



UNNES
UNIVERSITAS NEGERI SEMARANG

FACULTY OF MATHEMATICS AND NATURAL SCIENCES

HANDBOOK STUDY PROGRAM

**BIOLOGY
EDUCATION**



**CURRICULUM
INDEPENDENT LEARNING
INDEPENDENT CAMPUS**



**STUDY PROGRAMME
UNDERGRADUATE BIOLOGY EDUCATION**

**FACULTY OF MATHEMATICS AND NATURAL SCIENCES UNIVERSITAS
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CURRICULUM OF THE UNDERGRADUATE BIOLOGY EDUCATION STUDY PROGRAMME

I. Study Programme Identity

1	Name	Study Programme: Biology Education (Undergraduate/S1) 61-604-03-20-01-01
2	Establishment Permit	Decree of the Minister of Higher Education and Science No. 40 of 1965, 8 March 1965, ratified by Presidential Decree No. 271 of 1965, 14 September 1965
3	Accreditation	A , BAN-PT No. 2066/SK/BAN-PT/Ak-PPJ/S/IV/2020
4	Degree	Bachelor of Education (S.Pd.)
5	Description	The UNNES Undergraduate Biology Education Study Programme provides biology education with the aim of producing graduates in biology teaching at basic, secondary and higher education levels. Graduates hold an education degree and are skilled, excellent, professional, sensitive to environmental and socio-cultural conservation, and equipped with research and entrepreneurial skills.
6	Scientific Vision	To develop innovative and excellent biology education scholarship through the Exploration of the Surrounding Environment (JAS) approach, with a conservation perspective, the application of current technology, contribution to educational advancement and international reputation
7	Objectives	a. To produce biology educators who have faith in and devotion to God Almighty, embody Pancasila values, are able to develop innovative learning, understand learner characteristics, master educational and biological substance in line with developments in science and technology from a conservation perspective, and have the potential to continue to higher levels of study. b. To produce educational research assistants who master educational research methods, have skills in analysing quantitative and qualitative research, and are able to disseminate their research analysis to wider society. c. To produce creative entrepreneurs who possess managerial and collaborative skills, are independent, have an entrepreneurial spirit, and are able to develop themselves.
8	Strategies for Achieving Objectives	a. To provide biology education through the JAS approach that is exploratory, innovative, interdisciplinary, research-based and globally competitive in a sustainable manner. b. To conduct research in biology education and publish the results in national and international forums. c. To apply research findings and scientific thinking to wider society in order to help solve problems in biology education. d. To establish cooperation with other institutions or agencies to strengthen educational and research networks and partnerships at national and international levels.

II. Results of Curriculum Evaluation and Tracer Study

On 31 October 2024, the UNNES Biology Education Study Programme reviewed the 2020 Biology Education curriculum through a focus group discussion involving alumni, graduate users and programme lecturers. The activity recommended that the curriculum should be revised by integrating the demands of future teachers through the development of TPACK competence in courses, both in educational courses and disciplinary science courses, and by integrating MBKM courses. In addition to the future biology teacher competences required of Biology Education graduates, students also need to be equipped with entrepreneurial competence as a means of developing scientific practice.

III. Basis for Curriculum Design and Development and the Study Programme Body of Knowledge

The body of knowledge, or the knowledge and expertise delivered by the Undergraduate Biology Education Study Programme, Faculty of Mathematics and Natural Sciences, UNNES, comprises biological science, methodological-pedagogical knowledge (educational science), and other fields relevant to biology learning. This knowledge has linkages and constellations with similar fields in Biology Education at Master's and doctoral levels, and is also correlated with biological science, giving rise to Pedagogical Content Knowledge (PCK) in biology education. Developments in Industry 4.0, which have generated a disruptive era, must be considered, particularly the proliferation of technology in learning. Accordingly, technology also plays a role in integrating biological content and biology teaching. In general, therefore, the body of knowledge of biology education is described as TPACK (Technological Pedagogical and Content Knowledge), as illustrated by Koehler and Mishra (2009).

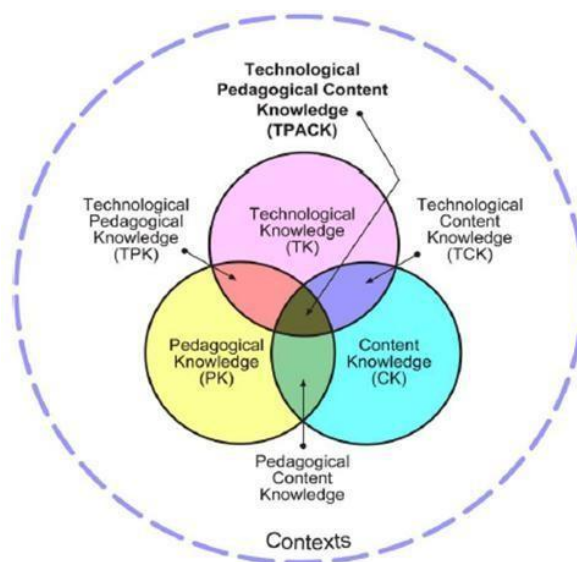


Figure 1. TPACK framework and components according to Koehler and Mishra (2009)

Biological science can be described in terms of events or phenomena and the organisational levels at which those phenomena occur. Biological phenomena include concept development, diversity, structure and function, life and the environment, evolution, behaviour, regulation and coordination. The organisational levels at which biological phenomena occur include the molecular, cellular, tissue, organ, organ-system, organism, population, community and biome levels. This body of biological science is confirmed and conceptualised through biological problem objects, ranging from viruses and monera, protists, fungi, plants and animals, including humans. When the body of knowledge and biological problem objects are mutually confirmed and conceptualised, various branches of biology emerge. For example, structure-function phenomena studied from the molecular level to the organism level in plants give rise to plant morphology, anatomy and physiology; in animals, they give rise to animal morphology, anatomy and physiology. Diversity phenomena studied from the molecular to organism levels in plants or animals give rise to plant or animal taxonomy; when expanded to the biome level, they give rise to studies of biodiversity. Life and environmental phenomena studied from organisms to biomes in biological objects give rise to ecology, and so forth, producing other branches such as genetics, molecular biology, tissue culture, embryology and biochemistry. The confirmation and conceptualisation of the body of knowledge at various organisational and phenomenon levels, and of biological problem objects, are studied in the Undergraduate Biology Education Study Programme as study materials packaged as course names. Confirmation and conceptualisation of the body of knowledge, organisational levels, general phenomena and biological problem objects are studied through structured scientific research culminating in an undergraduate thesis.

As a branch of educational scholarship in the nomenclature, biology education does not only study biological problem objects and the body of biological science, but also the methods used to confirm and conceptualise them. Appropriate methods are required to teach biological problem objects and the various phenomena they display. Learning methods in educational science are viewed as study materials ranging from planning, application, monitoring and assessment. This gives rise to study materials such as curriculum analysis, teaching and learning strategies, learning management, learning evaluation and biology microteaching. Methodological studies of teaching and learning at various levels of biological phenomena are intended to improve the quality of biology education scholarship. The body of knowledge diagram for biology education is shown in Figure 2.

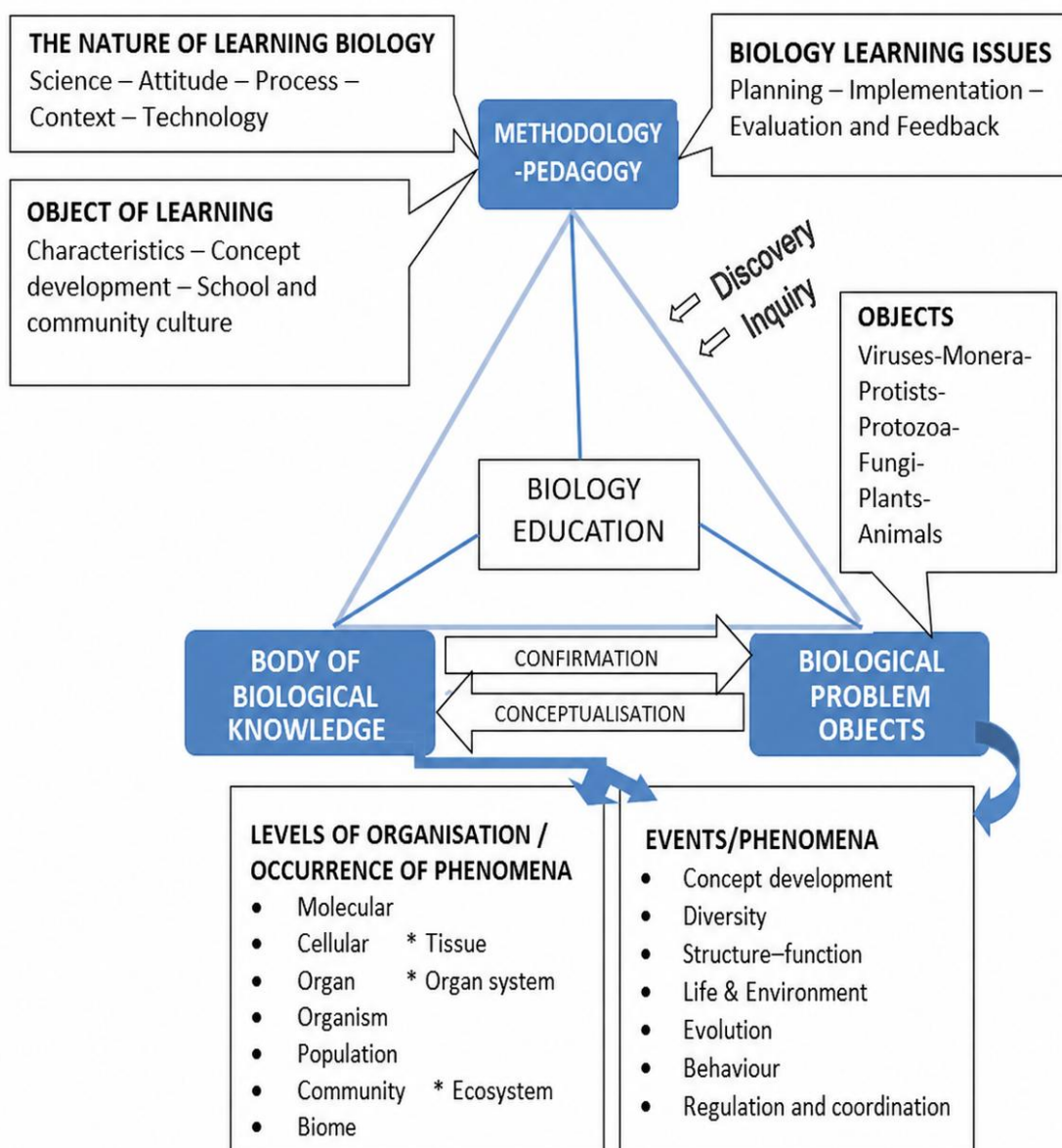


Figure 2. Structure of the body of knowledge of Biology Education

The current trend in biology is the use of biology as a basis for solving social problems, such as issues related to health, the environment, energy and food. The inputs and outcomes of an integrative approach in contemporary biological research are illustrated in Figure 3.

The integration of scientific information, theory, technology and thinking about the complexity of problems is no longer sufficient when treated in a traditional manner for addressing future challenges. Physical sciences, mathematics, engineering and informatics must be integrated with traditional disciplinary domains to form a “new biology”. Biology education should therefore also become an integral part of an interdisciplinary approach. Synergistic knowledge and thinking emerging from integrative biological research and its application to social problems will also become and drive fundamental research in science education, including biology.

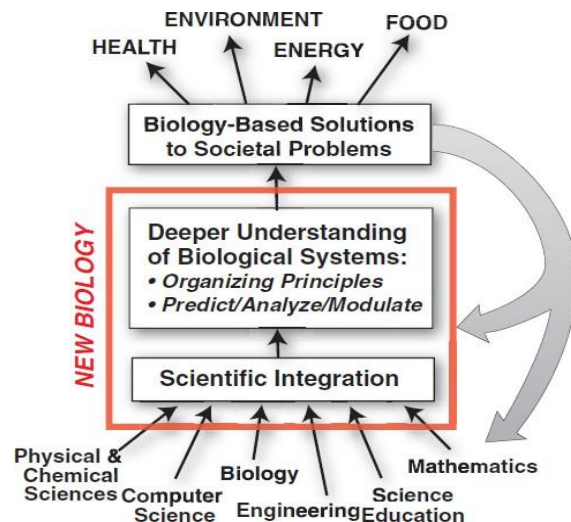


Figure 3. Inputs and outcomes of the integrative approach in twenty-first-century biology research (Labov, Reid and Yamamoto, 2010)

As a university study programme, the Biology Education Study Programme, Faculty of Mathematics and Natural Sciences, UNNES, develops educational study materials as a distinguishing feature from similar programmes at universities or teacher education institutions. In relation to this and to the demands of the National Higher Education Standards, the programme develops specific study materials based on conservation-oriented education through the Exploration of the Surrounding Environment (Jelajah Alam Sekitar/JAS) approach, which uses the surrounding environment as a student learning resource. Learning resources in the surrounding environment are explored to enrich and strengthen students' mastery of biological content. Environment-based study materials are aligned with developments in science and technology. These specific study materials are combined with other programme-specific materials, including Bioedutainment, JAS Learning, Biology Entrepreneurship Education and Learning, and Information Technology.

The education of future biology teachers also faces competency issues, in addition to the integration of biological content knowledge, pedagogy and technology (TPACK). Therefore, the UNNES Biology Education Study Programme is a place for studying biology using methods and pedagogy that meet twenty-first-century demands. Graduates of the Undergraduate Biology Education Study Programme must be able to examine the implications of developing or implementing science and technology while observing and applying humanities values according to their expertise and in accordance with scientific principles, procedures and ethics, in order to produce solutions, ideas and designs, prepare scientific descriptions of their studies, and publish them. Since 2008, the programme has developed the Exploration of the Surrounding Environment (JAS) learning approach in both its written and taught curricula. Over the past 13 years, the JAS approach has also been studied by lecturers and students, producing various learning models believed to have a positive effect on students' knowledge, skills and attitudes.

The Indonesian basic and secondary education curriculum develops dynamically in line with international educational developments. The written curriculum has developed through the 2013 Curriculum documents for basic and secondary education. The taught curriculum has developed by requiring the elaboration of innovative learning models, such as problem-based learning, project-based learning, discovery learning and inquiry. The tested curriculum has also developed by requiring teachers to elaborate authentic forms of assessment.

The Industrial Revolution 4.0 era affects how knowledge is transferred from lecturers to students. Conventional learning, involving face-to-face interaction between lecturers and students, will gradually be complemented by information-technology-based media. Therefore, the integration of human interaction and technology, known as blended learning, is being initiated in the taught curriculum of the UNNES Biology Education Study Programme, even though it is not explicitly stated in the written curriculum. The intended blended learning model is shown schematically in Figure 4.

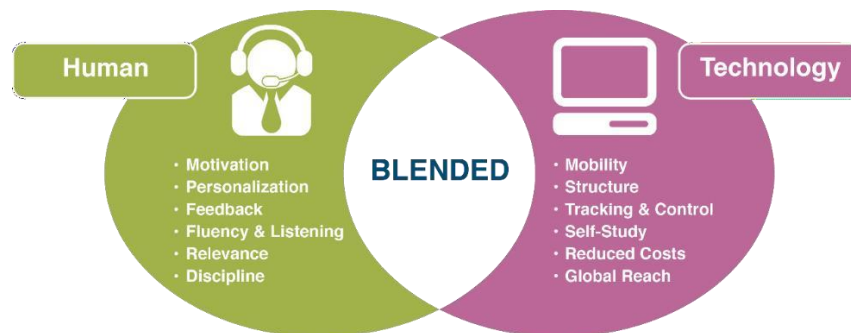


Figure 4. Blended learning scheme

The structuring of the body of knowledge of biology education in the Biology Education Study Programme, Faculty of Mathematics and Natural Sciences, UNNES, as described above, is intended to shape graduates who possess knowledge, skills and attitudes aligned with the educational pillars of learning to be, learning to do, learning to know and learning to live together. The structure of the body of knowledge related to learning outcomes is shown in Figure 5.

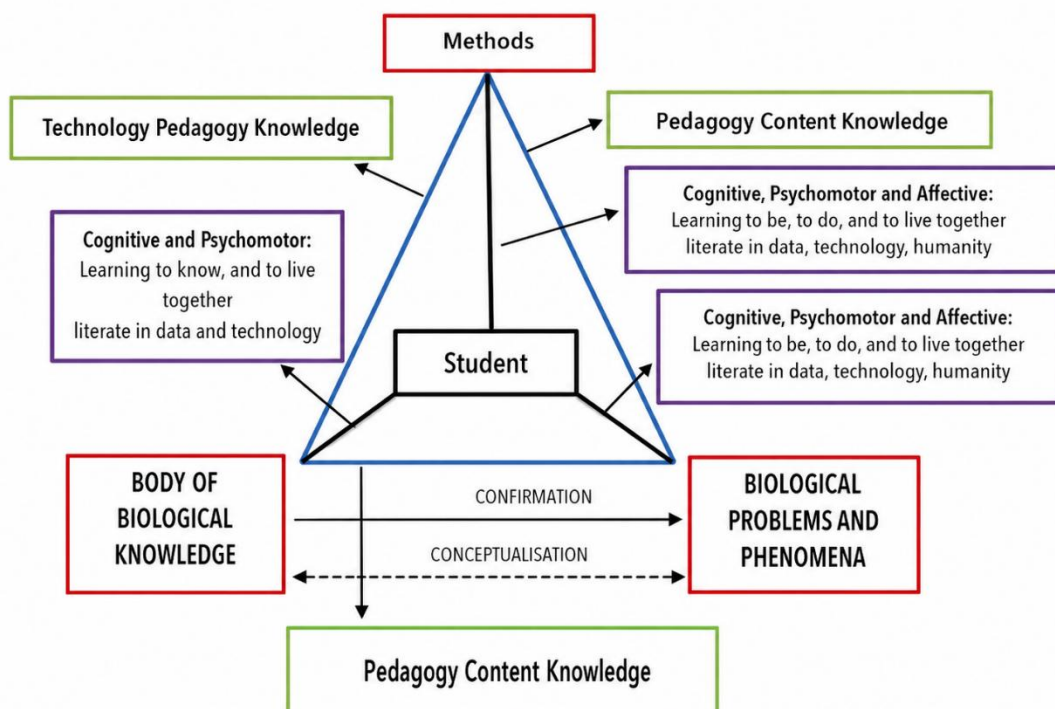


Figure 5. Structure of the body of knowledge related to learning outcomes

The conceptualisation and confirmation of the body of biological science and

biological problem objects require learning methods which, in the context of the disruptive era or Industry 4.0, must produce graduates who are literate in data, technology and humanity. Nevertheless, face-to-face education and teaching remain the primary choice because of the specific nature of biological objects of study. Based on meetings with alumni and stakeholders, graduates need to be equipped with information technology skills and good English proficiency; therefore, information technology provides a solution as the learning model used. This model is blended learning. Thus, the scientific fields offered by the Biology Education Study Programme, Faculty of Mathematics and Natural Sciences, UNNES, provide adequate preparation for graduates to continue to a higher level of study (Master's/S2) or to Teacher Professional Education (PPG), and even to work or create employment opportunities.

Another issue addressed in the development of the Biology Education curriculum is the facilitation of students' right to take courses at other higher education institutions, amounting to 20 to 40 credits. Therefore, the programme provides and allows students to take 76 credits of elective courses. Accordingly, graduates of the Biology Education undergraduate programme may complete 144–160 credits in accordance with the regulations of the Ministry of Research, Technology and Higher Education.

IV. Formulation of Scientific Vision, Objectives, Strategies and University Values

1. Scientific Vision of the Biology Education Study Programme

To develop innovative and excellent biology education scholarship through the Exploration of the Surrounding Environment (JAS) approach, with a conservation perspective, the application of current technology, contribution to educational advancement and international reputation.

2. Objectives

- 1) To produce biology educators who have faith in and devotion to God Almighty, embody Pancasila values, are able to develop innovative learning, understand learner characteristics, master educational and biological substance in line with developments in science and technology from a conservation perspective, and have the potential to continue to higher levels of education.
- 2) To produce educational research assistants who master educational research methods, have skills in analysing quantitative and qualitative research, and are able to publish the results of their research analyses to wider society.
- 3) To produce creative entrepreneurs who possess managerial skills, independence and collaboration, have an entrepreneurial spirit, and are able to develop themselves.

3. Strategies for Achieving the Vision and Objectives

- 1) To provide biology education through the JAS approach that is exploratory, innovative, interdisciplinary, research-based and globally competitive in a sustainable manner.
- 2) To conduct research in biology education and publish the results in national and international forums.
- 3) To apply research findings and scientific thinking to wider society in order to help solve problems in biology education.
- 4) To establish cooperation with other institutions or agencies to strengthen educational and research networks and partnerships at national and international levels.

4. University Values

The university values of the Biology Education Study Programme are Conservation and

Reputation.

V. Graduate Profile and Profile Description

The graduate profile comprises biology educators, educational research assistants and creative entrepreneurs in education or biology who are innovative, have faith in and devotion to God Almighty, embody Pancasila values, are supported by English-language competence and mastery of information technology, possess leadership qualities and have the potential to continue to higher levels of education. Descriptions of the graduate profiles of the Biology Education Study Programme are presented in Table 1.

Table 1. Graduate Profile Matrix of the Biology Education Study Programme (Undergraduate)

Profile	Profile Description
Teacher/Educator	An educator who understands learners, is able to develop innovative learning, and masters educational and biological substance in accordance with developments in science and technology from a conservation perspective.
Educational Research Assistant	An educational research assistant who is able to identify, design, implement, analyse and publish research findings in various scientific forums by implementing conservation values.
Creative Entrepreneur	An entrepreneur who, independently or in collaboration with others, produces goods and services based on education and/or biology while considering the sustainability of natural resources.

VI. Formulation of Study Programme Graduate Learning Outcomes

The appendix to Regulation of the Minister of Research, Technology and Higher Education Number 55 of 2017 concerning National Standards for Teacher Education contains four types of graduate competencies for undergraduate pre-service teacher programmes, which need to be mapped into four types of graduate learning outcomes: attitudes (S), general skills (KU), specific skills (KK) and knowledge (P). The mapping results in a matrix containing the elements of graduate learning outcomes, the PLO codes and the PLO statements of the UNNES Biology Education Study Programme, referring to Regulation Number 55 of 2017 and Level 6 of the Indonesian National Qualifications Framework, as presented in Table 2.

Table 2. Biology Education Study Programme Learning Outcomes

Integration of Attitudes, Knowledge, and Skills	Code and Statement of The Bachelor of Biology Education Study Programme PLO	
	Code	Statement
Knowledge	PLO-1	Graduates demonstrate an understanding of the application of general knowledge and fundamental professional principles to design knowledge-based solutions that are relevant to social, cultural developments, and environmental sustainability.

Skills	PLO-2	Graduates are capable of applying practical skills within their field of expertise, specifically in collaboration, communication, critical thinking, classroom management, instructional design, and the evaluation of educational processes, research, and community service.
Competences (Attitudes & Resources)	PLO-3	Graduates demonstrate a commitment to conservation and inclusivity values, integrating resource management with a professional attitude that upholds humanitarian values, ethics, and sustainability within the educational context.
Knowledge, Skills, and Competences (Attitudes & Resources)	PLO-4	Graduates master the facts, concepts, principles, theories, and philosophies of cell biology, molecular biology, biophysics, biochemistry, structure and development, physiology, genetics, ecology, and evolution with a conservation-oriented perspective; they exhibit appreciative and innovative attitudes toward environmental preservation and possess the competence to manage and utilize biological laboratories.
Knowledge, Skills, and Competences (Attitudes & Resources)	PLO-5	Graduates master the facts, concepts, principles, theories, and philosophies of Technological Pedagogical Content Knowledge (TPACK) in conservation-based biology education; they are capable of providing educational biology instruction and demonstrating innovative attitudes toward evolving socio-cultural values through effective communication skills.
Knowledge, Skills, and Competences (Attitudes & Resources)	PLO-6	Graduates master the facts, concepts, principles, theories, and philosophies of research and publication in biology education; they implement conservation values independently and responsibly through collaborative problem-solving by applying advancements in science, technology, and computational logic.
Knowledge, Skills, and Competences (Attitudes & Resources)	PLO-7	Graduates master entrepreneurial management with a futuristic outlook on opportunities; they are independent, responsible, and possess an entrepreneurial spirit capable of implementing promotional ideas based on biological sciences to enhance human welfare in line with scientific and technological developments, prioritizing the preservation of the environment and natural resources.

VII. Determination of Subject Matters Based on Programme Learning Outcomes (PLO)

Table 3. Mapping of Subject Matters Based on the Programme Learning Outcomes (PLO) of the Undergraduate Biology Education Study Programme

PLO CODE	STUDY MATERIALS	CODE OF SUBJECT MATTER
PLO-3	Religious Education	BK1
PLO-3	Character Education	BK2
PLO-1 PLO-7	Life Skills	BK 3
PLO-3 PLO-4 PLO-5 PLO-6 PLO-7	Conservation Insight	BK 4
PLO-2 PLO-6	Research Methodology and Publication	BK 5
PLO-5	TPK (<i>Technological Pedagogical Knowledge</i>)	BK 6
PLO-5	PCK (<i>Pedagogical Content Knowledge</i>)	BK 7
PLO-5	TCK (<i>Technological Content Knowledge</i>)	BK 8
PLO-5	TPCK (<i>Technological, Pedagogical and Content Knowledge</i>)	BK 9
PLO-4	Organism Structure	BK 10
PLO-4	Organism Function	BK 11
PLO-4	Organism Diversity	BK 12
PLO-4	Interaction between Organisms and the Environment	BK 13
PLO-4 PLO-7	Biotechnology	BK 14
PLO-1 PLO-2 PLO-6	Problem-Solving Skills	BK 15
PLO-6	Computational Logic	BK16
PLO-2 PLO-3 PLO-7	Soft-Skill Development	BK17
PLO-2 PLO-5	Communication Skills	BK18
PLO-2 PLO-5	Learning Implementation	BK 19
PLO-2 PLO-5	Technology-Based Learning Planning	BK 20
PLO-2 PLO-5	Learning Management	BK 21
PLO-5	Meaningful Learning	BK 22
PLO-2 PLO-6	Research and Publication in Education	BK 23

PLO-7	Scope of Entrepreneurship	BK 24
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Table 4. Matrix of Relationships between Graduate Learning Outcomes and Subject Matters

No	Subject Matter Code	Subject Matter (Bahan Kajian)	PLO CODE						
			PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
1	BK1	Religious Education			X				
2	BK2	Character Education			X				
3	BK 3	Life Skills	X						X
4	BK 4	Conservation Insight			X	X	X	X	X
5	BK 5	Research Methodology and Publication		X				X	
6	BK 6	TPK (Technological Pedagogical Knowledge)					X		
7	BK 7	PCK (Pedagogical Content Knowledge)					X		
8	BK 8	TCK (Technological Content Knowledge)					X		
9	BK 9	TPCK (Technological, Pedagogical and Content Knowledge)					X		
10	BK 10	Organism Structure				X			
11	BK 11	Organism Function				X			
12	BK 12	Organism Diversity				X			
13	BK 13	Interaction between Organisms and Environment				X			
14	BK 14	Biotechnology				X			X
15	BK 15	Problem-Solving Skills	X	X				X	
16	BK16	Computational Logic						X	
17	BK17	Soft-Skill Development		X	X				X
18	BK18	Communication Skills		X			X		
19	BK 19	Learning Implementation		X			X		
20	BK 20	Technology-Based Learning Planning		X			X		
21	BK 21	Learning Management		X			X		
22	BK 22	Meaningful Learning					X		
23	BK 23	Research and Publication in Education		X				X	
24	BK 24	Scope of Entrepreneurship							X

VIII. Study Materials and Courses

Table 3. Mapping of Study Materials and Course Distribution in the Undergraduate Biology Education Study Programme

PLO Code	Study Material Code	Learning Form			Credits	Courses
		T	S	P/L		
PLO-3	BK1	√			2	Islamic Religious Education, Protestant Christian Religious Education, Catholic Religious Education, Buddhist Religious Education, Confucian Religious Education
PLO-3	BK2	√			2	Pancasila Education, Civic Education, Conservation Education
		√		√	2	Innovation in Learning Models, Learning through Exploration of the Surrounding Environment
		√	√	√	6	Undergraduate Thesis
PLO-1 PLO-7	BK3	√			2	Digital and Human Literacy, Entrepreneurship
		√		√	2	Online Learning, Innovation in Learning Models, Learning Services Entrepreneurship, Learning Media Entrepreneurship, Urban Farming Entrepreneurship, Bioedutainment, Educational Tourism, Taxidermy
				√	4	Community Service Programme (KKN)
PLO-3 PLO-4 PLO-5 PLO-6 PLO-7	BK4	√				Conservation Education, Environmental Pollution, Biodiversity, Ethnobiology
		√		√	3	Ecology
PLO-2 PLO-6	BK5	√			2	Educational Research Statistics, Educational Research Methods, Education, Indonesian Language, Scientific Writing Techniques, Scientific English
		√		√	2	Educational Research Data Analysis, Research Instrument Development
		√	√	√	6	Undergraduate Thesis
				√	4	School Field Introduction (PLP)
PLO-5	BK6	√			2	Introduction to Education, School Management, Educational Psychology, Guidance and Counselling, Analysis of Senior High School Biology Curriculum, Biology Learning Strategies, Bio Perspectives

		√		√	2	Learning Multimedia, Web-Based Learning, Innovation in Learning Models, Learning Resource Management, Online Learning, Laboratory Techniques and Management, Learning Media Entrepreneurship, Bioedutainment, English-medium Microteaching, Biology Concept Analysis, Learning through Exploration of the Surrounding Environment, Taxidermy
		√		√	3	Biology Lesson Planning
				√	1	Microteaching
PLO-5	BK7			√	1	Microteaching
		√		√	2	Online Learning, Learning Media Entrepreneurship, Bioedutainment, English-medium Microteaching
PLO-5	BK8	√			2	Educational Supervision, Professional Ethics, Bio Perspectives
		√		√	2	Biology Concept Analysis
		√		√	3	Biology Learning Evaluation
PLO-5	BK9	√			2	Bio Perspectives
		√		√	2	Online Learning, Learning Media Entrepreneurship, Bioedutainment, English-medium Microteaching, Learning through Exploration of the Surrounding Environment
				√	1	Microteaching
PLO-4	BK10	√		√	3	Plant Morphology, Plant Anatomy, Animal Tissue Structure, Animal Body Structure, Molecular Biology, Cell Biology, Human Anatomy and Physiology
		√			2	Health Biology
		√		√	2	Animal Microtechnique, Plant Microtechnique, Taxidermy
				√	1	Fundamentals of Microtechnique
PLO-4	BK11	√		√	3	Biochemistry, Animal Physiology, Plant Physiology, Developmental Structure of Animals and Plants, Human Anatomy and Physiology
		√			2	Health Biology, Cell Signalling
PLO-4	BK12	√		√	3	Plant Taxonomy, Animal Taxonomy, Evolution, Genetics, Microbiology
		√			2	Viruses, Protists and Fungi
PLO-4	BK13	√		√	3	Ecology
		√			2	Ethnobiology, Environmental Pollution, Biodiversity

PLO-4 PLO-7	BK14	√		√	2	Tissue Culture
		√			2	Fundamentals of Biotechnology, School Field Introduction (PLP)
PLO-1 PLO-2 PLO-6	BK15	√			2	Laboratory Techniques and Management, Introduction to Education, Cell Signalling, Guidance and Counselling
		√	√		2	Proposal and Seminar
		√		√	3	Animal Tissue Structure
				√	1	Microteaching
		√		√	3	Biology Lesson Planning
		√			2	Educational Research Design, Educational Research Instrument Development, Educational Supervision, Learning through Exploration of the Surrounding Environment, Educational Tourism, English-medium Microteaching, Learning Resource Management
PLO-6	BK 16	√			2	Digital Literacy and Humanities, Educational Research Statistics,
		√		√	2	Development of Educational Research Instruments, Learning Multimedia, Online Learning, Learning Service Entrepreneurship, Learning Media Entrepreneurship, Thesis
		√		√	3	Media and Information Technology for Biology Learning, Biology Learning Evaluation,
PLO-2 PLO-3 PLO-7	BK 17	√				Review of Senior High School Biology Curriculum, School Management, Guidance and Counseling, Professional Ethics for Educators, Conservation Education, Entrepreneurship, Ethnobiology, Environmental Pollution, Biodiversity, Viruses, Protists, and Fungi, Biochemistry, Educational Neuroscience
		√		√	2	Bioedutainment, Plant Microtechnique, Animal Microtechnique, Taxidermy Learning Web, Innovative Learning Models, Analysis of Biological Concepts, Entrepreneurship Urban Farming Kultur Jaringan,
		√		√	3	Ecology, Microbiology, Plant Morphology, Animal Body Structure, Plant Taxonomy, Animal Taxonomy, Animal and Plant Developmental Structure, Genetics, Animal Physiology, Cell Biology, Fundamentals of Biotechnology, Plant Physiology, Molecular Biology, Human Anatomy and Physiology
				√	1	Basic Microtechnique
PLO-2 PLO-5	BK 18	√			2	Indonesian Language, English, English Saintifik, Educational Psychology, Civic Education, Teknik Penulisan Karya Ilmiah, English, English Saintifik, Educational Research Data

						Analysis
PLO-2 PLO-5	BK 19	√			2	Indonesian Language, Religion, English, English Saintifik, Professional Ethics
PLO-2 PLO-5	BK 20	√			2	Digital Literacy and Humanities,
		√		√	3	Media and Information Technology for Biology Learning,
		√		√	2	Learning Web
PLO-2 PLO-5	BK 21	√			2	Laboratory Techniques and Management, School Management, Educational Neuroscience Biology Learning Strategies,
		√		√	3	Biology Learning Evaluation
		√		√	2	Learning Resource Management, Innovative Learning Models, Bioedutainment, English Microteaching, Biology Learning Planning, Environmental Exploration Learning
				√	1	Microteaching
PLO-5	BK 22	√			2	Bio Perspective, Review of Senior High School Biology Curriculum, , Biology Learning Strategies,
		√		√	2	Learning Resource Management, Innovative Learning Models, Bioedutainment, Laboratory Techniques and Management, Environmental Exploration Learning
				√	1	Microteaching
		√		√	3	Biology Learning Planning
PLO-2 PLO-6	BK 23	√			2	Educational Research Statistics, , Educational Research Methods, , Indonesian Language, English Saintifik, Scientific Writing Techniques, ,
		√		√	2	Educational Research Data Analysis, Development of Educational Research Instruments, Educational Research Design
		√	√		2	Proposal and Seminar
PLO-7	BK 24	√			2	Entrepreneurship, Manajemen Entrepreneurship
		√		√	2	Learning Service Entrepreneurship Learning Media Entrepreneurship, Entrepreneurship Urban Farming, Educational Tourism, Taxidermy, Landscaping and Economic Botany, Educational Tourism, Laboratory Animal Cultivation, Fish Farming, Entrepreneurship Urban Farming, Manajemen Entrepreneurship, Entrepreneurship Pangan Fungsional, Entrepreneurship Biopestisida, Entrepreneurship Propagasi Tanaman, Entrepreneurship

						Biofertilizer, Entrepreneurship Pasca Panen, Entrepreneurship Kultur Jaringan Tanaman, Learning Media Entrepreneurship, Learning Service Entrepreneurship, Entrepreneurship Tulang Daun, Community Service Program
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Notes: T = Theory; S = Seminar; P/L = Practicum/Laboratory. PLO = Graduate Learning Outcome.

IX. Distribution of Courses and Credit Weighting in the Curriculum Structure and Curriculum Map

S	General Courses			UEF		FEFC	SPEFC	Study Programme Courses							
VIII	Undergraduate Thesis (6)														
VII	School Field Introduction (PLP) (4)	Community Service Programme (KKN) (4)													
VI								Health Biology	Plant Micro-technique	Animal Micro-technique	Concept Analysis	Environmental Pollution	Cell Signalling	Ethnobiology	Bioconservation
								Educational Professional Ethics	Educational Supervision	English-medium Microteaching	Online Learning	Learning Multimedia	Web-Based Learning	Bioedutainment	
								Learning JAS	Learning Model Innovation	Learning Resource Management					
								Livestock Husbandry	Laboratory Animal Husbandry	Fish Farming	Taxidermy				
								Entrepreneurship Learning Model	Educational Service Entrepreneurship	Leaf Skeleton Entrepreneurship	Entrepreneurship Tissue Culture Plant	Postharvest Entrepreneurship	Plant Propagation Entrepreneurship	Urban Farming Entrepreneurship	
								Educational Tourism	Educational Neurosains	Functional Food Entrepreneurship	Biopesticide Entrepreneurship	Fermentation Biology Entrepreneurship	Landscaping and Economic Botany	Entrepreneurship Management	
								Educational Research Design	Educational Research Data Analysis	Educational Instrument Development					

V				Bimb Konsl (2)				Proposal and Seminar	Biology Lesson Planning	Microtea- ching	Tissue Culture	Plant Physiology	Molecular Biology	Fundamentals of Micro- technique	Fundamen- tals of Biotech- nology
IV				Educational Psychology (2)				Research Methods	Educa- tional Research Statistics	Learning Evaluation	Evolution	Cell Biology	Genetics	Animal Physiology	Ecology
III	P. Panc (2)	Civic Education (2)	P Konsv (2)	Introduction to Education	School Management (2)			Biology Learning Strategies	Media and Information Technology for Biology Learning	Biochemistry	Plant Taxonomy	Animal Taxonomy	Microbiology	Development Structure of Animals and Plants	
II	Indonesian Language (2)					Entepren- eurship (2)	Scientific English	Curriculum Analysis	Plant Anatomy	Viruses, Protists and Fungi	Animal Tissue Structure				
I	Religious Education (2)	Digital and Human Literacy				English	Scientific Writing Techniques	Laboratory Techniques and Management	Bio Perspec- tives	Biodiversity	Animal Body Structure	Plant Morphology			

Note: S = Semester; UEF = University Educational Foundation Courses; FEFC = Faculty Educational Foundation Courses; SPEFC = Study Programme Educational Foundation Courses

Semester & Credits	LEARNING PROGRAMME WITHIN THE STUDY PROGRAMME											MBKM PROGRAMME																										
												Within HEI	Outside HEI	Non-HEI																								
VIII	20U00016											Integrated Internship																										
6	1	2	3	4	1	2	3	1	2	3	1				2	3	4	5																				
VII	20U00021																																					
8	1	2	3	4	1	2	3	1	2	3	1				2	3	4	5																				
	20U000142											Students Exchange																										
	1	2	3	4	1	2	3	1	2	3	4				5																							
VI	20P01858	20P01864	20P01865	20P01880	20P01887	20P02059	20P02060	20P01862	20P01856	20P01866																												
20	3	2	1	2	3	2	1	2	3	3	1	2	4	2	2	5	4	3	2	4	3	2	2	2	4	2	2	1	2	3	1	4	3	3	2	2		
	20P01860	20P01861	20P01867	20P01859	20P03231												Independent Project																					
	3	2	1	4	3															2	2	2	3	2	1	4	3	2	2	2	3	3	2	3				
	20P01898	20P01905	20P01903	20P01902	20P01894	20P01896	20P01899	20P01900	20P01901	20P01888		Entrepreneurial Activities																										
	3	3	2	5	3	3	2	5	3	3	1				4	3	2	1	1	3	3	2	5	3	3	2	5	3	3	2	5	3	3	2	5			
	20P01889	20P01891	20P01892	20P01893	20P01896							Student Exchange																										
	3	3	2	5	3	3	2	5	3	3	2				5	3	3	2	5																			
	20P01876	20P01886	20P01875												Student Exchange																							
	3	2	1															4	3	2	1	4	1	1	3	4												
V	20U00012	20P01834	20P01838	20P01840	20P01841	20P01843	20P01848	20P01850	20P01851	20P01777		Cross-programme exchange within UNNES																										
22	2	2	2	3	2	3	2	4	3	3	2				4	3	1	1	4	3	3	2	4	3	2	1	2	3	3	2	4							
IV	20U00011	20P01816	20P01817	20P01818	20P01819	20P01821	20P01821	20P01822	20P01815																													
22	3	2	3	3	3	2	4	3	3	2	4				3	3	1	2	3	1	1	4	3	3	2	4	3	1	1	4								
III	20U00013	20P01814	20P01813	20P01801	20P01799	20P01798	20P01797	20P01729																														
22	3	2	2	2	3	3	2	4	3	3	2				4	3	3	2	4	3	3	1	2	3	3	2	4											
II	20U00009	20U00007	20U00006	20P01782	20P01730	20P01727	20P01721	20J00287	20F00027	20U00010																												
22	4	3	2	3	2	2	2	3	1	1	2				3	3	3	2	3	3	3	2	4	3	3	1	4	3	2	3	1	1	2	2	5	3	2	1
I	20U00022	20U00008	20U00001	20P01789	20P01724	20P01583	20P01581	20P01583	20J00259	20F00005																												
22	3	2	1	2	2	1	3	1	1	1	1				4	3	2	4	4	3	2	4	4	3	1	3	3	3	1	2	4	2	4	1	1	3	4	1

Notes

-  : Attitude Learning Outcomes
-  : Knowledge Learning Outcomes
-  : General Skills Learning Outcomes
-  : Specific Skills Learning Outcomes

Explanation of MBKM Programme Activities

The integrated internship is conducted at a non-higher-education location under the supervision of an academic supervisor. The academic supervisor acts as the supervisor for the Community Service Programme (Community Service Programme (KKN)), School Field Introduction (School Field Introduction (PLP)) and the student's undergraduate thesis. The integrated internship is undertaken from Semester VII and recognises the School Field Introduction (PLP), Community Service Programme (KKN) and undergraduate thesis courses.

Independent Study/Project: Students may develop a project based on a specific social topic and may work collaboratively with other students. During the activity, students are supervised by an academic supervisor or lecturer. Students may choose this programme from Semester VI. The programme recognises a minimum of 10 credits and a maximum of 20 credits from elective courses offered in Semester VI. (BPMPK & STIEPARI)

Entrepreneurial Activities: Students develop entrepreneurial activities independently, evidenced by an activity description or entrepreneurial activity proposal and proof of consumer transactions. The programme is supervised by lecturers and partners. This activity may be selected from Semester VI. Entrepreneurial activities recognise various entrepreneurship courses offered in Semester VI, with a minimum of 10 credits and a maximum of 20 credits. (UNNES PARTNERS)

Student Exchange: Students take classes or a semester at a higher education institution outside UNNES based on a cooperation agreement. MBKM programme activities may be taken by students from Semester V. (UNNES-UPI; UNNES-UNIMED; UNNES-UNM; UNNES-UNDIKSA)

STRUCTURING OF COURSES IN THE STUDY PROGRAMME CURRICULUM

Study Programme : Biology Education
 Department : Biology
 Faculty : Faculty of Mathematics and Natural Sciences
 Level : Undergraduate (S1)

NO.	COURSE CODE	COURSE NAME / MBKM PROGRAMME	Credits	ACTIVITY FORM	MANAGING UNIT				ACTIVITY LOCATION					STATUS		MBKM PROGRAMME ACTIVITY			
					UNIV	FAC	DEP	PROG	A	B	C	D	E	W	P	MB-KM (1)	MB-KM (2)	MB-KM (3)	MB-KM (4)
SEMESTER I																			
1.	20F00005	English	2	A		√			√										
2.	20J00259	Scientific Writing Techniques	2	A			√		√										
3.	20J00261	Biodiversity	2	A			√		√										
4.	20P01581	Laboratory Techniques and Management	2	A/C				√	√										
5.	20P01583	Bio Perspectives	2	A				√	√										
6.	20P01724	Animal Body Structure	3	A				√	√										
7.	20P01789	Plant Morphology	3	A/C				√	√										
8.	20U00001	Islamic Religious Education	2	A	√					√									
9.	20U00002	Protestant Christian Religious Education	2	A	√					√									
10.	20U00003	Hindu Religious Education	2	A	√					√									
11.	20U00004	Buddhist Religious Education	2	A	√					√									
12.	20U00005	Confucian Religious Education	2	A	√					√									
13.	20U00008	Indonesian Language	2	A	√					√									
14.	20U00022	Digital and Human Literacy	2	A	√					√									
15.	20U00023	Catholic Religious Education	2	A	√					√									
TOTAL			22																
SEMESTER II																			
1.	20F00027	Entrepreneurship	2	A		√			√										
2.	20J00287	Scientific English	2	A			√		√										
3.	20P01721	Animal Tissue Structure	3	A/C				√	√										
4.	20P01727	Plant Anatomy	3	A/C				√	√										
5.	20P01730	Viruses, Protists and Fungi	2	A/C				√	√										
6.	20P01782	Analysis of Senior High School Biology Curriculum	2	A				√	√										
7.	20U00006	Pancasila Education	2	A	√					√									
8.	20U00007	Civic Education	2	A	√					√									
9.	20U00009	Conservation Education	2	A	√					√									
10.	20U00010	Introduction to Education	2	A	√					√									
TOTAL			22																

NO.	COURSE CODE	COURSE NAME / MBKM PROGRAMME	Credits	ACTIVITY FORM	MANAGING UNIT				ACTIVITY LOCATION					STATUS		MBKM PROGRAMME ACTIVITY			
					UNIV	FAC	DEP	PROG	A	B	C	D	E	W	P	MB-KM (1)	MB-KM (2)	MB-KM (3)	MB-KM (4)
SEMESTER III																			
1.	20P01729	Animal Taxonomy	3	A/C				√	√										
2.	20P01797	Media and Information Technology for Biology Learning	3	A/C				√	√										
3.	20P01798	Biochemistry	3	A/C				√	√										
4.	20P01799	Plant Taxonomy	3	A/C				√	√										
5.	20P01801	Biology Learning Strategies	2	A				√	√										
6.	20P01813	Microbiology	3	A/C				√	√										
7.	20P01814	Developmental Structure of Animals and Plants	3	A/C				√	√										
8.	20U00013	School Management	2	A	√					√									
TOTAL			22																
SEMESTER IV																			
1.	20P01815	Educational Research Methods	2	A				√	√										
2.	20P01816	Genetics	3	A/C				√	√		√					√			
3.	20P01817	Animal Physiology	3	A/C				√	√		√					√			
4.	20P01818	Biology Learning Evaluation	3	A/C				√	√										
5.	20P01819	Educational Research Statistics	2	A				√	√										
6.	20P01820	Cell Biology	2	A				√	√										
7.	20P01821	Evolution	2	A				√	√										
8.	20P01822	Ecology	3	A/C				√	√										
9.	20U00011	Educational Psychology	2	A	√					√									
TOTAL			22																
SEMESTER V																			
1.	20P01777	Fundamentals of Microtechnique	1	C				√	√										
2.	20P01834	Fundamentals of Biotechnology	2	A				√	√										
3.	20P01838	Plant Physiology	3	A/C				√	√										
4.	20P01840	Proposal and Seminar	2	A				√	√										
5.	20P01841	Molecular Biology	3	A/C				√	√										
6.	20P01843	Human Anatomy and Physiology	3	A/C				√	√										
7.	20P01848	Biology Lesson Planning	3	A/C				√	√										
8.	20P01850	Tissue Culture	2	A/C				√	√										
9.	20P01851	Microteaching	1	C				√	√										
10.	20U00012	Guidance and Counselling	2	A	√					√									
TOTAL			22																

NO.	COURSE CODE	COURSE NAME / MBKM PROGRAMME	Credits	ACTIVITY FORM	MANAGING UNIT				ACTIVITY LOCATION					STATUS		MBKM PROGRAMME ACTIVITY			
					UNIV	FAC	DEP	PROG	A	B	C	D	E	W	P	MB-KM (1)	MB-KM (2)	MB-KM (3)	MB-KM (4)
SEMESTER VI																			
1.	20P04109	Proposal and Seminar	2	A/C				√					√	√					
2.	20P00508	Learning through Exploration of the Surrounding Environment	2	A/C				√					√		√		√		
3.	20P01855	Health Biology	2	A				√			√				√	√			
4.	20P01856	Educational Supervision	2	A				√			√				√	√			
5.	20P01857	Bioconservation	2	A				√			√				√	√			
6.	20P01858	English-medium Microteaching	2	A/C				√			√				√	√			
7.	20P01859	Innovation in Learning Models	2	A/C				√					√		√		√		
8.	20P01860	Learning Multimedia	2	A/C				√					√		√		√		
9.	20P01861	Web-Based Learning	2	A/C				√					√		√		√		
10.	20P01862	Educator Professional Ethics	2	A				√			√				√	√			
11.	20P01863	Bioedutainment	2	A/C				√					√		√		√		
12.	20P01864	Learning Resource Management	2	A/C				√					√		√		√		
13.	20P01865	Cell Signalling	2	A				√			√				√	√			
14.	20P01866	Educational Neuroscience	2	A				√			√				√	√			
15.	20P01867	Online Biology Learning	2	A/C				√					√		√		√		
16.	20P01875	Educational Research Data Analysis	2	A				√			√				√				
17.	20P01876	Educational Research Design	2	A				√			√				√	√			
18.	20P01880	Ethnobiology	2	A				√			√				√	√			
19.	20P01886	Educational Research Instrument Development	2	A/C				√			√				√	√			
20.	20P01887	Environmental Pollution	2	A				√			√				√	√			
21.	20P01888	Taxidermy	2	A/C				√			√				√	√			
22.	20P01889	Landscaping and Economic Botany	2	A/C				√					√		√			√	
23.	20P01890	Educational Tourism	2	A/C				√					√		√		√		
24.	20P01891	Laboratory Animal Husbandry	2	A/C				√					√		√			√	
25.	20P01892	Livestock Husbandry	2	A/C				√					√		√			√	
26.	20P01893	Fish Farming	2	A/C				√					√		√			√	
27.	20P01894	Urban Farming Entrepreneurship	2	A/C				√					√		√			√	
28.	20P01895	Entrepreneurship Management	2	A/C				√					√		√			√	
29.	20P01896	Functional Food Entrepreneurship	2	A/C				√					√		√			√	
30.	20P01897	Biopesticide Entrepreneurship	2	A/C				√					√		√			√	
31.	20P01898	Plant Propagation Entrepreneurship	2	A/C				√					√		√			√	
32.	20P01899	Biofertiliser Entrepreneurship	2	A/C				√					√		√			√	

NO.	COURSE CODE	COURSE NAME / MBKM PROGRAMME	Credits	ACTIVITY FORM	MANAGING UNIT				ACTIVITY LOCATION					STATUS		MBKM PROGRAMME ACTIVITY			
					UNIV	FAC	DEP	PROG	A	B	C	D	E	W	P	MB-KM (1)	MB-KM (2)	MB-KM (3)	MB-KM (4)
33.	20P01900	Post-Harvest Processing Entrepreneurship	2	A/C				√					√		√			√	
34.	20P01901	Entrepreneurship Tissue Culture Tanaman	2	A/C				√					√		√			√	
35.	20P01902	Learning Media Entrepreneurship	2	A/C				√					√		√			√	
36.	20P01903	Learning Services Entrepreneurship	2	A/C				√					√		√			√	
37.	20P01905	Leaf Skeleton Entrepreneurship	2	A/C				√					√		√			√	
38.	20P02059	Plant Microtechnique	2	A/C				√	√		√				√	√			
39.	20P02060	Animal Microtechnique	2	A/C				√			√				√	√			
40.	20P03231	Biology Concept Analysis	2	A/C				√					√		√		√		
TOTAL			78																
Taken			22																
SEMESTER VII																			
1.	20U00014	Community Service Programme	4	C															√
2.	20U00021	School Field Introduction	4	C															√
JUMLAH			8																
SEMESTER VIII																			
1.	20U00016	Undergraduate Thesis	6	C															√
			144																

Notes:

Activity Form : A Theory
B Seminar
C Practice

Activity Location : A Within the Study Programme
B Outside the Study Programme within UNNES
C Similar Study Programme outside UNNES (UPI & UNDIKSHA)
D Outside the Study Programme and outside UNNES
E Non-HEI (BPMPK & STIEPARI)

MBKM Activity Programme : (1) Student Exchange (UPI and UNDIKSHA)
(2) Independent Study/Project with BPMPK and STIEPARI
(3) Activities Entrepreneurship
(4) Integrated Internship

