



ASIIN Seal

Accreditation Report

Bachelor's Degree Programs

***Animal Science and Industry
Biology***

Master's Degree Programs

***Biology
Biotechnology***

Provided by the
Universitas Gadjah Mada, Yogyakarta – Indonesia

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A About the Accreditation Process

Name of the degree program (in original language)	(Official) English translation of the names	Labels applied for ¹	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) ²
Ilmu dan Industri Peternakan	Bachelor in Animal Science and Industry	ASIIN	ASIIN Accreditation (2018 – 2023) AUN-QA Certification (2013) National Accreditation Body for Higher Education (BAN-PT) Rank: Excellent (2020 - 2023)	08
Sarjana Biologi	Bachelor in Biology	ASIIN	ASIIN Accreditation (2018-2023) National Accreditation Body for Higher Education (BAN-PT) Rank: Excellent (2020-2023) Rank: A (2020-2025)	10
Magister Biology	Master in Biology	ASIIN	AUN-QA Certification (2019-2023) National Accreditation Body for Higher Education (BAN-PT) Rank: A (2021-2026)	10
Magister Bioteknologi	Master in Biotechnology	ASIIN	National Accreditation Body for Higher Education (BAN-PT) Rank: A (2021-2026)	10
Date of the contract: 27.06.2022				

¹ ASIIN Seal for degree programs

² TC: Technical Committee for the following subject areas: TC 08 – Agriculture, Forestry, Food Sciences, and Landscape Architecture; TC 10 – Life Sciences

<p>Submission of the final version of the Self-Assessment Report: 16.11.2022</p> <p>Date of the audit: 15.05. – 18.05.2023</p>	
<p>Expert Group:</p> <p>Prof. Dr. Matthias Gauly, University of Bozen</p> <p>Prof. Dr. Ralph Schill, Stuttgart University</p> <p>Prof. Dr. Elisa Herawati, Universitas Sebelas Maret</p> <p>Dr. Sonja Kleinertz, Bali</p> <p>Muhammad Ibrahim, Universitas Sebelas Maret, student</p>	
<p>Representative of the ASIIN headquarter: Dr. Emeline Jerez</p>	
<p>Responsible decision-making committee: ASIIN Accreditation Commission</p>	
<p>Criteria used:</p> <p>European Standards and Guidelines as of 15.05.2015</p> <p>ASIIN General Criteria as of 28.03.2023</p> <p>Subject-Specific Criteria of Technical Committee 08 – Agriculture, Forestry, Food Sciences, and Landscape Architecture; as of 27.03.2015</p> <p>Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 28.06.2019</p>	

B Characteristics of the Degree Programs

Name	Areas of Specialisation	Corresponding level of the EQF ³	Mode of Study And duration	Credit points/unit	First time of offer
Bachelor in Animal Science and Industry	-	Level 6	Full time 8 Semesters	144 credit points (230.4 ECTS)	August 2005
Bachelor in Biology	-	Level 6	Full time 8 Semesters	144 credits (230.4 ECTS)	August 1995/96
Master in Biology	-	Level 7	Full time 4 Semesters	42 credits (105.6 ECTS)	Feb – Aug 1980/81
			By Research 4 Semesters	40 credits (102.4 ECTS)	
Master in Biotechnology	-	Level 7	Full time 4 Semesters	40 credits (102.4 ECTS)	August 1994

³ EQF = The European Qualifications Framework for lifelong learning

The experts acknowledge and consider the contextual framework within which the four programs currently being assessed are offered:

Founded in 1949 through Government Regulation No 23, Universitas Gadjah Mada (UGM) is a not-for-profit public institution of higher education in the urban environs of Yogyakarta city. With 61,440 students and 4,336 faculty staff members distributed across 18 faculties, two schools and 287 study programs, UGM is Indonesia's oldest and largest institution of higher learning. UGM has a selective admission policy based on entrance examinations, which will be further elaborated upon in subsequent sections of this report. International applicants are eligible to apply for enrolment. In terms of national and international rankings, UGM is ranked 2nd among 582 Indonesian Higher Education Institutions in the 2023 Indonesian University Ranking and at position 616 in world rankings.

The Faculty of Animal Science

The Faculty of Animal Science offers various degree programs, such as bachelor, master, doctoral, and professional engineering. Among them, the ***Bachelor in Animal Science and Industry*** program, which reports 1496 active students in 2022/2023, is currently undergoing a review for ASIIN re-accreditation. This Bachelor's degree program has been available since 2005 and is outlined with the following description in the UGM's Self-Assessment Report:

The program's vision "is to be an excellent, independent and dignified program in animal science and industry that is internationally recognized, and Pancasila-oriented (based on Indonesia Five Principles) focusing on prioritization of national interest and prosperity of Indonesia." Its mission is "1. To conduct an internationally qualified education in animal science and industry, producing graduates with high moral integrity and knowledge involved in nation-building and development of the country; 2. To conduct research utilizing local excellence and expertise in order to develop science and technology in animal science; 3. To provide community services and to develop innovations needed by the community, and 4. To develop organization in relation to educational activities, research, and community development through transparent, accountable, and qualified management."

In alignment with the above vision and mission, the ***Bachelor's degree program in Animal Science and Industry*** Education Objectives (PEOs) are to produce graduates who:

- "1. Embody the spirit of Pancasila, norms, religion, and ethics in developing the livestock sector.
2. Master the general theoretical concepts of related knowledge and the deeper concepts of animal science, and has an innate capacity in problem solving.

3. Are able to apply the acquired animal science through research, entrepreneurship or pursue higher education.
4. Perform effective communication skills in the fields of animal science and industry by using information technology and harmonizing the gained knowledge with other sciences.”

The Faculty of Biology

The Faculty of Biology provides three educational programs, one of which is a doctoral program in biology. The other two programs, the **Bachelor in Biology** and the **Master in Biology** have active enrolments of 1144 and 196 students, respectively. These programs are undergoing the ASIIN review process for accreditation (re-accreditation for the Bachelor’s degree program). The Bachelor’s degree program has been on offer since 1995/96, while the Master’s degree program, since 1980/81. The programs are presented with the following profile in the UGM’s Self-Assessment Report:

The “Faculty of Biology has the vision to become an internationally acknowledged faculty, as a center of education, research development, and community service in biology, especially in tropical biology, oriented to the interests of the nation and based on Pancasila, with a mission: 1. Organizing high quality of higher education in undergraduate and graduate levels in biology; 2. Performing good governance faculty organizations; 3. Producing excellent and competitive graduates of both undergraduate and graduate programs with high moral principles of Pancasila; 4. Conducting high-quality biological research for academic and community service purposes; 5. Providing public services in biology and biology-related applications, and 6. Building collaboration with other universities, government, private sectors and industries, both national and international, in order to develop the Tri Dharma of higher education.”

Accordingly, the **Bachelor’s degree program in Biology** Education Objectives (PEOs) are to provide:

- “1. Graduates with a comprehensive scientific education in all biology disciplines.
2. Graduates with the ability to pursue any career in biology, particularly in Tropical Biology.
3. Graduates with leadership and management skills to provide solutions to Tropical Biology problems.
4. Graduates who embrace Pancasila as a base for ethical scientific activities, as well as research, publication and daily conduct.
5. Graduates with an intellectual and practical understanding of good science on Tropical Biology to pursue higher education.”

As for the ***Master in Biology***, its mission “is carrying out a high qualified Master Program in order to educate and empower the nation, maintain national integration and international vision; develop a Master Program in accordance with the demands of the era and improve transparent management and quality in a sustainable manner; improving the quality of research that sustains education, advancement of science, technology, and art and enrichment of the nation's culture; improving community service on the basis of social responsibility for the benefit of the people; cooperate in a sustainable manner with research institutions, governments, businesses, and the global community; and produce graduates who are ethical, resilient, spirited leaders, and excel based on the identity of the nation (Pancasila).”

The UGM Graduate School

The Graduate School has 25 study programs consisting of 14 master's and 11 doctoral degree programs. It covers science and technology, social sciences, and humanities. The study program proposed to be accredited by ASIIN is the ***Master in Biotechnology***, established in 1994. With approximately 80 active students, it is supported by academic staff from 11 supporting Faculties, including Biology, Pharmacy, Mathematics and Natural Sciences, Medicine, Public Health and Nursing, Dentistry, Agriculture, Animal Husbandry, Veterinary, Agricultural Technology, Forestry, and Engineering.

The ***Master's degree program in Biotechnology*** Education Objectives (PEOs) are to provide:

- “1. graduates at the postgraduate level in biotechnology, which can develop and apply modern biotechnology principles to benefit humankind.
2. graduate program graduates who have competitive abilities so that they can continue to the next postgraduate level both at home and abroad.
3. quality scientific publications in the fields of health, agro, environmental and industrial biotechnology.
4. technology in health, agro, environmental and industrial biotechnology.
5. cooperation in education and research with other educational institutions at home and abroad.
6. cooperation in the field of research with research institutions and industry at home and overseas.”

The vision and mission statements and the PEOs of the study programs under review have been widely published. They are accessible via the corresponding website and in several documents, such as the Academic Guidebook/Handbook.

UGM is using international accreditation as a means of self-improvement and an instrument to promote its standing in the national and international HE community.

C Accreditation Report for the ASIIN Seal

1. The Degree Program: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree program (intended qualifications profile)

Evidence:

- Self-Assessment Report
- Academic Guidebook for the study programs under review
- Webpage Ba Animal Science and Industry: <https://fapet.ugm.ac.id/en/undergraduate-program/>
- Webpage Ba Biology: <https://biologi.ugm.ac.id/en/course-of-undergraduate-program/>
- Webpage Ma Biology: <https://biologi.ugm.ac.id/en/master-program-in-biology-description/>
- Webpage Ma Biotechnology: <https://magisterbioteknologi.pasca.ugm.ac.id/en/halaman-muka-english/>
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The ***Bachelor in Animal Science and Industry*** is a full-time program with a duration of eight semesters and 230.4 ECTS. As documented in the UGM's Self-Assessment Report, the Program Learning Outcomes (PLOs) are based on the Program Education Objectives (PEOs), developed through a stakeholder process involving students, academics, alumni, government officials, policymakers, and industry partners. These outcomes are aligned with the Indonesian quality frameworks, the Indonesian Animal Science Dean Forum Agreement, and the Indonesian National Qualification Framework (level 6). Based on Government regulation, the PLOs of the ***Bachelor in Animal Science and Industry*** are divided into four criteria as follows:

ATTITUDE	After this Program, the graduates are willing to
A1	Being devoted to God Almighty and upholding human values in carrying out duties based on religion, morals, and ethics (PLO 1);
A2	Contributing to improving the quality of life in the society, nation, and to the advancement of civilization based on Pancasila (PLO 2);
A3	Respecting the diversity of cultures, views, religions, and beliefs, as well as the original opinions or findings of others to show good teamwork and having social sensitivity and concern for the community and the environment (PLO 3);

A4	Obey the law and discipline in social life by embodying the academic values, norms, and ethics, and showing the work responsibility in their expertise independently (PLO 4);
A5	Embody the spirit of independence, work ethos, struggle and entrepreneurship to demonstrate behavior in accordance with ethics (PLO 5);
A6	Have sincerity, commitment to develop the attitudes, values, and abilities of students based on the values of local wisdom and noble character and have the motivation to act for the benefit of students and society in general (PLO 6);
A7	Be responsible, work professionally, and have a sensibility regarding issues as well as be able to anticipate and resolve problems in accordance with laws/regulations (PLO 7).
KNOWLEDGE	The graduates are demonstrating excellent knowledge in:
K1	Mastering the basic theoretical concepts of natural science and basic animal science (PLO 8);
K2	Mastering the principles and solving problems in the current animal science area based on economics, social, and environment (PLO 9);
K3	Mastering the principles and techniques of designing systems, processes, and/or components in the livestock sector (PLO 10);
K4	Applying the engineering principles of the livestock industry from upstream to downstream by considering business optimization and the development of information technology (PLO 11).
GENERAL SKILLS	The graduates are able to:
GS1	Able to apply critical, creative, strategic, and systematic thinking independently in the context of the science and technology implementation that pay attention to and apply human values in accordance with their expertise area (PLO 12);
GS2	Able to compose a scientific description of the study results as the final task, and disseminate it through the college website (PLO 13);
GS3	Able to lead and make decisions appropriately in the context of problem solving in animal husbandry based on the results of information and data analysis (PLO 14);
GS4	Able to uphold academic integrity in general and prevent plagiarism practices (PLO 15);
GS5	Able to communicate effectively with oral and written in Indonesian and English by using information technology for scientific development and animal husbandry implementation (PLO 16);
SPECIFIC SKILLS	The graduates are able to:
SK1	Able to identify, analyze, and formulate problem solving by applying the latest scientifically reliable methods and technology while maintaining academic integrity in animal science and industry (PLO 17);
SK2	Able to design, implement, and evaluate an innovative and sustainable livestock business management system by considering social, economic, cultural, and environmental considerations, especially in the tropics (PLO 18);
SK3	Able to utilize resources and planning tools and engineering analysis effectively and efficiently with a cutting-edge approach in animal science (PLO 19).

Together with this comprehensive list of graduate attributes, the Faculty of Animal Science has used the ASIIN Subject-Specific Criteria of the Technical Committee “Agriculture, Forestry, Food Sciences, and Landscape Architecture” as a point of reference. The table below presents the correlation matrix between subject-specific competences and expected learning outcomes for the *Bachelor in Animal Science and Industry* graduates:

Subject-Specific Competences (SSC)	Program Learning Outcome (PLO)
1. Knowledge and Understanding	
Graduates	
know and understand the principles of natural sciences, social science, mathematics, medical science, economics, and engineering their discipline is based on	PLO 8
have a coherent knowledge in their discipline including knowledge of the latest findings in their discipline	PLO 17
know concepts of identification and safeguarding of quality in their respective fields of work	PLO 9

Subject-Specific Competences (SSC)	Program Learning Outcome (PLO)
know the essential legal regulations relating to their discipline	PLO 7
are aware of the further multidisciplinary context of agriculture, forestry, food science, or landscape architecture and neighbouring fields	PLO 18
2. Engineering Analysis	
Graduates	
have the required knowledge and understanding to identify and formulate problems arising in agriculture, forestry, food science, or landscape architecture (which may contain aspects stemming from areas other than their field of specialisation)	PLO 9, PLO 17, PLO 14
are able to apply different methods orientated on fundamentals – such as mathematical, statistical, and experimental (laboratory) analysis	PLO 19
are qualified to plan and conduct respectively suitable experiments, interpret the data, and draw conclusions	PLO 13
3. Investigations	
Graduates	
are able to pursue literature searches in a targeted way and to use databases and other sources of information	PLO 13, PLO 14, PLO 15
are qualified to carry out assessments on the basis of comparisons with literature references and plausibility considerations	PLO 13, PLO 14, PLO 16
4. Engineering Practice	
Graduates	
have the skills to solve practical problems	PLO 9, PLO 17
can combine theory and practice to solve subject-specific practical problems	PLO 9, PLO 17, PLO 19
are able to select and apply suitable devices, processes, and methods	PLO 17
have developed an understanding of applicable techniques and methods and their limitations	PLO 11, PLO 18
recognize the technical, health and safety, social, ecological, and legal implications of engineering practice in their field of scientific expertise	PLO 18
can apply methods relevant for their profession	PLO 17, PLO 19
are aware of the usability and the restrictions of concepts and solution strategies	PLO 17
can resort to experience with problems, topics, and processes relating to their scientific discipline	PLO 11, PLO 19
are able to consult adequate literature and information sources and coordinate the work of experts	PLO 19
5. Social Competences	
Graduates	
are able to work efficiently on their own and as team members	PLO 7, PLO 14
are qualified to apply different methods to communicate effectively with the scientific community and the society as a whole	PLO 16
feel obliged to act in accordance with professional ethics and the responsibilities and standards of practical engineering	PLO 4, PLO 7, PLO 15
are aware of the methods of project management and business practices such as risk and change management and understand their limitations	PLO 11
recognise the necessity of independent life-long learning and are qualified to do so	PLO 2
depending on the professional field they have competences in the fields of management and marketing, in particular project management, acquisition, personnel management, controlling etc	PLO 9, PLO 10
are adequately competent in the area of communication, e.g., presentations or moderation	PLO 13, PLO 15, PLO 16

The learning outcomes for the *Bachelor in Animal Science and Industry* are reviewed every five years along with the curriculum. Additionally, they are monitored annually by

conducting a curriculum workshop and forum group discussion involving all stakeholders. The most recent evaluation took place in 2021.

As for the **Bachelor in Biology**, it is a full-time program with a duration of eight semesters and 230.4 ECTS. According to the UGM's Self-Assessment Report, the Program Learning Outcomes (PLOs) are aligned with the Program Education Objectives (PEOs). These objectives align with the vision and mission of the University and the Faculty of Biology, as well as the Indonesian National Qualification Framework (level 6). The PLOs are based on surveys conducted among alumni and stakeholders, as well as analysis from internal sources such as lecturers and students:

ATTITUDE	After this Program, the graduates are demonstrating ability to:
A1	acquire an appreciation for all biological disciplines and fundamental biology-relevant knowledge of mathematics and the natural sciences (PLO 11)
A2	acquire an appreciation for self-improvement and long-life learning, and ability to identify avenues for improvement (PLO 9)
GENERAL KNOWLEDGE AND SKILLS	The graduates are demonstrating excellent knowledge and skills in:
KS1	have an ability to apply what they have learned in Biology (PLO 1)
KS2	demonstrate skills and knowledge of Molecular Biology and Biotechnology in Tropical Biology (PLO 2)
KS3	demonstrate skills and knowledge of Functional Biology in Tropical Biology (PLO 3)
KS4	demonstrate skills and knowledge of Environmental Biology and Biodiversity in Tropical Biology (PLO 4)
SPECIFIC SKILLS	The graduates are demonstrating excellent skills in:
SS1	design and conduct biological research both individually or in a team, and then to analyze as well as to interpret the data and to form conclusions based on it (PLO 5)
SS2	value and internalize scientific method, scientific rigor, and the importance of good science (PLO 10)
SS3	communicate and express a fundamental scientific opinion effectively, in both oral and written formats (PLO 8)
COMPETENCE	The graduates have excellent competence in:
C1	identify problems including safety and environmental issues related to Tropical Biology and to develop scientifically sound solutions to them (PLO 6)
C2	recognize the importance of professional and ethical responsibility, and a commitment to apply these ethical principles in their research or daily conduct. (PLO 7)

The Faculty of Biology matches the PLOs of the **Bachelor in Biology** against the ASIIN Subject-Specific Criteria of the Technical Committee "Life Sciences". Accordingly, all graduates of the program are expected to achieve the following competences:

SOCIAL COMPETENCE	After this Program, the graduates are willing to
have trained conceptual, analytical and logical thinking	PLO 1, PLO 9
have an awareness of possible social, ethical and environment-related effects of their action	PLO 7
have acquired communication skills – also in a foreign language – and can communicate scientific information to experts and laypersons in a suitable manner	PLO 8
have a capacity for teamwork, also on an intercultural basis	PLO 1, PLO 5
have acquired lifelong learning strategies	PLO 9
SPECIALIST SKILLS	The graduates are able to:

have acquired sound fundamental biology-relevant knowledge of mathematics and the natural science	PLO 11
have sound knowledge of the fundamentals of molecular, cell and organismic biology	PLO 2, PLO 3, PLO 4
have gained methodological competence in bio sciences and are also able to apply this in other contexts	PLO 5, PLO 6, PLO 7, PLO 10
are able to carry out practical work in labs and outdoors independently as well as handle organisms	PLO 2, PLO 3, PLO 4, PLO 5
have relevant knowledge of safety and environmental issues as well as the associated legal fundamentals	PLO 6
have gained sound knowledge in at least one special life science area of the degree program	PLO 2, PLO 3, PLO 4
are able to recognize and solve subject-relevant problems	PLO 6
are able to solve life science problems and present the results	PLO 1, PLO 5

The learning outcomes for the **Bachelor in Biology** were established in 2017 and updated in 2021.

As regards the **Master in Biology**, it offers two admission paths, that is, a full-time regular program and a by-research program. As a multidisciplinary educational offering, it focuses on seven study interests, 1. Industrial Biology and Biological Engineering; 2. Medical and Forensic Biology; 3. Functional and Developmental Biology; 4. Biodiversity and Biosystematics; 5. Systems Biology and Synthetics; 6. Marine Biology; and 7. Environmental and Conservation Biology.

In its Self-Assessment Report, UGM first matches the PLOs of the **Master in Biology** against the national Standards of Higher Education and the Indonesian National Qualifications Framework (level 7), which request all graduates to be:

- “1. able to develop knowledge, technology and/or art in their field of science or professional practice through research, to produce innovative and reliable works;
2. able to solve problems in science, technology, and/or art through inter or multidisciplinary approaches; and
3. capable of managing research and development beneficial to society and science, and capable of gaining national and international recognition.”

The alignment of PLOs to the National Standards of Higher Education is discussed through a series of meetings with other universities in a forum of the Indonesian Biology Consortium. The formulation of PLOs also considers the input from stakeholders and represents all three domains in education (affective, cognitive, psychomotor):

ATTITUDE	After this Program, the graduates are willing to
A1	contribute in improving the quality of life of society, nation, state, and the development of civilization based on Pancasila (PLO 1)
A2	cooperate with communities at various level, and have social sensitivity and concern for the society and environment (PLO 2)
A3	internalize the academic values, norms, and ethics as well as demonstrate responsible attitudes in their field of expertise (PLO 3)
KNOWLEDGE	The graduates are demonstrating excellent knowledge in:

K1	biological theories, includes all aspects of biological studies at various levels in the organization of life (PLO 4)
K2	appropriate biological research methods (PLO 5)
K3	analysis and synthesis based on biological concepts, and principles of sustainable use and conservation of biological resources (PLO 6)
GENERAL SKILLS	The graduates are able to :
GS1	develop logical, critical, systematic, and creative thinking through scientific research; develop scientific concepts and present the results based on scientific rules, procedures, and ethics in the form of theses and scientific publications (PLO 7)
GS2	make decisions in solving biological problems based on analytical or experimental studies and critical analysis of information and data (PLO 8)
GS3	develop cooperation with institutions and research communities (PLO 9)
GS4	manage research data in order to ensure validity, strictly hold the academic integrity, and prevent themselves from plagiarism practices (PLO 10)
GS5	use information technology in scientific development and implementing it in their area of expertise (PLO 11)
GS6	communicate effectively (written and spoken) with at least one international language (PLO 12)
SPECIFIC SKILLS	The graduates are able to :
SK1	conduct research in the field of biology independently or in groups, and able to solve various biological-related problems (PLO 13)
SK2	solve problems related to biological resources through an inter- and / or multidisciplinary approaches beneficial to society and scientific community (PLO 14)
SK3	gain recognition from the national and / or international community in biological science (PLO 15)

In analogy to the exercise conducted for the undergraduate program, the Faculty of Biology matches the PLOs of the *Master in Biology* against the Subject-Specific Criteria of the Technical Committee (SSC) 10-ASIIN. Accordingly, every graduate of the program is challenged to demonstrate compliance with the following:

Subject-Specific Competences	After this Program, the graduates are willing to
have advanced their knowledge in core subjects, subject-relevant or interdisciplinary subjects	PLO 4, PLO 5, PLO 6, PLO 7
are in a position to discuss complex life science issues as well as own research results comprehensively and in the context of current international research and present these in writing (e.g., Master's thesis, scientific publication) and orally (e.g., lecture with free discussion)	PLO 1, PLO 2, PLO 3, PLO 10, PLO 12, PLO 15
have gained subject-specific and interdisciplinary problem-solving competence.	PLO 13, PLO 14
have gained the ability to combine specialized knowledge of various component disciplines, carry out independent scientific work and organize, conduct and lead more complex projects as well as publish the results	PLO 8, PLO 9, PLO 12, PLO 13, PLO 14
have acquired social competences, such as abstraction ability, systems analytical thinking, capacity for teamwork, ability to communicate, international and intercultural experience and others, and are therefore especially prepared to take on leadership responsibilities	PLO 11, PLO 13, PLO 15
are in a position to also assess the social and environment-related effects of their actions	PLO 14, PLO 15

The *Master in Biology's* current learning objectives have been updated from those established in 2013. In August 2017, the program reviewed and revised these objectives, seeking input from the curriculum team. Following this, in September of the same year, the Head of the Department endorsed the revised objectives.

Similarly, for the **Master in Biotechnology**, the Program Education Objectives (PEOs) align with the university's mission and graduate school's vision. These PEOs are further broken down into Program Learning Outcomes (PLOs) that outline the skills, knowledge, and competences needed for success at level 6 of the Indonesian National Qualification Framework:

ATTITUDE	After this Program, the graduates are willing to
A1	Contribute to the improvement in the quality of social life, the life of community and nation, and the progress of human civilization based on Pancasila (PLO1)
KNOWLEDGE	The graduates are demonstrating excellent knowledge in:
K1	molecular biology covers cell biology, molecular physiology, and molecular genetics (PLO2)
K2	the interactions among cells, tissues, organs, and living organisms within their environment (PLO3)
K3	the basics of molecular and cellular engineering, including genomes, genes, proteins, and metabolites engineering (PLO4)
K4	the concept of cells, tissue, and organ propagation for mass production of biotechnology products (PLO5)
GENERAL SKILLS	The graduates are able to:
G1	formulate and express ideas, thinking, and scientific arguments based on academic ethics and communicate them to the academic community and the general public using the available media (PLO6)
SPECIFIC SKILLS	The graduates are able to:
S1	identify the problems and the needs that can be overcome using biotechnology (PLO7)
S2	properly design and carry out an experimental/research methodology (PLO8)
S3	use laboratory equipment in an integrated manner to obtain biomass and biomolecular data (PLO9)
S4	use software for in-depth analysis of experimental/research results to comprehensively address the hypothesis (PLO10)

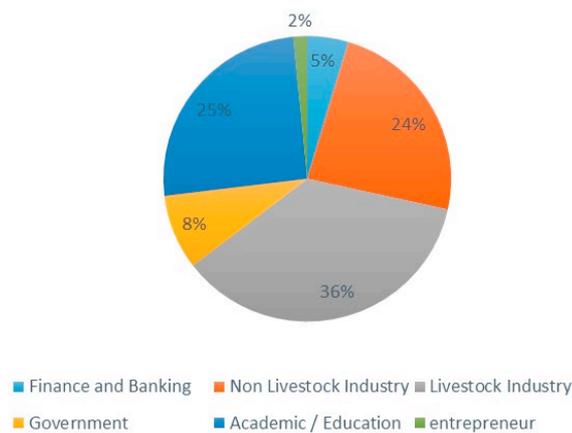
The PLOs of the **Master in Biotechnology** correspond to the requirements for the Master degree programs of ASIIN-Subject-Specific Criteria 10 – Life science:

Subject-Specific Competence	After this Program, the graduates are willing to
have advanced their knowledge in core subjects, subject-relevant or interdisciplinary subjects	PLO 2, PLO 3, PLO 4, PLO 5
are in a position to discuss complex life science issues as well as own research results comprehensively and in the context of current international research and present these in writing (e.g., Master's thesis, scientific publication) and orally (e.g., lecture with free discussion)	PLO 1, PLO 6, PLO 7
have gained subject-specific and interdisciplinary problem-solving competence	PLO 2, PLO 3, PLO 4, PLO 5, PLO 6
General and Social Competences	
have gained the ability to combine specialized knowledge of various component disciplines, carry out independent scientific work and organize, conduct and lead more complex projects as well as publish the results	PLO 7, PLO 8, PLO 9, PLO 10
have acquired social competences, such as abstraction ability, systems analytical thinking, capacity for teamwork, ability to communicate, international and intercultural experience and others, and are therefore especially prepared to take on leadership responsibilities	PLO 6, PLO 7
are in a position to also assess the social and environment-related effects of their actions	PLO 1, PLO 6, PLO 7

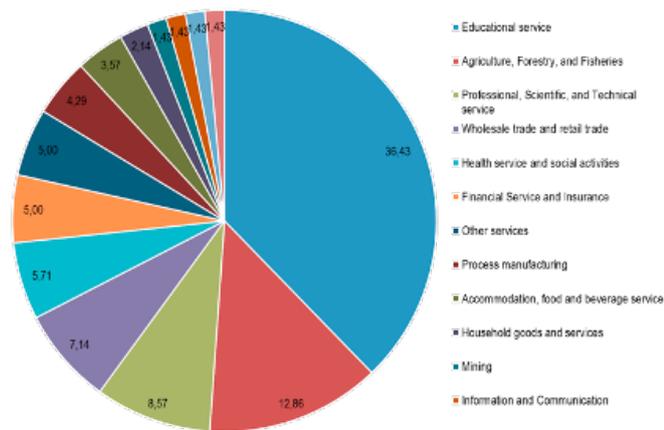
Employability

UGM has implemented tracer studies to monitor the employability of graduates from the reviewed study programs, tracking their achievements and outcomes in the professional field.

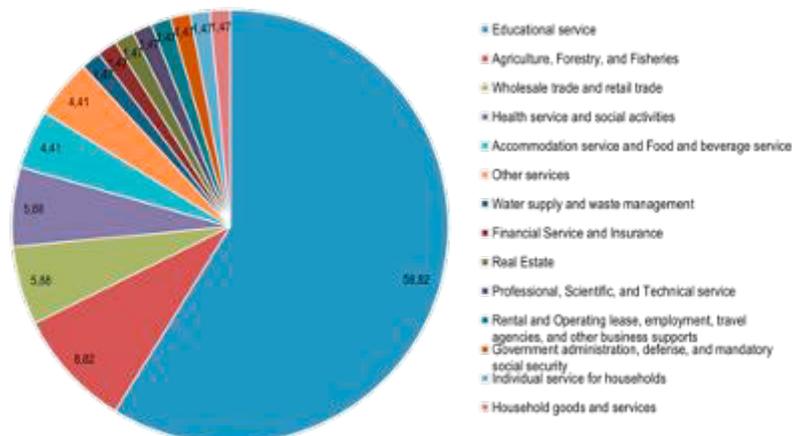
Graduates of the **Bachelor in Animal Science and Industry** are expected to find suitable positions as a) professional animal engineer; b) professional livestock farmer; c) business leader; d) entrepreneur; e) researcher; f) educator, and g) bureaucrat. The 2017-2021 tracer study indicates that almost half of the graduates typically wait one to three months before securing their first job. The chart below shows that graduates work in the livestock industry (36%), including feed mills, poultry farms, ruminant farms, swine farms, and farm equipment support. Academic areas come in second (25%), followed by the non-livestock industry (24%), government institutions (8%), finance and banking (5%), and entrepreneurs (2%).



For the **Bachelor in Biology**, the 2019-2021 tracer study shows that 32% of graduates had to wait one to three months before finding employment, while 5% were recruited before graduation. Almost 90% of the graduates were employed within one year after graduation. As illustrated in the figure, most graduates work in education services (36%). In contrast, others opt for fields like agriculture, forestry, and fisheries (13%), professional and scientific services (9%), wholesale and retail trade (7%), and health and social services (6%). Private companies employ 55% of alumni, followed by the government sector (16%), entrepreneurs (16%), and NGOs (4%).

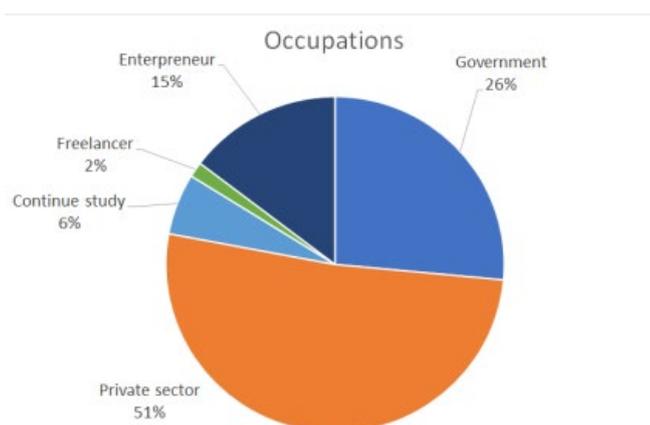


As regards the **Master in Biotechnology**, most students who join the program have prior work experience, are primarily from academic backgrounds, or are researchers seeking advanced education. However, there has been a recent trend where fresh graduates from undergraduate programs enrol in the master's program before finding employment. According to the 2019-2021 tracer study, almost half of the recent graduates found their first job in less than three months, while a quarter had started working before graduating. As shown in the visual representation, most graduates pursue education careers (56%), with some working in agriculture, forestry and fisheries (9%), health services (6%), and food and beverage service (4%). Furthermore, most alumni work in Government offices (29%), while 23% work for private institutions, and 16% are entrepreneurs.



Master in Biotechnology graduates are expected to be able to find suitable positions as a) higher education educators; b) researchers in the field of biotechnology; c) biotechnology specialist labs, and d) entrepreneurs in the field of biotechnology. In 2021, 50% of graduates found employment before graduating, thanks to previous work experience or study assignments from their employer. As evidenced by the visual data, most graduates are employed in both the government and private sectors. Those who work for the government typically conduct research in organisations like BRIN (*Badan Riset dan Inovasi*

Nasional). The remaining graduates pursue careers as educators, business owners, independent contractors, or further their education.



In their assessment of this criterion, the ASIIN expert team comes to the following conclusions:

UGM has defined Program Education Objectives (PEOs) and Program Learning Outcomes (PLOs) to describe the profile and the goals of the programs under review. The PEOs outline general purposes, while the PLOs provide specific details on the competences that students should acquire during their studies. These objectives were created by analysing the University's vision, mission, and industry demands. They were determined through a stakeholder process that reflects the University's requirements and the needs of the labour market and broader society.

The auditors believe that the objectives and program learning outcomes of the Bachelor's and Master's degree programs under review are reasonable and well-founded. They reflect very well the level of qualification for each program. In addition, an assignment to possible occupations is given in a precise and realistic way. PLOs are arranged in line with PEOs and are well described on the programs' website and Academic Guidebook, making them accessible to all stakeholders.

Based on the Self-Assessment Report and the discussions during the on-site visit, the experts see that the graduates of the programs under review acquire the necessary subject-related competences, such as a life science-related sound knowledge of mathematics and the natural sciences, in-depth knowledge and methodological competence in biological sciences and can apply this in other contexts. They also gain methodological competence in the classical core life sciences, are familiar with the hazards caused by handling chemicals, the manipulation of living and non-living material (pathogenic viruses, bacteria, and parasites), are adequately trained on the necessary safety measures and precautions, can carry out practical work in laboratories and outdoors independently. Moreover, the graduates should be able to handle organisms and have acquired relevant knowledge of

safety and environmental issues as well as the associated legal fundamentals. Furthermore, they are able to solve subject-relevant problems, present the results, have trained their analytical and logical abilities and have an awareness of possible social, ethical and environmental effects of their actions. During their studies, the students have also acquired communicative skills, can work in a team and have developed a strategy for life-long learning.

With respect to social competences, the graduates have trained their conceptual, analytical and logical thinking, are aware of possible social, ethical and environment-related effects of their actions and can adequately communicate scientific information. Finally, they also gain some competences in work methodology, such as the knowledge and skill to work independently on scientific tasks and to present work results.

The experts attest that the learning outcomes of the four programs under review correspond to level 6 and level 7 of the European Qualification Framework and the Dublin Descriptors, respectively. In their view, the programs satisfy the requirements of the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 10 – Life Sciences and the SSC of the Technical Committee 08 - Agriculture, Forestry, Food Sciences, and Landscape Architecture.

Criterion 1.2 Name of the degree program

Evidence:

- Self-Assessment Report
- Discussion during the audit
- Diploma and Diploma Supplement

Preliminary assessment and analysis of the experts:

The title for the undergraduate degree of **Bachelor in Animal Science and Industry** is Sarjana Peternakan (S.Pt) or Bachelor of Science (B.Sc.). The title for the undergraduate degree of **Bachelor in Biology** is Sarjana Sains (S.Si.) or Bachelor of Science with honours (B.Sc. (Hons.)). The title for the postgraduate degree of **Master in Biology** is Master of Science (M.Sc.). The title for the postgraduate degree of **Master in Biotechnology** is Master of Biotechnology (M. Biotech.). The titles of these programs follow the rules for naming study programs under the regulation of the Minister of Research, Technology and Higher Education Number 15/2017.

During the discussion with the program coordinators of the Bachelor in Biology, the experts enquired about the possibility of changing the degree program's name to '*Bachelor in*

Tropical Biology'. They learned that current regulations regarding the name of study programs present a barrier to this adjustment. The experts believe the concept '*Tropical Biology*' describes the program's content more precisely and creates a unique selling point. As a result, they recommend renaming the degree program to '*Bachelor in Tropical Biology*' and taking the necessary steps to achieve this change.

Having put forth this recommendation, the experts confirm that the English translation and the original Indonesian names correspond to the intended aims and learning outcomes as well as the main course language.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Curricular overview of the study programs under review
- Module handbooks of the study programs under review
- Discussion during the audit
- Webpage Ba Animal Science and Industry: <https://fapet.ugm.ac.id/en/undergraduate-program/>
- Webpage Ba Biology: <https://biologi.ugm.ac.id/en/course-of-undergraduate-program/>
- Webpage Ma Biology: <https://biologi.ugm.ac.id/en/master-program-in-biology-description/>
- Webpage Ma Biotechnology: <https://magisterbioteknologi.pasca.ugm.ac.id/en/halaman-muka-english/>

Preliminary assessment and analysis of the experts:

The **Bachelor's degree programs** under review are designed for eight semesters; one semester consists of 16 weeks, including two weeks for midterm and final exams. Both programs encompass a minimum of 144 and a maximum of 148 Indonesian credits (230.4 – 236.8 ECTS).

The **undergraduate program in Animal Science and Industry** consists of 107 credits for compulsory courses and 37 - 41 credits for elective courses. Students can choose elective courses in accordance with their areas of interest and after consultation with their academic advisor. In the first and second semesters, students take general courses such as religious education, mathematics, chemistry, physics, biology, Bahasa Indonesia, and English. From the third semester to the fifth semester, the courses taken are more subject-specific and designed to achieve the intended learning outcomes. During the sixth, seventh

and eighth semesters, students must complete community service, practical fieldwork and the undergraduate thesis.

The **undergraduate program in Biology** involves compulsory subjects with a load of 126 credits and elective subjects with a load of 18-22 credits. Students have the option to select elective courses based on their interests, and they can consult with their academic advisor for guidance. The courses in the first two semesters convey basic knowledge of natural sciences, mathematics and the English language. Courses on the different biological sciences are offered from the third to the sixth semester. During this phase, the students can choose between three areas of interest:

1. Functional and Developmental Biology
2. Environmental Biology and Biodiversity
3. Molecular Biology and Biotechnology

Students can select their field of interest after completing at least 80 credits or after completion of the fourth semester. Students must complete the community service and the undergraduate thesis during the sixth, seventh and eighth semesters.

Another important feature of both **Bachelor's degree programs** has been the Independent Learning Program (MBKM) implementation by the Minister of Education, Culture and Higher Education No. 03/2020 decree. It has allowed students to learn outside the study program through internship, student exchange, community development and entrepreneurship. The credits of this initiative can be converted to relevant courses to fulfil the total credits the students must obtain.

After analysing the module descriptions and the study plans, the experts confirm that both Bachelor's programs under review are divided into modules and that each module is a sum of coherent teaching and learning units. All working practice intervals (community service), internship and Independent Learning Program activities (MBKM) are well integrated into the curriculum, and the supervision by the Faculty of Animal Science and the Faculty of Biology guarantees their respective quality in terms of relevance, content, and structure.

As regards the **Master's program in Biology**, it organises two curricula, namely regular and research programs. To complete the master's program, students must take 42 (regular; 105.6 ECTS) and 40 Indonesian credits (by research; 102.4 ECTS), respectively. The general distribution of courses is as follows:

Courses/Regular Program	SEMESTER WORKLOAD (ECTS)			
	1	2	3	4
Study Program Compulsory Courses	12.8	12.8	12.8	28.8
Compulsory Courses for Study Interest	16			
Laboratory Compulsory Courses		9.6		

Elective Courses		12.8-17.6		
Total credits each semester	28.8	35.2-40	12.8	28.8
Total	105.6-110.4			

Courses/ by Research Program	SEMESTER WORKLOAD (ECTS)			
	1	2	3	4
Study Program Compulsory Courses	9.6			
Compulsory Courses for Study Interest	3.2			
Research		19.2	19.2	
Thesis (Proposal Seminar, Comprehensive Exam, Seminar, Thesis Exam)		9.6	3.2	19.2
Publication			19.2	
Total credits each semester	12.8	28.8	41.6	19.2
Total	102.4			

Within the programs, students acquire basic knowledge through the Study Program Compulsory Courses. They obtain specialised expertise from the Compulsory Courses for Study Interest, Laboratory Compulsory Courses and Elective Courses (regular program), Research (by research program), Publication, and Thesis. Students can choose one of the following seven study interests:

1. Industrial Biology and Biological Engineering;
2. Medical and Forensic Biology;
3. Functional and Developmental Biology;
4. Biodiversity and Biosystematics;
5. Systems Biology and Synthetics;
6. Marine Biology; and
7. Environmental and Conservation Biology.

Compulsory courses of some study interests listed in the program can be chosen as elective courses of other study interests. The program also encourages cross-border education as the entry requirement accommodates students from Biology and non-Biology backgrounds such as Agricultural Technology, Forestry, Fishery, Animal Husbandry, Medicine, and Veterinary Medicine.

Concerning the **Master's program in Biotechnology**, it is a multidisciplinary study program that combines basic science, including biology, chemistry, physics and mathematics, applied life science, medical and engineering. To complete the master's program, students must take 40 Indonesian credits (102.4 ECTS). The general distribution of courses is as follows:

Courses	SEMESTER WORKLOAD (ECTS)		
	1	2	3 & 4
Study Program Compulsory Courses	14.4	9.6	38.4

Compulsory Courses for Study Interest		9.6	
Laboratory Compulsory Courses		9.6	
Thesis Proposal		9.6	
Elective Courses	8-16	3.2-11.2	
Total credits each semester	22.4-30.4	41.6-49.6	38.4
Total	102.4 –118.7		

Each student may take 22.4-49.6 ECTS in one semester except for the thesis that should be taken in the third and fourth semesters with 38.4 ECTS. The first semester involves compulsory and elective courses. The second semester introduces the mandatory courses for four study interests:

1. Health Biotechnology;
2. Agricultural Biotechnology;
3. Industrial Biotechnology; and
4. Environmental Biotechnology.

The ***Master in Biotechnology***'s third and fourth semesters are for the thesis, including research, thesis manuscript writing, and exam. Every student in the program must pass two types of thesis exams, including closed and open examinations. The closed exam involves examiners, a supervisor, and the Head of the study program.

The process of converting Indonesian credits to ECTS is different for master's programs compared to bachelor's programs. To clarify this difference, the university was asked for more information. As described in Appendix E, for master's programs, 1 Indonesian credit (SKS) equals 2.6 ECTS, whereas, for bachelor's programs, 1 SKS is equivalent to 1.6 ECTS.

Upon review of the module descriptions and study plans, the experts attest that both Master's programs are organised into modules consisting of cohesive learning and research units. The guidance and supervision of the Faculty of Biology and the Graduate School ensure their quality in terms of relevance, content, and structure.

In their assessment of the curricular structures of the four programs under review, the experts find the **Bachelor curriculum** and **Master curriculum** to be well-rounded, which in their view, adequately prepares students to achieve the intended learning outcomes.

The experts gain the impression that the graduates of the ***Bachelor's degree program Animal Science and Industry*** and ***Bachelor's degree program in Biology*** are well prepared for entering the labour market and can find adequate jobs in Indonesia. Similarly, the graduates of the ***Master's degree program in Biology*** and the ***Master's degree program in Biotechnology*** are well-equipped to enter the workforce or pursue a research career and are able to secure appropriate job prospects in Indonesia. During the discussion with the

experts, UGM's partners from the industry/public sector confirm that the graduates have a broad scientific education, are very adaptable and hardworking, have good English skills, and have manifold competences, which allows them to find adequate jobs.

In summary, the auditors are convinced that the intended qualifications profiles of both **Bachelor's degree programs** and both **Master's degree programs** under review allow the students to take up an occupation that corresponds to their qualification profile.

International Mobility

As part of its Self-Assessment Report, UGM describes a set of measures and instruments to foster internationalisation among students in the reviewed programs. During the audit, the program coordinators point to the introduction of English courses for the Bachelor's programs and the delivery of several courses in English. In the Master in Biotechnology, the student selection criteria include an English proficiency score equivalent to TOEFL 450. The experts also learned that, in 2022, the Ministry of Research, Technology and Higher Education Indonesia implemented an international student exchange program for undergraduate students called IISMA. The program aims to increase the number of students' participation in international mobility. The information about this program is communicated to interested students by the Office of International Affairs, and lectures are called upon to motivate and guide them, which is further corroborated during the meeting with the students.

In terms of outgoing mobility, data from 2017-2021 indicate that in the period pre-pandemic, 46 **Bachelor in Animal Science and Industry** students/year studied abroad (2017-2019). Even though student mobility dramatically decreased due to Covid-related restrictions, virtual events, such as summer courses, international seminars, virtual student exchange programs and credit transfers, were used to compensate. Students went to Asia, Europe, America, and Australia, with most choosing Malaysia, Thailand, Japan, and South Korea. Incoming student mobility remained limited during 2020-2021 to Malaysia and domestic students (147 students). Before the pandemic, students came from ASEAN countries, Australia, South Korea, and Japan. In 2019, students from African countries, such as Sudan and Ethiopia, joined the Bachelor's international program. Student mobility is monitored annually by the Academic and Student Section and supported by the Office of International Affairs at the University and Faculty levels. The types of student mobility programs are:

1. Student exchange program (one–six months)
2. Internship program (three-four months)
3. Credits Earning Program (six–12 months)
4. Credits Transfer (four-six months)
5. International Conference (three-five days)

6. International Competitions (three-five days)
7. International Organization/youth forum (five–10 days)
8. International joint graduate seminar
9. Summer course

Regarding the **Bachelor in Biology**, students are strongly encouraged to participate in international mobility. The Faculty of Biology has formed partnerships with various international universities, such as Universiti Tun Hussein Onn Malaysia (2018), Yamagata University (2020), and a double degree program with the Australian National University (2019) and Leeds University (2021). In 2021, two students received an IISMA award and were able to study at Newcastle University and Boston University. In 2022, students had the chance to study at Radboud University, the University of California Davis, Korea University, and the University of Queensland. Students are encouraged to participate in international conferences, with a notable rise in participation from 31 to 90 students between 2017 and 2021. Conference attendance can count for extracurricular credit. In 2022, the program welcomed two exchange students from Radboud University and Groningen University. Starting in 2022/2023, the program accepted one international student from Timor Leste.

The **Master in Biotechnology** had five students participating in international conferences between 2018 and 2019 and sent four students to South Korea, the UK, San Diego University, and Tunghai University, respectively. The Master's program currently has four international students from Libya, Pakistan, Malawi, and Ghana.

For the **Master in Biotechnology**, student mobility is carried out through a double degree, summer course program, winter course program, international conference, fellowship program, and credit transfer program. The Master's program collaborates with Ibaraki University on a double degree program (DD). Accepted students in this DD can complete ten months of coursework at Ibaraki University, and the research is used as their thesis. Between 2017 and 2021, there were 10 students accepted into the DD. The program also collaborates with NAIST Japan for doctorate candidates' pre-screening. In recent years, students have participated in various Biotechnology programs and workshops, including those held by Tokyo University, Ibaraki University, and National Yang-Ming University. Some programs were held online due to the pandemic, such as the Omics Logic Bioinformatics training at the University of Haifa. Additionally, some students attended online conferences and lectures, including the International Applied Microbiology Conference and the Osaka University anniversary lecture course.

The experts highly value UGM's efforts to foster student mobility, offering various resources and information regarding partnerships and opportunities. They notice that the

university supports the development of students' English skills on different levels. The experts appreciate the proactive approach in providing additional English language support to students from disadvantaged backgrounds. However, since UGM has the strategic priority to enhance its international visibility and aims to advance the internationalisation of its degree programs, the experts recommend further increasing the number of courses delivered in English in alignment with the internationalisation goals. This would be vital for students to improve their English proficiency, enabling them to access a broader range of educational opportunities and fostering a truly global learning environment.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Academic guidebooks
- UGM web page: <https://um.ugm.ac.id>
- Statistical data about the progress of studies for all degree programs under review
- Discussions during the audit

Preliminary assessment and analysis of the experts:

Admission and selection of prospective students are clearly regulated at UGM. The admission of new students in all study programs follows a selection mechanism based on the Decree of the Minister of Education, Culture and Higher Education No. 6 / 2020 about Bachelor's admission and the UGM Decree of Rector No 11/2016. The requirements, schedule, registration venue, and selection test are announced on UGM's webpage and thus accessible for all stakeholders.

There are three different ways by which students can be admitted to UGM's Bachelor's programs. First, there is the national admission system, which is based on the academic performance at the high school. 40% of the students at UGM are admitted through this selection system. Secondly, a national selection test is held every year for university candidates. It is a nationwide written test, accounting for 30% of the admitted students at UGM. Finally, 30% of the students are selected based on a written test specifically held by UGM.

The International Undergraduate Program (IUP) has a different admission process for international applicants but the equivalent requirement of high school qualification. IUP's classes are delivered in English, so communicating in that foreign language becomes a primary prerequisite. IUP admission test covers English proficiency (AcEPT) and scholastic ability (GMST) as well as an interview with the Faculty Academic Board for the applicants who pass the GMST >450 and AcEPT >209 (equal to TOEFL score 450).

To determine the level of tuition fees (UKT), admitted students must input their biodata into the UGM Academic Information System (simaster.ugm.ac.id). UGM has mechanisms to consider changes in students' financial circumstances and may reduce fees if they experience financial distress. The experts appreciate these measures, which were discussed with the students.

For the ***Bachelor in Animal Science and Industry***, new domestic students apply via the regular admission process and, starting in 2021, international applicants apply through IUP. Over the past few years, there has been a fluctuation in the number of applicants for the degree program, reaching a peak of 4803 in 2020 and dropping to 1943 in 2021, likely due to the pandemic. However, the number of applicants has consistently exceeded the available spots. For example, in 2021, only 351 new students were accepted, which is equivalent to an admission rate of 18%.

As regards the ***Bachelor in Biology***, prospective students can apply via the regular admission process and, starting from 2019/2020, through IUP. The international undergraduate program opened with a student intake capacity of 35 students in response to recommendations from the AUN and ASIIN accreditations. Over the last few years, applicants have fluctuated but exceeded the available places. For example, in 2021, 2135 students were applying for admission, and only 241 new students were accepted. This is equivalent to an admission rate of 11 %. The number of applicants via IUP has consistently increased from 19 in 2019 to 159 in 2021.

The ***Master in Biology*** added a February intake in 2016 due to the increasing number of applicants. Eligible applicants are 1. graduates with a Bachelor's degree in Biology and non-Biology (including Agricultural Technology, Forestry, Fishery, Animal Husbandry, Medicine, Veterinary Medicine or other related disciplines); 2. have an academic performance record with a minimum cumulative achievement index (GPA) 2.5 for those with A accreditation, 2.75 for B accreditation, and 3.00 for C accreditation; 3. have to obtain an acceptable score in an approved English language test with a minimum TOEFL (IPT) score of 400 or equivalent; 4. have to pass the TPA (Academic Potential Test) selection with a minimum score of 450. Furthermore, they must submit two letters of recommendation from two people who know their academic ability. Finally, they are requested to submit a letter of motivation and study plan as well as a health certificate from a certified doctor. Between 2017 and 2019, there was a rise in the number of applicants, with the highest figures seen during 2018 and 2019 due to institutional scholarships made available through partnerships with various government agencies. There was a decrease in applicants during 2020, but numbers have improved since then. For example, in 2021-2, 72 students applied for admission, and 52 new students were accepted. This is equivalent to an admission rate of 72%.

Regarding the ***Master in Biotechnology***, it opens new student admissions once a year for the odd semester. The program applies higher criteria for GPA, TPA and TOEFL scores than the UGM basic requirement. Eligible applicants are: 1. Graduates from life science Bachelor's programs; 2. have a minimum GPA of 3.00; 3. Have to obtain an English proficiency score equivalent to TOEFL 450 and TPA 500. Over the last few years, the number of applicants has varied, with a decrease in 2019. However, there has been an increase in the number of applicants recently, and in 2021, there were 49 students who applied for admission. Of those, 35 were accepted, resulting in an admission rate of 71%.

The details of the application process at UGM and further information on admissions criteria and deadlines can be found in the Academic Guidebook, which is also published on the university's webpage.

The experts find that (prospective) students are informed in detail about the requirements and the necessary steps to apply for admission into the programs. The corresponding rules and regulations are binding and transparent and are based on decrees by the Ministry of Research, Technology and Higher Education and on the University's written regulations. In relation to the international undergraduate program, the experts consider that it would be valuable to collect data on the age and nationality of applicants to gain insights into which international groups the degree programs are attractive. This information might inform strategic initiatives aimed at increasing the number of international students.

The experts confirm that the admission requirements support the students in achieving the intended learning outcomes. This finding is also supported by the "drop-out" statistics provided by the faculties and school, demonstrating that most students graduate while moderately exceeding the standard study period.

Criterion 1.5 Workload and Credits

Evidence:

- Self-Assessment Report
- Student handbook for all programs
- Module handbooks for all programs
- Survey of student satisfaction related to the workload
- Discussions during the audit

Preliminary assessment and analysis of the experts:

All the study programs at UMG must abide by the Indonesian credit system (SKS) rules. As the Self-Assessment Report indicates, one SKS is equivalent to 1.6 ECTS for the Bachelor's

programs. Each credit is distributed between guided and independent learning activities, as well as between face-to-face activities, laboratory activities/practicum, and project and field studies. According to Regulation of the Ministry of Research, Technology and Higher Education No. 44 of the Year 2015, the learning activities used are lectures, responses, seminars, and practicum. One credit of lecture and practicum is equivalent to 170 minutes, with 50 minutes for a face-to-face meeting (online/offline), 60 minutes for structured assignments, and 60 minutes for self-study. In one semester, students must complete at least 75% of classes and all the laboratory activities (if applicable).

At the end of each semester, students provide feedback on the workload of their courses using the Lecture Evaluation by Students (EDoM) tool in SIMASTER. They rate their agreement with statements like '*Assignments matching study load*' and '*Quizzes matching study load*'. The program coordinators and teaching staff attend a meeting to review the evaluation and make necessary adjustments for the following semester. Student representatives and alumni also provide feedback on their lecture experiences during the annual curriculum evaluation and exit survey.

As regards the programs under review, the ***Bachelor in Animal Science and Industry*** stipulates a minimum study load of 144 credits (corresponding to 230.4 ECTS) and a maximum of 148 credits (236.8 ECTS) in line with national requirements (Permendikbud No. 3 of 2020 concerning National Standards of Higher Education). The minimum load consists of 103 credits of compulsory courses, 37 credits of elective courses and a Bachelor Thesis of 4 credits (6.4 ECTS). The maximum load of 148 credits involves 41 credits for elective courses. The even semester 2021/2022 sample of course evaluation reports provided by the Faculty of Animal Science indicate that most students have rated the assignments and quizzes as appropriately aligned with the study load, with an average rating of over 3 points (out of 4). The experts question the allocation of 4 credits for the thesis, which is lower than the typical credit awarded in other bachelor's degree programs. The program coordinators clarify that the final task encompasses an internship and a research proposal, accounting for two credits and one credit, respectively, resulting in 7 credits for the final task.

The ***Bachelor in Biology*** also has a minimum study load of 144 credits (corresponding to 230.4 ECTS) and a maximum of 148 credits (236.8 ECTS) in line with national requirements. The minimum load consists of 120 credits of compulsory courses, 18 credits of elective courses and a Bachelor thesis of 6 credits (9.6 ECTS). The maximum load with 148 credits involves 22 credits for elective courses in total. According to the Exit Survey data that was made available (January 2018), 63% of students agreed or strongly agreed that there were sufficient courses to complete the program on time.

Concerning the Master's programs, a UGM statement clarifies that one SKS is equivalent to 2.6 ECTS. Please refer to Appendix E for more information.

For the **Master in Biology**, the total credits that must be completed for graduation amount to 42 credits for the regular program and 40 credits for the by-research program. For the regular program, the total credits for four semesters (or two years) are equivalent to 105.6 ECTS, consisting of General Compulsory modules (38.4 ECTS), Specific Compulsory modules (16 ECTS), Laboratory Compulsory modules (9.6 ECTS), Elective modules (12.8 ECTS), and Master Thesis (28.8 ECTS). For the by-research program, the total credits for four semesters are equivalent to 102.4 ECTS, consisting of General Compulsory modules (9.6 ECTS), Specific Compulsory modules (3.2 ECTS), Research (38.4 ECTS), Publication (19.2 ECTS), and Master Thesis (32 ECTS). Based on the Exit Survey results provided by the Faculty of Biology, 84% of graduates agreed or strongly agreed that there were adequate available courses so they could finish the program at the right time. The experts discuss the distinctions between regular and research-based master's programs. The program coordinators note that the regular master's program primarily emphasises coursework and tends to attract a more significant number of applicants. The admission requirements for each program also differ. On the other hand, the research-based program involves active participation in research, with a stronger emphasis on publication requirements (accepted papers). Students applying to this program are typically expected to have prior research experience and may have existing positions as academics, making them more inclined towards pursuing an academic career.

As per the **Master in Biotechnology**, the total credits that must be completed for graduation amounts to 39 credits. The total credits for four semesters (or two years) are equivalent to 102.4 ECTS, consisting of General Compulsory modules (24 ECTS), Specific Compulsory modules (9.6 ECTS), Laboratory Compulsory modules (9.6 ECTS), Elective modules (11.2 ECTS), Thesis proposal (9.6 ECTS) and Master Thesis (38.4 ECTS). There were no evaluation reports on student workload satisfaction provided. However, during the audit, the students confirmed that their workload is adequate and that finishing the degree program within the expected two years is possible.

UGM provided statistical data about the average length of studies for the programs under review and the number of dropouts. As indicated in the previous 2018 ASIIN review, Bachelor in Animal Science and Industry program students had an average study period of 4.75 years. In addressing this, the Faculty of Animal Science has introduced a new procedure for the Bachelor's thesis and a revised curriculum (2021-2026) to shorten the overall study length.

For the ***Bachelor in Biology***, the average study period of the students in the last five years is 4.4 years. This is an improvement from the previous study period of 4.6 years reported in the previous ASIIN procedure. Several changes were implemented to achieve this improvement, including the seminar, which now presents a thesis proposal and is no longer separate as mini research. Additionally, internship and community service time are currently limited to two and three credits and are carefully monitored.

On average, students in the ***Master of Biology*** program study for 2.25 years. In the ***Master of Biotechnology*** program, the length of study has decreased from 2.7 years in 2017/2018 to 2.4 years in 2021/2022. The Graduate School offers student-supervisor collaborative research grants, a scheme that has accelerated the thesis project. Moreover, the research expenses can be paid in collaboration with the supervisor using grant funds.

Additionally, the figures show that the degree programs have had very few dropouts in recent years, indicating that most students successfully complete them. The data confirms that the degree programs under review can be completed.

In the experts' eyes, the time budget seems realistic for completing the degree programs in regular course duration; there are no peaks to be recognisable, and there is a good relationship between classroom attendance/laboratory work, self-study and structured tasks per credit as a base. The workload fits very well.

The experts are satisfied with how UGM administers the academic credit system. In their discussions with students, the experts learn of no complaints; students are generally satisfied with the workload and the distribution of credits between the semesters. The Module handbooks for the programs under review clearly distinguish between credits given for various forms of supervised studies and self-study time.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Report
- Module handbooks of the programs under review
- Results of Staff Satisfaction
- Discussion during the audit

Preliminary assessment and analysis of the experts:

In its Self-Assessment Report, UGM records that appropriate learning methods and instruments are implemented for the Bachelor's degree programs as well as the Master's

degree programs and that the variations in learning methods and instruments are adjusted to the level of knowledge, skills, and competences that have been set in each module.

The university's approach to learning is student-centred and involves teaching methods that prioritise the student's involvement in the learning process. Government regulations and internal curricula have recently focused on increasing research-based learning, case studies and project-based learning. This approach helps students collect and analyse data, problem-solve, and present research results in laboratory and field settings. By using these methods, graduates are expected to apply their knowledge and technological skills for productive activities, conduct community development and services, as well as to utilise and keep up with the rapid development of science and technology.

For the Bachelor's degree programs, the Independent Learning program (MBKM) supports student-centred learning by allowing students to learn from other institutions, industries, and society. They can pursue MBKM programs while receiving supervision to ensure learning outcomes are met. UGM also takes pride in introducing technology to facilitate learning and foster improvement. These include:

1. eLOK, learning management system (LMS) allowing access to course material, schedule, meeting link, and lecture recording;
2. SIOBA, information system of outcome-based assessment, used for planning, monitoring and evaluation of the learning process;
3. EDoM, evaluation platform to get feedback from students about how the courses are implemented.
4. SIMASTER, integration of UGM's information systems and resources

Examples of the implementation of teaching methodology in courses are presented as follows:

No	Teaching method	Related activities
1	Contextual learning	Lecture; Presentation; Discussion and Practice
2	Collaborative learning	Group Discussion; Role Playing; Group work role play Presentation and Small group discussion (same group assignment) practice
3	Cased based learning	Discussion; Group work; Presentation and Practice
4	Research-based learning	Field observation, Data collection and analysis; Presentation Literature review; Laboratory/field work; Discussion and Report of literature study on recent research

The program coordinators for the programs under review point to the information provided in the Module handbooks, which clearly state the teaching methods applied in each learning unit and completed with practical instructions for laboratory work, learning materials and the learning plan and assessment. E-learning systems (eLOK and SIMASTER)

have been used by lecturers for learning and teaching processes, especially for supporting the blended learning system.

At the start of the pandemic, teaching at UGM quickly switched to online learning with videoconferences, recorded videos and other media. Educational activities were conducted exclusively through LMS, with examinations conducted via eLOK, SIMASTER, or Google Form until the return to the pre-pandemic mode of operation.

The experts confirm that a variety of learning methods are used, always aligned with the learning objectives. In the discussions with students, the experts learn that they are generally satisfied with the quality of teaching and learning in the programs under review. The student surveys also confirm this finding.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 1:

The experts appreciate that The Faculty of Biology is in agreement with the suggestion of changing the name of the Bachelor in Biology to Bachelor in Tropical Biology. They also understand that this process takes some time.

The experts support UGM in its efforts to encourage the lecturer to have classes in English. They thank UGM for explaining that already proposal seminar, thesis defence, and journal writing are offered in English and that Ba Animal Science and Industry and Ba Biology have opened an International Undergraduate Program (IUP), which is taught in English, in 2019 (Biology) and 2021 (Animal Science and Industry).

The experts consider criterion 1 to be mostly fulfilled.

2. Exams: System, Concept and Organization

Criterion 2 Exams: System, concept and organization

Evidence:

- Self-Assessment Report
- Module descriptions
- Academic guidebook for all degree programmes
- Samples of student's work (projects, exams and thesis)
- Academic Guidelines and Academic Calendar

Preliminary assessment and analysis of the experts:

UGM presents the general rules for the examination and assessment systems applicable to the programs under review. Exams in the *Bachelor of Animal Sciences and Industry*, *Bachelor in Biology*, *Master in Biology* and *Master of Biotechnology* follow the University's rules as stated in the Academic Guidelines.

Exams and the corresponding assessment rubrics aspire to measure students' learning outcomes (knowledge, skills and competences) according to a predefined grading scale reference. The module handbooks for the programs currently under review include the course learning outcomes and specify the types of examinations used to assess the achievement of these learning objectives. A diverse range of assessment methods is employed, including written assignments, quizzes, tests, reports, practical lab assignments, project reports, presentations, and oral exams. In its Self-Assessment Report, UGM has provided the following table, presenting a grade calculation model:

Assessment Methods	Teaching Class	Lab Work	Field Work *)	Student Community Services *)	Thesis
Quizzes	v				
Assignments	v				
Presentations	v		v		v
Exam (Mid/Final)	v				
Written Report/Paper		v	v	v	v
Activities		v	v	v	v
Pretest/ posttest		v		v	
Team work		v	v	v	

*) only in Bachelor Program

Students are informed of what is required to pass the respective module at the first meeting. The form and length of each exam are specified in the course descriptions

available to the students via the university's integrated information system (SIMASTER). The students also learn about mid-term and final exams via the Academic Calendar. The final grade of each module is a combination of the scores of these individual types of assessment. The exact formula, as well as the final grade required to pass the module, is given in the Module handbook. The final grade for a course is written in letters, which is then converted into a grade in the form of numbers, namely: A = 4.0, A- = 3.75, A/B = 3.50, B+ = 3.25, B = 3.0, B- = 2.75, B/C = 2.50, C+ = 2.25, C = 2.0, C- = 1.75, C/D = 1.50, D+ = 1.25, D = 1.0, and E = 0.

Students must attend at least 75% of the total course sessions to be able to take the final exam of the course. Students who cannot attend the examination due to health reasons or personal matters may request re-sits or replacement examinations. Once students provide the required documents, such as medical or approved institutional letters, the examination committee schedules a replacement examination. Feedback on each student's progress is provided through their exam results. Final grades are available on students' academic accounts in SIMASTER within 14 working days after the last exams.

The experts confirm that there is a form of assessment for each course and that all students are well informed about the form of the evaluation and the details of what is required to pass the module. The rules for re-sits, disability compensation, illness and other circumstances are written down in the Academic Guidebook and, therefore, transparent to all stakeholders.

As also stipulated in the Academic Guidebooks, every student is required to do a final thesis. As regards the ***Bachelor in Animal Science and Industry***, it is a requirement for every student to take a written-based test after taking at least 103 Indonesian credits. Students are required to undertake a final project/research and write a bachelor thesis as the concluding assignment in the eighth semester. The thesis is based on their research work and is assisted by two supervisors; this number was reduced to one supervisor in 2022 to streamline the administration process. Students defend their thesis in front of a board of bachelor thesis examiners determined by the Vice Dean for Academic and Student Affairs and coordinated by the program's Head.

For the ***Bachelor's in Biology*** program, the workload in the seventh and eighth semesters is reduced to allow students to focus on their thesis, community services, and elective courses. Before commencing the research work, students must register for the thesis course with the Bachelor Thesis Advisory Committee, which will assign a thesis supervisor. Once they have met with their supervisor, students are required to draft a research proposal, which needs the advisory committee's approval. Upon completion of the Bachelor's thesis, students must present and defend their findings in front of a Bachelor

Thesis Defense Committee comprising the supervisor and two examiners. This defense committee is responsible for assessing whether the thesis meets the requirements for a degree, which includes providing evidence of manuscript submission to at least one unaccredited national journal for publication.

At UGM, a Bachelor's degree is awarded to students who collect a minimum of 144 credits and a maximum of 148 credits; have taken all required compulsory and elective courses; the number of credits with a D grade is not more than 25% of the total credits; have no E grade; and obtain a minimum cumulative GPA of 2.00. The maximum length of active study is five years (10 semesters), except for students who get an extension of the study.

As regards the **Master in Biology thesis**, after students fulfil their coursework and present a thesis proposal, they must pass a comprehensive exam, which measures their readiness to do thesis research. At the final stage of the master thesis assessment, supervisors and examiners will assess the thesis based on a thesis examination rubric, focusing mainly on writing and presentation skills, research methods, understanding of the thesis, and related knowledge. After the final exam, the study program provides one month for students who are declared passed to undertake a thesis revision and correction if required by the examiner team. A re-sit exam may be required for students who fail to achieve the minimum thesis examination result.

In relation to the **Master in Biotechnology**, the process of completing the thesis begins with students selecting their advisors during the first semester. During the second semester, students are required to present their thesis proposal. The research for the thesis takes place throughout the second year, with the final defense scheduled for the fourth semester. Students are required to register for the thesis defense online (<http://ugm.id/ThesisRegistrationSOP>). The thesis defense panel comprises the head of the program or Academic Committee, two thesis advisors, and one examiner. The evaluation of the thesis includes three components: (1) research activities/data collection, (2) thesis manuscripts, and (3) thesis examinations/defense. The advisor solely provides scores for component (1), while all examiners contribute to the scores for components (2) and (3). The final score for the master thesis is calculated by accumulating the assessment scores from all examiners. Students who pass the examination are expected to revise their thesis based on the examiner's recommendations, while those who fail will be scheduled for a re-examination.

To graduate from the Master's programs, students must have a minimum grade point average of 3.00; no D and/or E grades; have passed the thesis exam; and have submitted the thesis text approved by the Dean/Head of Department. Master students must also have

at least one research article published in a reputable academic journal before taking the final thesis exam.

UGM has a policy on academic integrity in all student activity, including examinations and assignments. Students who commit fraud or plagiarism will be sanctioned according to the violation level. The penalties are decided by the study program and or the ethical committee of the University and vary from a warning, letter of notification, or suspension for six months up to one year to drop out.

In their assessment of this criterion, the expert group finds that appropriate rules and regulations, which govern the examination systems university-wide, are in place. These rules and regulations are adequately communicated and transparently published. The students also confirm during the interviews that they are well-informed about the examination schedule, the examination form and the grading rules. They also have adequate time to prepare for the exams.

The experts also inspect a sample of examination papers and final theses and are overall satisfied with the general quality of the samples. They confirm the high standard of the Bachelor's and Master's theses.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 2:

UGM does not comment on this criterion in its statement.

The experts consider criterion 2 to be fulfilled.

3. Resources

Criterion 3.1 HR Resources, Staff Development and Student Support
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Evidence:

- Self-Assessment Report
- Staff handbook
- Discussion during the audit

Preliminary assessment and analysis of the experts:

HR Resources

At UGM, the staff members have different academic positions. There are professors, associate professors, assistant professors and lecturers. The academic position of each staff

member is based on research activities, publications, academic education, supervision of students, and other supporting activities. For example, a full professor needs to hold a PhD degree. In addition, the responsibilities and tasks of a staff member with respect to teaching, research, and supervision depend on the academic position.

For the ***Bachelor in Animal Science and Industry***, the teaching staff comprises 73 full-time lecturers, three visiting professors, and 27 lecturers from other programs. All lectures must do mandatory activities related to education, research, community services and other supporting activities. Among the 73 full-time lecturers, 51 hold doctoral degrees (70%), while the remaining 22 hold master's degrees (30%). 12 of the master holders are studying for a doctoral degree in overseas or domestic universities. In terms of staff positions and the evidence provided in the staff handbook, there are 16 full professors (22%), 19 associate professors (26%), 15 assistant professors (21%) and 23 lecturers (31%). The Faculty of Animal Science provides an HR development plan until 2025 with clear target goals.

With respect to the ***Bachelor in Biology*** and the ***Master in Biology***, they are supported by 70 teaching staff, respectively. The minimum academic qualification for a lecturer in the Bachelor in Biology is a master's degree and a doctoral degree for teaching in the Master in Biology. Concerning the academic qualification profile of the teaching staff, around 41% of the lecturers in the Bachelor program hold master's degrees and 59% doctoral degrees. Over half of the master's holders are currently doctoral candidates. As for staff positions and the evidence provided in the staff handbook, for the Bachelor's degree, there are six full professors (9%), 21 associate professors (30%), 17 assistant professors (24%) and 26 instructors (37%). The Faculty of Biology has also formulated a comprehensive HR development plan outlining specific target goals until 2025.

Concerning the Master in Biotechnology, it is supported by 75 teaching staff coming from 11 supporting faculties, all of them doctoral degree holders. Thirty-two of them are full professors (42%), 21 associate professors (28%), 20 assistant professors (27%) and two lecturers (3%), who are in charge of research, teaching and community services. The Graduate School actively encourages the teaching staff through, for example, research activities, the outstanding lecturer research grant, student-lecturer collaboration, and young-lecturer research grant. Similarly, the School has an HR development plan that sets target goals for 2019-2023. The experts inquire about the reason behind organising this master's program under the Graduate School rather than one of the faculties. The program coordinators explain that it is an interdisciplinary program that benefits from lectures and support from multiple faculties, including agriculture, engineering, and others. While it may seem more straightforward to coordinate the program under the Faculty of Biology, a restructuring process made it more challenging to align it with a specific faculty.

The teaching staff's promotion to a higher academic position is based on several factors, such as achievement in research activities, publications, academic education, supervision of students, and other supporting activities. In order to be promoted to the position of a full professor, the applicant must hold a PhD degree.

In terms of staff-student ratios, they are predefined by the Indonesian government through the regulation of the Ministry of Research, Technology and Higher Education. Accordingly, the ideal ratio of staff to active student numbers is 1:10 - 1:20. The current ratio in the Bachelor in Animal Science and Industry is 1:15 and in the Bachelor in Biology 1:14, which ensures students have a good chance of a dynamic and interactive learning environment.

The UGM Human Resources Directorate publishes and disseminates selection criteria for appointments, assignments, and promotions on its official website (<http://sdm.ugm.ac.id/en/home/>). Staff recruitment is determined based on the HR needs derived from the faculty/school development projections. Regulations, both from the Indonesian government and internal UGM guidelines such as the Rector's Decree No. 18 of 2016, guide staff hiring, selection, placement, development, retention, and termination.

Job Conditions and Performance Review of Staff

UGM has established evaluation methods based on staff performance targets, workload - Teaching, Research and Community Service (*Tridharma Perguruan Tinggi*), arranged between 12-16 credits per semester (544-725.33 hours)- as well as student surveys regarding their satisfaction with the teaching performance of individual lecturers.

Academic staff of the degree programs under review conduct their research projects collaboratively in research groups. Most of the research projects are supported by grants from the university, the government, private companies, and international institutions. The students are reportedly involved in research activities in order to support the completion of their final projects. Some researchers are also engaged in collaboration with other domestic and overseas universities as well as other institutions specifically for industry-related research. The academic staff is requested to disseminate research results at national and international conferences and publish them in reputable national and international journals. Staff members who have demonstrated exceptional accomplishments are rewarded.

HR Development

Regarding staff development, UGM encourages training its academic and technical staff, so it has established an HR management system to upgrade qualifications, develop a specific expertise or improve didactic abilities and teaching methods. The professional and scientific development of the staff members is coordinated by the Vice Dean for Academic and Student Affairs and Vice Dean for Finance, Administration and Human Resources

Affairs. Financial resources are available for staff members to go abroad for a limited time and to participate in conferences or other events to stay up to date with the scientific development in their area of expertise. In addition, both faculties and the school want to promote the process of internationalisation at UGM by hosting international scientific events, facilitating sabbatical leaves, and inviting international professors.

The experts discuss with the members of the teaching staff about the opportunities to develop their skills and learn that the teachers are satisfied with the internal qualification program at UGM. This provides them opportunities to improve their didactic abilities, spend time abroad to attend conferences, workshops and seminars, or even participate in the staff recharging program (sabbatical leave).

Support and assistance for students

The University, as well as the faculties and the school, have implemented a series of instruments to support students in their learning process and monitor success in reaching the expected learning outcomes of all four programs. A crucial component of the UGM support framework is offering students a comprehensive advisory system. At the start of the first semester, every student is assigned to an academic advisor appointed by the Dean. Each academic advisor is a member of the academic staff, responsible for a group of 15 to 20 students. They become the student's first call for advice or support on study-related or personal matters.

The role of the academic advisor is to help students transition to the university, acclimatise to academic life and the university's environment, and respond promptly to any questions. Students consult with academic advisors regarding the courses to be taken in the upcoming semester. They also offer general academic advice, make suggestions regarding relevant careers and skills development and help if there are problems with other teachers. Students can communicate with their academic advisors via SMS/WhatsApp/email or by accessing the university-wide integrated information system SIMASTER. The students confirm during the discussion with the experts that they all have an academic advisor, that they meet regularly, and that they can always contact their advisor personally and ask for help or advice.

The faculties and the school also have at their disposal the capabilities of SIMASTER to monitor students' academic progress, check academic achievement, including GPA per semester, cumulative GPA and percentage of achievement or approve and change student plans and course programs.

In addition, each student is assigned to a thesis supervisor. For the Bachelor's programs, the thesis supervisor is responsible for guiding the students with the final assignment, start-

ing from the proposal, research process, undergraduate thesis writing, and research results. The thesis supervisor comes from the department/laboratory of the course specialisation. At the end of the 4th semester, the students choose the topics and undergraduate thesis supervisor from the department they are interested in by filling out a specific form.

The Master's thesis supervisor supervises a maximum of 6 students, provides guidance, ensures research compliance and timely implementation, and supports students in meeting publication requirements. The selection of the thesis supervisor occurs at the end of the first semester during a meeting involving the Faculty/School leaders, Head of Study Programs, and representatives from each field of interest. The primary thesis supervisor can appoint a co-supervisor who specialises in a relevant scientific area that aligns with the thesis theme.

As regards other support services of UGM/Faculties and the School, such as career support, psychological support, health services, sports facilities, financial assistance, etc., students are generally satisfied with the level of assistance they receive. During the meeting with the students, important information is shared, such as the special consideration given to student circumstances changes. For instance, in financial distress, there is a provision for a fee reduction to alleviate the student burden.

In their appreciation of this criterion, the experts come to the following conclusions:

Regarding the teaching staff's composition, scientific orientation and qualification, in the experts' opinion, these are suitable for successfully implementing and sustaining the programs under review.

In the discussions with the expert team, the lecturers confirm that a range of professional development options are available. The experts acknowledge that UGM offers sufficient support mechanisms and opportunities for teaching staff members who wish to develop their professional and teaching skills further. During the interviews, teaching staff expressed satisfaction with their working environment and professional development chances and exhibited a strong commitment to their students. As regards the students, they are equally satisfied with the teaching performance at the faculties and school levels as well as with their learning environment.

There is a good and trustful relationship between the students and the teaching staff; enough resources are available to provide individual assistance, advice and support for all students. The support system helps students adjust to the university environment, achieve the intended learning outcomes and complete their studies successfully and without delay. The students are well-informed about the services available to them. They also appreciate the functional integration of the different platforms and the possibility of accessing mobile user-friendly applications.

Criterion 3.2 Funds and equipment**Evidence:**

- Self-Assessment Report
- UGM tuition fee web page: <https://admission.ugm.ac.id/application/tuition-fee/>
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The university and the faculties/school are mainly funded by the Indonesian government through tuition fees as well as grants for research projects. The student tuition fee structure varies based on individual circumstances and backgrounds, taking into account factors such as residency status, program of study, and financial need. The UGM website outlines the specific tuition fee rates applicable to different categories. The financial management processes in the study programs are executed through a performance-based management system (SIMABEKA) and financial management information system (SIMKEU).

There is basic funding from the faculties for teaching the students. Additional funds from grants can be applied through government and non-government organisations/institutions for building facilities, research and teaching projects, student and staff exchange, community engagements, and equipment procurement. During the meeting with the Program Coordinators and Representatives of the Rector's Office, the experts raised concerns regarding the pandemic's impact on each program's funding. In response, the Program Coordinators clarified that while there had been a reduction in tuition fees as encouraged by the government, the government had effectively compensated for this by increasing funding. As a result, there were no budget cuts, ensuring the continuity and stability of the programs despite the challenges posed by the pandemic.

During the audit, the expert group visits the laboratories, the classroom, student community rooms and sports facilities in order to assess the quality of infrastructure and technical equipment. They find no severe bottlenecks due to missing equipment or a lack of infrastructure. The basic technical equipment for teaching students at a Bachelor's and Master's level is available in sufficient numbers. However, it is not state of the art in some specific cases.

In the Faculty of Animal Science, the experts notice, for example, that the laboratory of the animal nutrition unit is well-equipped but needs to be updated. It is still sufficient for research and teaching but has to be renovated within the next years so this scientific sector can offer similar possibilities to the students as other groups can do in the Research Centre.

As a result, they recommend including the renovation of this laboratory in future plans for rebuilding or upgrading the facilities.

The experts were highly impressed by the Tropical Animal Research Centre, a new, expansive, and state-of-the-art facility. This facility was established based on the recommendations derived from the prior accreditation procedure. The significant investment made in this modern infrastructure clearly indicates the university's strong dedication to enhancing both learning experiences and research outcomes. The farm facilities are also good. They can show all relevant livestock species to students, and, in addition, research trials can be conducted. The added advantage is its proximity to the university.

As regards other laboratories, the experts confirm that they are equipped with essential analytical instruments for biology and biotechnology research. Laboratories are also equipped with technicians to assist students and lecturers in teaching, learning, and research activities in the laboratories.

The students confirm during the discussion with the experts that they are generally satisfied with the available equipment. They express particular satisfaction with the university's library, emphasising the availability of a wide range of literature and workspaces. According to the students, there is ample access to current international literature and databases, and they appreciate the convenience of remote access.

The experts also learn that UGM is actively prioritising the implementation of an inclusion strategy. They commend the university for this commitment and, in line with the inclusive approach, suggest ensuring that all laboratories and teaching facilities have accessible pathways for students with disabilities or mobility challenges.

Besides the abovementioned suggestions, the auditors judge the available funds, the technical equipment, and the infrastructure (laboratories, library, seminar rooms etc.) to comply with the requirements for sustaining the degree programs.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 3:

The experts acknowledge that UGM will provide accessibility for anyone with disabilities and mobility challenges in the new buildings. Additionally, existing buildings, we will make improvements for accessibility with building safety in mind.

The experts are glad that UGM provides an annual budget for upgrading the facilities in the Faculty of Animal Science. They hope that this will result in better equipped laboratories, especially in animal nutrition.

The experts consider criterion 3 to be mostly fulfilled.

4. Transparency and documentation

Criterion 4.1 Module descriptions

Evidence:

- Self-Assessment Report
- Webpage Ba Animal Science and Industry: <https://fapet.ugm.ac.id/en/undergraduate-program/>
- Webpage Ba Biology: <https://biologi.ugm.ac.id/en/course-of-undergraduate-program/>
- Webpage Ma Biology: <https://biologi.ugm.ac.id/en/master-program-in-biology-description/>
- Webpage Ma Biotechnology: <https://magisterbioteknologi.pasca.ugm.ac.id/en/halaman-muka-english/>
- Student handbook for all programs

Preliminary assessment and analysis of the experts:

The Module handbooks for all programs were available as appendices to the Self-Assessment Report. These module descriptions have also been published on UGM's website. They are thus accessible to the students as well as to all stakeholders, although for the Ba Animal Science and Industry, Ba Biology, and Ma Biotechnology, some links to compulsory and elective modules are not provided.

The experts observe that the module descriptions contain all necessary information about the persons responsible for each module, the language, the teaching methods and workload, the credit points awarded, the intended learning outcomes, the examination requirements, the forms of assessment and details explaining how the final grade is calculated.

While generally appreciating the quality of the module handbooks, there is room for improvement as some bibliographical references in the module descriptions for all programs are over ten years old.

Criterion 4.2 Diploma and Diploma Supplement**Evidence:**

- Self-Assessment Report
- Sample Transcript of Records for each degree program
- Sample Diploma certificate for each degree program
- Sample Diploma for each degree program

Preliminary assessment and analysis of the experts:

According to the Self-Assessment Report, students of all four programs under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The issuance of Diploma certificates is the university's authority and is signed by the Rector and Dean, while the Dean signs the academic transcript and the Diploma Supplement.

The Diploma Supplement contains all necessary information about the degree program, including learning outcomes, acquired soft skills and awards (extracurricular, co-curricular, and intra-curricular activities).

The ASIIN experts are provided with samples of these documents. The experts confirm that the students of the Bachelor's and Master's programs under review are awarded a Diploma Certificate, a Diploma Supplement, as well as a Transcript of Records. The Transcript of Records lists all the courses the graduate has completed, the achieved credits, grades, cumulative GPA, and the seminar and thesis title.

Criterion 4.3 Relevant rules**Evidence:**

- Self-Assessment Report
- All relevant regulations as published on the university's webpage: www.ugm.ac.id

Preliminary assessment and analysis of the experts:

The auditors confirm that the rights and duties of both UGM and the students are clearly defined and binding. All rules and regulations are published on the university's website and hence available to all relevant stakeholders. In addition, the students receive all relevant course material in the language of the degree programs at the beginning of each semester.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 4:

The experts appreciate that all study programs have revised and updated the module descriptions and that the new versions are available via UGM's homepage.

The experts consider criterion 4 to be fulfilled.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development**Evidence:**

- Self-Assessment Report
- Quality Assurance Policy of UGM
- Questionnaire and the results of the Student Feedback Survey
- Results of Staff Satisfaction
- Discussion during the audit

Preliminary assessment and analysis of the experts:

UGM, the Faculties, and the Graduate School present a comprehensive system of external and internal QA, which has been institutionalised in line with Government regulations. The quality assurance system at UGM is conducted by the Office of Quality Assurance (KJM), supported by the Quality Assurance Unit (UJM) at the faculty/school level.

External Quality Assurance exercises of UGM and the academic units are related to the processes established by the Indonesian National Accreditation Board for Higher Education (BAN-PT) for institutional and program accreditation. BAN-PT assessment is conducted by experts from outside the institution and voluntarily for universities that organise study programs. The programs under review have received the highest accreditation status (A) from BAN-PT. In addition to these national procedures, international accreditation (such as ASEAN University Network Quality Assurance-AUN-QA and ASIIN) is done in UGM's quest to become internationally recognised and to improve its standing in international rankings.

Furthermore, UGM has established a comprehensive system of Internal QA:

All study programs undergo thorough internal screening processes employing student surveys and data obtained from external stakeholders through tracer study and labour

market observation. Lecturers provide feedback on the effectiveness of the teaching and learning process via the semester monitoring system (SiMoni). In contrast, students offer their input on the curriculum through the lecture evaluation questionnaire (EDoM). The evaluations are conducted at the end of each semester and are compulsory for all students in order to access their final grades. There are 12 feedback categories, including schedule timings, course materials and course plan, workload, and motivation. Course feedback is compiled by the academic office and monitored by the Head of the study program, who is in charge of initiating any measures if problems or needs for improvement have been detected. The lecturers also can access their EDoM results privately through their SIMASTER.

In addition to the surveys, there is an annual Internal Quality Audit to evaluate whether the general learning objectives have been achieved. Students, supporting staff, lecturers, alumni, and employers participate in this procedure.

During the audit, the experts learn that the results of the surveys are accessible to the students and the teaching staff members. If there is negative feedback, the Dean talks to the respective teacher, analyses the problem, and offers guidance. In the discussion with the experts, students are of the opinion that their comments are taken into consideration. The industry representatives confirm in the discussion that the university is eager to receive feedback about new developments and trends and the employability of its graduates.

Overall, the expert panel has a positive impression of the quality assurance system for the programs under review. Quality management has a high priority within the university, and a variety of functioning structures have been created in this regard. They consider UGM and the Faculty of Animal Science, Faculty of Biology and Graduate School to conduct a sufficient number of evaluations to survey the opinion of students, stakeholders, and staff on a regular basis. The results of these processes are incorporated into the continuous development of the programs under review. The results and measures derived from the various quality assurance instruments used (various survey formats, student statistics, etc.) are communicated to the students and other stakeholders.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 5:

UGM does not comment on this criterion in its statement.

The experts consider criterion 5 to be fulfilled.

D Additional Documents

Before preparing their final assessment, the panel ask that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

- Information on the conversion of Indonesian credits in ECTS points

E Comment of the Higher Education Institution (20.07.2023)

UGM provided a detailed statement as well as the following additional documents:

1. The Degree Program: Concept, content & implementation

Criterion 1.2 Name of the degree program

The Faculty of Biology is in agreement with the suggestion of ASIIN expert regarding the name changing of Ba Biology to Ba Tropical Biology. However, the process of name changing of study program would need time to be approved by Ministry of Education, Culture, Research, and Technology, hence we will start the process as soon as possible.

Criterion 1.3 Curriculum

As part of our effort to better equip our students for students' mobility, especially in English Proficiency ability, we encourage the lecturer to have class in dual languages (Indonesia and English) with presentation is in English. We also have had proposal seminar, thesis defence, and journal writing in English, guest lectures and joined classes with international partners, international summer courses, conferences, and other international programs. These steps have been done since 2019. In addition to those steps, Ba Animal Science and Industry and Ba Biology had opened International Undergraduate Program (IUP) which has all learning activities in English. The IUP of Biology has been established and admitted the first batch of students since 2019, while The IUP of Animal Science and Industry since 2021.

Criterion 1.4 Admission requirements

Thank you for the suggestion from ASIIN Expert. We surely will analyse the applicant's data to make our International Undergraduate Program more appealing for international prospective students.

3. Resources

Criterion 3.2 Funds and Equipment

As part of the inclusiveness effort in UGM, we have pledged to make our new building have accessibility for anyone with disabilities and mobility challenges. For the existing buildings, we will make improvements for accessibility with building safety in mind.

As the ASIIN experts recommend for including the renovation of the laboratory in future plans for rebuilding or upgrading the facilities in the Faculty of Animal Science, We provides annual budget to each laboratories for the purchase of laboratory equipment, as well as for other laboratory needs. For physical renovation and reparation to the damage of laboratory infrastructure, the Faculty provides an opportunity for the relevant laboratory to submit a budget according to the needs of repair and renovation.

4. Transparency and Documentation

Criterion 4.1 Module descriptions

For the availability and updated bibliography in module handbook, all study program had asked the lectures to revise and update the module handbook. All the module handbooks are available at:

1. <https://fapet.ugm.ac.id/en/undergraduate-program/> for Ba Animal Science and Industry
2. <https://biologi.ugm.ac.id/en/course-of-undergraduate-program/> for Ba Biology
3. <https://biologi.ugm.ac.id/en/curriculum-structure-master-program/> for Ma Biology
4. <https://magisterbioteknologi.pasca.ugm.ac.id/en/course/> for Ma Biotechnology

- Statement on the different formulas used to convert Indonesian credits to ECTS for Bachelor and Masters programs:

Responses of Programmes:

Ba Biology	Ba Animal Science and Industry	Ma Biology	Ma Biotechnology
NA	NA	<p>This discrepancy was due to changes in Indonesian credit points (SKS) over the years, especially at the master's program level. The Ma in Biology and Ma in Biotechnology accounted for 40-42 SKS, following Government regulation SN-DIKTI no 3 2020. This regulation stated that the minimal credit for a master's is 36 SKS (SN-DIKTI no 3 the Year 2020 article 17th clause 1f). Moreover, the Government Regulation from the Ministry of Education no 49 the Year 2014 and Government Regulation from the Ministry of Higher Education no 44 the Year 2015 implied that 1 credit at the master level has more workload than one credit in bachelor level.</p> <p>In Universitas Gadjah Mada, one credit in master level consists of 50 minutes of class meeting, 120 minutes of structural assignments, and 70 minutes of independent learning. In one semester we will have 16 weeks, thus it would be 3480 minutes/semester which in turn equal to 64 hours/semester for one SKS in master level.</p> <p>In regards of ECTS, 1 credit point (SKS) in the master level equals 2.6 ECTS. From those calculations, 40-42 Indonesian credit points are equivalent to 102.4 and 107.5 ECTS, respectively.</p>	
 Sukirno, S.Si., M.Sc., Ph.D.	 Ir. Tri Satya Mastuti Widi, S.Pt., MP., M.Sc., Ph.D., IPM., ASEAN Eng.	 Dr. rer. nat. Andhika Puspito Nugroho	 Dr. Dini Wahyu Kartika Sari, S.Pi., M.Si.

F Summary: Expert recommendations (18.08.2023)

Taking into account the additional information and the comments given by UGM the experts summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Program	ASIIN Seal	Maximum duration of accreditation
Ba Animal Science and Industry	Without requirements	30.09.2030
Ba Biology	Without requirements	30.09.2030
Ma Biology	Without requirements	30.09.2029
Ma Biotechnology	Without requirements	30.09.2029

Requirements

No requirements

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to further increase the number of courses delivered in English in alignment with the UGM internationalisation strategy.

For the Bachelor in Biology

E 2. (ASIIN 1.2) It is recommended to rename the Bachelor in Biology to Bachelor in Tropical Biology and take the necessary steps to achieve this change. This is to describe more precisely the content of the programme and create a unique selling point.

For the Bachelor in Animal Science and Industry

E 3. (ASIIN 3.2) It is recommended to include the renovation of the lab of animal nutrition in further rebuilding plans.

G Comment of the Technical Committees (13.09.2023)

Technical Committee 08 - Agriculture, Forestry, Food Sciences, and Landscape Architecture (13.09.2023)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and decides to follow the experts' assessment to accredit the degree programme with recommendations.

The Technical Committee 08 - Agriculture, Forestry, Food Sciences, and Landscape Architecture recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Maximum duration of accreditation
Ba Animal Science and Industry	Without requirements	30.09.2030

Technical Committee 10 – Life Sciences (04.09.2023)

Assessment and analysis for the award of the ASIIN seal:

The procedure was conducted on-site in Yogyakarta (Indonesia) in May. The Bachelor's degree programmes are re-accreditations, the two Master's degree programmes are initial accreditations. In this procedure, too, the expert group proposes not to impose any requirements, but only three recommendations, which concern more English-language courses, the name of the biology programme, and the renovation of the laboratory for animal nutrition. The Technical Committee discusses whether recommendation E2 on the name of the Bachelor's degree programme in biology makes sense or not. In the end, it is in favour of deleting this recommendation because, firstly, it will not be possible for the university to change the name to "Tropical Biology" due to national regulations and, secondly, almost all undergraduate biology programmes have a reference to regional flora and fauna without this being reflected in the name of the degree programme. Otherwise, the Technical Committee agrees with the proposals of the experts.

The Technical Committee 10 - Life Sciences recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba Biology	Without requirements	30.09.2030
Ma Biology	Without requirements	30.09.2029
Ma Biotechnology	Without requirements	30.09.2029

H Decision of the Accreditation Commission (22.09.2023)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses the procedure, especially about the suggestion of TC 10 to cancel recommendation E2. The AC sees that the university will not be able to change the name of the Bachelor's degree programme Biology due to national regulations and agrees with the assessment of TC 10.

The Accreditation Commission decides to award the following seals:

Degree Program	ASIIN Seal	Maximum duration of accreditation
Ba Animal Science and Industry	Without requirements	30.09.2030
Ba Biology	Without requirements	30.09.2030
Ma Biology	Without requirements	30.09.2029
Ma Biotechnology	Without requirements	30.09.2029

Requirements

No requirements

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to further increase the number of courses delivered in English in alignment with the UGM internationalisation strategy.

For the Bachelor in Animal Science and Industry

E 2. (ASIIN 3.2) It is recommended to include the renovation of the lab of animal nutrition in further rebuilding plans.

Appendix: Study Plan and Curricular Overview

1. Bachelor in Animal Science and Industry

Study Plan or Curricular Overview

A. Compulsory Courses

No	Code	Courses	SKS	ECTS	Status	Semester	Total
1	UNU2111000	Religion Education	2/0	3.2	Compulsory	I	18/3
2	UNU2111006	Pancasila	2/0	3.2	Compulsory	I	
3	PTU2111001	Indonesian	2/0	3.2	Compulsory	I	
4	PTU2111002	General Biology	2/1	4.8	Compulsory	I	
5	PTU2111003	Basic Chemistry	2/1	4.8	Compulsory	I	
6	PTU2111004	Mathematics	2/0	3.2	Compulsory	I	
7	PTUD2111012	Introduction to Animal Science and Industry	2/0	3.2	Compulsory	I	
8	PTE2111101	Introduction to Livestock Economics	2/0	3.2	Compulsory	I	17/5
9	PTUP2111016	Anatomy and Histology	2/1	4.8	Compulsory	I	
10	PTU2112005	Basic of Physics	2/1	4.8	Compulsory	II	
11	UNU2112007	Civics	2/0	3.2	Compulsory	II	
12	PTU2112006	English	2/0	3.2	Compulsory	II	
13	PTUE2112014	Basic of Management and Entrepreneurship	2/0	3.2	Compulsory	II	
14	PTUP2112017	Genetics	2/0	3.2	Compulsory	II	
15	PTUN2112015	Basic of Microbiology	1/1	3.2	Compulsory	II	
16	PTUD2112013	Animal Behavior and Welfare	2/0	3.2	Compulsory	II	
17	PTN2112101	Basic of Biochemistry	1/1	3.2	Compulsory	II	
18	PTP2112201	Animal Physiology	1/1	3.2	Compulsory	II	
19	PTE2112202	Basic of Business and Innovation Communication	2/1	4.8	Compulsory	II	17/4
20	PTUP2113018	Introduction to Statistics and Experimental Design	3/0	4.8	Compulsory	III	
21	PTN2113102	Animal Biochemistry	1/1	3.2	Compulsory	III	
22	PTN2113303	Basic of Animal Nutrition	2/0	3.2	Compulsory	III	
23	PTD2113001	Introduction to Livestock Production Science	3/0	4.8	Compulsory	III	
24	PTP2113102	Basic of Molecular Genetics Analysis	2/0	3.2	Compulsory	III	
25	PTP2113203	Animal Reproduction Science	1/1	3.2	Compulsory	III	
26	PTE2113003	Agribusiness and Institutional Management	2/1	4.8	Compulsory	III	
27	PTH2113101	Abattoir and Slaughter Techniques	1/1	3.2	Compulsory	III	12/9
28	PTUP2113019	Research Methodology	2/0	3.2	Compulsory	III	
29	PTN2114304	Animal Feed and Nutrition	1/1	3.2	Compulsory	IV	
30	PTN2114405	Feed and Ration Formulation	1/1	3.2	Compulsory	IV	
31	PTN2114206	Forage Science	1/1	3.2	Compulsory	IV	
32	PTD2114102	Dairy Industry	2/1	4.8	Compulsory	IV	
33	PTD2114203	Meat Animals Industry	2/1	4.8	Compulsory	IV	
34	PTD2114304	Poultry Industry	2/1	4.8	Compulsory	IV	
35	PTH2114102	Meat Science and Technology	1/1	3.2	Compulsory	IV	
36	PTH2114203	Animal Industrial Waste Management Science	1/1	3.2	Compulsory	IV	
37	PTH2114304	Milk Science and Technology	1/1	3.2	Compulsory	IV	
38	PTU2115007	Contextual Study of Religion	2/0	3.2	Compulsory	V	
39	PTN2115407	Technology and Feed Industry	2/0	3.2	Compulsory	V	

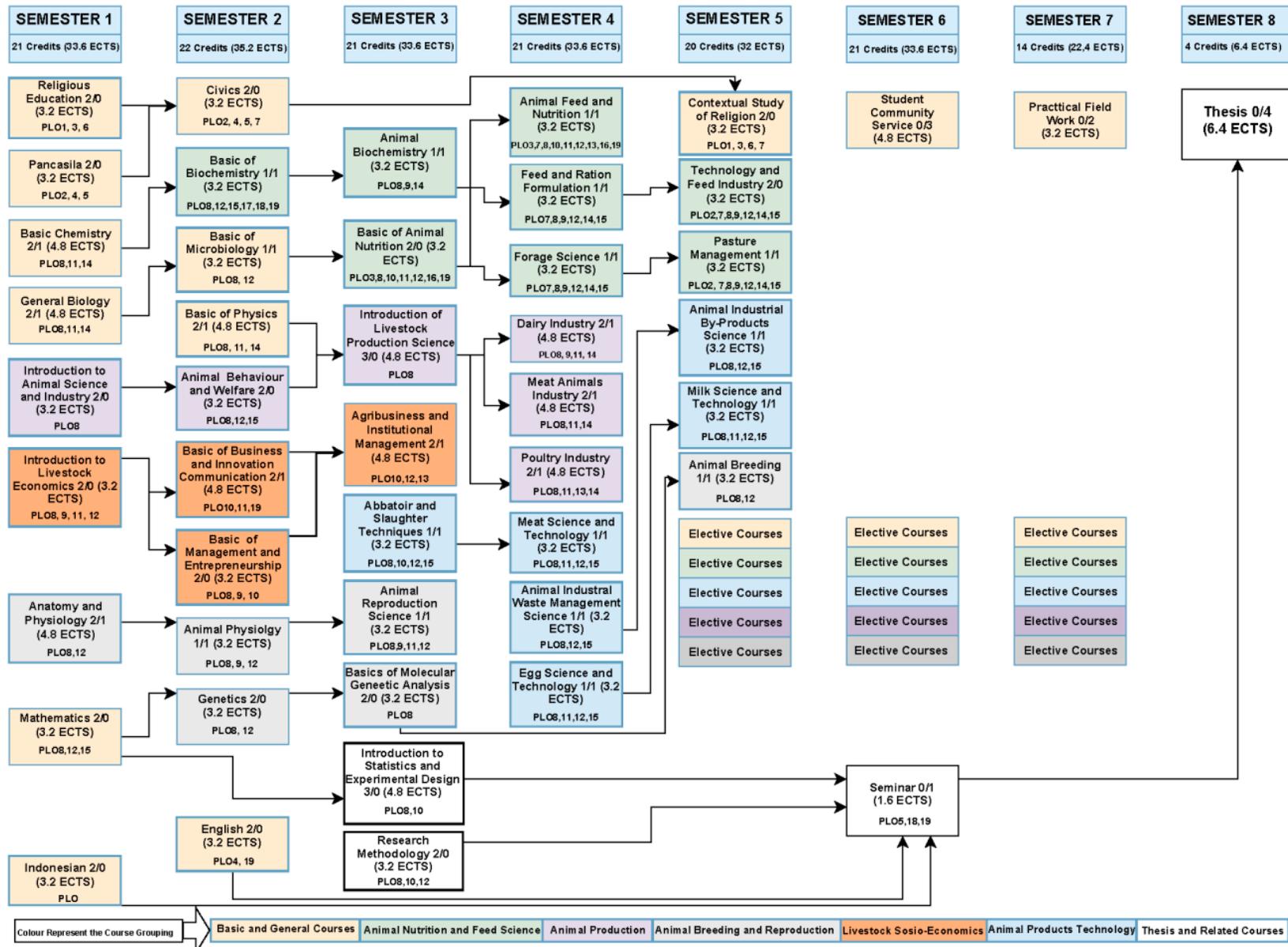
40	PTN2115208	Pasture Management	1/1	3.2	Compulsory	V	8/4
41	PTP2115104	Animal Breeding	1/1	3.2	Compulsory	V	
42	PTH2115205	Animal Industrial By-Products Science	1/1	3.2	Compulsory	V	
43	PTH2115306	Egg Science and Technology	1/1	3.2	Compulsory	V	
44	PTU2116008	Student Community Service	0/3	4.8	Compulsory	VI	0/3
45	PTU2117009	Seminar	0/1	1.6	Compulsory	VII	0/3
46	PTU2117010	Practical Field Work	0/2	3.2	Compulsory	VII	
47	PTU2118011	Undergraduate Thesis	0/4	6.4	Compulsory	VIII	0/4
							72/35
TOTAL SKS WAJIB							107

B. Elective Courses

No	Code	Courses	SKS		Status	Semester	Total
1	PTN2117109	Introduction to Enzymology and Fermentation Technology	2/1	4.8	Elective	Odd	
2	PTN2117110	Introduction to Livestock	2/0	3.2	Elective	Odd	
3	PTN2117411	Practicum of Technology and Feed Industry	0/1	1.6	Elective	Odd	
4	PTN2117417	Feed Evaluation Techniques	2/0	3.2	Elective	Odd	
5	PTN2117212	Biodynamic Integrated Farming	2/0	3.2	Elective	Odd	
6	PTN2117213	Introduction to Feed Plants Genetic Resources Conservation	2/0	3.2	Elective	Odd	
7	PTN2117314	Introduction to Functional Feed	2/0	3.2	Elective	Odd	
8	PTN2117320	Poultry and Non-Ruminant Ration	2/1	4.8	Elective	Odd	
9	PTD2117005	Introduction to Animal Production System	3/0	4.8	Elective	Odd	
10	PTD2117106	Dairy Industry	2/1	4.8	Elective	Odd	
11	PTD2117207	Companion and Experimental Animals Industry	2/1	4.8	Elective	Odd	
12	PTD2117308	Miscellaneous Poultry Industry	2/1	4.8	Elective	Odd	
13	PTP2117106	Practicum of Basic of Molecular Genetics Analysis	0/1	1.6	Elective	Odd	
14	PTP2117207	Reproduction Technology	2/1	4.8	Elective	Odd	
15	PTE2117004	Socio-Economic Data Instrumentation and Analysis	1/1	3.2	Elective	Odd	
16	PTE2117205	Rural Development	2/0	3.2	Elective	Odd	
17	PTE2117106	Industrial Economics	2/0	3.2	Elective	Odd	
18	PTH2117107	Poultry Meat Industry	2/1	4.8	Elective	Odd	
19	PTH3203/PTH2117208	Animal Industrial Waste Management Technology	2/0	3.2	Elective	Odd	
20	PTH3303/PTH2117009	Animal Products Microbiology	2/1	4.8	Elective	Odd	
21	PTH2117011	Food Nutrition of Animal Products	2/0	3.2	Elective	Odd	
22	PTUN2117030	Introduction to Biotechnology	2/0	3.2	Elective	Odd	
23	PTUN2117031	Honey Bee Science / Apiculture	1/1	3.2	Elective	Odd	
24	PTUD2117021	Basic of Livestock Programming and Instrumentation	2/0	3.2	Elective	Odd	
25	PTUE2117024	Livestock Technology and Social Entrepreneurship	2/0	3.2	Elective	Odd	
26	PTU2117020	Research Techniques	2/0	3.2	Elective	Odd	
27	PTE2116207	Extension Development	1/1	3.2	Elective	Even	

28	PTU3104/PTN21 16113	Feed Toxicology	2/0	3.2	Elective	Even		
29	PTN2116416	Quality Control and Feed Industry Management	2/1	4.8	Elective	Even		
30	PTN2116218	Feed Plant Seeds Production and Certification	2/0	3.2	Elective	Even		
31	PTN2116219	Introduction to Plant Tissue Culture	1/1	3.2	Elective	Even		
32	PTN3304/PTN21 16321	Ruminant Rations	1/1	3.2	Elective	Even		
33	PTD2116109	Miscellaneous Dairy Animals Industry	2/1	4.8	Elective	Even		
34	PTD2116210	Draught and Sport Animals Industry	2/1	4.8	Elective	Even		
35	PTD3304/PTD21 16311	Poultry Breeding and Hatching Industry	2/1	4.8	Elective	Even		
36	PTP2116108	Basic of Livestock Assessment and	3/0	4.8	Elective	Even		
37	PTP2116209	Infertility and Sterility	2/0	3.2	Elective	Even		
38	PTP2116210	Animal Environmental Science	2/0	3.2	Elective	Even		
39	PTP2116105	Basic of Ruminant and Non Ruminant Breeding Industrial Engineering	2/1	4.8	Elective	Even		
40	PTE2116108	Consumer Behavior	2/0	3.2	Elective	Even		
41	PTE2116109	Livestock Project Analysis	1/1	3.2	Elective	Even		
42	PTE2116210	Psychology of Work	2/0	3.2	Elective	Even		
43	PTH2116010	Livestock Food Safety	2/0	3.2	Elective	Even		
44	PTH2116212	Leather Science, Design, and Technology	2/1	4.8	Elective	Even		
45	PTH2116213	Animal By-Products Technology	2/0	3.2	Elective	Even		
46	PTH2116014	Livestock Food Enzymes	2/0	3.2	Elective	Even		
47	PTH2116313	Basics of Processing Livestock	2/0	3.2	Elective	Even		
48	PTUD2116022	Animal Health Science	2/0	3.2	Elective	Even		
49	PTUE2116025	Livestock Politics	2/0	3.2	Elective	Even		
50	PTUH2116029	Livestock Products Halal Production System	2/0	3.2	Elective	Even		
51	PTUE2116026	Livestock Product Marketing	2/0	3.2	Elective	Even		
52	PTUE2116027	Livestock Industry Management	2/0	3.2	Elective	Even		
53	PTUE2116028	Animal Based Tourism	2/0	3.2	Elective	Even		
54	PTUD2116023	Swallow and Silkworm Cultivation / Sericulture	2/0	3.2	Elective	Even		
55	PTUP2116032	Experimental design	2/0	3.2	Elective	Even		
56	PTU2110033	External Seminar Recognition			Elective	Odd/Even		
57	PTU2110034	Competition Winner Recognition			Elective	Odd/Even		
58	PTU2110035	MBKM Rural Development Project			Elective	Odd/Even		
59	PTU2110036	MBKM Research			Elective	Odd/Even		
60	PTU2110037	MBKM Indenpent Study / Project			Elective	Odd/Even		
61	PTU2110038	MBKM Teaching in Education Unit			Elective	Odd/Even		
62	PTU2110039	MBKM Internship			Elective	Odd/Even		
63	PTU2110040	MBKM Student Exchange			Elective	Odd/Even		
64	PTU2110041	MBKM Entrepreneurial Activities			Elective	Odd/Even		
65	PTU2110042	MBKM Humanity Project			Elective	Odd/Even		
66	PTU2110043	MBKM State Defence			Elective	Odd/Even		
67	...	Courses Outside Study Program			Elective	Odd/Even		
TOTAL							100/22	122

0 Appendix: Study Plan and Curricular Overview



Curriculum Map Study Program of Bachelor in Animal Science and Industry

2. Bachelor in Biology**Offered Courses each semester****Semester 1**

No	Code	Courses	Credits	Prerequisite
1	BISB211101	English for Biology	2-0	–
2	BISB211102	General Biology	3-1	–
3	GEF 1120	Geomorphology	2-0	–
4	MKS 1105	Chemistry	3-1	–
5	MMS 1107	Mathematics	2-0	–
6	MFS 1107	Physics	2-1	–
7	UNU 1110	Pancasila	2-0	
Total			19 credits	

Semester 2

No	Code	Courses	Credits	Prerequisite
1	BISB211201	Bioentrepreneurship	2-0	
2	BISB211202	Biochemistry	2-0	BIO 10001, MFS 1107, MKS 2401
3	BISB211203	Biostatistics	2-0	MMS 1107
4	BISB211204	Animal Structure and Development	3-1	BISB211102
5	BISB211205	Plant Structure and Development	3-1	BISB211102
6	UNU 1100	Religion	2-0	
7	UNU 1240	Civics	2-0	
Total			20 credits	

Semester 3

No	Code	Courses	Credits	Prerequisite
1	BISB211301	Environmental Science	2-0	–
2	BISB211302	Genetics	3-1	BISB211204, BISB211202
3	BISB211303	Plant Systematics	3-1	BISB211202
4	BISB211304	Animal Systematics	3-1	BISB211203
5	BISB211305	Scientific Methods and Experimental Design	2-0	BISB211204
6	BISB211306	Technical Biochemistry	1-1	BISB211202
Total			20 credits	
		Elective courses		

Semester 4

No	Code	Courses	Credits	Prerequisite
1	BISB211401	Ecology	3-1	BISB211301, BISB211204, BISB211303
2	BISB211402	Microbiology	3-1	BISB211202
3	BISB211403	Animal Physiology	3-1	BISB211202, BISB211203
4	BISB211404	Plant Physiology	3-1	BISB211202, BISB211203
5	BISB211405	Scientific Writing	2-0	BISB211305
Total			20 credits	
		Elective courses		

Semester 5

No	Code	Courses	Credits	Prerequisite
1	BISB211501	Cell and Molecular Biology	3-0	BISB211202
2	BISB211502	Microbial Systematics	3-1	BISB211402
3	BISB211504	Internship	0-2	BISB211405,
4	BISB211503	Paleontology	2-1	BISB211102, GEF 1120, BISB211303,
Total			9	

		Interest Compulsory Courses (required for all interest)		
5	BISB211505	Population Genetics	2-0	BISB211302
		Compulsory Interest in Environmental Biology		
6	BISB211506	Microbial Diversity*	2-0	BISB211402
		Required Interest in Functional Biology and		
7	BISB211507	Animal Ecophysiology*	2-0	BISB211403, BISB211401
8	BISB211508	Plant Ecophysiology*	2-0	BISB211404, BISB211401
		Elective courses		

Semester 6

No	Code	Courses	Credits	Prerequisite
1	BISB211602	Science Philosophy	2-0	> 60 credits
2	BISB211603	Seminar	0-2	BISB211405, ≥80 credits
3	UNU4450	Community Services**	0-8	
4	BISB211601	Evolution	2-0	BISB211503, BISB211505
Total			12	
		Interest Compulsory Courses (required for all interest)		
5	BISB211605	Biotechnology	2-0	BISB211501
		Required Interest in Molecular Biology and		
6	BISB211606	Bioinformatics*	1-1	BISB211505, BISB211501
		Compulsory Interest in Environmental Biol-		
7	BISB211607	Biogeography*	2-0	BISB211401
8	BISB211608	Animal Biosystematics*	2-1	BISB211304
9	BISB211609	Plant Biosystematics*	2-1	BISB211303
		Elective courses		

Semester 7

o	Code	Courses	Credits	Prerequisite
1	BISB211701	Extracurricular II*	0-2	
2	BISB211702	Undergraduate Thesis	0-6	BISB211504, BISB211603 ≥100 credits
Total			8	
		Elective courses		
	BIOMBPK1***	Independent Learning		
	BIOMBMD1***	Independent Learning Village Development		
	BIOMBSI***	Independent Learning		
	BIOMBPK***	Independent Learning Humanity Program		
	BIOMBMS***	Independent Learning Teaching at School		
	BIOMBPM***	Independent Learning Student Exchange		
	BIOMBKW***	Independent Learning Entrepreneurship		

Semester 8

No	Code	Courses	Credits	Prerequisite
1		Independent Learning Courses		
	BIOMBPK1***	Independent Learning Internship Course		
	BIOMBMD1***	Independent Learning Village Development		
	BIOMBSI***	Independent Learning Independent Study		
	BIOMBPK***	Independent Learning Humanity Program		
	BIOMBMS***	Independent Learning Teaching at School		
	BIOMBPM***	Independent Learning Student Exchange		
	BIOMBKW***	Independent Learning Entrepreneurship		

*Students take one of the courses listed in one of their interests according to the theme of their thesis. Students can take courses other than their chosen interests, but these courses will be declared as elective courses.

**Courses can be claimed as MBKM courses

***The MBKM course code will be followed by a numeric code according to the credit load

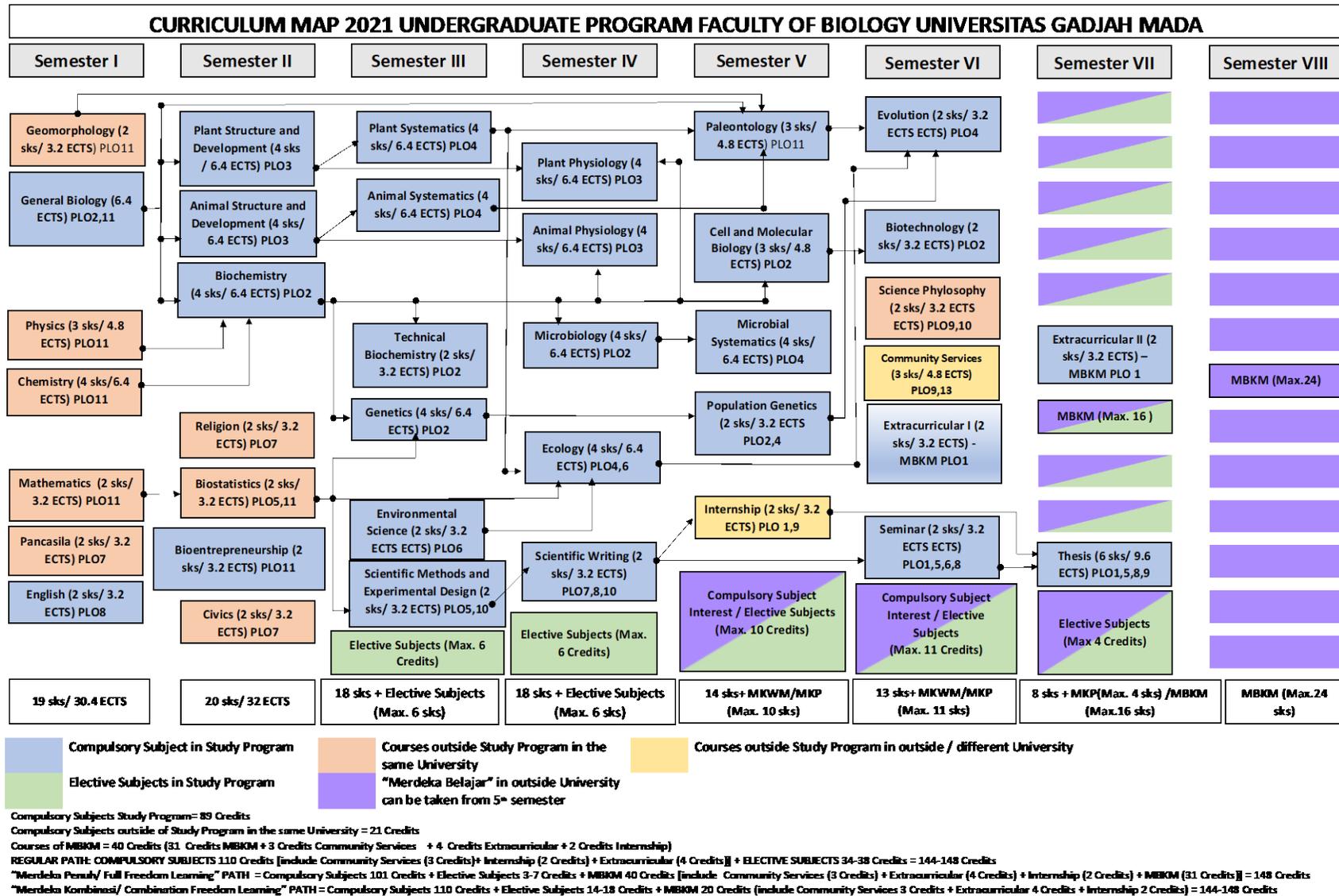
Elective courses/Odd

No	Code	Course	Credits	Prerequisite
1	BISB211307	Advanced Biochemistry	2-0	BISB211202
2	BISB211308	Plant Anatomy	2-1	BISB211202
3	BISB211309	Plant Embryology	2-1	BISB211202
4	BISB211310	Plant Structure and Secretory Tissue Prod-	2-1	BISB211202, MKS 1105
5	BISB211311	Animal Anatomy	2-1	BISB211203
6	BISB211312	Histology	2-1	BISB211203
7	BISB211313	Animal Embryology	2-1	BISB211203
8	BISB211314	Biomaterial	2-1	BISB211102, MKS 1105, BISB211202
9	BISB211509	Phycology	2-1	BISB211303
10	BISB211510	Orchidology	2-1	BISB211303
11	BISB211511	Plant Nomenclature	2-0	BISB211303
12	BISB211512	Carcinology	2-1	BISB211304
13	BISB211513	Malacology	2-1	BISB211304
14	BISB211514	Ornithology	2-1	BISB211304
15	BISB211515	Protozoology	2-1	BISB211304
16	BISB211516	Acarology	2-1	BISB211304
17	BISB211517	Marine Biology	2-1	BISB211401
18	BISB211518	Virology	2-0	BISB211202, BISB211306, BISB211402
19	BISB211519	Nutritional Biochemistry	2-0	BISB211404, BISB211403
20	BISB211520	Plant Tissue Culture Technique	2-0	BISB211404
21	BISB211521	Limnology	2-1	BISB211401
22	BISB211522	Environmental Pollution and Toxicology	2-1	BISB211301, BISB211401
23	BISB211523	Marine Ecology	2-1	BISB211401
24	BISB211524	Advanced Ecology	2-1	BISB211401
25	BISB211525	Microbial Physiology	2-0	BISB211402
26	BISB211526	Industrial Microbiology	2-1	BISB211402
27	BISB211527	Microbial Genetics	2-0	BISB211402
28	BISB211528	Immunobiology	2-1	BISB211403
29	BISB211529	Endocrinology	2-1	BISB211403
30	BISB211530	Advanced Plant Physiology	2-1	BISB211404
31	BISB211531	Phytohormone	2-1	BISB211102, BISB211202, BISB211404
32	BISB211532	Insect Structure and Function	2-1	BISB211424
33	BISB211533	Insect Ecology	2-1	BISB211424
34	BISB211534	Enzymology	2-0	BISB211306
35	BISB211703	Paleobotany and Palynology	2-0	BISB211503, BISB211303
36	BISB211704	Palaeozoology	2-1	BISB211503, BISB211304

Elective courses/Even

No	Code	Course	Credits	Prerequisite
1	BISB211406	Radiation Biology	2-1	BISB211306
2	BISB211407	Algae Culture and Engineering	2-1	BISB211102, BISB211306
3	BISB211408	Cytogenetics	2-1	BISB211302
4	BISB211409	Human Genetics	2-0	BISB211302
5	BISB211410	Plant Microtechniques	1-1	BISB211202
6	BISB211411	Botanical Economy	2-1	BISB211202, BISB211303
7	BISB211412	Pathoanatomy	2-1	BISB211203, BISB211312

8	BISB211413	Animal Microtechniques	1-1	BISB211203
9	BISB211414	Animal Cell Culture	2-0	BISB211203, BISB211306
10	BISB211415	Mycology	2-1	BISB211303
11	BISB211416	Bryology	1-1	BISB211303
12	BISB211417	Ethnobotany	2-0	BISB211303
13	BISB211418	Herpetology	2-1	BISB211304
14	BISB211419	Ichthyology	2-1	BISB211304
15	BISB211420	Mammalogy	2-1	BISB211304
16	BISB211421	Parasitology	2-1	BISB211304
17	BISB211422	Helminthology	2-1	BISB211304
18	BISB211423	Entomology	2-1	BISB211304
19	BISB211610	Conservation Biology	2-1	BISB211524
20	BISB211611	Molecular Genetics	2-0	BISB211302, BISB211306, BISB211501
21	BISB211612	Food Microbiology	2-1	BISB211402
22	BISB211613	Soil Microbiology	2-1	BISB211402
23	BISB211614	Applied Animal Physiology	2-0	BISB211403
24	BISB211615	Vertebrate Pest Biology	2-1	BISB211304, BISB211401
25	BISB211616	Human Biology	2-1	BISB211503, BISB211304
26	BISB211617	Climate Change : International Negotia-	2-0	> 80 credits



3. Master in Biology

Study Program Compulsory Courses

#	Course Code	Course Name	Cred-
1	BIMB202101	Research Methodology in Biology	2-0
2	BIMB202102	Cell and Molecular Biology	2-0
3	BIMB202103	Science Philosophy	2-0
4	BIMB202104	Biodiversity	2-0
5	BIMB202201	Scientific Writing and Publication	2-0
6	BIMB202301	Comprehensive exam	2-0
7	BIMB202302	Publication	2-0
8	BIMB202401	Thesis exam	6-0

Compulsory Course Interest Study Program

#	Course Code	Course Name	Cred-
1. Industrial Biology and Biological Engineering			
1	BIMB202105	Bioprospect and Entrepreneurship	2-0
2	BIMB202106	Biological Engineering	2-0
3	BIMB202107	Bioprocess and Biorefinery	2-1
4	BIMB202108	Biodegradation and Bioremediation	3-0
2. Medical Biology and Forensic			
1	BIMB202109	Forensic Biology	2-0
2	BIMB202110	Cellular and Molecular Immunology	2-1
3	BIMB202111	Analytical Biochemistry	2-1
4	BIMB202112	Nutrition and Metabolism	2-0
3. Functional and Developmental Biology			
1	BIMB202113	Molecular Developmental Biology	2-0
2	BIMB202114	Structural and Functional Biology	2-1
3	BIMB202115	Reproduction Biology	2-0
4	BIMB202116	Microscopy and Microtechnique	2-1
4. Biodiversity and Biosystematics			
1	BIMB202117	Biosystematics	2-0
2	BIMB202118	Biogeography	2-0
3	BIMB202119	Systematic Research Methods	2-1
4	BIMB202120	Ethnobiology	2-1
5. Systems Biology and Synthetics			
1	BIMB202121	Omics	2-0
2	BIMB202122	Natural Products	2-0
3	BIMB202123	Cell and Molecular Genetics	2-1
4	BIMB202124	Genetic Engineering and Biotechnology	2-1
6. Marine Biology			
1	BIMB202125	Marine Biota	2-0
2	BIMB202126	Management of Marine Biology	2-1
3	BIMB202123	Natural Products	2-0
4	BIMB202127	Marine Ecology	2-1
7. Environmental Biology and Conservation			
1	BIMB202128	Population Ecology	2-0

2	BIMB202129	Community Ecology	2-0
3	BIMB202130	Limnology/Marine Ecology	2-1
4	BIMB202131	Conservation Biology	2-1

Laboratory Compulsory Courses

#	Course Code	Course Name	Cred-
1	BIMB202203	Biochemical Signaling System	2-0
2	BIMB202204	Vegetation Ecology	2-1
3	BIMB202205	In Vitro Culture Technique	1-2
4	BIMB202206	Entomology	2-1
5	BIMB202207	Physiology of Animal Behavior	2-0
6	BIMB202208	Physiology of Plant Development	2-1
7	BIMB202209	Genetics	2-0
8	BIMB202210	Culture Collections and Microbial Techniques	2-1
9	BIMB202211	Animal Biosystematics	2-1
10	BIMB202212	Numerical Taxonomy and Plant Phylogenetics	2-1
11	BIMB202213	Animal Developmental Abnormal	2-1
12	BIMB202214	Anatomy of Vascular Plant Development	2-1

Elective Course

#	Course Code	Course Name	Cred-
1	BIMB202215	Enzyme Technology	2-0
2	BIMB202216	Biochemistry of Essential Oils	2-0
3	BIMB202217	Plant Interaction with Microbes and Insects	2-0
4	BIMB202218	Plant Biotechnology	2-1
5	BIMB202219	Algae Biotechnology	2-1
6	BIMB202220	Insect Ecology	2-1
7	BIMB202221	Insect Physiology	2-1
8	BIMB202222	Insect Biosystematics	2-1
9	BIMB202223	Insect Pathology	2-1
10	BIMB202224	Model Animals and Bioethics	2-1
11	BIMB202225	Plant Nutrition	2-1
12	BIMB202226	Molecular Plant Hormones	2-1
13	BIMB202227	Population Genetics	2-0
14	BIMB202228	Human Genetics	2-0
15	BIMB202229	Plant and Animal Breeding	2-0
16	BIMB202230	Bioprocess and Biomolecular Bacteria	2-1
17	BIMB202231	Fermentation Technology	2-0
18	BIMB202232	Viral Infection and Plant, Animal, and Human Defense	2-1
19	BIMB202233	Tropical Parasite Biology	2-1
20	BIMB202234	Fungi Diversity and Taxonomy	2-1
21	BIMB202235	Algae Diversity and Taxonomy	2-1
22	BIMB202236	Plant Vascular Diversity and Taxonomy	2-1
23	BIMB202237	Pollen Diversity and Phytochemistry	2-1
24	BIMB202238	Plant Organogenesis	2-1
25	BIMB202239	Structure and Products of Plant Secretory Tissues	2-1
26	BIMB202240	Regenerasi dan Biology of Aging	2-1

27	BIMB202241	In Vitro Animal Cell Culture	2-1
28	BIMB202242	Wetland Ecology	2-1
29	BIMB202243	Toxicology and Environmental Pollution	2-1
30	BIMB202244	Biomechanics and Biomimetics	2-1
31	BIMB202245	Environmental Impact Analysis	2-0
32	BIMB202246	Natural Resources Conservation	2-0

**CURRICULUM MAP 2021 MASTER PROGRAM REGULAR FACULTY OF BIOLOGY
UNIVERSITAS GADJAH MADA**

SEMESTER I	SEMESTER II	SEMESTER III	SEMESTER IV
Research methods Biology (3.2 ECTS) - MKWP PLO 3, PLO 7, PLO 8, PLO 12, PLO 14	Scientific Writing and Publication (3.2 ECTS) PLO 2, PLO 7, PLO 12	Exam Comprehensive (9.6 ECTS) PLO 5, PLO 8, PLO 12	Thesis Exam (28.8 ECTS) PLO 3, PLO 5, PLO 8, PLO 10, PLO 12
Cell Biology and Molecular (3.2 ECTS) -MKWP PLO 3, PLO 4, PLO 7, PLO 11, PLO 12, PLO 15	Proposal Seminar (3.2 ECTS) PLO 4, PLO 7, PLO 8	Publication (9.6 ECTS) PLO 1, PLO 3, PLO 7, PLO 9, PLO 10, PLO 13, PLO 15	
Philosophy of Science (3.2 ECTS) - MKWP PLO 1, PLO 6	Laboratory Compulsory Courses (9.6 ECTS) PLO 7		
Biodiversity (3.2 ECTS) - MKWP PLO 1, PLO 2, PLO 6, PLO 14	Elective courses (12.8/11.2 ECTS) PLO 4, PLO 7		
Compulsory Courses Interest in Study Program (16 ECTS) - MKWP PLO 4, PLO 5, PLO 6, PLO 7, PLO 8, PLO 9, PLO 11, PLO 13, PLO 14			

**CURRICULUM MAP 2021 MASTER BY RESEARCH PROGRAM, FACULTY OF BIOLOGY
UNIVERSITAS GADJAH MADA**

SEMESTER I	SEMESTER II	SEMESTER III	SEMESTER IV
Research methods Biology (3.2 ECTS) PLO 3, PLO 7, PLO 3, PLO 7, PLO 8, PLO 14	Proposal Seminar (3.2 ECTS) PLO 4, PLO 7, PLO 8	Research II (19.2 ECTS) PLO 4, PLO 5, PLO 8, PLO 11, PLO 13, PLO 14	Thesis Exam (19.2 ECTS) PLO 3, PLO 5, PLO 8, PLO 10, PLO 12
Writing Scientific and Publication (3.2 ECTS) PLO 2, PLO 7, PLO 12	Comprehensive examination (3.2 ECTS) PLO 5, PLO 8, PLO 12	Results Seminar (3.2 ECTS) PLO 4, PLO 7, PLO 12	
Philosophy of Science (3.2 ECTS) PLO 1, PLO 6	Research I (19.2 ECTS) PLO 3, PLO 4, PLO 7, PLO 10, PLO 12, PLO 13	Publication (19.2 ECTS) PLO 1, PLO 3, PLO 7, PLO 9, PLO 10, PLO 13,	
Compulsory Courses Interest in Study Program (3.2 ECTS) PLO 4, PLO 5, PLO 6, PLO 7, PLO 8, PLO 9, PLO 11, PLO 13, PLO 14	Seminar (3.2 ECTS) PLO 9, PLO 12, PLO 15		

4. Master in Biotechnology

Odd semester:

Compulsory Course	Code	Credit
Biologi Sel/Cell Biology	SPSBT-6101	2/0
Fisiologi Molekular/Molecular Physiology	SPSBT-6102	2/0
Genetika molekular/Molecular Genetics	SPSBT-6103	2/0
Karier bioteknologi/Carrier in biotechnology	SPSBT-6104	1/0
Good research practice	SPSBT-6105	2/0

Elective courses

Mata Kuliah	Code	Credit
Virologi/virology	SPSBT-7103	2/0
Bioteknologi Kesehatan Ikan/Fish Health Biotechnology	SPSBT-7110	2/0
Microbiome/Microbiome	SPSBT-7112	2/0
Nanobioteknologi/Nanobiotechnology	SPSBT-7111	2/0
Bioteknologi Tanah dan Pupuk Hayati/Soil Biotechnology and Biofertilizer	SPSBT-7109	2/0
Biosintesis Metabolit Sekunder/Secondary Metabolite Biosynthesis	SPSBT-7105	2/0
Analisis Biomolekul/Biomolecular Analysis	SPSBT-7102	2/0
Fitoaleksin dan Resistensi/Phytoalexins and Resistance	SPSBT-7107	2/0
Imunologi/Immunology	SPSBT-7101	2/0
Bioteknologi Perlindungan Tanaman/Plant Protection Biotechnology	SPSBT-7106	2/0
Enzimologi/Enzymology	SPSBT-7104	2/0
Keanekaragaman & Keamanan Hayati/Diversity and Biosafety	SPSBT-7108	2/0

Even Semester

Compulsory Course	Code	Credit
Rekayasa Genetika/Genetic Engineering	SPSBT-6201	2/0
Propagasi sel/Cell Propagation	SPSBT-6202	2/0
Deteksi molekular/Molecular detection	SPSBT-6203	0/2
Bioinformatika analisis gen dan protein/ Bioinformatics Gene and Protein Analysis	SPSBT-6204	2/0
Pengembangan proposal/ Proposal Development	SPSBT-6205	0/2

Compulsory for Health Biotechnology study Interest	Code	Credit
Diagnostik Molekular/Molecular Diagnostic	SPSBT-6240	2/0
Teknologi Terapi Gen/Genes Therapy Technology	SPSBT-6241	2/0
Bioteknologi Kesehatan Preventif/Preventive Health Biotechnology	SPSBT-6242	2/0

Compulsory for Agricultural Biotechnology study Interest	Code	Credit
Asosiasi mikroba tanaman dan hewan/Plant and animal microbial associations	SPSBT-6243	3/0

Teknologi hewan dan tanaman transgenic/GMO plant and animal technology	SPSBT-6244	3/0
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Compulsory for Industrial Biotechnology study Interest	Code	Credit
Rekayasa biokimia/Biochemical Engineering	SPSBT-6245	3/0
Transport Phenomena in Bioprocess	SPSBT-6246	3/0

Compulsory for Environmental Biotechnology study Interest	Code	Credit
Bioteknologi Lingkungan/Environmental Biotechnology	SPSBT6247	3/0
Toksikologi Lingkungan/Environmental Toxicology	SPSBT-6248	3/0

Elective Course

Course	Code	Credit
Bioteknologi Kelautan/Marine Biotechnology	SPSBT-6240	2/0
Teknologi Fermentasi/Fermentation Technology	SPSBT-7203	2/0
Onkologi/Oncology	SPSBT-7201	2/0
Omics: From Genomes to Biomes	SPSBT-7208	2/0
Imunokimia/Immunochemistry	SPSBT-7202	2/0
Biotechentrepneurship	SPSBT-7211	2/0

