students can describe the interactions between microbes, plants, and soil for a healthy ecosystem. 6. Students can plan and design appropriate and relevant methods for developing microbial ecology studies.



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Content	This course covers the basic concepts of microbial biodiversity and ecology, including microbial evolution, microbial systematics, methods for measuring biodiversity in specific microbial populations and ecosystems such as soil, water, air, and symbionts in other organisms. It explores the role of microbes in ecosystems, microbial interactions within populations and with plants and animals, and microbial exploration and bioprospecting using traditional and molecular approaches for studying microbial biodiversity and ecology about environmental issues.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Affective Assessment (10%)2. Individual assignment (20%)3. Mid-Semester Examination (30%)4. Final Examination (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Brown, J. W. 2014. Principles of Microbial Diversity. ASM Press, Washington, DC. U.S.A.2. Gunjal, A., and S. Shinde (Eds). 2022. Microbial Diversity and Ecology In Hotspots. Academic Press & Elsevier Inc. London. U.K.3. Barton, L. L., and Northup, D. E. 2011. Microbial Ecology. Willey-Blackwell. U.S.A.4. Bull, A. 2003. Microbial Diversity and Bioprospect. ASM Press, Washington, DC. U.S.A.5. Tanya, EC, David CC, Diana HW. 2013. Microbial Ecology in Sustainable Agroecosystems. CRC Press. U.S.A.6. Verma, P., and M.P. Shah (Eds). 2022. Bioprospecting of Microbial Diversity: Challenges and Applications in Biochemical Industry, Agriculture, and Environment Protection. Elsevier Inc. Amsterdam, Netherlands.



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Module Description

Title	Molecular Biology Analysis Techniques
Code, if applicable	230702603P027
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Jusmaldi, M.Si. Muhammad Fauzi Arif, M.Sc.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <p>Students will understand the techniques and methods used in molecular biology analysis, such as basic DNA isolation techniques, primer design techniques, PCR principles, molecular marker analysis techniques, DNA/RNA sequencing analysis techniques, and the use of software for genetic variation analysis. They will master the use of tools related to molecular biology research.</p>



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Content	This course explains the procedures for sample preservation (animals, plants, and microbes) for molecular genetics purposes, the basic principles of DNA and RNA isolation and purification, the use of primers and how to design them, the principles and methods of PCR, electrophoresis principles, sequencing result editing, DNA mutation analysis, DNA barcoding, single nucleotide polymorphism (SNP), and bioinformatics.
Examination forms	Individual assignment, Practical sessions, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignment (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Chamberlain, J.R. dan J.D. Hubert. 2002. Molecular Analysis of Genetic Variation. University of Oxford. Oxford.2. Innis MA., gelfand DH., Sninsky JJ. 1999. PCR Applications Protocol for functional Genomics. Academic Press. New York.3. Fatchiyah, 2000, Polymerase Chain reaction. Brawijaya University. Malang.4. Alberts B, Johnson A., Lewis J, Raff M, Roberts K, Walter P. 2002. Molecular Biology of The Cell, 4th Edition. Garland Science. USA.



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Module Description

Title	Molecular Microbial Genetics
Code, if applicable	200702603P069
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr.rer.nat. Bodhi Dharma, S.Si., M.Si M. Fauzi Arif, S.Si., M.Sc
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Lectures, Questions and Answers session, Literature review, discussions, and presentations.
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing this course, students will have the knowledge and skills to study and perform functional analysis of microbial genes and genomes. Furthermore, students are expected to have a solid foundation in molecular genetics, particularly in gene expression. This course will enable them to analyze genetic and physiological responses and microbial growth in response to environmental influences, substrates, and other factors that affect gene expression in microbial cells.



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	<p>Students will understand the regulation of gene expression in bacteria, archaea, and fungi. They can predict the necessary culturing techniques when encountering genetically and physiologically distinct conditions, ensuring that microorganisms can effectively perform their physiological and genetic functions.</p> <p>Key aspects to be understood thoroughly include gene regulation in bacteria, attenuation, stringent response, sigma factors and their alternatives, protein secretion pathways, signal peptides, quorum sensing and quorum quenching in bacteria, bacteriophage genetics and regulation, fungal gene structure, and gene expression regulation in yeast and fungi.</p>
Content	<p>This elective course focuses on functional analysis techniques for microbial genes and genomes. It provides foundational knowledge in molecular genetics, especially regarding gene expression in bacteria, bacteriophages, and fungi. Additionally, the course delves deeper into gene regulation in bacteria, including attenuation, stringent response, sigma factors and their alternatives in cell differentiation and division, protein secretion pathways, signal peptides, quorum sensing and quorum quenching in bacteria, bacteriophage genetics, lysogenic and lytic control in bacteriophages, gene regulation in bacteriophages, gene structure in fungi, and gene expression regulation in yeast and fungi.</p>



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Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journal articles (10%) 2. Practicum (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Knippers R., Philippsen P., Schäfer P., and E. Fanning. 1990. Molekulare Genetik. 5 Auflage. Georg Thieme Verlag. Stuttgart. Germany 2. Dale, J.W. and S. F. Park. 2004. Molecular Genetics of Bacteria, 4th Edition. John Wiley & Sons Ltd, Sussex, England. 3. Beckwith, Jon. 2011. The Operon as Paradigm: Normal Science and the Beginning of Biological Complexity. J. Mol. Biol. 409:7–13. 4. Bell C.E and M. Lewis. 2001. The Lac repressor: a second generation of structural and functional studies. Curr Opin Struct Biol.11(1):19-25. 5. Boutte, C. C. and S. Crosson. 2013. Bacterial lifestyle shapes stringent response activation. Trends in Microbiology. 21(4): 174 -180. 6. Germany.Stan-Lotter H. 2012. Adaption of Microbial Life to Environmental Extremes: Novel Research



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	<p>Results and Application. Helga Stan-Lotter and Sergiu Fendrihan (Eds.). Springer Wien, New York. U.S.A. ISBN 13: 978-3-211-99691-1.</p>
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Module Description

Title	Morphometrics
Code, if applicable	230702603P074
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Jusmaldi, S.Si., M.Si Dr. Medi Hendra, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW) and Cooperative Learning (CpL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Students can analyze and understand the fundamentals of morphometric data collection on various animals and plants for taxonomy in the tropical rainforest environments of Kalimantan Island.</p>
<p>Content</p>	<p>This course explains the methods of morphometric data collection on various animals and plants, including marking, measurement of size and shape of simple variables, Bookstein coordinate shape, and superimposition methods. It covers the visualization of shape changes as</p>



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	deformation, management of morphometric data, and techniques for analyzing morphometric variable data: ordination, discriminant analysis, principal component analysis, regression, multivariate analysis, and cluster analysis. The course also explores the application of morphometrics in the relationship between ontogeny and phylogeny, and the connection between morphometrics and systematics. Students will practice measurement, management, and independent data analysis in this course.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Practicum (20%) 2. Affective assessment (10%) 3. Mid-term exam (30%) 4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Zelditch ML, Swiderski DL, Sheets HD and Fink WL. 2004. <i>Geometric morphometrics for biologists: a primer</i>. Elsevier Academic Press. London. 456 p. 2. Bookstein FL. 2003. <i>Morphometric tools for landmark data</i>. Cambridge University Press. USA. 455 p. 3. Wahl C. 2012. <i>Morphometric</i>. Free Online Edition of Intech. 120 p.



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4. Elewa AMT. 2004. *Morphometries applications in biology and paleontology*. Springer-Verlag Berlin Heidelberg. New York. 269 p.



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Module Description

Title	Nutrigenomics
Code, if applicable	230702602P079
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Prof. Rudy Agung Nugroho, M.Si., Ph.D. Dr. Retno Aryani, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can conduct self-evaluation of group performance and make improvements in the preparation of a nutrigenomics paper. 2. Students can produce academic work by preparing papers, learning journals, and analyzing articles, utilizing available natural resources and relevant information and communication technologies.
<p>Content</p>	<p>This course explores physiological aspects related to nutrigenomics, including cell membrane structure and activity, nutrigenomic cells, molecular perspectives on nutrition and diet, laboratory tools in nutrigenomics, oxidative stress and antioxidants, gene–nutrient interactions about disease, mechanisms and biomarkers associated with nutrigenomics, fatty acid expression and disease occurrence, nutrigenomic diets, isoflavone-based diets and related diseases, gene expression modulation</p>



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	by minerals, as well as metabolism, growth, and aging in the context of nutrigenomics.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none"> 1. Brown, J. E. 2011. Nutrition Through the life cycle. 4th ed. Wadsworth Cengage Learning. USA. 2. Worthington-Roberts B. S, and Williams S.R. 2000. Nutrition Throughout The Life Cycle 4th ed. Mc Graw Hill. USA. 3. Gibson RS. 2005. Principles of Nutritional Assessment 2nd ed. Oxford University Press. New York. 4. Thompson, J. L, Manore, M. M, and Vaughan, L. A. 2011. The Science of Nutrition, 2nd ed. Benjamin Cummings, USA Christopher D. Moyes, 2016. Principles of Animal Physiology, 3rd Edition Queens University Patricia M. Schulte. University of British Columbia. 5. Nugroho, R. A., Aryani, R., Manurung, H., Rudianto, R., Prahastika, W., Juwita, A., Alfarisi, A.K., Pusparini, N. A. O., and Lalong, A. 2020. Acute and Subchronic Toxicity Study of the Ethanol Extracts from <i>Ficus deltoidea</i> Leaves in Male Mice. <i>Open Access Macedonian Journal of Medical Sciences</i>, 8(A):76-83. 6. Nugroho, R. A., Aryani, R., Manurung, H., Anindita, D. F., Hidayati, F. S. N., Prahastika, W., and Rudianto, R. 2022. Effects of the Ethanol Extracts of <i>Ficus deltoidea</i> leaves on the Reproductive Parameters in Male Mice. <i>Open Access Macedonian Journal of Medical Sciences</i>. 2022 Jan 18; 10(A):146-152. 7. Aryani, R., Nugroho, R. A., Manurung, H., Rulimada, M. H., Maytari, E., Siahaan, A., Rudianto, R., and Jati, W.



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	N. 2023. Anti-angiogenic activity of <i>Ficus deltoidea</i> L. Jack silver nanoparticles using chorioallantoic membrane assay. F1000Research, 12, 544.
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Module Description

Title	Occupational Health and Safety (OHS)
Code, if applicable	230702602P048
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Prof. Rudy Agung Nugroho, M.Si., Ph.D.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can contribute to community life based on religious values, Pancasila, and ethics by demonstrating responsibility, discipline, effective communication, and the ability to work independently and in teams (CPL1/S1/PLO1). 2. Students can apply scientific methods and ethics in solving problems and making appropriate decisions based on data and information analysis within the field of biology (CPL3/KU3/PLO3). 3. Students are skilled in using and applying instruments related to the field of biology responsibly and honestly, while considering the principles of environmental sustainability (CPL5/KS2/PLO5). 4. Students can master theoretical concepts in biology, ranging from molecular, cellular, and organismal levels, and apply these concepts in managing and utilizing biodiversity in wet tropical forests and their environments (CPL7/P2/PLO7).



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Content	This course covers the definition, scope, and knowledge of Occupational Health and Safety (OHS), an integrative program within the Biology Study Program at the Faculty of Mathematics and Natural Sciences (FMIPA).
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none"> 1. Himpunan Peraturan Perundangan-Undangan Keselamatan dan Kesehatan Kerja, Direktorat Pengawasan Norma K3, Dirjen Binwasnaker, Kemnakertrans RI, 2005. 2. Suma'mur, P. K. 1995. <i>Keselamatan Kerja dan Pencegahan Kecelakaan</i>. Jakarta: PT Toko Gunung Agung. 3. Suma'mur, P. K. 1995. <i>Higene Perusahaan dan Kesehatan Kerja</i>. Jakarta: PT Toko Gunung Agung. 4. Roger, L. B. 2006. <i>Safety, and Health for Engineers</i>. New York: John Wiley & Sons, Inc. 5. Silalahi, B. N. B. dan Silalahi, R. B. 1991. <i>Manajemen Keselamatan dan Kesehatan Kerja</i>. Jakarta: PT Pustaka Binaman Pressindo. 6. Harrington, J. M. & F. S. Gill, 2003, <i>Kesehatan Kerja</i>, EGC, Jakarta. 7. Achadi Budi Cahyono, 2004, <i>Keselamatan Kerja Bahan Kimia di Industri</i>, Gadjah Mada University Press. 8. Rudi Suardi, 2005, <i>Sistem Keselamatan & Kesehatan Kerja</i>, Jakarta, Penerbit PPM.



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Module Description

Title	Ornithology
Code, if applicable	230702603P059
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dijan Sunar Rukmi, M.Si. Dr. Lariman, M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 7 th semester.
Teaching methods	Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation or Field Practice (FO)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing the Ornithology course, students will understand the concepts of bird diversity and biology (including morphology, anatomy, physiology, reproduction, behavior, and distribution), and recognize their importance to humans based on observations in the laboratory and surrounding environment. Students will also be able to communicate their findings in writing and orally.



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Content	This course covers the concepts of biodiversity, biology, and ecology of birds (members of Aves). It also discusses the benefits of birds for life and the methods used in bird research. The material is delivered using a student-centered approach, with practical activities and assignments as research projects.
Examination forms	Field Practice, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Mid-term exam (60%) 2. Field Practice and Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Bibby C. J., Burgess, N. D., and Hill, D. A. 1992. <i>Bird Census Techniques</i>. London: Academic Press. 2. Gill, F.B. 2007. <i>Ornithology</i>. Third Edition. New York: W.H. Freeman and Company. 3. Holmes, D.A., and Nash, S. 1989. <i>The Birds of Java and Bali</i>. Oxford: Oxford University Press. 4. MacKinnon, J. 2010. <i>Panduan Lapangan Pengenalan Burung-Burung di Jawa dan Bali</i>. Yogyakarta: Gadjah Mada University Press. 5. Proctor, N.S., and Lynch, P.J. 1993. <i>Manual of Ornithology: Avian Structure and Function</i>. London: Yale University Press. 6. Wiens, J.A. 1989. <i>The Ecology of Bird Community</i>. Cambridge: Cambridge University Press.



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Module Description

Title	Palynology
Code, if applicable	230702603P056
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Syafrizal, M.P. Dr. Samsurianto, M.Si. Dr. Medi Hendra, M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and is offered in the 6 th semester.
Teaching methods	Interactive Learning (IL), Laboratory Work (LW), Field Observation / Field Practice (FO) and Case-based learning (CBL).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS)



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	<p>Details:</p> <p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	The student can comprehensively analyze problems based on biological science and its applications.
Content	The Palynology course explores the study of pollen and spores, both fresh—obtained from reproductive organs of plants—and fossilized. This course divides its content into four main areas:



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1. An introduction to the definition and scope of palynology.
2. The study of plant reproductive cells (pollen and spores), including their morphological characteristics, structures, types, and dispersal mechanisms.
3. Methods and techniques in palynological research, covering materials, tools, and specimen preparation procedures.
4. Human interactions with palynology, including its applications and potential risks in areas such as health, biotechnology, and vegetation history.

This field contributes to various disciplines by supporting paleoecological analysis, identifying mineral deposits in sedimentary layers, and determining the geological age of rock formations. It further promotes understanding of the characteristics, taxonomy, and distribution of plant groups, as well as their importance in human health, for example, in the analysis of food and beverages (e.g., honey and bee pollen), aero-allergens (causing respiratory diseases), and forensic science. Students demonstrate their achievement through assignments, mid-semester examinations (UTS), and final examinations (UAS).

Examination forms	Individual assignment, Mid-term exam, and Final exam
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Study and examination requirements	<ol style="list-style-type: none">1. Assignments (20%)2. Affective Assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Banks, H. P. 1972., Fundamentals of Botany Series ; Evolution and Plant of The Past, The Mac Millan Press Ltd. 170 pp.2. Erdtman, G. 1943. An Introduction to Pollen Analysis, Chronica Botanica New Series of Plant Science Books, Vol. XII, The Ronald Press Company, New York. 239 h.3. Erdtman, G. 1952. An Introduction to Pollen Analysis, Chronica Botanica New Series of Plant Science Books, Vol. I, Almqvista & Wiksell, Stockholm.539h.4. Erdtman, G. 1957. Pollen and Spore Morphology/Plant Taxonomy: Gymonspermae, Pteridophyta, Bryophyta (An Introduction to Palynology II). The Ronald Press Company, New York. 456 h.5. Faegri, K and J. Iversen. 1988. Textbook of Pollen Analysis. 4th ed. Hafner Press a Division of Mac-Millan Publishing Co, New York. 328 h.



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6. Flenley, J.R. 1979. The Equatorial Rain Forest. A Geological History. Butterworths, Page Bros (Norwich), England. 153 h.
7. Hesse, M.; H. Halbritter; R. Zetter; M. Weber; R. Buchner; A. Frosch-Radivo and S. Ulrich. 2009. Pollen Terminology: An Illustrated Handbook. Springer-Verlag/Wien, Austria. 266 h.
8. Kapp, R.C. 1969. How to Know Pollen and Spore. W.H.C. Brown Company Publisher, Dubuque. 249 h.
9. Moore, P.D. & J.A. Webb., 1978., An illustrated Guide to Pollen Analysis, Departement of Plant Sciences, King College. London. 897 pp.
10. Raup, D. M and S. M. Stanley., 1971., Principles of Paleontology., W. H. Freeman and Co. San Fransisco. p. 193-218.
11. Selley, R. C. 1978. Ancient Sedimentary Environment, Second Edition. Chapman and Hall Ltd. London.
12. Shukla, A. C and Misra, S. P. 1982. Essential of Paleobotany, Second Revised Edition. Vikas Publisher, PVT Ltd. New Delhi. 365 pp.
13. Syafrizal. 2006. Identifikasi Polen dan Spora pada Perlapisan Batubara Formasi Balikpapan di Kec. Loa Buah, Kutai Kartanegara, Kalimantan Timur. FMIPA Universitas Mulawarman. PDM-P2M, Dirjen Dikti Dep. Pendidikan Nasional.



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| | <p>14. Tschudy, R. 1968. Morphology of Pollen and Spore, John Willey and Sons. New York. 397 pp.</p> |
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Module Description

Title	Parasitology
Code, if applicable	230702602P069
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Nova Hariani, M.Si Dra. Sudiastuti, SU
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<ol style="list-style-type: none"> 1. Be devoted to God Almighty and demonstrate a religious attitude while participating in English classes. 2. Respect cultural diversity, perspectives, religions, beliefs, and others' original opinions or findings in English discussions on theories, concepts, principles, and procedures. 3. Be able to apply logical, critical, systematic, and innovative thinking to master English language material.



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	<ol style="list-style-type: none"> 4. Take responsibility for achieving group work results and supervise and evaluate problem-solving in using English in biology. 5. Perform self-evaluation of group performance and improve writing papers and reports in English. 6. Have the intrinsic motivation to continuously follow developments in biological science through English-language information by applying logical, critical, systematic, and innovative thinking through critical analysis of articles. 7. Be able to produce written work, learning journals, analyze articles, and make effective presentations in English by utilizing available natural resources and relevant information and communication technologies.
Content	The course covers understanding the principles of taxonomy and nomenclature and their application to parasitic animals. It includes the recognition of the properties, characteristics, and relationships of the most critical groups and their position within the taxonomic hierarchy, lifestyle, distribution areas, and significance to humans for selected examples.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journal articles (10%) 2. Practicum (20%) 3. Affective assessment (10%)



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	<ol style="list-style-type: none">4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Brotowidjoyo, M.D., 1987. Parasit dan Parasitisme. PT. Melton Putra. Jakarta2. Dunn, A. M (1978). Veterinary Helminthology. Second Ed. William Heinemann Medical Books. London.3. Georgi, J. R and Georgi, M. E (1990). Parasitology for Veterinarians. 5 th Ed. W. B. Saunders Company.4. Hendrik, C.M dan Ed. Robinson (1998). Diagnostic Parasitology for Veterinary Techniciand. 3th Ed. Mosby Inc. an affiliate of elsevier inc.5. Levine, N. D. (1990). Parasitologi Veteriner. Gadjah Mada University Pess. Yogyakarta6. Levine, N.D (1995). Protozoologi Veteriner. Penerjemah Soeprpto Soekardono. Gadjah Mada University Press.7. Noble, E.R. and G.A.Noble. (1989). Parasitologi Biologi Parasit Hewan. Edisi ke-5 Gajah Mada University Press8. Olsen, O.W (1962). Animal Parasites : Their Biologi and Life Cycles. Burgers Publishing Company.9. Richardson dan Kendall (1963). Veterinary Protozoology. Oliver & Boyd. Ltd.London



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10. Soulsby, E.J.LI (1982). Helminth, Arthropods and Protozoa of Domestic Animals. 7thEd. Bailliere Tynhall. W.B. Saunders. London
11. Urquhart, G.M.; Armour, J.; Duncan, J.L.; Dunn, A.M.; Jennings, F.M. 2001. Veterinary Parasitology. Second Edition. Blackwell Publishing.
12. Walker, A (1994). Arthropods of Humans and Domestic Animals. Chapman & Hall



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Module Description

Title	Phytochemistry
Code, if applicable	230702602P046
Semester(s) in which the module is taught	5 th -7 th semester
Person responsible for the module	Dr. Hetty Manurung, S.Si., M.Si. Drs. Dwi Susanto, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 5 th - 7 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none">1. Students can apply scientific methods and ethics in solving problems and making informed decisions based on data and information analysis in plant phytochemistry (CPL 3).2. Students can use instruments, supervise, and evaluate the completion of practicum tasks and experimental work related to plant phytochemistry (CPL 5).3. Students can master the theoretical concepts of phytochemistry by identifying and explaining theories and ideas related to types of secondary metabolites, their biosynthesis, isolation, basic qualitative and quantitative tests, and bioactivity assays of compounds from various plant species, while demonstrating discipline and responsibility by academic norms and ethics, particularly in the management and utilization of biodiversity in wet tropical forests and their environments (CPL 1, 7).



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<p>Content</p>	<p>This course explores the definition, history, and development of phytochemistry, along with its practical aspects as the study of plant-derived chemical compounds. It covers the chemical constituents of plants and the concept of compound formation through primary and secondary metabolism. The course also examines how geographic factors, taxonomy, plant organs used, and pest presence affect the quality and quantity of secondary metabolites.</p> <p>Key topics include types of extraction, the concepts and principles of chromatography, types of aglycones and their compounds, and the methods and principles for detecting glycosides using color reagents. The structure, types, and biosynthesis of polyketides and their detection using Thin Layer Chromatography (TLC) are also discussed.</p> <p>Students will study the biosynthesis and types of phenolic compounds, the basic structures, classifications, and biosynthetic pathways of flavonoids, and the core structures of mono- and sesquiterpenes, diterpenes, triterpenes, steroids, and carotenoids. The structure, types, and classifications of alkaloids include alkaloids derived from tryptophan, histidine, the isoprene pathway, and other biosynthetic origins.</p> <p>Additionally, the course includes drying processes, the fundamentals of qualitative and quantitative testing of compounds in extracts or fractions, and the basic principles of bioactivity testing of natural plant-derived substances.</p>
<p>Examination forms</p>	<p>Individual assignment, Mid-term exam, and final exam.</p>
<p>Study and examination requirements</p>	<ol style="list-style-type: none"> 1. Affective Assessment (10%) 2. Practicum (20%) 3. Mid-Semester Examination (30%) 4. Final Examination (40%)



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Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Saifuddin, A. 2014. Senyawa Alam Metabolit Sekunder. Teori, Konsep, dan Teknik Pemurnian. Deepublish. Ed 1. Yogyakarta. Hlm 546.2. Newman, D. J., Craag G. M. 2012. Natural Products as Sources of New Drugs over the 30 Years from 181 to 2010. J. Nat. Prod. 75 (3): 311-335.3. Laboratory Handbook for the fractionation of Natural Extracts, Houghton, P. J. and Raman, A., Chapman & Hall.1998. 1st edition Natural Product Isolation, Sarker, SD., Latif, Z., and Gray, A. I., Humana Press, 2006, 2nd edition.4. Harbone, J. B. 1993. Phytochemical Methods. Chapman and Hall. London5. Robinson, T. 1991. The Organic Constituents of Higher Plants, Chapman and Hall. London.6. Houghton, P. J. 1998. Laboratory Handbook fo Fractination of natural Extracts, Thomson, Science, New York.7. Markham, K. R. 1982. Techniques of Flavonoid Identification, Academic Press Inc, London8. Manurung, <i>et al.</i> 2019. Phytochemical Analysis And Antioxidant Activity Of Leaves Extracts Of Endemic Plant Jahe Balikpapan (Etingera Balikpapanensis A.D.Poulsen). International Journal of Scientific & Technology Research. 8 (9): 308-313.9. Manurung, <i>et al.</i> 2022. Phytochemical, GC-MS analysis and antioxidant activities of leaf methanolic extract of Lai (<i>Durio kutejensis</i>), the endemic plant of Kalimantan, Indonesia. Biodiversitas, 23 (11): 5566 - 5573. DOI: 10.13057/biodiv/d231104.10. Manurung, <i>et al.</i> 2017. Total flavonoid content and antioxidant activity of tabat Barito (<i>Ficus deltoidea</i> Jack) on different plant organs and ages. Journal of Medicinal Plants Studies 5(6): 120-125.



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Module Description

Title	Phytohormones
Code, if applicable	230702603P028
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Yanti Puspita Sari, M.Si Dr. Ir. Samsurianto, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <p>Students will master the concepts, principles, and procedures related to phytohormones and their applications. They will be able to solve problems related to the technology and applications of phytohormones.</p>



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Content	This elective course covers the types and benefits of plant hormones, their physiological activities, and the mechanisms of their formation. The course also provides an understanding of the potential of plant hormones in enhancing plant productivity and quality.
Examination forms	Individual assignment, Practical sessions, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignment (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Davis PJ. 1988. Plant Hormones : Physiology, Biochemistry, and molecular Biology. Kluwer Academic Publisher. London.2. Taiz,L. and E. Zeiger. 1998 Plant Physiology. Second Edition. Sinauer Associates, INC. Publisher Sunderland. Massachusett.3. Wilkins MB. 1984. Advanced Plant physiology. English Language Book. Longman.4. Campbell, NA., J.B. Reece & L.G. Mitchell. 2010. Biologi. Edisi ke 8. Terjemahan dari Biology 8th ed. Oleh Manulu, W. Jakarta :Erlangga.



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Module Description

Title	Phytopathology
Code, if applicable	230702603P037
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Linda Oktavianingsih, S.Si., M.Si. Imam Rosadi, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL), Laboratory Practice (LW) and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO) :</p> <p>Students will understand the definition of phytopathology along with its supporting aspects. They will develop an understanding of the benefits and various services provided by microorganisms. They will be able to apply plant disease control methods in the tropical rainforest areas of Kalimantan Island.</p>



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Content	The Phytopathology course is an elective that covers concepts related to plant diseases, the significance of plant diseases for humans, identification of various symptoms and causes of plant diseases, their pathogenesis in host plants, and methods for controlling plant diseases. Student mastery is assessed through theoretical mid-term exams (UTS), final exams (UAS), practical mid-term exams (UTS), practical final exams (UAS), and assignments (practical reports and individual reports).
Examination forms	Practical sessions, Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Reviewing relevant journals (10%)2. Affective assessment (10%)3. Practicum (20%)4. Mid-term exam (30%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Agrios G.N. 2005. Plant Pathology (fifth edition). Elsevier Pub. Amsterdam.2. Ainsworth G.C. 1981. Introduction to the History of Plant pathology. Cambridge University.3. Semangun H. 1996. Pengantar Ilmu Penyakit Tumbuhan. GAMA Univ. Press. Yogyakarta.4. Jurnal dan prosiding terkait Jurnal, prosiding yang terkait.



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Module Description

Title	Plant Biotechnology
Code, if applicable	190702603P039
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Hetty Manurung, S.Si., M.Si. Dr. Yanti Puspita Sari, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Lecture, Discussion, and Question-Answer. The course will be conducted online.
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students will be able to master the concepts, principles, and procedures in Plant Tissue Culture. 2. Students will be able to solve problems in Plant Tissue Culture. 3. Students will be able to independently demonstrate responsibility for their work in their field of expertise. 4. Students can internalize the spirit of independence, perseverance, and entrepreneurship. 5. Students will be able to work independently and in teams for any assigned tasks. 6. Students will be able to apply biological knowledge in daily life. 7. Students can develop creativity and innovation in biology and other related fields. 8. Students will have a broad understanding of biology and the latest developments in the field.



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	<p>9. Students will be able to use modern techniques, skills, and technologies required to practice solutions in the laboratory and the field.</p> <p>10. Students will be able to explore local potential and utilize it effectively.</p>
Content	<p>This course covers the history of modern biotechnology development, techniques, and its applications for improving plant production and developing commercial products. Additionally, this course provides insight and understanding of the basic concepts of plant biotechnology, its role in human life, in-vitro micropropagation techniques, plant tissue culture, plant biotechnology laboratory management, small-scale/home industry tissue culture, gene isolation, gene cloning, recombinant DNA, gene transformation, genetic markers, the controversy surrounding genetic engineering (GMOs), and the regulations and bioethics involved in producing plant biotechnology products.</p>
Examination forms	<p>Individual assignment, Mid-term exam, and final exam.</p>
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing Relevant Journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).</p>
Reading list	<ol style="list-style-type: none"> 1. N. Steward Jr (Ed.). 2008. <i>Plant Biotechnology and Genetics: Principles, Techniques, and Applications</i>. Wiley and Sons, Inc. 2. Goerge, E.F & Sherington.1984. <i>Plant Propagation by Tissue Culture Handbook and Directory of Comercial Laboratories</i>.



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3. O. Brandenburg, *et al.* 2011. Introduction to Molecular Biology and Genetic Engineering. Food Agriculture Organization of United Nations. Rome.
4. Ausubel, F. M., Brent, R., Kingston, R. E., Moore. D. D., Seidman, J. G., Smith, J. A., and Struhl, K. 2002. *Short Protocol in Molecular Biology*. 5th edition. USA: Jhon Wiley and Sons.
5. Kumar, H. D. 2003. *Modern Concepts of Biotechnology*. Vikas Publishing House PVT Ltd.
6. Kuswanto. 2013. *Bioetika di Indonesia*. Universitas Brawijaya.



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Module Description

Title	Plant Ecology
Code, if applicable	230702603P076
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. agr. Budiman, M.Si. Dr. Medi Hendra, M. Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can understand the basic concepts and the importance of studying plant ecology. 2. Students can understand the influence of climate, soil, water in the soil, and biotic factors on the structure and dynamics of plant populations. 3. Students can understand the structure and dynamics of terrestrial and aquatic plant communities, their roles in food chains, biogeochemical cycles, responses to environmental pollution and climate change, and the interconnections between plant communities, culture, and landscape diversity.
<p>Content</p>	<p>This course discusses the basic concepts and the urgency of plant ecology, the influence of biotic and abiotic environmental factors on plant populations, plant community structure, the dynamics of plant community structure, the role of plant communities in terrestrial and</p>



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	aquatic ecosystems in responding to environmental pollution and climate change, as well as the interrelationship between plant communities, culture, and landscape diversity.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Project (15%)3. Case Study (15%)4. Practicum (20%)5. Mid-term exam (15%)6. Final exam (25%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Gliessman, S.R. 2007. Agroecology: The Ecology of Sustainable Food Systems. New York: CRC Press.2. Schulze, E.D, E. Beck, N. Buchmann, S. Clemens, K. Müller-Hohenstein, M. Scherer-Lorenzen. 2019. Plant Ecology. Springer.3. Crawley, M. J. 2009. Plant Ecology. Willey-Blackwell.



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Module Description

Title	Plant Ecophysiology
Code, if applicable	230702602P066
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Dwi Susanto, M.Si Dr. Hetty Manurung, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing the Plant Ecophysiology course, students will be able to understand the concept of plant ecophysiology along with its supporting aspects. They will be able to address environmental stress factors affecting plant growth and apply this knowledge in the tropical rainforest areas of Kalimantan Island.



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Content	The Plant Ecophysiology course studies the theories and concepts related to environmental factors affecting plant growth and the physiological adaptations of plants to water stress, salt or salinity stress, temperature stress, light stress, soil/nutrient stress, CO ₂ stress, pH stress, and allelopathic compounds.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Atwell B, Kriedemann P, Turnbull, C (1999) Plant in Action. MacMillan Publisher Australi Pty Ltd2. Fosket, D.E. 1995. Plant growth and development. A molecular approach. Acad.Press, San Diego: xii + 580 hlm.3. Knox, Lediges P, Evans B, Saint R (2001) Biology 2nd Edition. McGraw Hill Australia4. Lea P . & Leegood RC (1993). Plant biochemistry and molecular biology. John Wiley & Sons, London: ix + 321 hlm.



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5. Larcher, W. 2003. Physiological plant ecology: ecophysiology and stress physiology of functional groups. Springer, Berlin: xx + 513 hlm
6. Lambers H, Chapin FS, Pons TL (1998). Plant Physiological Ecology. Springer. New York.
7. Marschner H. (1995). Mineral nutrition of higher plants. 2nd. Reprint. Acad.
8. Jurnal dan prosiding terkait Jurnal, prosiding yang terkait.



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Module Description

Title	Plant Growth Analysis Techniques
Code, if applicable	230702602P078
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Dwi Susanto, S.Si., M.Si. Dr. Hetty Manurung, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can understand the concept of plant growth analysis and its supporting aspects and apply it to the tropical rainforest areas of Kalimantan Island.
Content	<p>This course discusses the theories and concepts related to plant growth processes, including the concepts of soil and plant environment, internal and external factors influencing plant growth, plant metabolic processes, plant growth and development, phases of plant growth, identification of variables for plant growth observation, determination of growth analysis, description of vegetative and generative organ growth, methods for measuring leaf area, calculation of individual plant growth analysis, community plant growth analysis, and the balance between source and sink organs.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.



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Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Practicum (20%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Gardner, F.P., Pearce, R. B., and Mitchell, R. L. (1991). Fisiologi Tanaman Budidaya. Penerbit Universitas Indonesia Press. Jakarta.2. Sitompul, S. M (1992). Analisa Pertumbuhan Tanaman. Diktat Kuliah. Fakultas Pertanian Universitas Brawijaya. Malang3. Agustina, L. (2004). Pertumbuhan dan Perkembangan Sistem Tanaman Secara Kuantitatif. Diktat kuliah Fakultas Pertanian Universitas Brawijaya. Malang4. Fitter, A. H. (1991). Fisiologi Lingkungan Tanaman. Gajah Mada University Press. Yogyakarta.5. Sitompul, S. M. (1992). Metabolisme Dasar Tanaman. Edisi 2. Diktat kuliah Fakultas Pertanian Universitas Brawijaya. Malang.6. Sitompul, S. M. (1995). Fisiologi Tanaman Tropis. Pertumbuhan Tingkat molekuler dan Tanaman. Indonesian Australia Eastern Universities Project. Agriculture-Short Course.



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Module Description

Title	Plant Nutrition
Code, if applicable	230702602P077
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Hetty Manurung, S.Si., M.Si. Dr. Dwi Susanto, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester 1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation: 1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can apply scientific methods and ethics in solving problems and making informed decisions based on data and information analysis in plant nutrition (CPL 3). 2. Students can operate instruments, supervise, and evaluate the completion of practicum assignments and experimental work related to plant nutrition (CPL 5). 3. Students can master theoretical concepts in the field of plant nutrition, including identifying and explaining the theories and ideas related to essential nutrients (chemical elements) required by plants for growth, the mechanisms by which plants acquire nutrients from the soil, nutrient transport within plant systems, the functions of each nutrient, and deficiency symptoms exhibited by plants (CPL 1, 7).



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Content	This course discusses essential nutrients (chemical elements) required by plants for growth, the mechanisms by which plants acquire nutrients from the soil, and the transport of these nutrients within plant tissues. It also covers the specific functions of each nutrient and the deficiency symptoms plants exhibit.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Practicum (20%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Barker, A. V., and Pilbeam, D. J. 2006. Handbook of Plant Nutrition. CRC Press, USA.2. Marschner, P. 2012. Marschner's Mineral Nutrition of Higher Plants. Academic Press, USA.3. Barker, A. V., and Pilbeam, D. J. 2015. Handbook of Plant Nutrition (Second ed.). CRC Press, USA.4. Mengel, Konrad., E. A. Kirkby., H. Kosegarten and T. Appel. 2001. Principles of Plant Nutrition. Kluwer Academic Publishers.5. Mia, M. A. Baset. 2015. Nutrition of Crop Plants. Nova Science Publishers, New York.



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Module Description

Title	Population Genetics
Code, if applicable	230702603P036
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Muhammad Fauzi Arif, M.Sc. Sus Trimurti, M.P.
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO) :</p> <p>Students with an understanding of the basic concepts of population genetics, the principles and applications of Hardy-Weinberg's law, the factors that influence allele and genotype frequency changes (Microevolution Forces), and their relationship to mechanisms of isolation and speciation. In addition, students will be able to explain molecular techniques used for analyzing genetic variation in populations and be capable of analyzing population genetic variation using relevant software.</p>



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Content	The Population Genetics course explains the basic concepts of population genetics, the principles and applications of Hardy-Weinberg's law, the factors that influence changes in allele and genotype frequencies (Microevolution Forces), and their relationship to mechanisms of isolation and speciation. Additionally, the course covers molecular techniques used for analyzing genetic variation within populations and how to analyze genetic variation using relevant software.
Examination forms	Practical sessions, Individual assignment, Mid-term exam and final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignment (10%)2. Affective assessment (10%)3. Practicum (10%)4. Mid-term exam (30%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Säll, T. and Bengtsson, B.O. 2017. Understanding Population Genetics. Wiley-Blackwell Publisher2. Allendorf and Luikart. 2012. Conservation and The Genetic Populations. 2nd Edition. Blackwell Publishing (UK)3. Campbell, N.A., L.G. Mitchell, and J.B. Reece. 2017. Biology. Concept and Connection. 9th Edition. The Benjamin Cummings Publ.Co.Inc., California (USA)4. Griffith, A.J.F., J.F.Miller, D.T. Suzuki, R.C. Lewontin, and W.M. Gelbart. .2015. An Introduction to Genetic Analysis. 11th Edition. W.H. Freeman & Co., New York (USA)



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Module Description

Title	Quantitative Ecology
Code, if applicable	230702603P058
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Medi Hendra, M.Si Dr. Jusmaldi, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation or Field Practice (FO)
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS)



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	<p>Details:</p> <p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing this course, students will have a deeper understanding of the basic concepts and definitions of quantitative ecology and methods for quantitatively collecting data on species, populations, and ecosystems.



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Content	This course explains the basic concepts and definitions of quantitative ecology; methods for quantitatively collecting data on species, populations, and ecosystems; biodiversity, biodiversity indices, ecological communities, community similarity, species association and covariance, species extinction; and methods for analyzing experimental and observational data through multivariate approaches.
Examination forms	Practical sessions, Individual assignment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journal articles (10%) 2. Practicum (20%) 3. Affective assessment (10%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none"> 1. Indriyanto 2006. Ekologi Hutan. Jakarta: Penerbit PT Bumi Aksara. 2. Schneider, D.C. 1994.. Quantitative Ecology: Spatial and Temporal Scaling. San Diego: Academic Press. 3. Schneider, D.C. 2009. Quantitative Ecology 2nd Edition: Measurement, Models and Scaling.London: Academic Press. 4. Soegianto, A.1994. Ekologi Kuantitatif: Metode Analisis Populasi dan Komunitas. Surabaya:Usaha Nasional



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| | 5. Tarumingkeng, R.C. 1994. <i>Dinamika Populasi: Kajian Ekologi Kuantitatif</i> . Jakarta: Sinar Harapan. |
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Module Description

Title	Seed Physiology
Code, if applicable	230702602P047
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Drs. Dwi Susanto, S.Si., M.Si. Dr. Hetty Manurung, S.Si., M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: - 100 minutes for lectures, - 120 minutes for structural activities, - 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <p>1. Students can understand the concept of seed physiology along with its supporting aspects, address issues related to seed extraction, seed germination, and seedling preparation, and apply this knowledge in the tropical rainforest areas of Kalimantan Island.</p>
Content	<p>This course studies the theories and concepts related to physiological processes in seeds, including seed and fruit structure, seed food reserves, seed maturation, seed function and formation, germination, seed degeneration, seed dormancy, recalcitrant seeds, and germination factors.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.



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Study and examination requirements	<ol style="list-style-type: none">1. Affective Assessment (10%)2. Practicum (20%)3. Mid-Semester Examination (30%)4. Final Examination (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Copeland, L. O, and M. B. McDonald. 2001. Principles of Seed Science and Technology. Kluwer Academic Publishers. London.2. Cresti, M., and A. Tiezzi. 1992. Sexual Plant Reproduction. Springer-Verlag. New York.3. Sutopo, L. 2005. Teknologi Benih. Penerbit Rajawali Pers.4. Prpto, Yudono. 2018. Ilmu dan Teknologi Benih Rekalsitran: Tanaman Buah dan Perkebunan.



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Module Description

Title	Soil Science
Code, if applicable	230702603P088
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Dr. Samsurianto, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 7 th semester.
Teaching methods	Problem-Based Learning (PBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can understand the concepts in Soil Science. 2. Students can understand the factors that form soil, the processes involved in its formation, and the components of soil in daily life. 3. Students can understand soil's physical, chemical, and biological properties in everyday life. 4. Students can understand soil fertility. 5. Students can understand soil conservation methods.
Content	<p>This course covers the definition of soil, mineral soils, and organic soils, branches of soil science, factors of soil formation, soil formation processes, soil components, physicochemical characteristics of soil, and soil conservation for life.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.



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Study and examination requirements	<ol style="list-style-type: none">1. Affective assessment (10%)2. Individual assignment (10%)3. Practicum (20%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Harjowigeno. S. 2007. Ilmu Tanah. Akapres. Bogor, Indonesia.2. Mustafa, M., A. Ahmad., M. Ansar., M. Syaifuddin. 2012. Dasar-dasar Ilmu Tanah. Hibah Penulisan Buku Ajar. Program studi Agroteknologi, Jurusan Ilmu Tanah. Fakultas Pertanian Universitas Hasanuddin, Makassar.3. Subroto. 2003. Tanah, Pengelolaan dan Dampaknya. Fajar Gemilang, Samarinda.4. Subroto dan A. Yusrani. 2005. Kesuburan dan Pemanfaatan Tanah. Bayumedia. Malang, Indonesia.5. Sutedjo, M. M., A. G. Kartasapoetra., S. Sastroatmodjo. 1991. Mikrobiologi Tanah. Rineka Cipta, Jakarta.6. Sutedjo, M. M., A. G. Kartasapoetra. 2005. Pengantar Ilmu Tanah. Rineka Cipta, Jakarta.



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Module Description

Title	Special Topics in Thesis Support
Code, if applicable	230702602P038
Semester(s) in which the module is taught	6 th - 7 th semester
Person responsible for the module	Dr. Syafrizal, MP Dr. Fatmawati Patang, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th - 7 th semester.
Teaching methods	Case-Based Learning (CBL), Project-Based Learning (PjBL), Collaborative Learning (CbL), and Cooperative Learning (CpL).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Upon completing the Special Topics in Thesis Support course, students can construct a theoretical framework, research methods, and data analysis (in the form of a draft proposal) in alignment with their thesis research topic.</p>
<p>Content</p>	<p>This course is designed to accelerate students in preparing their thesis research proposals, covering the following aspects: literature review to formulate the background, writing the literature review, developing research methods, conducting data analysis/interpretation, preparing</p>



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	presentations and presentation techniques, and deepening laboratory and field techniques.
Examination forms	Practicum, Individual assessment, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (50%)2. Affective assessment (10%)3. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	Adjusting to the research topic.



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Module Description

Title	Stem Cell Biology
Code, if applicable	230702602P085
Semester(s) in which the module is taught	3 th semester
Person responsible for the module	Imam Rosadi, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 3 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), and Interactive Learning (IL).
Workload	For this course, students are required to meet a minimum of 79 hours in one semester, which consists of: <ul style="list-style-type: none">- 100 minutes for lectures,- 120 minutes for structural activities,- 120 minutes for individual study.
Credit points	2 credit points (equivalent to 3,2 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can explain the concepts of stem cell biology and analyze solutions to health-related issues within the field of biomedical sciences based on stem cell biology knowledge.
Content	<p>This course covers the basic concepts of stem cells, including definitions, sources, differentiation capabilities, and techniques for isolation and purification from adipose tissue, bone marrow, and umbilical cord. The course also includes the study of biomarkers, immunological characteristics, differentiation potential, and the regenerative abilities of stem cells.</p>
Examination forms	Individual assignment, Mid-term exam, and final exam.



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Study and examination requirements	<ol style="list-style-type: none">1. Affective Assessment (10%)2. Individual assignment (20%)3. Mid-Semester Examination (30%)4. Final Examination (40%)
Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	<ol style="list-style-type: none">1. Putra, A. 2019. Basic Molecular Stem Cell. Semarang: Unissula Press.2. Rajabzadeh, N., Fathi, E., and Farahzadi, R. 2019. Stem cell-based regenerative medicine. <i>Stem cell investigation</i>, 6.3. Rosadi, I., Karina, K., Rosliana, I., Sobariah, S., Afini, I., Widyastuti, T., and Barlian, A. 2019. In vitro study of cartilage tissue engineering using human adipose-derived stem cells induced by platelet-rich plasma and cultured on silk fibroin scaffold. <i>Stem cell research & therapy</i>, 10(1), pp.1-15.



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Module Description

Title	Tissue culture
Code, if applicable	230702603P064
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Yanti Puspita Sari, M.Si Dr. Samsurianto, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing the Plant Tissue Culture course, students will be able to develop concepts, principles, and procedures in the field of Plant Tissue Culture, including: the benefits and challenges of tissue culture, sterilization techniques, types and composition of media, explant planting, acclimatization, plant embryogenesis, haploid plants, somaclonal variation, in vitro induction of secondary metabolites, and protoplast culture.



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Content	This is an elective course that develops knowledge and skills through the study of basic tissue culture concepts, including its history and development, tissue culture laboratory facilities, advantages and disadvantages of tissue culture, types of tissue culture, preparation and composition of nutrient media, the effect of plant growth regulators on tissue growth, sterilization of equipment and explants, the influence of internal and external factors of the plant source on explant growth and development, the effect of physical factors on tissue growth and development, micropropagation, embryo culture, tissue culture for generating new traits, protoplast culture, protoplast fusion, acclimatization, and in vitro culture applications.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Practicum (20%)2. Affective assessment (10%)3. Mid-term exam (30%)4. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Gomborg, O.L. dan G.C. Phillips. 1995. Plant Cell, Tissue and Organ Culture – Fundamental Methods. Berlin: Springer - Verlag



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2. Goerge, E.F & Sherington .1984. Plant Propagation by Tissue Culture Handbook and Directory of Commercial Laboratories.
3. Mantell & Smith .1983.Plant Biotechnology
4. Pierik, R. L.M., 1987, In Vitro Culture of Higher Plants
5. Thorpe .1981. Plant Tissue Culture Methods & Application in Agriculture
6. Sari, Y.P.2018. Potensi Sarang Semut Sebagai Bahan Fitofarmakokimia, Mulawarman Press
7. Sari, Y.P. 2017. The potential of secondary metabolites of *Myrmecodia tuberosa* from different host trees. Jurnal Nusantara Bioscience
8. Sari, Y.P. 2018. Effect of sucrose and plant growth regulators on callogenesis and preliminary secondary metabolic of different explant *Myrmecodia tuberosa*. Jurnal Nusantara Bioscience
9. Sari, Y.P 2016. Micropropagation Of *Myrmecodia tuberosa* Jack.:A Medicinal Plant From Borneo. International Journal Of Scientific & Technology Research.
10. Sari, Y.P 2022. Antioxidant Activity Of Single Bulb Garlic Callus (*Allium sativum* L.) extract with in vitro method. AIP Conference Proceeding.



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Module Description

Title	Tropical plant breeding
Code, if applicable	230702603P065
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Yanti Puspita Sari, M.Si Dr. Ratna Kusuma, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<ol style="list-style-type: none"> 1. Explain the definition of plant breeding, standard breeding programs, and the plant breeding process. 2. Explain the domestication process in plants. 3. Explain the stages of plant breeding. 4. Explain the concept of the center of origin and germplasm. 5. Explain the basic techniques of plant breeding. 6. Explain the forms of plant breeding and the application of biotechnology in plant breeding.



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Content	In the Fundamentals of Plant Breeding course, students will study the definition and history of breeding, domestication, centers of origin, and germplasm. The course also covers breeding programs and processes, basic plant breeding techniques, including genetic material selection, crossing/hybridization, selection of hybrid offspring, polyploidy, mutation, yield testing, adaptation testing, and variety release.
Examination forms	Practicum, Individual assessment, Mid-term exam, and Final exam
Study and examination requirements	<ol style="list-style-type: none">1. Assignments (10%)2. Practicum (10%)3. Affective assessment (10%)4. Mid-term exam (30%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Fehr W.R. and H.H. Hadley. 1980. Hybridization of Crop Plants. Crop Science Society of America, Publishers, Madison, Wisconsin, USA.2. Allard, R. W. 2005. Principles of Plant Breeding. John Wiley and Sons, New York.3. Wiener G. 1999. Animal Breeding. Centre for Tropical Veterinary Medicine University of Edinburgh. First Published 1994 by Mac Millan Education Ltd.



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4. Sinha, U. and S. Sinha. 1997. Cytogenetics, Plant Breeding and Evolution. Vikas Publishing House PVT LTD. New Delhi.
5. Mugiono, 2001. Pemuliaan Tanaman Dengan Teknik Mutasi. Badan Tenaga Nuklir Nasional, Pusat Pendidikan dan Pelatihan, Jakarta.



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Module Description

Title	Water Quality Monitoring
Code, if applicable	230702602P081
Semester(s) in which the module is taught	6 th semester
Person responsible for the module	Dr. Fatmawati Patang, S.Si., M.Si. Dr. agr. Budiman, M.Si.
Language	Indonesian
Relation to curriculum	This course is applied (elective) and is offered in the 6 th semester.
Teaching methods	Case-Based Learning (CBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), Laboratory Work (LW), and Field Observation/Field Practice (FO).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study.
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester



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	<p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Students can formulate research problems, design studies, conduct sampling, perform data analysis, and interpret data related to monitoring water quality from physical, chemical, and biological perspectives.
Content	This course discusses the basic concepts of water quality monitoring from physical, chemical, and biological perspectives.
Examination forms	Individual assignment, Mid-term exam, and final exam.
Study and examination requirements	<ol style="list-style-type: none"> 1. Affective assessment (10%) 2. Project (15%) 3. Case Study (15%) 4. Practicum (20%) 5. Mid-term exam (15%) 6. Final exam (25%)



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Media employed	Whiteboard, projector, textbooks, and Mulawarman Integrated Learning (STAR).
Reading list	1. Bartram, J., R. Balance. 1996. <i>Water Quality Monitoring</i> . London: CRC Press.



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Module Description

Title	Wet Tropical Aquaculture
Code, if applicable	230702603P031
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Prof. Rudy Agung Nugroho, M.Si., Ph.D Dr. Lariman, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and offered in the 5 th semester.
Teaching methods	Case-Based Learning (CBL), Interactive Learning (IL) and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: - 150 minutes for lectures, - 180 minutes for structural activities, - 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details: 1 Credits = 170mins/week/semester 1 Credits = 170 mins x 14 week = 2,380 mins



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	<p>= 39.7hours/semester</p> <p>1 ECTS = 39.7h/29h</p> <p>= 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks including the two weeks for mid-semester test in between and final examination at the end of semester.</p> <p>1 semester consists of 2 quartiles, 1 quartile equals to 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 29 hours is set as a standard for 1 ECTS.</p>
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<ol style="list-style-type: none"> 1. Be devoted to God Almighty and demonstrate a religious attitude while participating in the endocrinology course. 2. Respect cultural diversity, perspectives, religions, beliefs, and the opinions or original findings of others during discussions on theories, concepts, principles, and basic procedures in the field of animal reproduction and development. 3. Apply logical, critical, systematic, and innovative thinking to master the material on animal reproduction and development. 4. Take responsibility for group work outcomes and supervise and evaluate practical assignments and experiments related to endocrinology. 5. Conduct self-evaluation of group performance and improve writing papers and practical reports in animal endocrinology. 6. Have intrinsic motivation to keep up with developments in endocrinology by applying logical, critical,



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	<p>systematic, and innovative thinking through critical analysis of articles.</p> <p>7. Be capable of producing written work, learning journals, analyzing articles, and creating preservation methods by utilizing available natural resources, relevant information, and communication technologies.</p>
Content	<p>This course provides knowledge, understanding, and insight into wet tropical aquaculture, various management and cultivation technologies (fish, shrimp, algae), aquatic environmental health, knowledge and handling of aquatic parasites and diseases, and fish nutrition</p>
Examination forms	<p>Practical sessions, Mid-term exam and final exam</p>
Study and examination requirements	<ol style="list-style-type: none"> 1. Reviewing relevant journals (10%) 2. Affective assessment (10%) 3. Practicum (20%) 4. Mid-term exam (20%) 5. Final exam (40%)
Media employed	<p>Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)</p>
Reading list	<ol style="list-style-type: none"> 1. Boyd, Claude E. "Guidelines for aquaculture effluent management at the farm-level." <i>Aquaculture</i> 226.1 (2003): 101-112. 2. Beveridge, Malcolm CM. <i>Cage aquaculture</i>. Vol. 5. John Wiley & Sons, 2008. 3. Pillay, Thundathil Velayudhan Ramakrishna. <i>Aquaculture: principles and practices</i>. Fishing News Books, 1990. 4. Boyd, Claude E., and Craig S. Tucker. <i>Pond aquaculture water quality management</i>. Springer Science & Business Media, 2012.



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| | <p>5. De Silva, Sena S., and Trevor A. Anderson. Fish nutrition in aquaculture. Vol. 1. Springer Science & Business Media, 1994.</p> |
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Module Description

Title	Wet Tropical Aquatic Resources Management
Code, if applicable	230702602P039
Semester(s) in which the module is taught	5 th semester
Person responsible for the module	Dr. Jusmaldi, M.Si Dr. Lariman, M.Si
Language	Indonesian
Relation to curriculum	This course is elective and is offered in the 5 th semester.
Teaching methods	Problem-Based Learning (PBL), Cooperative Learning (CpL), Collaborative Learning (CbL), Interactive Learning (IL), and Laboratory Work (LW).
Workload	For this course, students are required to meet a minimum of 119 hours in one semester, which consists of: <ul style="list-style-type: none">- 150 minutes for lectures,- 180 minutes for structural activities,- 180 minutes for individual study
Credit points	3 credit points (equivalent to 4,8 ECTS) Details:



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	<p>1 Credits = 170mins/week/semester</p> <p>1 Credits = 170 mins x 14 week = 2,380 mins = 39.7hours/semester</p> <p>1 ECTS = 39.7h/25h = 1.6</p> <p>Explanation:</p> <p>1 semester = 16 weeks, including the two weeks for the mid-semester test in between and the final examination at the end of the semester.</p> <p>One semester consists of 2 quarters, 1 quarter equals 12.5 – 15 ECTS, therefore 1 ECTS = 25 – 30 hours. The 25 hours are set as a standard for 1 ECTS.</p>
<p>Required and recommended prerequisites for joining the module</p>	<p>-</p>
<p>Module objectives/intended learning outcomes</p>	<p>Course Learning Outcomes (CLO):</p> <ol style="list-style-type: none"> 1. Demonstrate devotion to God Almighty and exhibit a religious attitude by studying wet tropical aquatic resource management. 2. Master the fundamental concepts of wet tropical aquatic resource management, including principles and procedures in freshwater research; demonstrate skills in using tools for measuring the physical and chemical parameters of water and analyzing the results; and be



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	<p>able to design, conduct, and report research projects, enabling the application of knowledge in managing water quality and conserving freshwater aquatic biodiversity under supervision.</p> <ol style="list-style-type: none">3. Demonstrate proficiency in applying scientific process skills to solve environmental problems in the surrounding area.4. Make sound decisions based on information and data analysis, and guide in selecting various alternative solutions independently or in groups within aquatic resource management.
Content	<p>This course introduces students to wet tropical aquatic resources, covering the characteristics of freshwater ecosystems based on physical, chemical, biological, and geological properties. Topics include the features and characteristics of lakes, rivers, phytoplankton, periphyton, microphytes, zooplankton, nekton, neuston, aquatic vertebrates, and benthic microinvertebrates. It also explores food chains, trophic structures, and energy transfer in marine ecosystems; eutrophication—its causes, impacts, prevention, and mitigation; water pollution—its causes, impacts, prevention, and solutions; biological indicators and freshwater biomonitoring; and the management of freshwater biological resources.</p>
Examination forms	<p>Individual assignment, Practical sessions, Mid-term exam, and Final exam.</p>



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Study and examination requirements	<ol style="list-style-type: none">1. Reviewing relevant journals (10%)2. Laboratory practicum (20%)3. Affective assessment (10%)4. Mid-term exam (20%)5. Final exam (40%)
Media employed	Whiteboard, projector, textbooks, Mulawarman Integrated Learning (STAR)
Reading list	<ol style="list-style-type: none">1. Kalf, J. 2002. <i>Limnology</i>. New York: Prentice Hall2. Michael, P. 1984. <i>Ecological method for Field and Laboratory Investigations</i>. New Delhi: Tata McGraw-Hill Publishing3. Company Limited.4. Payne, A.I. 1986. <i>The Ecology of Tropical Lake & River</i>. Chicester-New York-Toronto-Brisbane. Singapura : John Wiley and5. Sons.6. Suwono, Hadi. 2012. <i>Dasar-dasar Limnologi</i>. Malang: Putra Media Nusantara7. Wetzel, R.G. 1998. <i>Limnology</i>. Philadelphia: W.B. Saunders Company.



Contact & Information

We are here to support your journey with the Biology Programme. Feel free to reach out to us through the following channels:

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