CURRICULUM DOCUMENTS

BIOLOGY EDUCATION STUDY PROGRAM (BESP)

FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS NEGERI MAKASSAR
2024

DOCUMENTS

Curriculum Development for Higher Education
Study Programme : Biology Education

Name of Head of Study Programme: Faisal, S. Pd., M. Pd., Ph.D.
NIDN 0019068401
Study Programme : Biology Education
Faculty : MIPA
University : UNM

Compilation Team:
1. Dr Abd Muis, M.Si.
2. Prof. Dr Muhiddin P., S.Pd., M.Pd.
3. Prof. Dr Arsad Bahri, S.Pd., M.Pd.
4. Dr. Asham Bin Jamaluddin, S. Pd., M. Pd.
5. Andi Citra Pratiwi, S. Pd., M. Ed.

STATE UNIVERSITY OF MAKASSAR
Year 2024

RESPONSE
STUDY PROGRAMME CURRICULUM
BIOLOGY EDUCATION

1.	College	: Makassar State University
2.	Faculty	: MIPA
3.	Study Programme	: Biology Education
4.	Address	: Jalan Daeng Tata Raya
5.	Head of Prodi	:
a.	Name	: Faisal P., S.Pd., M.Pd., Ph.D.
b.	NIP / NIDN	: 198406192008011003/0019068401
c.	Office Address	: Jalan Daeng Tata Raya, Makassar
d.	Phone / Mobile Phone	:
e.	e-mail	: pend.bio@unm.ac.id

Makassar, 05 February 2024

Dean of FMIPA UNM *

Drs. Suwardi Annas, M.Si., Ph.D.
NIP. 19691231199403 1110

Head of Prodi Pend. Biology UNM

Faisal, S.Pd., M.Pd., Ph.D.
NIP. 198406192008011003

Rector of State University of Makassar **

Prof. Dr. Ir. H. Husain Syam, M.T.P., IPU, ASEAN, Eng.
NIP. 19660707 199103 1 003

) validated by WD 1*
*)** validated by WR 1*

TABLE OF CONTENTS

FOREWORD

Thank God, with the permission and grace of Allah SWT, the Biology Education Curriculum for the Department of Biology FMIPA UNM in 2021 which supportsstudents' learning rights for 3 semesters outside the study programme has been prepared and is expected to be a reference for the process of achieving the learning outcomes of the Biology Education study programme. This curriculum will take effect in the 2020/2021 academic year. With the enactment of this curriculum, it is expected that biology education graduates of FMIPA UNM have pedagogical competence and professional competence that master attitudes, knowledge, general skills and special skills and in accordance with the needs of the industrial revolution 4.0 era. With this mastery, it is expected that biology education graduates of FMIPA UNM will be able to solve biology learning problems and have creativity that is scientifically developed, full of initiative, care, and responsibility so that it is useful for society and adaptive to global developments in the era of the industrial revolution 4.0. This curriculum was prepared based on input from various parties during the 2018 curriculum workshop and evaluation of the implementation of the Biology Education Curriculum FMIPA UNM in 2019. This curriculum change was also made with the Ministry of Education and Culture's 2020 policy on independent campus learning.

Therefore, thanks are extended to lecturers, stakeholders, and alumni who participated in the preparation of this curriculum.

Makassar, 05 February 2024

Head of Biology Education Study Programme

Faisal, S.Pd., M.Pd., Ph.D.

1. STUDY PROGRAMME IDENTITY

1	Name of College (PT)	Makassar State University
2	Faculty	MIPA
3	Department	Biology
4	Study Programme	Biology Education
5	Accreditation Rating/Predicate	A
6	Number of students	581 (PDPT: Even 2020/2021)
7	Number of Lecturers	24
8	Study programme address	Jalan Daeng Tata
9	Phone	
10	PRODI Web	http://bio.fmipa.unm.ac.id

2. CURRICULUM FOUNDATION

2.1 PHILOSOPHICAL FOUNDATION

(explain the philosophical basis for curriculum development and implementation that refers to the philosophies of perennialism, essentialism, progressivism, and constructionism in higher education)

The design of the higher education curriculum cannot be separated from the two main pillars of the national education system, namely Pancasila and the 1945 Constitution. With the philosophical values contained in Pancasila and the 1945 Constitution, the functions and objectives of national education are not only directed at mastering science and technology, but also at developing faith and piety in God Almighty, as well as noble character rooted in the noble values of the nation's culture. These values are also what animates the process of drafting and developing the curriculum of the biology education study programme at Makassar State University. The values of religion, culture, and positive characters such as capable, creative, independent, democratic, and responsible are clearly illustrated in the graduate learning outcomes (ELOs), especially in the attitude domain. Likewise, the spirit of educating the nation's life as stated in the preamble of the 1945 Constitution, is embodied in the SLOs in the knowledge and skills domains, by adjusting to the latest developments in science and technology and the challenges of life changes, both at the local, national and global scope.

2.2 SOCIOLOGICAL FOUNDATIONS

(Explains the sociological foundations of the curriculum in relation to analyses of the interrelationships between individuals, society and culture as reflected in the knowledge, skills and values adopted by the citizens of society)

The curriculum of the biology education study programme at Makassar State University is designed to provide a meaningful learning environment and experience for students so that it can support their personal development and social spirit as learners. In addition, the curriculum developed also inherits the cultural values and local wisdom of the people of South Sulawesi and other regional cultures that have become national identities. This is considered necessary so that students are more familiar with their own culture, not only its strengths, but also its weaknesses, and fortify students from the influence of outside cultural flows. The internalisation of local and national cultural values into the curriculum can also

prevent the enormous influence of globalisation that can threaten the existence of local culture.

Furthermore, through the development of the study programme curriculum, the academic community of Makassar State University is expected to be able to combine the objectives for the development of science and technology with the need to appreciate the cultural diversity of students in the formulation of graduate learning outcomes (ELOs). In the context of the 21st century, ELOs that emphasise the development of student competencies in socio-cultural aspects can be divided into three main competencies, namely, cultural *minimisation, cultural adaptation*, and *cultural* integration.

2.3 HISTORICAL FOUNDATION

(explain historically the development of the curriculum that has been developed & implemented during the implementation of the study programme)

The Biology Education study programme at Makassar State University (UNM) has a strategic role in educating the nation's life through the provision of academic education programmes for undergraduate biology education candidates. In order to produce professional biology graduates, who can support students' future careers, the curriculum in the study programme is designed and developed with reference to the National Higher Education Standards which include the development of intellectual intelligence, noble character, and skills (UU R1 No. 12, Year 2012). The curriculum currently implemented by the Biology Education study programme has undergone several changes following the dynamics of government policies in the field of education. In addition, to produce curriculum components and structures that are accommodating and can answer increasingly complex educational challenges, the curriculum development activities of the study programme are carried out in the form of workshops by involving the entire academic community and *stakeholders*.

The first curriculum workshop for the biology education study programme was held in 2008 to respond to the government's policy of implementing a competency-based curriculum as a guideline for learning in higher education. Several changes to the curriculum were made, including the reformulation of graduate competencies in the realm of attitudes, knowledge and skills, reviewing

course study materials and learning processes, and grouping courses according to their study materials into five groups, namely the Personality Development Course Group (MPK); Scientific and Skills Course Group (MKK); Working Expertise Course Group (MKB); Working Behaviour Course Group (MPB); and Community Life Course Group (MBB).

The next curriculum workshop was held in 2011, but not many changes were made. At this workshop, the curriculum development team of the study programme reviewed the number of credits and the distribution of courses in each semester and reviewed the relevance of the formulation of graduate learning outcomes to the national standards of higher education. The results of this workshop also determined the total number of credits that must be completed by students to obtain a bachelor's degree in biology education, which is 149 ECTS. This number of credits consists of 1310.5 ECTS spread over 51 compulsory courses and 9 credits thatcan be selected in 34 elective courses. This curriculum is known as the Competency-Based Curriculum 2013 Pend.Biologi FMIPA.

The issuance of Law No. 12/2012 on Higher Education and Presidential Regulation No. 8/2012 on the Indonesian National Qualifications Framework (KKN) encouraged UNM's Biology Education study programme to re-adjust its curriculum to these provisions. In addition, there is a requirement for the study programme to accommodate the new vision of UNM as a campus with educational and entrepreneurial insight. Some fundamental changes were made, especially in the formulation of *learning outcomes* in the realm of knowledge and skills that need to be possessed by prospective biology education graduates in the 21st century. The curriculum review was also carried out to ensure mastery and development of biological scientific competencies for students. The principle of curriculum development refers to the four pillars of UNESCO education (*learning to know, learning to do, learning to be* and *learning to live together*) and the concept of lifelong learning.

Furthermore, the latest development of the biology study programme curriculum as contained in this document was carried out with the aim of supporting the Merdeka Belajar-Kampus Merdeka (MBKM) policy. As is known, the MBKM policy, which has been implemented by the Ministry of Education and Culture-Ristek

since 2020, provides opportunities for students to gain broader learning experiences and develop new competencies through various learning activities, both inside and outside their universities. Therefore, the study programme reviewed the learning outcomes of graduates to be in line with 21st century competencies and learning standards in the industrial era 4.0. The study programme also reorganised the curriculum structure to facilitate lecturers and students who want to participate in the MBKM programme.

The curriculum that runs in the Biology Education Study Program refers to the KKNI and hereinafter referred to as the Biology Education KBK which was enacted in the 2013/2014 academic year then revised to the 2016 Education Curriculum which was enacted in the 2016/2017 academic year with a total of 149 ECTS each. This curriculum is still considered incomplete so it was revised again and called the 2019 UNM Biology Education Curriculum with a total of 147.5 ECTS and was approved by the UNM Chancellor. Along with changes in the policy of the Ministry of Education and Culture, namely the existence of an Independent Campus, the 2021 curriculum was prepared which gives students the right to study outside the original study programme for a maximum of 3 semesters in the form of learning activities (maximum recognition of 20 credits each semester).

2.4 LEGAL FOUNDATION

1. Law of the Republic of Indonesia Number 14 Year 2005 on Teachers and Lecturers (State Gazette of the Republic of Indonesia Year 2005 Number 157, Supplement to State Gazette of the Republic of Indonesia Number 4586);
2. Law of the Republic of Indonesia Number 12 Year 2012 on Higher Education (State Gazette of the Republic of Indonesia Year 2012 Number 158, Supplement to State Gazette of the Republic of Indonesia Number 5336);
3. Presidential Regulation of the Republic of Indonesia Number 8 of 2012, concerning the Indonesian National Qualifications Framework (KKNI);
4. Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 73 of 2013, concerning the Implementation of KKNI in the Field of Higher Education;
5. Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 3 of 2020, concerning National Higher Education Standards;

6. Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 5 of 2020, concerning Accreditation of Study Programmes and Higher Education;
7. Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 7 of 2020, concerning the Establishment, Amendment, Dissolution of State Universities, and Establishment, Amendment, Revocation of PTS Licences;
8. Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 81 of 2014, concerning Diplomas, Certificates of Competence, and Certificates of Higher Education Profession;
9. Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia
10. Guidebook for the Preparation of KPT in the Industrial Era 4.0 to Support Merdeka Learning Merdeka Campus, Ditjen Belmawa, Dikti-Kemendikbud, 2020.
11. Guidebook for Merdeka Belajar - Kampus Merdeka, Ditjen Belmawa, Dikti-Kemendikbud, 2020.
12. Guidebook for the Preparation of KPT in the Industrial Era 4.0 to Support Merdeka Learning Merdeka Campus, Ditjen Belmawa, Dikti-Kemendikbud, 2020;
13. Strategic Plan of Makassar State University Year 2020-2024.
14. Regulation of the Chancellor of Makassar State University Number: 501/UN36/HK/2020 concerning the Independent Learning-Campus Curriculum for Undergraduate and Applied Undergraduate Programmes at Makassar State University

3. COMPETENCE CONCEPT WITHIN THE FRAMEWORK OF SCIENCE EDUCATION (BIOLOGY EDUCATION)

A. Conceptual Definition and Rationale

In science education, competence is understood as an integrated and context-sensitive capacity that enables students to combine knowledge, skills, and professional dispositions to perform authentic tasks and to make accountable decisions in real learning situations. In this sense, competence is not identical to "mastering more content," but rather to using knowledge meaningfully, ethically, and effectively in complex teaching–learning contexts. For Biology Education, the competence concept is essential for four reasons:

1. Teacher education requires integration rather than separation. Students are expected to integrate their understanding of biology with instructional design, assessment literacy, and knowledge of learners. Such integration characterizes teachers' professional competence.
2. Science learning emphasizes practice and reasoning. Contemporary science education views learning science as engagement in scientific practices such as inquiry, evidence-based reasoning, modelling, and argumentation. Therefore, competence must include performance in these practices, not only the acquisition of factual knowledge.
3. OBE demands measurable outcomes and evidence of achievement. Outcome-Based Education (OBE) curricula require learning outcomes that can be observed and assessed, supported by evidence of attainment through aligned learning activities and assessments.
4. Global comparability and quality assurance. A competence framework grounded in international literature enhances transparency, comparability, and continuous improvement, ensuring that curriculum design remains aligned with global developments in science education and teacher education.

B. Definition and Scope of Science Education Competence (Biology Education)

BESP operationalizes science education competence as an integrated construct consisting of five mutually reinforcing dimensions. Each dimension is reflected in the PLOs, translated into CLOs at the course level, and evidenced through aligned assessment.

1. **Scientific literacy and science practices**

   Competence includes the ability to understand science as a way of knowing, not merely as a collection of concepts. Students are able to formulate questions, design investigations, interpret data, use models, and communicate evidence-based explanations. This dimension is grounded in contemporary science education frameworks.

2. **Competence in inquiry/problem-based learning/project-based learning**

   Competence includes the ability to design and implement inquiry-based, problem-based, and project-based learning to build conceptual understanding and scientific reasoning. In Biology Education, this dimension also includes the ability to design laboratory/practicum learning and to guide learners' investigations in a structured manner.

3. **Evidence-based reasoning and scientific argumentation**

   Competence includes the ability to construct and evaluate claims using evidence and reasoning. Students are able to judge the quality of evidence, develop logical justifications, and facilitate learners' scientific argumentation through classroom discourse and appropriate assessment.

4. **Pedagogical Content Knowledge (PCK) as a core domain**

   Competence explicitly includes PCK as a core domain of teacher education, encompassing common student misconceptions, effective representations/analogies, instructional strategies appropriate to biology topics, and topic-specific assessment. PCK is positioned as the primary link between biology content and school teaching practice

C. Professional dispositions, ethics, and responsibility

Competence includes professional responsibility, ethics, collaboration, and self-reflection as the basis for continuous development. This dimension ensures that graduates demonstrate integrity, commitment to student learning, sensitivity to equity and inclusion, and the ability to improve practice based on evidence.

D. Competence Domains in Biology Education

To support curriculum planning and instructional implementation, BESP organizes competence into domains that are widely recognized in science teacher education.

1. **Content Knowledge (CK)**

   CK refers to conceptual understanding of core biology (e.g., cell biology, genetics, physiology, ecology, evolution) and the ability to explain biological phenomena scientifically. In teacher education, CK emphasizes not only accuracy, but also conceptual structure and explanatory power so that knowledge can be represented meaningfully in instruction.

2. **Pedagogical Content Knowledge (PCK)**

   PCK refers to the specialized competence required to teach biology topics effectively. In BESP, PCK includes knowledge of learners' ways of thinking, typical misconceptions, instructional strategies and representations, topic-specific assessment, and alignment with school curriculum requirements.

3. **General pedagogical knowledge and teaching skills**

   This domain includes lesson planning, classroom management, differentiation, assessment literacy (formative and summative), classroom interaction, and reflective teaching. It ensures graduates can manage instruction adaptively across contexts and diverse learners.

4. **Scientific literacy and science practices**

   This domain emphasizes graduates' competence to model and teach science as

practice, including designing investigations, reasoning from evidence, interpreting scientific representations, and communicating scientific explanations, especially through practicum and inquiry-based learning.

5. **Professional dispositions and ethical responsibility**

   This domain includes professionalism, ethics, collaboration, lifelong learning orientation, and reflective practice. It strengthens accountability and teacher education quality through professional conduct and evidence-based improvement.

E. Competence Model and Developmental Progression in the Curriculum

BESP ensures that competence development is progressive (from foundational to advanced, from theory to practice, and from guided to independent). The curriculum progression is designed as follows:

1. Foundational science content (early semesters): building core biology understanding and basic scientific reasoning.
2. Educational foundations (early–middle semesters): learning theories, assessment principles, curriculum and instruction, and classroom communication.
3. PCK-integrated content courses (middle semesters): biology content accompanied by PCK elements (misconceptions, representations, instructional strategies, assessment).
4. Microteaching and school-based teaching practice (later semesters): demonstration of integrated competence in authentic teaching contexts.
5. Thesis/research competence (final stage): research literacy, methodology, academic ethics, and scholarly communication as evidence of advanced competence.

F. Alignment with CPL/PLO and Curriculum Structure

To ensure conceptual transparency, BESP aligns the competence framework with curriculum elements as follows:

1. **Mapping competence domains to CPL/PLO**

   Each competence domain (CK, PCK, general pedagogy, science practices, professional dispositions) is mapped to the relevant CPL/PLO statements. This mapping ensures the competence framework is not abstract, but functions as a design mechanism that is traceable to graduate outcomes.

2. **Mapping competence domains to course clusters and semester structure**

   Courses are grouped and sequenced to support stepwise competence development. For example:

   a. biology courses strengthen CK and foundational science practices;

   b. pedagogical courses strengthen teaching competence and assessment literacy;

c. subject-specific teacher education courses strengthen PCK;

d. teaching practice courses provide authentic evidence of integrated competence.

G. Curriculum Implications: Outcomes, Learning Activities, and Assessment

The competence concept is implemented through three curriculum mechanisms:

1. **CLOs as indicators of competence**

   Each course formulates CLOs using measurable verbs, so competence is stated as observable and assessable performance.

2. **Constructive alignment of CLO–content–activities–assessment**

   BESP applies constructive alignment to ensure that learning activities and assessments provide direct evidence of CLO attainment. Assessment types (written exams, practical exams, portfolios, microteaching performance, project reports) are selected according to the targeted competence domains.

3. **Authentic assessment as evidence of competence achievement**

   Teacher education requires authentic evidence such as portfolios, lesson plans, teaching demonstrations, microteaching, evaluation of school practice, inquiry projects, and reflective reports. Authentic assessment provides stronger evidence of integrated competence, especially PCK, than reliance on traditional examinations alone.

4. VISION, MISSION, GOALS, AND STRATEGIES OF THE STUDY PROGRAMME

Note from APS 4.0

The suitability of the **Vision**, **Mission**, **Goals** and **Strategies** (VMTS) of the Study Programme Management Unit (UPPS) to the VMTS of the Higher Education Institution (HEI) and the **scientific vision of the Study Programme (PS) it** manages.

Score 4.0 if:

1) a vision that reflects the vision of the university and oversees the scientific vision related to the uniqueness of the study programme and is supported by consistent implementation data, 2) missions, goals, and strategies that are in line and in synergy with the mission, goals, and strategies of the university and support the development of study programmes with consistent implementation data.

4.1 VISION

The vision of the Biology education study programme of FMIPA UNM is "In 2025 to become a reliable study programme in learning, studying, developing and researching biological learning in Indonesia, with an entrepreneurial outlook, and competitive both at the national and international levels based on noble morals".

4.2 MISSION

The mission of the Biology Education study programme of FMIPA UNM is:

1. Organising education and learning in the field of Biology education in order to create people who are faithful and devoted to God Almighty, qualified and professional andable to act as agents of reform in the midst of society,
2. To organise studies and research in the field of biology education that are quality, innovative, relevant and highly competitive,
3. Organising community service in order to disseminate research results by taking into account the potential of the region,
4. Developing an entrepreneurial spirit that directs the potential of Biology EducationStudy Program students, so that they are able to become agents of reform in providing employment opportunities.
5. Establishing cooperation with institutions both at home and abroad in the realisation of the tridharma of higher education

4.3 DESTINATION

The objectives of the Biology Education study programme are:

1. Producing biology education graduates who are faithful and devoted to God Almighty, qualified and professional and able to act as agents of development reformers in the midst of society.
2. Producing biology education graduates who have a high commitment to achievement, have a high work ethic, never give up, and serve the interests of the nation and state based on Pancasila and the 1945 Constitution.
3. Producing biology education graduates who master technology related to the field of biology learning.
4. Producing biology education graduates who have an entrepreneurial spirit, enablingthem to become agents of reform in biology learning and biology-based entrepreneurship development.

4.4 STRATEGY

The goals and strategies for achieving the Biology Education study programme are shown in the following table

No.	Strategic Objectives	Indicators	Achievement Strategy
1	**Learning Quality and Graduate Quality**		
1.1	Increased number of students who complete their studies on time	Percentage of students with a length of study of 8 semesters	1. Improve the quality of the lecture process by conducting monitoring and evaluation 2. Improve the quality of lecture facilities and infrastructure 3. Improving the role of academic advisors in monitoring the progress of student learning outcomes 4. Involving students in lecturer research 5. Enhance the role of alumni association to inform job opportunities
1.2	Increased number of students who complete their studies in less than 4 years	Percentage of students with a length of study of less than 4 years	
1.3	Increased number of students who complete their thesis in less than one semester	Percentage of thesis preparation in less than one semester	

			6. Customising courses to the needs of the community 7. *Updating* course content with labour market needs 8. Establish co-operation with various institutions
1.4	Reduced waiting time for graduates to obtain employment	Waiting time for employment	
1.5	Increased mastery of English for students (TOEFL Preparation)	TOEFL test result score Preparation	1. Use English teaching materials/literature in lectures and assignments. 2. Improving the quality of subject matter 3. Collaborate with Cambridge Language Assessment institute 4. Conducting TOFL test trials
1.6	Increased number of graduates with entrepreneurial spirit	Success in opening a business	1. Establish entrepreneurial groups related to biology and biology education 2. Provide services to students such as hydroponic and verticulture entrepreneurship. 3. Training for students related to the preparation of student creativity programme (PKM) proposals
1.7	Develop ICT-based Learning Innovations (using e-learning)	Percentage of courses using e-learning	1. Integrating courses with IT 2. Conduct e-learning training for lecturers 3. Provide lecture facilities and infrastructure that utilise ICT
1.8	Increased number of students that achieved achievement/reputation in academic and non-academic fields	Percentage of students who excel	1. Conducting written work training for students 2. Mentoring science Olympiad 3. Mentoring student creativity programmes 4. Motivate students to participate in national activities 5. Appoint a supervisor for each academic activities
2	**Academic atmosphere, qualifications of lecturers, education personnel**		
2.1	Increase in lecturers using e-lectures Learning	Use of e-learning in lectures	1. Conduct *e-learning* workshops for lecturers
2.2	Increased percentage of lecturers with	Lecturers with doctoral qualifications	2. Provide opportunities for lecturers to continue their doctoral studies

	doctoral qualifications		
2.3	Increased competence of education personnel in library management	Competence of education personnel in managing the library	3. Inviting education staff to attend library management workshops
2.4	Increased competence of education personnel in laboratory management	Competence of education personnel in laboratory management	4. Inviting laboratory assistants to attend laboratory management training
3	**Research and Community Service**		
3.1	Increased number of research titles funded by Higher Education	Number of research titles	5. Establish a research and service expertise study group
3.2	Increased number of community service titles funded by Higher Education	Number of service titles	6. Establish a community service study group 7. Inviting lecturers to attend training on the preparation of community service proposals
3.3	Increased national/international publications of lecturers	National/inter-national publications	8. Inviting lecturers to attend training on writing articles for reputable journals
3.4	Increased number of IPRs of lecturers	Number of IPRs	9. Inviting lecturers to IPR workshops

4.5 UNIVERSITY VALUE

(Explain the values that are championed in the implementation of education in higher education in accordance with its vision and mission based on the existence of the college philosophically, sociologically, and historically in the community).

The values developed in the implementation of education in the Biology Education study programme FMIPA UNM are upholding the values listed in:

1. Lecturers' code of ethics, in accordance with UNM Rector Decree No.9618/UN36/HK/2019.
2. Code of ethics for education personnel, in accordance with UNM Rector Decree Number 9664/UN36/HK/2019
3. Student code of ethics, in accordance with UNM Rector Decree Number 9617/UN36/HK/2019

4. Enforcing academic regulations in accordance with UNM Rector Regulation Number 401/UN36/HK/2019, Article 44 Paragraph (1) regarding academic offences
5. The attitudinal SLOs set by the Indonesian Ministry of Education and Culture No.mor 3 of 2020.

In addition to the above, the study programme provides "freedom" to students to use the right to study 3 semesters outside their own study programme as a policy of the Ministry of Education and Culture regarding Independent Campus.

4. CURRICULUM EVALUATION & TRACER STUDY RESULTS

4.1 CURRICULUM EVALUATION

(Explain about: 1. Evaluation mechanism, 2. Curriculum items/elements evaluated from the existing curriculum, 3. Evaluation results & and what needs to be improved. => can use the evaluation method reference in the KPT 4.0 Guidebook 4th edition, 2020)

4.1.1 Evaluation Mechanism

The mechanism for evaluating the curriculum of the Biology Education study programme, Department of Biology, FMIPA UNM is through (1) the formationof a committee by the Head of the Department, (2) followed by a meeting at the department / study programme level to request input related to the implementation of the current curriculum. Subsequently, a workshop was held involving lecturers of the Biology Education study programme, student representatives, alumni and *stakeholders* such as the Education Office, Schools (Education Units), Subject Teacher Consultation (MGMP); (3) The committee accommodated the participants' input related to curriculum improvement; (4) The draft curriculum was submitted at the department / study programme level meeting.

4.1.2 Evaluation Items

. Curriculum evaluation is focused on the achievement of graduate profiles and student learning rights 3 semesters outside the study programme, The items evaluated are:

a. ELO Attitude which previously referred to Permenristek Dikti No. 44 of 2015 was changed with reference to Permendikbud No. 3 of 2020
b. Study materials that support each SLO
c. Distribution of courses that give students the right to study 3 semesters outside the study programme.
d. Acceleration of students in completing their studies

4.1.3 Evaluation Results

The Biology Education study programme, FMIPA UNM, currently runs two curricula, namely the 2016 curriculum and the 2019 curriculum. The 2016

curriculum is for students from 2016 to 2019. The 2019 curriculum applies to students of class 2020. The number of credits for the 2016 and 19 curricula is 149 ECTS each. The curriculum consists of 139 ECTS of compulsory courses with a total of 51 courses, and 10 credits of electives from a total of 16 elective courses prepared. Currently, students who follow the 2016 curriculum are the class of 2016,2017, and 2018.

In December 2018, at the La'riz Hotel and Remcy Hotel, the 2019 curriculum workshop was held and the Biology Education study programme evaluated the implementation of the 2016 curriculum and further made curriculum adjustments by referring to Presidential Decree No. 8 of 2012 concerning the Indonesian National Qualifications Framework (KKNI) and Permenristek Dikti No. 44 of 2015 concerning National Higher Education Standards. Then in 2021, a curriculum evaluation was carried out again in the context of implementing the Ministry of Education and Culture's policy on Merdeka Learning Independent Campus andPermendikbud No. 3 of 2020. The results of the curriculum evaluation: (1) The distribution of courses is re-improved by considering basic knowledge and prerequisite knowledge as well as the independent learning activities programme of independent campus learning (2)) In the previous curriculum, the Foundations of Education course was replaced with an Introduction to Education course, the Educational Psychology course was replaced with a Learner Development course, and the Biology Learning and Learning course was changed to Learning and Learning as a general education course so that a Biology Learning Strategy course was offered, PLP 1 and PLP2 courses were merged into PLP 6 ECTS; (2) to accommodate the university's vision and mission on entrepreneurship, a 4 credit Entrepreneurship course is presented, (3) There is a requirement from the DirectorGeneral of Belmawa that makes the *Learning Outcome* formulated by the relevant study program association to be used as the basis for curriculum development, (5) The need for each lecturer to design OBE RPS for the courses he teaches, and (6) Prioritising courses related to education in the elective courses presented.

4.2TRACER STUDY

(Explain the results of the *tracer study* that can be used as a basis for formulating the profile of graduates, CPL Prodi, and developing study materials)

Alumni of the Biology Education study programme FMIPA UNM are spread across various institutions in South Sulawesi and other regions in Indonesia. Based on data distributed to respondents± 82 people, in several institutions including the STKIP Pembangunan Makassar campus, Unsulbar, Athirah Islamic School.

Integrity, Ethics, Morals

The average discipline is 3.94 (Very Good); Honesty 3.95 (Very Good); Responsibility 3.96 (Very Good); Upholding the Professional Code of Ethics 3.94 (Very Good). From these data, the attitude SLOs that have been formulated are still included with reference to Permendikbud Number 3 of 2020.

Expertise based on field of Science

The expertise of alumni according to their respective scientific fields in the view of stakeholders is very good. Average Performance Mastery of scientific

substance 3.95 (Very Good); Mastery of strategies and techniques for preparing and presenting teaching materials 3.93 (Very Good); Ability to solve problems in work 3.94 (Very Good). From the data, these ELOs related to the knowledge aspect are still imposed on several courses and enriched with the latest scientific developments.

English Language Proficiency

Foreign language skills including English to actively communicate and explain subject matter in the classroom are still lacking but access teaching materials from books / ebooks / research articles in English. 3.75 (Very Good). From this data, SLOs related to English language skills need to be imposed on several courses explicitly.

Information Technology Usage Skills

The alumni have skills in using ICT for the purpose of organising educational learning activities 3.87 (Very Good); Skills in using ICT for the purpose of conducting learning evaluation 3.88 (Very Good); Skills in using ICT for self-development 3.88 (Very Good). Based on these data, SLOs related to TPACK need to be maintained and enriched with the use of technology.

Communication Skills

Based on the survey, the level of communication of alumni of Biology Education Study Programme FMIPA UNM is very good. Skills to communicate effectively, empathetically, and politely with students 3.93 (Very Good); Skills to communicate effectively, empathetically, and politely with fellow educators, education personnel, parents, and the community 3.96 (Very Good); and Ability to interact in organisations 3.95 (Very Good). From these data, the SLOs of the study programme still need to be maintained and enriched with other 21st century skills.

Suitability of Field of Study with the Workplace

In general, alumni of the UNM Biology Education Study Program work in accordance with their field of knowledge, which is around 85% and the rest work in other institutions such as banks, tutoring and entrepreneurship. From this data, the SLOs of the UNM Biology Education Study Programme support the achievement of the study programme alumni profile. However, alumni who work as researchers, education personnel and biology entrepreneurs are still lacking, therefore the curriculum to be prepared is prepared to provide opportunities for students not only as teachers.

5.GRADUATE PROFILE & FORMULATION OF GRADUATE LEARNING OUTCOMES (CPL)

(Explaining about the PROFILE of graduates, formulating CPL according to the profile of graduates, CPL consists of aspects: Attitude, general skills, special skills and knowledge formulated based on SN-Dikti and KKNI descriptors according to their level).

5.1 GRADUATE PROFILE

(Explain the method/mechanism of obtaining a graduate profile, Graduate Profile and its description, formulated from the results of a tracer study of graduates with work experience approximately 3-5 years after graduation)

Table 1 Graduate Profile and its description

No.	Graduate Profile (PL)	Graduate Profile Description
PL1	Biology Educator Candidate	Educator, facilitator of creative, innovative learning that educates with good mastery of biological materials, has the ability to use information technology to keep abreast of developments in biology and learning.
PL2	Biology Education Researcher	Study and apply the principles of biology / biological education for various entrepreneurial activities as a provision for independent life
PL3	Biology Education Entrepreneurship	Study and apply the principles of biology / biological education for various entrepreneurial activities as a provision for independent life
PL4	Biology Education Practitioner	Primary and secondary education institution/unit managers as school laboratory managers

5.2 FORMULATION OF SLOS

(Explain how/mechanism to obtain SLOs, SLOs consist of Attitude Aspects, General Skills, Specific Skills, and Knowledge)

Table 2. Learning Outcomes of Study Programme Graduates

No.	Graduate Learning Outcomes (GLOs)	
	Attitude (S)	
1	S1	Be devoted to God Almighty and uphold high regard for humanity values in carrying out duties based on religion, morals and ethics.
2	S2	Contribute to the improvement of community, nation, and civilization based on Pancasila, as well as pride and love for the homeland.
3	S3	Appreciate the diversity of cultures, perspectives, religions, beliefs, and opinions; able to collaborate, possess social sensitivity, entrepreneurial spirit, and concern for society and the environment; adhere to laws, discipline, and responsibility.

No.	Graduate Learning Outcomes (GLOs)	
	General Skills (KU)	
1	KU1	Capable of applying logical, critical, systematic, and innovative thinking in the development or implementation of science and technology and applying humanistic values relevant to their expertise.
2	KU2	Capable of assessing the implications of science and technology development by considering and applying humanistic values in their expertise, based on scientific norms, procedures, and ethics to generate solutions, ideas, designs, or art critiques.
3	KU3	Able to make decisions in problem-solving, take responsibility, develop networks, demonstrate independence, quality, and measurability, as well as compose and document a thesis, self- evaluate, and engage in self-directed learning.
	Special Skills (KK)	
1	KK1	Have the ability to plan, design, implement, and evaluate biology learning and apply appropriate teaching approaches/models/strategies/methods according to school curriculum requirements within the framework of TPCK (Technological Pedagogical dan Content Knowledge) or SSP (Subject Specific Pedagogy) and keep up with the scientific developments in biology and its learning.
2	KK2	Able to mentor students and/or improve biology learning processes through action research or other research, as well as develop an entrepreneurial spirit and communicate the results or outcomes.
3	KK3	Able to describe natural or biological processes and phenomena and use measuring tools, teaching aids, calculators, and computer software to enhance the quality of biology learning in classrooms, laboratories, or fields, as well as design and plan biology experiments for learning or research purposes and conduct studies on policies or policy implementation in the field of biology education or learning.
	Knowledge Mastery (PP)	
1	PP1	Master the theory of concepts, principles, and basic procedures in the field of biological science, biological research or education, entrepreneurship, as well as the management and safety of working or studying in school biology laboratories in accordance with the scientific developments and learning in schools.
2	PP2	Master the concepts, principles, pedagogical and andragogical theories, and the application of various approaches, strategies, models, planning techniques, and evaluation of learning, as well as master and apply ICT, TPACK (Technological Pedagogical and Content Knowledge), and SSP (Subject Specific Pedagogy) in line with the demands of the times and the development of current education policy issues
3	PP3	Understand the structure (including functional relationships between concepts) of biology and related sciences.

5.3 MATRIX OF SLO RELATIONSHIP WITH GRADUATE PROFILE

(this matrix aims to ensure that each item of Prodi's SLO is related to the formulation of its Graduate Profile)

Table 3. Profile & SLO relationship matrix of Prodi

SLOs of Study Programmes		PL1	PL2	PL3	PL4
Attitude (S)					
S1	Be devoted to God Almighty and uphold high regard for humanity values in carrying out duties based on religion, morals and ethics.	√	√	√	√
S2	Contribute to the improvement of community, nation, and civilization based on Pancasila, as well as pride and love for the homeland.	√	√	√	√
S3	Appreciate the diversity of cultures, perspectives, religions, beliefs, and opinions; able to collaborate, possess social sensitivity, entrepreneurial spirit, and concern for society and the environment; adhere to laws, discipline, and responsibility.	√	√	√	√
General Skills (KU)					
KU1	Capable of applying logical, critical, systematic, and innovative thinking in the development or implementation of science and technology and applying humanistic values relevant to their expertise.	√	√	√	√
KU2	Capable of assessing the implications of science and technology development by considering and applying humanistic values in their expertise, based on scientific norms, procedures, and ethics to generate solutions, ideas, designs, or art critiques.	√	√	√	√
KU3	Able to make decisions in problem-solving, take responsibility, develop networks, demonstrate independence, quality, and measurability, as well as compose and document a thesis, self- evaluate, and engage in self-directed learning.	√	√	√	√
Special Skills (KK)					
KK1	Have the ability to plan, design, implement, and evaluate biology learning and apply appropriate teaching approaches/models/strategies/methods according to school curriculum requirements within the framework of TPCK (Technological Pedagogical dan Content Knowledge) or SSP (Subject Specific Pedagogy) and keep up with the scientific developments in biology and its learning.	√	√	√	√
KK2	Able to mentor students and/or improve biology learning processes through action research or other research, as well as develop an entrepreneurial spirit and communicate the results or outcomes.	√			√
KK3	Able to describe natural or biological processes and phenomena and use measuring tools, teaching aids, calculators, and computer software to enhance the quality of biology learning in classrooms, laboratories, or fields, as well as design and plan biology experiments for learning or research purposes and conduct studies on policies or policy implementation in the field of biology education or learning.	√	√		√

Knowledge Mastery (PP)					
PP1	Master the theory of concepts, principles, and basic procedures in the field of biological science, biological research or education, entrepreneurship, as well as the management and safety of working or studying in school biology laboratories in accordance with the scientific developments and learning in schools.	√	√	√	√
PP2	Master the concepts, principles, pedagogical and andragogical theories, and the application of various approaches, strategies, models, planning techniques, and evaluation of learning, as well as master and apply ICT, TPACK (Technological Pedagogical and Content Knowledge), and SSP (Subject Specific Pedagogy) in line with the demands of the times and the development of current education policy issues	√			√
PP3	Understand the structure (including functional relationships between concepts) of biology and related sciences.	√			√

6. DETERMINATION OF STUDY MATERIALS

6. 1 OVERVIEW OF THE BODY OF KNOWLEDGE (BOK)

(Write/describe the branches/fields of science developed in the study programme as the basis for determining study materials, and can be described in the form of a diagram/scheme of the BoK structure)

The body of knowledge or science and expertise that will be held by the Biology Education study programme FMIPA UNM includes the field of Biology, the field of methodic-pedagogic (educational science), and other fields that are in accordance with Biology learning. The science has a connection with similar fields with Biology Education at the S-2 and S-3 levels, even correlated with the field of Biology. Thus, the scientific fields organised are adequate provisions for continuing studies to higher strata (S-2) or Teacher Professional Education. In a broader area, the knowledge and expertise is also related to allied fields (Science Fields: Physics and Chemistry), mathematics, and appropriate fields of application of science and technology (ICT and Media). The field of Biology covers the organisation of life from cells, tissues, organs, organ systems, individuals/organisms, populations, communities, ecosystems and the biosphere. In addition, it also examines ranging from atoms to molecules as a supporter of the field of Biology. The fields of biology presented include cell and molecular biology, microbiology, ecology and conservation, physiology, genetics, structure and development, and biosystematics. To realise the vision and mission of UNM, each study programme is required to present Entrepreneurship courses. The study materials are briefly presented in Figure 1.

The study materials are categorised into 14 groups, namely:

1. Spiritual and social attitudes (BK1)
2. National, social and personality values (BK2)
3. Cell and Molecular Biology (BK3)
4. Microbiology (BK4)
5. Ecology and Conservation (BK5)
6. Physiology (BK6)
7. Genetics (BK7)
8. Structure and Development (BK8)

9. Biosystematics and Evolution (BK9)
10. Entrepreneurship (BK 10)
11. Fundamentals of Education (BK11)
12. Biology Education Professional Expertise (BK12)
13. Fundamentals of Plumbing (BK13)
14. Communication and Scientific Applications (BK14)

Table 4. Study materials based on SLOs of Study Programmes

SLOs of Study Programmes		Study Material
Attitude (S)		
S1	Be devoted to God Almighty and uphold high regard for humanity values in carrying out duties based on religion, morals and ethics.	1. Spiritual and social attitudes (BK1) 2. National, social and personality values (BK2) 3. Cell and Molecular Biology (BK3) 4. Microbiology (BK4) 5. Ecology and Conservation (BK5) 6. Physiology (BK6) 7. Genetics (BK7) 8. Structure and Development (BK8) 9. Biosystematics and Evolution (BK9) 10. Entrepreneurship (BK 10) 11. Fundamentals of Education (BK11) 12. Biology Education Professional Expertise (BK12) 13. Fundamentals of Plumbing (BK13) 14. Communication and Scientific Applications (BK14)
S2	Contribute to the improvement of community, nation, and civilization based on Pancasila, as well as pride and love for the homeland.	1. Spiritual and social attitudes (BK1) 2. National, social and personality values (BK2) 3. Ecology and Conservation (BK5) 4. Entrepreneurship (BK 10) 5. Fundamentals of Education (BK11) 6. Communication and Scientific Applications (BK14)
S3	Appreciate the diversity of cultures, perspectives, religions, beliefs, and opinions; able to collaborate, possess social sensitivity, entrepreneurial spirit, and concern for society and the environment; adhere to laws, discipline, and responsibility.	1. Spiritual and social attitudes (BK1) 2. National, social and personality values (BK2) 3. Ecology and Conservation (BK5) 4. Communication and Scientific Applications (BK14)
General Skills (KU)		

KU1	Capable of applying logical, critical, systematic, and innovative thinking in the development or implementation of science and technology and applying humanistic values relevant to their expertise.	1. Cell and Molecular Biology (BK3) 2. Microbiology (BK4) 3. Ecology and Conservation (BK5) 4. Physiology (BK6) 5. Genetics (BK7) 6. Structure and Development (BK8) 7. Biosystematics and Evolution (BK9) 8. Entrepreneurship (BK 10) 9. Fundamentals of Education (BK11) 10. Biology Education Professional Expertise (BK12) 11. Fundamentals of Plumbing (BK13)
KU2	Capable of assessing the implications of science and technology development by considering and applying humanistic values in their expertise, based on scientific norms, procedures, and ethics to generate solutions, ideas, designs, or art critiques.	1. Ecology and Conservation (BK5) 2. Biology Education Professional Expertise (BK12) 3. Communication and Scientific Applications (BK14)
KU3	Able to make decisions in problem-solving, take responsibility, develop networks, demonstrate independence, quality, and measurability, as well as compose and document a thesis, self- evaluate, and engage in self-directed learning.	1. Fundamentals of Education (BK11) 2. Biology Education Professional Expertise (BK12) 3. Communication and Scientific Applications (BK14)
Special Skills (KK)		
KK1	Have the ability to plan, design, implement, and evaluate biology learning and apply appropriate teaching approaches/models/strategies/methods according to school curriculum requirements within the framework of TPCK (Technological Pedagogical dan Content Knowledge) or SSP (Subject Specific Pedagogy) and keep up with the scientific developments in biology and its learning.	1. Cell and Molecular Biology (BK3) 2. Microbiology (BK4) 3. Ecology and Conservation (BK5) 4. Physiology (BK6) 5. Genetics (BK7) 6. Structure and Development (BK8) 7. Biosystematics and Evolution (BK9) 8. Entrepreneurship (BK 10) 9. Biology Education Professional Expertise (BK12)
KK2	Able to mentor students and/or improve biology learning processes through action research or other research, as well as develop an entrepreneurial spirit and communicate the results or outcomes.	1. Biology Education Professional Expertise (BK12) 2. Communication and Scientific Applications (BK14)

KK3	Able to describe natural or biological processes and phenomena and use measuring tools, teaching aids, calculators, and computer software to enhance the quality of biology learning in classrooms, laboratories, or fields, as well as design and plan biology experiments for learning or research purposes and conduct studies on policies or policy implementation in the field of biology education or learning.	1. Cell and Molecular Biology (BK3) 2. Microbiology (BK4) 3. Ecology and Conservation (BK5) 4. Physiology (BK6) 5. Genetics (BK7) 6. Structure and Development (BK8) 7. Biosystematics and Evolution (BK9) 8. Entrepreneurship (BK 10) 9. Biology Education Professional Expertise (BK12)
Knowledge Mastery (PP)		
PP1	Master the theory of concepts, principles, and basic procedures in the field of biological science, biological research or education, entrepreneurship, as well as the management and safety of working or studying in school biology laboratories in accordance with the scientific developments and learning in schools.	1. Cell and Molecular Biology (BK3) 2. Microbiology (BK4) 3. Ecology and Conservation (BK5) 4. Physiology (BK6) 5. Genetics (BK7) 6. Structure and Development (BK8) 7. Biosystematics and Evolution (BK9) 8. Entrepreneurship (BK 10) 9. Fundamentals of Plumbing (BK13) 10. Communication and Scientific Applications (BK14)
PP2	Master the concepts, principles, pedagogical and andragogical theories, and the application of various approaches, strategies, models, planning techniques, and evaluation of learning, as well as master and apply ICT, TPACK (Technological Pedagogical and Content Knowledge), and SSP (Subject Specific Pedagogy) in line with the demands of the times and the development of current education policy issues	1. Fundamentals of Education (BK11) 2. Biology Education Professional Expertise (BK12) 3. Communication and Scientific Applications (BK14)
PP3	Understand the structure (including functional relationships between concepts) of biology and related sciences.	1. Fundamentals of Education (BK11) 2. Biology Education Professional Expertise (BK12)

6. 2DESCRIPTION OF STUDY MATERIALS

Introduction

Table 5. Study Material (BK)

Code	Study Material (BK)	Description of Study Material
BK1	Spiritual and social attitudes	Examine the devotion to God Almighty and the ability to demonstrate a religious attitude, and uphold human values in carrying out duties based on religion, values, morals, and ethics both in the general public and academic community.
BK2	Nationality Social and Personality Values	Examines the values of Pancasila and citizenship guidelines which are broken down in detail into several sub-studies: Pancasila in the historical flow of the Indonesian nation, Pancasila becomes the basis of the State of the Republic of Indonesia, State ideology, philosophical system, ethical system and Pancasila becomes the basis of the value of science development. Pancasila as the orientation of civic education, National identity, Understanding of citizens, nation, State, rights and obligations of citizens, Understanding of the state constitution, Understanding of democracy and human rights, Archipelagic insight, National resilience and Diversity of Indonesian society.
BK3	Cell and Molecular Biology	Comprehensive study of cell and molecular biology. Cell biology includes the study of the structure and function of each cell organelle and discusses in detail the functions of organelles such as the cell wall, cell membrane, endoplasmic reticulum, golgi bodies, lysosomes. Microbodies, mitochondria, chloroplasts, cytoskeletons and cytosol, nucleus and robosomes, cell cycle, basic genetic mechanisms and analytical techniques to study cells. The Molecular section discusses molecular structures in both prokaryotic and eukaryotic cells, DNA and RNA replication, transcription, translation and regulation of gene expression in both prokaryotes and eukaryotes. In addition to cell and molecular biology, BK 3 also covers biochemical processes in the body which are detailed in carbohydrates, lipids, nucleic acids, proteins and enzymes.
BK4	Microbiology	Examines microbiological concepts including: Definition and role of Microbiology; Viruses; Bacteria, and Archae; Actinomycetes; Fungi; Cyanobacteria; Protozoa; Microbial cultivation; Microbial

Code	Study Material (BK)	Description of Study Material
		metabolism; Microbial growth; Microbial systematics and Microbiological methods.
BK5	Ecology and Conservation	Examines Ecology and conservation including: Animals and their Environment; Life history patterns; Populations; Table of Life; Intraspecific Population Regulation; Interspecific Competition; Predation; Herbivory; Mutualism; Parasites; Animal Defence Systems in Ecological interactions; Sampling methods in animal ecology.
BK6	Physiology	Examines physiology both animal, plant and specifically human physiology. Plant physiology examines bioprocesses in plants, including the relationship between plants and water, Soil and Plant Nutrition, Photosynthesis, nitrogen, sulfur and phosphorus metabolism, plant respiration, plant growth and development, plant hormones, seeds, movement in plants, dormancy and aging, photoprodism and vernalisation. The field of plant physiology also specialises in plant nutrition. Animal physiology specifically examines the bioprocesses of the nervous system, sensory system, hormone system, movement system, respiration system, excretion system, digestive system, reproduction, circulation system, osmoregulation and thermoregulation in the animal kingdom. In particular, physiology also discusses bioprocesses in humans in the human Anatomy and Physiology course which includes all organ systems as well as disorders and diseases of each organ system.
BK7	Genetics	Examines the concept of Genetics which includes the History of the Development of Genetics, Genetic Material, The concept of inheritance of Mendel's Humum traits, Mendel's Law Deviations, Multiple Alleles, Sex Determination, Linking and Crossing Over, Recommendations, Population genetics, Double Genes. Basic Genetic Engineering. The study of genetics is also related to Biotechnology and Molecular Genetics. Biotechnology specifically examines the definition of biotechnology, the branches of science, the three main components of biotechnology and the relationship of biotechnology to development.
BK8	Structure and Development	Examines structure and development which includes several specialised studies such as animal structure, plant morphology, plant anatomy and animal development. Animal structure specifically examines the basic tissues in animals, the structure of the integument, muscle, skeletal, digestive, respiratory, excretory, reproductive, circulatory and nervous and endocrine systems. Plant morphology and anatomy cover the general shape of plants, plant body structure, leaves, stems, roots, flowers, fruits and seeds. Plant anatomy examines the internal structure of the plant body, including the structure of basic

Code	Study Material (BK)	Description of Study Material
		tissues, young and mature tissues, secretory structures, and the development of roots stems and leaves. Animal development examines animal developmental processes such as gametogenesis, fertilisation, segmentation and balstulation, gastrulation, organogeneisis, embryonic membranes and placenta, larval form and metomorphosis, regeneration, developmental principles and developmental abnormalities.
BK9	Biosystematics and Evolution	Examines scientific behaviour in Biosystematics and evolution including: History of evolutionary theory; Emergence and extinction; Biogeography; Origin of prokaryotic and eukaryotic emergence; Evidence of evolution and examples of evidence of evolution; Origin of diversity; Natural selection and adaptation; Phylogeny; Origin of plant and animal groups. Biosystematic materials include the fields of zoology and botany. Zoology covers invertebrate zoology which deals with the classification of invertebrate animals (protozoa, porifera, coelentrata, platyhelminthes, Nemathehelminthes, Annelida, Mollusca, Echinodermata, Arthopoda). Vertebrate Zoology studies the classification of vertebrate animals, especially the chordate phylum. The field of Botany covers the botany of higher plants and lower plants, especially their classification and taxonomy.
BK10	Entrepreneurship	Examines entrepreneurship and its derivatives. Some of the courses covered include the basics of entrepreneurship, horticulture and tissue culture. Entrepreneurship specifically examines how to become an entrepreneur, entrepreneurial character, business plan, production and technology, benchmarking, marketing, financial management, human resources and business plan planning.
BK11	Fundamentals of education	The basics of education cover several sub-sections of study such as the foundations of education, educational psychology, the education profession and the philosophy of education. The foundation of education includes the concept of the foundation of education, education as a system, education as a science and art, philosophical, sociological, scientific, historical, anthropological, juridical, religious, technological and economic foundations of education. Educational Psychology examines student development and developmental factors, the relationship between education and learner development, the characteristics of adolescent development and its application in education,

Code	Study Material (BK)	Description of Study Material
		learning theories, the definition of intelligence and how to measure it, learning difficulties, the concept of talent, classroom management. The education profession examines the personal, social, professional and pedagogic competencies of teachers, the role of teachers in learning, the teacher code of ethics and its application, reflection on duties and professional development.
BK12	Biology Education Professional Expertise	Expertise in the Education profession examines the application of the biology education profession both in terms of learning and research. The scope of this study material includes curriculum review and learning planning (discussing curriculum analysis in the design of learning documents such as lesson plans, syllabi, semester programs, annual programs, effective time analysis and application in learning practices). Learning and learning examines the nature of learning and learning various approaches, models and methods of learning as well as the application of basic teaching skills. Learning media and learning innovations cover the design of IT-based media used in learning and how to apply technology to produce varied and fun teaching materials and media. Other sub-studies such as the evaluation of biologyteaching which examines the design and implementation oflearning evaluations, including the rules for writing questions and managing test scores. In addition to the study of learning in particular, it is also given a sub-sectionstudying the school-based management section and also school-based practicum. This aims to provide students with knowledge and understanding of the implementationof management in schools. Educational research methods and advanced research examines the basics of research, determining samples, determining designs, hypotheses, formulating problems, determining methods to preparing research reports.
BK13	Fundamentals of Plumbing	Examines the basics of chemistry such as basic biology, basic physics, basic chemistry, basic mathematics, basic statistics, environmental knowledge.
BK14	Communication and Scholarly Applications	Examines the application of knowledge obtained during lectures including Field Experience Practice (PPL 1 and 2), Real Work Lecture (KKN), Biology Seminar, and Thesis. In this study material, students apply the concepts and knowledge that have been obtained during lectures both in biology and education, applied to learning practices, research practices and final assignments.

7. COURSE FORMATION AND DETERMINATION OF ECTS

7.1 COURSE FORMATION

(Courses are formed based on the Graduate Learning Outcomes (LLOs) imposed on the course and study materials that are in accordancewith the LLOs. The formation can use the following matrix pattern)

Table 6. Matrix of SLOs and New Courses**)

CPL-S

No.	MK	CPL - S		
		S1	S2	S3
	SEM 1			
1	Pancasila Education	√	√	√
2	English	√	√	√
3	Basic Biology	√	√	√
4	Basic Physics	√	√	√
5	Basic Maths	√	√	√
6	Basic Chemistry	√	√	√
7	Environmental Education	√	√	√
8	Basic Statistics	√	√	√
9	Introduction to Education	√	√	√
	SEM 2			
1	Islamic Religious Education	√	√	√
2	Christian Religious Education	√	√	√
3	Catholic Religious Education	√	√	√
4	Hindu Religious Education	√	√	√
5	Buddhist Education	√	√	√
6	Confucian Religious Education	√	√	√
7	Civic Education	√	√	√
9	Bahasa Indonesia	√	√	√
8	Educational Profession	√	√	√
9	Biological Laboratory Techniques and Management	√	√	√
10	Learner Development	√	√	√
11	Plant Morphology	√	√	√
	Practicum in Plant Morphology	√	√	√
12	Animal Structure	√	√	√
	Animal Structure Practicum	√	√	√
13	Biochemistry	√	√	√
14	Learning and Learning	√	√	√
	SEM 3			
1	Invertebrate Zoology	√	√	√
	Practicum of Invertebrate Zoology	√	√	√
2	Plant Anatomy	√	√	√
	Practicum in Plant Anatomy	√	√	√
3	Lower Plant Botany	√	√	√
	Practicum of Lower Plant Botany	√	√	√
4	Animal Development	√	√	√
	Animal Development Practicum	√	√	√

No.	MK	CPL - S		
		S1	S2	S3
5	Plant Ecology	√	√	√
	Animal Ecology Practicum	√	√	√
6	Genetics	√	√	√
	Genetics Practicum	√	√	√
7	School Biology Curriculum Design and Development	√	√	√
8	Biology Learning Media and ICT	√	√	√
	SEM 4			
1	Botany of Higher Plants	√	√	√
	Practicum in Higher Plant Botany	√	√	√
2	Vertebrate Zoology	√	√	√
	Practicum in Vertebrate Zoology	√	√	√
3	Plant Physiology	√	√	√
	Practicum in Plant Physiology	√	√	√
4	Animal Physiology	√	√	√
	Practicum in Animal Physiology	√	√	√
5	Biology Learning Evaluation	√	√	√
6	Animal Ecology	√	√	√
	Animal Ecology Practicum	√	√	√
7	Biology Learning Strategies	√	√	√
8	Cell Biology	√	√	√
	SEM 5			
1	Philosophy of Education	√	√	√
2	Entrepreneurship	√	√	√
3	Biology Learning Innovation	√	√	√
4	Microbiology	√	√	√
	Microbiology Practicum	√	√	√
5	Educational Research Methodology	√	√	√
6	Human Anatomy and Physiology	√	√	√
	Human Anatomy and Physiology Practicum	√	√	√
7	Introduction to Biotechnology	√	√	√
8	Advanced School Science	√	√	√
9	Learning Theories	√	√	√
10	Mycology	√	√	√
11	Microtechnics	√	√	√
12	Learning Models	√	√	√
13	Teaching Material Development	√	√	√
14	School Biology Practicum	√	√	√
15	School-based Management	√	√	√
	SEM6			
1	Evolution	√	√	√
2	Molecular Genetics	√	√	√
3	Curriculum Review and Biology Lesson Planning	√	√	√
4	Nutrition and Health Sciences	√	√	√
5	Advanced Educational Research Methodology	√	√	√
6	Microteaching	√	√	√
7	Biology Seminar	√	√	√
8	Development of Educational Research Instruments	√	√	√

No.	MK	CPL - S		
		S1	S2	S3
10	Remedial Teaching	√	√	√
11	Plant Tissue Culture	√	√	√
12	Contextualised Teaching	√	√	√
13	Horticulture	√	√	√
14	Animal Behaviour	√	√	√
15	Circulatory Physiology	√	√	√
	SEM 7			
1	PLP	√	√	√
2	Community Service	√	√	√
	SEM8			
1	Thesis	√	√	√

CPL-P

No.	MK	CPL - P		
		P1	P2	P3
	SEM1			
1	Pancasila Education	√	√	√
2	English	√	√	√
3	Basic Biology	√	√	√
4	Basic Physics	√	√	√
5	Basic Maths	√	√	√
6	Basic Chemistry	√	√	√
7	Environmental Education	√	√	√
8	Basic Statistics	√	√	√
7	Introduction to Education	√	√	√
	SEM2			
1	Islamic Religious Education	√	√	√
2	Christian Religious Education	√	√	√
3	Catholic Religious Education	√	√	√
4	Hindu Religious Education	√	√	√
5	Buddhist Education	√	√	√
6	Confucian Religious Education	√	√	√
7	Civic Education	√	√	√
8	Bahasa Indonesia	√	√	√
9	Educational Profession	√	√	√
10	Biological Laboratory Techniques and Management	√	√	√
11	Learner Development	√	√	√
12	Plant Morphology	√	√	√
	Practicum in Plant Morphology	√	√	√
13	Animal Structure	√	√	√
	Animal Structure Practicum	√	√	√
14	Biochemistry	√	√	√
15	Learning and Learning	√	√	√
	SEM3			
1	Invertebrate Zoology	√	√	√

No.	MK	CPL - P		
		P1	P2	P3
	Practicum of Invertebrate Zoology	√	√	√
2	Plant Anatomy	√	√	√

No.	MK	CPL - P		
		P1	P2	P3
	Practicum in Plant Anatomy	√	√	√
3	Lower Plant Botany	√	√	√
	Low Plant Practicum	√	√	√
4	Animal Development	√	√	√
	Animal Development Practicum	√	√	√
5	Plant Ecology	√	√	√
	Practicum in Plant Ecology	√	√	√
6	Genetics	√	√	√
	Genetics Practicum	√	√	√
7	School Biology Curriculum Design and Development	√	√	√
8	Biology Learning Media and ICT	√	√	√
	SEM4			
1	Botany of Higher Plants	√	√	√
	Practicum in Higher Plant Botany	√	√	√
2	Vertebrate Zoology	√	√	√
	Practicum in Vertebrate Zoology	√	√	√
3	Plant Physiology	√	√	√
	Practicum in Plant Physiology	√	√	√
4	Animal Physiology	√	√	√
	Practicum in Animal Physiology	√	√	√
5	Biology Learning Evaluation	√	√	√
6	Animal Ecology	√	√	√
	Animal Ecology Practicum	√	√	√
7	Biology Learning Strategies	√	√	√
8	Cell Biology	√	√	√
	SEM5			
1	Philosophy of Education	√	√	√
2	Entrepreneurship	√	√	√
3	Biology Learning Innovation	√	√	√
4	Microbiology	√	√	√
	Microbiology Practicum	√	√	√
5	Educational Research Methodology	√	√	√
6	Human Anatomy and Physiology	√	√	√
	Human Anatomy and Physiology Practicum	√	√	√
7	Introduction to Biotechnology	√	√	√
8	Advanced School Science	√	√	√
9	Learning Theories	√	√	√
10	Mycology	√	√	√
11	Microtechnics	√	√	√
12	Learning Models	√	√	√
13	Teaching Material Development	√	√	√
14	School Biology Practicum	√	√	√
15	School-based Management	√	√	√
	SEM6			
1	Evolution	√	√	√
2	Molecular Genetics	√	√	√
3	Curriculum Review and Biology Lesson Planning	√	√	√
4	Nutrition and Health Sciences	√	√	√
5	Advanced Educational Research Methodology	√	√	√
6	Microteaching	√	√	√

No.	MK	CPL - P		
		P1	P2	P3
7	Biology Seminar	√	√	√
8	Development of Educational Research Instruments	√	√	√
9	Remedial Teaching	√	√	√
10	Plant Tissue Culture	√	√	√
11	Contextualised Teaching	√	√	√
12	Horticulture	√	√	√
13	Animal Behaviour	√	√	√
14	Circulatory Physiology	√	√	√
	SEM7			
1	PLP	√	√	√
2	Community Service	√	√	√
	SEM8			
1	Thesis	√	√	√

CPL-KK

No.	MK	CPL-KK		
		KK1	KK2	KK3
	SEM1			
1	Pancasila Education	√	√	√
2	English	√	√	√
3	Basic Biology	√	√	√
4	Basic Physics	√	√	√
5	Basic Maths	√	√	√
6	Basic Chemistry	√	√	√
7	Environmental Education	√	√	√
8	Basic Statistics	√	√	√
9	Introduction to Education	√	√	√
	SEM2			
1	Islamic Religious Education	√	√	√
2	Christian Religious Education	√	√	√
3	Catholic Religious Education	√	√	√
4	Hindu Religious Education	√	√	√
5	Buddhist Education	√	√	√
6	Confucian Religious Education	√	√	√
7	Civic Education	√	√	√
8	Bahasa Indonesia	√	√	√
9	Educational Profession	√	√	√
10	Biological Laboratory Techniques and Management	√	√	√
11	Learner Development	√	√	√
12	Plant Morphology	√	√	√
	Practicum in Plant Morphology	√	√	√
13	Animal Structure	√	√	√
	Animal Structure Practicum	√	√	√
14	Biochemistry	√	√	√
15	Learning and Learning	√	√	√
	SEM3			
1	Invertebrate Zoology	√	√	√
	Practicum of Invertebrate Zoology	√	√	√

No.	MK	CPL-KK		
		KK1	KK2	KK3
2	Plant Anatomy	√	√	√
	Practicum in Plant Anatomy	√	√	√
3	Lower Plant Botany	√	√	√
	Practicum of Lower Plant Botany	√	√	√
4	Animal Development	√	√	√
	Animal Development Practicum	√	√	√
5	Plant Ecology	√	√	√
	Practicum in Plant Ecology	√	√	√
6	Genetics	√	√	√
	Genetics Practicum	√	√	√
7	School Biology Curriculum Design and Development	√	√	√
8	Biology Learning Media and ICT	√	√	√
	SEM4			
1	Botany of Higher Plants	√	√	√
	Practicum in Higher Plant Botany	√	√	√
2	Vertebrate Zoology	√	√	√
	Practicum in Vertebrate Zoology	√	√	√
3	Plant Physiology	√	√	√
	Practicum in Plant Physiology	√	√	√
4	Animal Physiology	√	√	√
	Practicum in Animal Physiology	√	√	√
5	Biology Learning Evaluation	√	√	√
6	Animal Ecology	√	√	√
	Animal Ecology Practicum	√	√	√
7	Biology Learning Strategies	√	√	√
8	Cell Biology	√	√	√
	SEM5			
1	Philosophy of Education	√	√	√
2	Entrepreneurship	√	√	√
3	Biology Learning Innovation	√	√	√
4	Microbiology	√	√	√
	Microbiology Practicum	√	√	√
5	Educational Research Methodology	√	√	√
6	Human Anatomy and Physiology	√	√	√
	Human Anatomy and Physiology Practicum	√	√	√
7	Introduction to Biotechnology	√	√	√
8	Advanced School Science	√	√	√
9	Learning Theories	√	√	√
10	Mycology	√	√	√
11	Microtechnics	√	√	√
12	Learning Models	√	√	√
13	Teaching Material Development	√	√	√
14	School Biology Practicum	√	√	√
15	School-based Management	√	√	√
	SEM6			
1	Evolution	√	√	√
2	Molecular Genetics	√	√	√
3	Curriculum Review and Biology Lesson Planning	√	√	√
4	Nutrition and Health Sciences	√	√	√
5	Advanced Educational Research Methodology	√	√	√
6	Microteaching	√	√	√
7	Biology Seminar	√	√	√

No.	MK	CPL-KK		
		KK1	KK2	KK3
8	Development of Educational Research Instruments	√	√	√
9	Remedial Teaching	√	√	√
10	Plant Tissue Culture	√	√	√
11	Contextualised Teaching	√	√	√
12	Horticulture	√	√	√
13	Animal Behaviour	√	√	√
14	Circulatory Physiology	√	√	√
	SEM7			
1	PLP	√	√	√
2	Community Service	√	√	√
	SEM8			
1	Thesis	√	√	√

CPL-KU

No.	MK	CPL - KU		
		KU1	KU2	KU3
	SEM1			
1	Pancasila Education	√	√	√
2	English	√	√	√
3	Basic Biology	√	√	√
4	Basic Physics	√	√	√
5	Basic Maths	√	√	√
6	Basic Chemistry	√	√	√
7	Environmental Education	√	√	√
8	Basic Statistics	√	√	√
9	Introduction to Education	√	√	√
	SEM2			
1	Islamic Religious Education	√	√	√
2	Christian Religious Education	√	√	√
3	Catholic Religious Education	√	√	√
4	Hindu Religious Education	√	√	√
5	Buddhist Education	√	√	√
6	Confucian Religious Education	√	√	√
7	Civic Education	√	√	√
8	Bahasa Indonesia	√	√	√
9	Educational Profession	√	√	√
10	Biological Laboratory Techniques and Management	√	√	√
11	Learner Development	√	√	√
12	Plant Morphology	√	√	√
		√	√	√
13	Animal Structure	√	√	√
		√	√	√
14	Biochemistry	√	√	√
15	Learning and Learning	√	√	√
	SEM3			
1	Invertebrate Zoology	√	√	√
	Practicum of Invertebrate Zoology	√	√	√
2	Plant Anatomy	√	√	√
	Plant Anatomy Practicum	√	√	√
3	Lower Plant Botany	√	√	√

No.	MK	CPL - KU		
		KU1	KU2	KU3
	Practicum of Lower Plant Botany	√	√	√
4	Animal Development	√	√	√
	Animal Development Practicum	√	√	√
5	Plant Ecology	√	√	√
	Practicum in Plant Ecology	√	√	√
6	Genetics	√	√	√
	Genetics Practicum	√	√	√
7	School Biology Curriculum Design andDevelopment	√	√	√
8	Biology Learning Media and ICT	√	√	√
	SEM4			
1	Botany of Higher Plants	√	√	√
	Practicum in Higher Plant Botany	√	√	√
2	Vertebrate Zoology	√	√	√
	Practicum in Vertebrate Zoology	√	√	√
3	Plant Physiology	√	√	√
	Practicum in Plant Physiology	√	√	√
4	Animal Physiology	√	√	√
	Practicum in Animal Physiology	√	√	√
5	Biology Learning Evaluation	√	√	√
6	Animal Ecology	√	√	√
	Animal Ecology Practicum	√	√	√
7	Biology Learning Strategies	√	√	√
8	Cell Biology	√	√	√
	SEM5			
1	Philosophy of Education	√	√	√
2	Entrepreneurship	√	√	√
3	Biology Learning Innovation	√	√	√
5	Microbiology	√	√	√
	Microbiology Practicum	√	√	√
5	Educational Research Methodology	√	√	√
6	Human Anatomy and Physiology	√	√	√
	Human Anatomy and Physiology Practicum	√	√	√
7	Introduction to Biotechnology	√	√	√
8	Advanced School Science	√	√	√
9	Learning Theories	√	√	√
10	Mycology	√	√	√
11	Microtechnics	√	√	√
12	Learning Models	√	√	√
13	Teaching Material Development	√	√	√
14	School Biology Practicum	√	√	√
15	School-based Management	√	√	√
	SEM6			
1	Evolution	√	√	√
2	Molecular Genetics	√	√	√
3	Curriculum Review and Biology LessonPlanning	√	√	√
4	Nutrition and Health Sciences	√	√	√
5	Advanced Educational Research Methodology	√	√	√
6	Microteaching	√	√	√
7	Biology Seminar	√	√	√

No.	MK	CPL - KU		
		KU1	KU2	KU3
8	Development of Educational Research Instruments	√	√	√
9	Remedial Teaching	√	√	√
10	Plant Tissue Culture	√	√	√
11	Contextualised Teaching	√	√	√
12	Horticulture	√	√	√
13	Animal Behaviour	√	√	√
14	Circulatory Physiology	√	√	√
	SEM7			
1	PLP	√	√	√
2	Community Service	√	√	√
	SEM8			
1	Thesis	√	√	√

**) Use MS Excel if required

7.2 DETERMINATION OF SKS WEIGHT

Table 7. List of Courses, SLOs, Study Materials and Learning Materials

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
1	23X00C007	Pancasila Education	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material**: Social Nationality Value (BK2) **Learning Materials**: 1. Introduction to Pancasila Education 2. Pancasila in the flow of Indonesian history 3. Pancasila became the foundation of the Republic of Indonesia 4. Pancasila as State ideology 5. Pancasila is a system of philosophy	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				6. Pancasila into an ethical system 7. Pancasila is the basic value of science development			
				Estimated time (hours)	**90,56**	-	
				Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK			**3 ECTS**
2	23A41C101	English	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material**: Communication and Scientific Applications (BK14) **Learning Materials:** 1. *The basic parts of speech include: noun, pronoun, verb, adjective, adverb, preposition and* article. 2. Noun, verb, adjective and adverb 3. Tenses, structure and how to use them: 4. Present tense, past tense, future tense, present perfect tense, present continues tense, past perfect, past continues etc. 5. Use of Idioms, Subject and verb agreement. 6. Paralellesims, Gurend and to infinitive.	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				7. Sentence types: simple sentences, compound sentences, complex and compound-complex sentences. 8. Dependent and Independent clauses. 9. Noun clauses, Adjective clauses and Adverb clauses. 10. Noun, adjective and adverb phrases 11. Academic Writing : Three parts of paragraph : Topic sentence, supporting tenses and conclution 12. An Essay : introductory paragraph, body paragraph and concluding paragraph			
				Estimated time (hours)	**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
3	23A41C102	Basic Biology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Study Material:** Fundamentals of Plumbing (BK13) **Learning Materials:** 1. Biology as a science (scientific method, theory of	**90,56**	**45,28**	**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				origin of living things, scientific method) 2. Cell 3. Animal body organisation 4. Plant Body Organisation 5. Reproduction in Living Things 6. Metabolism 7. Inheritance of Traits 8. Biotechnology 9. Evolution 10. Interaction of Living Things with their Environment			
				Estimated time (hours)	**90,56**	**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
4	23A41C103	Basic Physics	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Fundamentals of Plumbing (BK13) **Learning Materials**: 1. Measurement, magnitude and units 2. Motion in one dimension 3. Motion in two dimensions 4. Dynamics 5. Effort and Energy 6. Linear momentum and collisions 7. Rotational Motion	**90,56**	**45,28**	**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				8. Balance 9. Gravity 10. Fluid Mechanics 11. Vibrations and Waves 12. Sound 13. Optics 14. Hot			
	Estimated time (hours)						
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
5	23A41C104	Basic Maths	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Fundamentals of Plumbing (BK13) **Learning Materials:** 1. Real Number System 2. Limits and continuity 3. Derivatives 4. Derivative Applications	**135, 84**	-	**4.5 ECTS**
	Estimated time (hours)				**135,84**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
6	23A41C105	Basic Chemistry	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Fundamentals of Plumbing (BK13) **Learning Materials** **Study Material:**	**90,56**	**45,28**	**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Fundamentals of Plumbing, Basic Concepts of Chemistry **Learning Materials:** 1. Atomic Structure 2. Periodic System 3. Molecular Structure 4. Stoichiometry 5. Solution 6. Chemical Energetics 7. Electrochemistry			
	Estimated time (hours)				**90,56**	**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
7	23A41C106	Environmental Education	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Fundamentals of Plumbing (BK13) **Learning Materials:** 1.Ecology 2.Pollution 3.Living environment 4.Components of the environment (Abiotic and biotic)	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
8	23A41C107	Basic Statistics	Attitude (S) S1, S2, S3	**Study Material:** Basic Statistical Concepts and Applications	**90,56**		**3 ECTS**

			General Skills (KU): KU1,KU2, KU3				
			Special Skills (KK) : KK1, KK2, KK3				
			Knowledge Mastery (PP): PP1,PP2,PP3				

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				Learning Materials: 1. Introduction to Probability Theory 2. Opportunity Spread 3. Data Preparation and Presentation 4. Symptom Centre Size 5. Location Size 6. Size of Spread 7. Slope and Convexity Measures 8. Distribution of Sampling 9. Hypothesis Testing 10. Parameter Estimation			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
9	23X00C009	Bahasa Indonesia	Attitude (S) S1, S2, S3	**Study Material**: Communication and Scientific Applications (BK14)	**90,56**		**3 ECTS**

			General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. Indonesian language and personality development 2. History, position, and function of the Indonesian language 3. Indonesian language and the scientific variety			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				4. Utilisation of scientific writing materials 5. Critical reading for writing 6. Writing techniques for scientific papers, writing materials, theoretical studies, and their application to journal articles 7. Academic writing 8. Scientific presentation 9. Speech			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
10	23X00C001 23X00C002 23X00C003 23X00C004 23X00C005 23X00C006	Islamic Religious Education Christian Religious Education Catholic Religious Education Hindu Religious Education Buddhist Education Confucian Religious Education	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Spiritual and Social Attitudes (BK1) Learning Materials: 1. How to Study Islam in Higher Education. 2. How Humans Are Godly. 3. How to Integrate Faith, Islam, and Ihsan in Forming Insan Kamil. 4. How to Build a Qur'anic Paradigm for Modern Life. 5. How to Ground Islam in Indonesia.	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				6. How Islam Builds Unity in Diversity. 7. How Islam Faces the Challenge of Modernisation. 8. How Islam Contributed to the Development of World Civilisation. 9. How to Develop Islamic Culture Through Campus Mosques			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
11	23X00C008	Civic Education	ATTITUDE (S) S1, S2, S3 GENERAL SKILLS (KU) SPECIAL SKILLS (KK) KNOWLEDGE MASTERY (PP)	**Study Material:** Social Nationality Value (BK2) **Learning Materials:** 1. Pancasila as the orientation of civic education 2. National identity 3. Understanding of citizens, nation, state, rights and obligations of citizens. 4. Understanding of the state constitution 5. Understanding of democracy and human rights. 6. Insight into the archipelago 7. National resilience	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				8. Diversity of Indonesian society			
	Estimated time (hours)					**90,56**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
12	23X00C014	Educational Profession	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Fundamentals of Education (BK11) **Learning Materials:** 1. The teaching profession in student development 2. Teacher personality competence 3. Teacher social competence 4. Teacher professional competence 5. Teacher pedagogical competence 6. The various roles of teachers in learning 7. The teacher's role in guidance and counselling 8. Stress management in learning 9. Teacher code of ethics and its application in various areas of teacher life 10. Reflection in tasks	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				11. Professional development through organisations			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
13	23A41C201	Laboratory Techniques and Management	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** 1. Basic tool management and specifications 2. Management of power tools 3. Work safety in the laboratory 4. Handling of experimental animals 5. Taxidermy 6. Wet preservation	**90,56**		**2SKS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
14	23X00C012	Learner Development	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Study Material:** Fundamentals of Education (BK11) **Learning Materials:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Knowledge Mastery (PP): PP1,PP2,PP3	1. Development in students, the process of student development, developmental factors and tasks and phases of student development 2. The relationship between education and learner development 3. Characteristics of child and adolescent development and their application in education 4. Individual differences that cause differences in learning processes and outcomes 5. Theories in Learning; 6. Definition of intelligences and how they are measured and the concept of multiple intelligences 7. The concept of giftedness, gifted children and their education 8. Learning difficulties; definition of learning difficulties, diagnosis and alternative solutions.			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				9. Learning for children with special needs 10. Classroom management 11. Evaluation of learning achievement			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
15	23X00C011	Introduction to Education	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Fundamentals of Education (BK11) **Learning Materials:** 1. Definition of Education, 2. Education science 3. foundations of lifelong education 4. Education for All 5. Education environment, 6. the relationship between education and development	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						
16	23A41C202	Plant Morphology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Study Material:** Structure and Development (BK8) **Learning Materials**	**90,56**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Knowledge Mastery (PP): PP1,PP2,PP3	1. Life forms and common forms of plants 2. Leaves 3. Trunk 4. Roots 5. Flowers 6. Fruit 7. Seeds			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**2 CREDITS**
17	23A41C203	Practicum in Plant Morphology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** 1. Schizophita 2. Cyanophyta 3. Thallophyta 4. Dynophyta 5. Fungi and Lichenes 6. Bryophyta 7. Pteridophyta		**45,28**	
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
18	23A41C204	Animal Structure	ATTITUDE (S)	**Study Material:**	**90,56**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Structure and Development (BK8) **Learning Materials:** 1. Introduction (Definition, branches of science and relationship with other sciences) 2. Cells, Epithelial Tissues, epithelial origin, properties and functions and classification of epithelium. 3. Tissue Tie 4. Muscle Tissue 5. Neural Networks 6. Integumentary System 7. Muscular System 8. Frame System 9. Digestive System 10. Respiratory System 11. Excretory System 12. Reproductive System 13. Circulatory System 14. Nervous System and Endocrine System			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
19	23A41C205		ATTITUDE (S)	**Learning Materials:**		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
		Animal Structure Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	1. Microscope Introduction 2. Occupational Safety 3. Epithelial Tissue 4. Tissue Tie 5. Muscle Tissue 6. Neural Networks 7. Body Structure of Goldfish 8. Frog Body Structure 9. Tortoise Body Structure 10. Pigeon Body Structure 11. Mammal Body Structure			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
20	23A41C206	Biochemistry	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Cell and Molecular Biology (BK3) **Learning Materials:** - Carbohydrates - Lipids - Nucleic acid - Protein - enzymes	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						
21		Learning and Learning	ATTITUDE (S)		**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	23X00C013		Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** 1. The nature of learning and learning 2. Learning Theory 3. classroom management in biology learning 4. competencies and attitudes that teachers must have 5. Approaches to Science Learning 6. Families of learning models 7. Learning Models 8. Learning Methods 9. Basic Teaching Skills			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**2SKS**
22	23A41C301	Invertebrate Zoology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Biosystematics and Evolution (BK9)	**90,56**	**45,28**	**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Learning Materials: 1. Basis of classification according to Zoologists 2. Position of animal classification 3. Classification of the animal world 4. Characteristics, anatomy and physiology of the phylum Protozoa 5. Characteristics, anatomy and physiology of the phylum Porifera 6. Characteristics, anatomy and physiology of the phylum Coelentrata 7. Characteristics, anatomy and physiology of the phylum Platyhelminthes 8. Characteristics, anatomy and physiology of the phylum Nemathelminthes 9. Characteristics, anatomy and physiology of the phylum Annelida 10. Characteristics, anatomy and physiology of the phylum Mollusca			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				11. Characteristics, anatomy and physiology of the phylum Echinodermata 12. Characteristics, anatomy and physiology of the phylum Artophoda			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3SKS**
23	23A41C302	Practicum of Invertebrate Zoology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** 1. Protozoa 2. Porifera 3. Coelenterata 4. Platyhelminthes 5. Nemathelminthes 6. Annelida 7. Mollusca 8. Echinodermata 9. Arthropods		**45,28**	
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
24	23A41C303	Plant Anatomy	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Structure and Development (BK8) **Learning Materials:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	1. Plant Cells 2. Meristem tissue 3. Parenchyma and collenchyma tissues 4. Scelerenchyma Tissue 5. Epadaermis tissue and its derivatives 6. Primary xylem and secondary xylem tissues 7. Variations in wood structure, cambium and vessels 8. Phloem Network 9. Periderm tissue 10. Secretion structure 11. Root development and anatomy: 12. Trunk development and anatomy 13. Leaf development and anatomy			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**2 CREDITS**
	23A41C304	Practicum in Plant Anatomy	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Learning Materials:** 1. Cell 2. Network		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	3. Roots 4. Trunk 5. Leaves 6. Flowers 7. Fruit			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
25	23A41C305	Lower Plant Botany	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biosystematics and Evolution (BK9) **Learning Materials:** 1. Classification and Taxonomy of the Cyanophyta division 2. Classification and Taxonomy of the Glaucophyta and Rhodophyta divisions 3. Classification and Taxonomy of the Cryptophyta division 4. Classification and Taxonomy of the Haptophyta and Dinophyta divisions 5. Classification and Taxonomy of the Zygomycota and Ascomycota divisions 6. Classification and Taxonomy of the Basidiomicota and	**90,56**		**2 CREDITS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				Deutromycota and Chytridiomycota divisions 7. Classification and Taxonomy of the Lichenes division 8. Classification and Taxonomy of the Bryophyta division 9. Classification and Taxonomy of the Anthocerothopsida and Bryopsida divisions 10. Classification and Taxonomy of the Pteridophyta division 11. Classification and Taxonomy of heterospore spikes 12.			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**2 CREDITS**
26	23A41C306	Low Plant Botany Practicum	ATTITUDE (S) S1, GENERAL SKILLS (KU) **KU1,** SPECIAL SKILLS (KK) **KK1,** KNOWLEDGE MASTERY (PP) **PP1**	Study Material: 1. Vegetative organs of plants (sprouts) 2. Organ nutritivum (Parts and accessory organs of the leaf) 3. Organ Nutritivum Part II (Petiole Morphology)		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				4. Organ Nutritivum Part III (Leaf Building) 5. Organ Nutritivum Part IV (Leaf Apex and Basal) 6. Organ Nutritivum Part V (Nervatio and Margofolii) 7. Organ Nutritivum Part VI (Folium Compositum) 8. Organ Nutritivum Part VII (Phyllotaxis Folii) 9. Caulis 10. Radix 11. Leaf, Stem and Root Modification 12. Organ Reproductivum I (Number layout, and flower parts) 13. Organ Reproductivum II (Tungal, compound, and formula flowers)			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				14. Organ Reproductivum III (Fructus)			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
27	23A41C307	Animal Development	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Structure and Development (BK8) **Learning Materials:** 1. Scope of animal development and developmental theories 2. Gametogenesis 3. Fertilisation 4. Segmentation and Blastulation 5. Gastrulation 6. Organogenesis 7. Embryonic and placental membranes 8. Larval form and metamorphosis 9. Regeneration 10. Developmental principles 11. Developmental Abnormalities	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
28	23A41C308		ATTITUDE (S)	**Learning Materials:**		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
		Animal Development Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	1. Reproductive cycle 2. Reproductive system 3. Gametogenesis 4. Sex cell observation 5. Induction of ovulation in frogs 6. Fertilisation 7. Embryonic development in frogs 8. Embryo development in chickens 9. Reproduction and embryonic development of mice 10. Metamorphosis 11. Regeneration 12. Drug administration to test animals			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
29	23A41C309	Plant Ecology	ATTITUDE (S)	**Field of Study:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Ecology and Conservation (BK5) **Learning Materials:** 1. Plant ecology concepts and approaches 2. Abiotic environments and their effects on plant distribution and abundance 3. Plant species and complex environments 4. Plant population 5. Plant Community 6. Biotic interactions in plant communities 7. Community productivity 8. Types of ecosystems in Indonesia 9. Vegetation analysis method			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
30	23A41C310	Practicum in Plant Ecology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Learning Materials:** 1. Plant ecology concepts and approaches 2. Abiotic environments and their effects on plant distribution and abundance 3. Plant species and complex environments		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Knowledge Mastery (PP): PP1,PP2,PP3				
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
31	23A41C311	Genetics	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Genetics (BK7) **Learning Materials:** 1. History of the Development of Genetics 2. Genetic material 3. Mendel's concept of trait inheritance 4. Deviations from Mendel's Law 5. Multiple Alleles 6. Gender Determination 7. Linking and Crosswalking 8. Recommendation 9. Population genetics 10. Double Gene 11. Basic Genetic Engineering	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
32	23A41C312	Genetics Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Learning Materials:**		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	1. Fruit fly (Drosophila melanogaster) rearing medium 2. Life cycle observations of Drosophila melanogaster 3. Drosophila melanogaster crosses 4. Mendel's law pseudo-violation 5. Effect of UV radiation on yeast growth 6. The role of sex-influenced genes 7. Double allele 8. Chromosome staining 9. DNA isolation 10. DNA Electrophoresis			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
33	23A41C313	School Biology Curriculum Design and Development	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Biology Education Professional Expertise (BK12) **Learning Materials:** 1. The nature of the curriculum and the curriculum that has been used in Indonesia. 2. Paper writing rules (attached in the assignment details). *3.* Curriculum Linkage with Learning which includes: ideal curriculum, actual curriculum, and *hidden* curriculum. 4. The nature, foundations, and principles, as well as the role of teachers in curriculum development 5. Curriculum design includes: discipline-orientated, community-orientated, student-orientated, and technological curriculum design. 6. Curriculum Development Approaches include: Top Down and Grass Roots Approaches.			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				7. Curriculum Development Models include: Tyler Model, Taba Model, Oliva Model, Bwauchamp Model, Weheeler Model, Nicholls Model, and Dynamic Skilbeck Model. 8. Development of Curriculum Objectives and Content 9. Key learning approaches and steps, and syllabus development			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
34	23A41C314	Biology Learning Media and ICT	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12). **Learning Materials:** 1. The Nature and Position of Learning Media 2. Functions, Taxonomy and Media Characteristics 3. Media Selection and Utilisation 4. Learning Media Development	**135,84**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				5. Designing Conventional Media 6. Designing Environmental Media 7. Designing ICT-based Media 8. Media Usage Technique 9. Evaluation of Biology Media and Learning Resources			
	Estimated time (hours)				**135,84**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
35	23A41C401	Botany of Higher Plants	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biosystematics and Evolution (BK9) **Learning Materials:** 1. Fundamentals of Plant Taxonomy 2. Divisiono Pinophyta (Gymnospermae) 3. Divisiono Magnoliopsida (Angiosperms) 4. Classis Magnoliopsida (Dicotyledonae) 5. Classis Liliopsida (Monocotyledonae) and its role for humans 6. Plant Collection	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				7. Identification Key			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
36	23A41C402	Practicum in Higher Plant Botany	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** 1. Cycadaceae, Pinaceae, Gnetaceae 2. Magnolidae, Hamamelidae 3. Caryophillidae, Dillenidae 4. Caryophillidae, Dillenidae 5. Rosales, Fabales 6. Myrtales, Lythrales, Santales, Euphorbiales 7. Sapindales, Geraniales, Apiales 8. Gentianales, Solanales 9. Lamiales, Scrophulariales, Asterales 10. Hydrocharitales, Arecales, Pandanales, Arales, Cyperales, Commenlinales 11. Bromeliales, Zingiberales, Liliales, Orchidées		**45,28**	
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
37	23A41C403	Vertebrate Zoology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Biosystematics and Evolution (BK9)	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. History and Development of Zoology 2. Phylum Chordata 3. Chonrichtyes and Ostichtyes Classes of the Pisces Superclass 4. Classes of Amphibia and Reptiles in the Super Class Tetrapods 5. Class Aves 6. Mammal Class 7. Reviewing Zoology-Based Research Articles			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
38	23A41C404	Vertebrate Zoology Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. Pisces 2. Amphibians 3. Reptiles 4. Aves 5. Mammals		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			PP1				
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
39	23A41C405	Plant Physiology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Physiology (BK6) **Learning Materials:** 1. Introduction 2. Plant and Water Relationship 3. Soil and Plant Nutrition 4. Photosynthesis 5. Metabolism of Nitrogen, Sulphur and Phosphorus 6. Plant Respiration 7. Plant Growth and Development 8. Plant Hormones 9. Seed Physiology 10. Motion in Plants 11. Dormancy and Ageing 12. Photopriodism and Vernalisation	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**	**45,28**	
	81obo tsks ((total estimated time) x 1 credit / (2.83 hours/mg x 16 mg) MK						**3SKS**
40	23A41C406		ATTITUDE (S)	**Learning Materials:**		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
		Practicum in Plant Physiology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	1. The relationship between plants and water 2. Soil and plant nutrition 3. Photosynthesis 4. Respration in plants 5. Plant growth 6. Plant Hormones 7. Plant motion 8. Seed Physiology			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
41	23A41C407	Animal Physiology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Physiology (BK6) **Learning Materials:** 1. Animal Physiology and Homoestatic Concepts 2. Nervous system 1 and 2 3. Sensory system 4. Hormone system 5. Motion system 6. Respiration system 7. Excretory System 8. Digestive system 9. Reproductive system 10. Circulation system 11. Osmoregulation 12. Thermoregulation	**90,56**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	Estimated time (hours)				**90,56**	**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3SKS**
42	23A41C408	Practicum in Animal Physiology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. Cell homeostasis 2. Blood 3. Nerve 4. Sensory Apparatus 5. Digestive System 6. Protein Digestion 7. Respiration 8. Urinalis		**45,28**	
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
43	23A41C409	Cell Biology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Study Material:** Cell and Molecular Biology (BK3) **Learning Materials:** 1. Developmental Cell Biology, Chemical Composition of Cells, Cell Walls 2. Cell Membrane 3. Endoplasmic Reticulum	**135,84**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Knowledge Mastery (PP): PP1,PP2,PP3	4. Golgi body 5. Lysosomes 6. Microbodies, 7. Mitochondria 8. Chloroplasts 9. Cytoskeleton and Cytosol, 10. Nucleus and Ribosomes. 11. Cell cycle, 12. Basic Genetic Mechanisms, 13. Analytical Techniques for Studying Cells			
	Estimated time (hours)				**135,84**		**4.5 ECTS**
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						
44	23A41C410	Animal Ecology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Field of Study**: Ecology and Conservation (BK5) Learning Materials: 1. Introduction to Animal Ecology 2. Animals and their Environment 3. Life history patterns 4. Population 5. Life Table 6. Intraspecific Population Regulation 7. Interspecific Competition	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				8. Predation 9. Herbivory 10. Mutualism 11. Parasites 12. Animal Defence Systems in Ecological interactions 13. Sampling methods in animal ecology			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
45	23A41C411	Animal Ecology Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. Ecology Practicum Safety Procedures 2. Introduction to Field Abiotic Measurement Tools 3. Taxis Movement in Animals 4. Preference for Ambient Temperature 5. Day Degree 6. Activity and Daily Circulation Distance of Snails 7. Living Table (Drosophila Melanogaster) 8. Estimation of Simulated Animal Population Abundance CMRR (Capture-		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				Mark-Release-Recapture) Method **9.** Estimation of Population Abundance			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
46	23A41C412	Biology Learning Strategies	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** A review of classroom management, competencies and attitudes that must be possessed by teachers, various approaches in biology learning, various methods in biology learning, various cooperative learning models. Simulation of approaches, methods and learning models that are in accordance with the biology material contained in the junior and senior high school curriculum	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
47	23A41C413	Biology Learning Evaluation	Attitude (S) S1, S2, S3	**Study Material:**	**135,84**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Biology Education Professional Expertise (BK12) **Learning Materials:** 1. Basic concepts of evaluation and legal basis of educational evaluation 2. Basic principles and reference for assessment 3. Aspects of cognitive, psychomotor and affective assessment 4. Indicators and learning objectives 5. Question writing rules 6. Instrument preparation of assessment grids in learning 7. Formulation of learning outcome tests 8. HOTS-orientated questions 9. Item quality analysis 10. Authentic Assessment 11. Affective Assessment 12. Psychomotor Assessment 13. Analyse test results			
	Estimated time (hours)				**135,84**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
48			ATTITUDE (S)	**Study Material:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	23A41C501	Philosophy of Education	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Fundamentals of Education (BK11) **Learning Materials:** 1. Introduction to Philosophy of Education Lectures 2. The existence and nature of human beings as natural and social beings 3. The meaning of philosophy and the meaning of education 4. Philosophical approaches in education 5. Knowledge and value theory 6. Views of educational philosophy schools 7. Problems of education 8. Conceptions of future Indonesian education 9. Curriculum 2313			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
49	23A41C502	Biology Learning Innovation	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	1. Basic concepts of educational innovation and the process of educational innovation 2. Education Innovation Strategy 3. Curriculum Innovation 4. Learning Innovation 5. Assessment Innovation 6. Taxonomy of learning *7. Bridging Education*			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
50	21A41C503	Microbiology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Microbiology (BK4) Learning Materials: 1. Definition and role of Microbiology 2. Virus 3. Bacteria, and Archae 4. Actinomycetes 5. Fungi 6. Cyanobacteria 7. Protozoa 8. Microbial cultivation 9. Microbial metabolism 10. Microbial growth 11. Microbial systematics	**90,56**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				Microbiological Methods			
	Estimated time (hours)				**90,56**		**3SKS**
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						
51	23A41C504	Microbiology Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. Laboratory Equipment 2. Sterilisation of tools and materials 3. Medium preparation 4. Microbial isolation 5. Microbial painting and morphology 6. Qualitative and quantitative analysis of microbes 7. The influence of environmental factors on microbial growth 8. Microbial biochemical activity			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
52	23A41C505	Educational Research Methodology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Field of Study:** Biology Education Professional Expertise (BK12) Learning Materials: 1. Basic concepts of research	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Knowledge Mastery (PP): PP1,PP2,PP3 ,	2. The scope of educational research 3. types of research 4. experiment design 5. research population and sample 6. problem formulation and research objectives 7. conceptual framework, research variables 8. research hypothesis 9. Determination of materials and methods 10. formulation of conclusions and suggestions research report			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
53	23A41C506	Human Anatomy and Physiology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Physiology (BK6) **Learning Materials:** 1. Definition of anatomy and physiology 2. The body as a system: Cells, Tissues, Organs	**90,56**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				3. Anatomy Terms and Directions 4. Homeostasis 5. Integumentary System 6. Frame System 7. Muscular System 8. Nervous System 9. Sensory System 10. Endocrine System 11. Cardio-vascular system 12. Digestive System 13. Respiration System 14. Excretory System 15. Immune System 16. Reproductive System 17. Respectively on the Structure; Function; and Disorders/Diseases of each organ system			
	Estimated time (hours)				**90,56**	**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
54	23A41C507	Human Anatomy and Physiology Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Learning Materials:** 1. Anatomical posture 2. Frame		**45,28**	

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Knowledge Mastery (PP): PP1,PP2,PP3	3. Muscles and joints 4. Reflex movement 5. Colour blindness 6. Type and blood glucose 7. Sarah's arterial pressure 8. Lung volume and capacity 9. 9.Food Test 10. 10.Kidney Function Test			
	Estimated time (hours)					**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**1 CREDIT**
55	23A41C508	Introduction to Biotechnology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Genetics (BK7) **Learning Materials:** 1. Definition of biotechnology, 2. Branches of biotechnology, 3. The three main components of biotechnology. 4. how biotechnology relates to world development	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
56	23X00C010	Entrepreneurship	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Entrepreneurship (BK10) **Learning Materials:** 1. Becoming an entrepreneur 2. Entrepreneurial Character 3. Business Plan 4. Production and Technology 5. *Branding* 6. Marketing 7. Financial Management 8. Human Resources 9. Business Plan Planning	**135,84**		**4.5 ECTS**
	Estimated time (hours)				**135,84**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
57	23A41C509	Advanced School Science	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** 1. Science Objects and Observations 2. Object Classification 3. Energy in Living Systems 4. Motion of Objects 5. Simple Aircraft 6. Additives and Addictive Substances	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				7. Optical tools 8. The Solar System and Life on Earth 9. Population and Environment 10. Global warming 11. Particles that make up inanimate and living things 12. Concept of Static Electricity 13. Dynamic Electricity Concept 14. Magnetism 15. Eco-friendly Technology 16. Soil and Survival			
	Estimated time (hours)				**90,56**		
	95obo tsks ((total estimated time) x 1 credit / (2.83 hours/mg x 16 mg) MK						**3 ECTS**
58	23A41C510	Learning Theories	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Fundamentals of Education (BK11) **Learning Materials:** 1. The Nature of Learning 2. Principles and Factors Affecting Learning 3. Learning Motivation 4. Behaviourism Learning Theory 5. Cognitivism Learning Theory 6. Constructivism Learning Theory	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				7. Humanist Learning Theory			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
59	23A41C511	Mycology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Microbiology (BK4) **Learning Materials:** 1. Definition and position of fungi 2. Morphology and structure of fungi 3. Growth and development of fungi 4. Fungal systematics 5. Association of fungi with plants 6. Isolation of fungi (endophytes and non-endophytes) 7. Identification and characterisation of fungi 8. Fungal cultivation method for cultivation 9. Fungal biotechnology	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
60	23A41C601	Evolution	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biosystematics and Evolution (BK9) **Learning Materials:** 1. History of evolutionary theory 2. Emergence and extinction 3. Biogeography 4. Origin of prokaryotic emergence 5. Origin of eukaryotic emergence 6. Evidence for evolution and examples of evidence for evolution 7. Origins of diversity 8. Natural selection and adaptation 9. Phylogeny 10. Origin of plant groups 11. Origin of animal groups	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
61	23A41C602	Molecular Genetics	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Cell and Molecular Biology (BK3)	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. Structure and function of DNA, RNA 2. DNA replication in prokaryotes 3. DNA replication in eukarito 4. Transcription in prokaryotes 5. Transcription in eukaryotes 6. Translation in prokaryotes 7. Translation in eukaryotes 8. Regulation of gene expression in prokaryotes 9. Regulation of eukaryotic gene expression			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
62	23A41C603	Curriculum Review and Biology Lesson Planning	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** 1. Science and Biology Curriculum 2013 2. education calendar 3. effective week time	**135,84**		**4.5 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				4. how to prepare annual and semester programmes based on effective week time 5. instructional design and design models 6. preparation of learning tools by referring to one of the instructional models or designs which include silbus, lesson plans, teaching materials, LKPD, media, and assessments.			
	Estimated time (hours)				**135,84**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**4.5 ECTS**
63	23A41C604	Nutrition and Health Sciences	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Physiology (BK6) **Learning Materials**: 1. Basic definitions and terms of nutrition and health. 2. The relationship between nutrition and health. 3. The relationship between nutrition and body processes.	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				4. History of nutrition science and current development of nutrition science. 5. Key Nutrition Issues 6. Foodstuffs and Nutrients: 7. Macronutrients: Carbohydrate, Protein and Fat 8. Micronutrients: Vitamins, Minerals, Water. Each on its Type, Function, and mechanism 9. Malnutrition: Deficiency and Excess 10. Degenerative diseases: Diabetes mellitus, Cardiorespiratory disease 11. Food Security and Safety 12. Lifecycle Nutrition 13. Balanced Nutrition 14. Determination of Nutritional Status 15. Calorie and food requirements			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
64	23A41C605	Advanced Educational Research Methodology	Attitude (S) S1, S2, S3	**Study Material:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Biology Education Professional Expertise (BK12) **Learning Materials:** 1. Introduction to PTK (PTK in education, Definition of PTK, Importance of PTK for teachers), 2. Purpose and Benefits of PTK 3. Characteristics and principles of PTK 4. Pros and Cons of PTK 5. Stages and Models of PTK 6. Steps of PTK 7. Introduction to R&D (Brief history of R&D, Definition of R&D) 8. R&D in education 9. R&D Model and Stages 10. Instructional development design used in R & D (4 D, Dick and Carey, ADDIE) 11. Data Processing Research Proposal Development			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
65	23A41C606	Microteaching	Attitude (S) S1, S2, S3	**Study Material:**		**90,56**	**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Biology Education Professional Expertise (BK12) **Learning Materials:** - Basic Teaching Skills include: 1) Opening Lesson Skills; 2) Classroom Management Skills; 3) Questioning Skills; 4) Reinforcement Skills; 5) Lesson Explanation Skills; 6) Variation Skills; 7) Individual Teaching Skills; 9) Lesson Closing Skills. Skills for Guiding Small Group Discussions; 8) Individual Teaching Skills; 9) Skills for Closing Lessons. - Learning tools: syllabus, lesson plans, LKPADA, subject matter analysis, conventional and modern learning media, and assessment tools) for microteaching implementation. - Practice practising the lesson plans that students have made by simulating teaching in small classes using appropriate approaches, models, methods,			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				and media to teach certain topics in Science (SMP) and or Biology (SMA) subjects and evaluating students. - Reflect on the exercise of implementing learning tools in microtech.			
	Estimated time (hours)					**90,56**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
66	23A41C607	Biology Seminar	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Communication and Scientific Applications (BK14) **Learning Materials:** 1. Scientific paper 2. Criteria for scientific papers 3. Types of scientific papers 4. Systematics/Writing Framework 5. Presetation Technique	**45,28**	**45,28**	**3 ECTS**
	Estimated time (hours)				**45,28**	**45,28**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
67	23A41C608	Development of Educational Research Instruments	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Procedure for developing educational research instruments Learning Materials: 1. Research Variables 2. Research Data 3. Research data collection 4. Test instrument 5. Non-test instrument 6. Instrument Validity and Reliability 7. Analysis of validity and reliability of instruments 8. Proposal Preparation			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
68	23A41C609	Remedial Teaching	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** Introduction 1. The nature of teaching and learning 2. Learning issues 3. Learning Completed	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				4. Learning Evaluation and Assessment 5. Diagnosing learning difficulties 6. The nature of remedial teaching 7. Characteristics of remedial teaching Functions and objectives of remedial teaching 8. Principles of remedial teaching 9. Remedial Teaching Techniques and Methods 10. Implementation of Remedial Teaching 11. Procedures for remedial teaching and timing of remedial teaching 12. Evaluation of remedial teaching			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
69	23A41C610	Plant Tissue Culture	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3	**Study Material:** Communication and Scientific Applications (BK14)	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials:** 1. Plant tissue culture concepts and approaches 2. Types of explants, plant nutrition 3. laboratory equipment 4. Main types of medium in tissue culture 5. Compound chemistry of some plant nutrients, 6. Concentration and dilution of solutions, 7. Meristem culture, axillary bud proliferation, adventitious shoot induction, organogenesis, somatic embryogenesis 8. Auxin, gibberillin and cytokinin, Sterilisation of tools and materials, 9. Explant sterilisation, explant isolation, incubation, 10. Explant selection, explant sterilisation, temperature, light, humidity, hygiene,skills, 11. Acclimatisation procedure, room temperature, light,			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				12. Browning, necrosis, somaclone diversity, 13. shoot application, lettuce cotyledons, cocoa embryos, patchouli callus, cauliflower, carrot vascular tissue, banana shoots			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
70	23A41C611	Contextualised Teaching	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** 1. Contextual Teaching and Learning (CTL) Learning 2. Contextual Approach 3. Constructivist Learning 4. Forms of Contextual Learning 5. Active Learning 6. Implementation of Contextualised Learning 7. Intellectualised Learning Assessment	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
71		Horticulture	ATTITUDE (S)	Study Material:	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	23A41C612		Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Communication and Scholarly Applications Learning Materials: 1. Meaning, concept and scope of horticulture 2. Hybridroponic plant needs 3. Cultivation and post-harvest handling of ornamental plants 4. Grafting, cuttings and pollination techniques 5. Bottle orchid acclimatisation 6. Vegetable cultivation and post-harvest aspects of vegetables 7. Fruit crop production and harvesting process 8. Plant requirements for landscaping 9. The ins and outs of organic farming			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
72	23A41C512	Microtechnics	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Entrepreneurship (BK10) **Learning Materials:** 1. Methods of preparation.	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	2. Basic principles of fixation, dehydration and purification in animals and plants 3. Basic Techniques of Using a Microtome 4. Basic principles and applications of the109 araffin method in animals and plants 5. Basic principles of infiltration, embedding, cutting and sticking 6. basic principles of colouring methods			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
73	23A41C513	Learning Models	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise **Learning Materials:** 1. Basic Concepts of Learning Models.Concepts. 2. Basic learning design models.	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				3. Direct Teaching Model, 4) Co-operative Learning Model, 4. Inquiry Learning Model, 5. Discovery Learning Model, 6. Problem-Based Learning Model, 7. Project Based Learning Model, 8. WEB-based Learning Model (*E-learning*), 9. Web-based Learning Model (*E-Learning*), 10. *Blended Learning*, 12) Classification of *Blended Learning*, 11. *Blended Learning* models and sub-models, and, 12. Developing a *Blended Learning* model with Learning Models in Curriculum 2013 (revised 2017)			
	Estimated time (hours)				**90,56**		
	110tsks weight ((total estimated Time) x 1 credit / (2.83 hours/mg x 16 mg) MK						**3 ECTS**
74	23A41C514	Teaching Material Development	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3	**Study Material:** Biology Education Professional Expertise (BK12)	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
			Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Learning Materials**: 1. Learning Paradigms in Formal Education 2. Learning Resources 3. Development Models 4. Teaching Material Preparation Techniques 5. Teaching Material Development 6. Evaluation of Teaching Materials			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
75	23A41C515	School Biology Practicum	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** Adjusting Biology Practicum Materials at the High School and Junior High School Level in accordance with the applicable curriculum	**90,56**		**3 ECTS**
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
76			ATTITUDE (S)		**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	23A41C516	School-based Management	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Biology Education Professional Expertise (BK12) **Learning Materials:** 1. Basic concepts of school management. 2. pillars and steps of the school-based management process 3. the juridical basis of school-based management 4. the nature of school management. 5. school as a social system. 6. school effectiveness. 7. school component management and local wisdom. 8. communication in school management. 9. the role of teachers in school management 10. the role of teachers in school-based management.			
	Estimated time (hours)				**90,56**		
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**3 ECTS**
77		Animal Behaviour	ATTITUDE (S)	**Study Material:**	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	23A41C613		Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	Biosystematics and Evolution (BK9) **Learning Materials:** 1. Animal Behaviour and Animal Behaviour Assessment Approaches 2. Behavioural phenomenon observation method 3. Genetic factors, Physical and physiological maturity.Environment 4. Innate behaviour patterns; taxis, reflexes and instincts 5. Learning behaviour patterns: "trial and error", imitation, "reasoning" 6. Adaptation Behaviour in Groups; Ingestive,113 obo tsks, epimeletic -Et - Epimeletic Eliminative, allelomimetic, Investigative , sexual, and shelter and refuge places 7. Types of animal biorhythms 8. Principles of animal communication Patterns of animal communication.			

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				9. Animal orientation patterns and types of animal navigation 10. animal migration patterns and114 obo ts that influence animal migration 11. Social Behaviour, Navigation 12. Patterns of social behaviour 13. Plan, conduct and report research results			
	Estimated time (hours)				**90,56**		
	114obo tsks ((total estimated time) x 1 credit / (2.83 hours/mg x 16 mg) MK						**3 ECTS**
78	23A41C614	Circulatory Physiology	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Physiology (BK6) **Learning Materials** 1. Heart Structure and Function 2. Homeostasis 3. Heart cycle 4. Cardiac Excitation and Conduction: Cardiac conducting system, thoracic sinus reflexes	**90,56**		**3 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
				5. Cardiodynamics: Blood pressure, measurement, gravity, regulation 6. Haemodynamics: Composition and function of blood; Stem cells, Factors affecting the flow equation 7. Electrocardiograph 8. Cardiovascular disorders and diseases			
	Estimated time (hours)				**90,56**		
	115obo tsks ((total estimated time) x 1 credit / (2.83 hours/mg x 16 mg) MK						**3 ECTS**
79	23A41C701	PLP	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Communication and Scientific Applications (BK14) Conduct practical activities at formal educational institutions.		**181,12**	**6 ECTS**
	Estimated time (hours)					**181,12**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**6 ECTS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
80	23A41C702	Real Work Lecture	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Communication and Scientific Applications (BK14) **Learning Materials:** Application of theory, skills, attitudes in community service activities in the context of community life.		**181,12**	**6 ECTS**
	Estimated time (hours)					**181,12**	
	116obo tsks ((total estimated time) x 1 credit / (2.83 hours/mg x 16 mg) MK						**6 ECTS**
81	Thesis	Thesis	Attitude (S) S1, S2, S3 General Skills (KU): KU1,KU2, KU3 Special Skills (KK) : KK1, KK2, KK3 Knowledge Mastery (PP): PP1,PP2,PP3	**Study Material:** Communication and Scientific Applications (BK14) Proposal Systematisation Thesis Systematics		**271,68**	**9 ECTS**
	Estimated time (hours)					**181,12**	
	Weight of credits ((total estimated Time) x 1 credit / (2.83 hrs/mg x 16 mg) MK						**6SKS**

No.	MK Code	MK Name	Some of the SLOs imposed on MK	Study Material: Learning Materials	Estimated time (hours)		ECTS
					Theory	Practice	
	Estimated time (hours)						
Total number of credits (for UNM undergraduate 149 ECTS)							219 ECTS

8. COURSE STRUCTURE IN THE STUDY PROGRAMME CURRICULUM

8.1 CURRICULUM MATRIX

Table 8. Matrix of Course Structure in the Study Programme Curriculum

Smt	credits	Number of MKs	UNDERGRADUATE / D4 PROGRAMME COURSE GROUPS		
			Compulsory MK	Optional MK	MKWK
VIII		1	1. Thesis (9 ECTS)		
VII		2	1. PLP (6 ECTS) 2. KKN (6 ECTS)		
VI	21	14	1. Evolution (2KS) 2. Molecular Genetics (3 ECTS) 3. Biology Curriculum Review and Learning Planning (4.5 ECTS) 4. Nutrition and Health Science (3 ECTS) 5. Advanced Educational Research Methodology (3 ECTS) 6. Microteaching (2SKS) 7. Biology Seminar (3 ECTS)	1. Educational Research Instrument Development (2KS) 2. Remedial Teaching (2KS) 3. Plant Tissue Culture (3 ECTS) 4. Contextualised Teaching (3 ECTS) 5. Horticulture (2KS) 6. Animal Behaviour (3 ECTS) 7. Circulatory Physiology (3 ECTS)	
V	21	15	1. Philosophy of Education (3 ECTS) 2. Biology Learning Innovation (3 ECTS) 3. Biology Learning Evaluation (4.5 ECTS) 4. Educational Research Methodology (3 ECTS) 5. Human Anatomy and Physiology (3 ECTS) 6. Practicum in Human Anatomy and Physiology (1 credit)	1. Advanced School Science (3 ECTS) 2. Theories of Learning (3 ECTS) 3. Mycology (3 ECTS) 4. Microtechnics (2KS) 5. Learning Models (2KS) 6. Teaching Material Development (2KS)	Entrepreneurship (4.5 ECTS)

			7. Introduction to Biotechnology (2KS)	7. Practicum in School Biology (3 ECTS) 8. School Based Management (2KS)	
IV	23	8	1. Botany of Higher Plants (3 ECTS) 2. Practicum in Higher Plant Botany (1 credit) 3. Vertebrate Zoology (3 ECTS) 4. Practicum in Vertebrate Zoology (1 credit) 5. Plant Physiology (3 ECTS) 6. Practicum in Plant Physiology (1 credit) 7. Animal Physiology (3 ECTS) 8. Practicum in Animal Physiology (1 credit) 9. Microbiology (3 ECTS) 10. Practicum in Microbiology (1 credit) 11. Animal Ecology (3 ECTS) 12. Practicum in Animal Ecology (1 credit) 13. Biology Learning Strategies (4.5 ECTS) 14. Cell Biology (4.5 ECTS)		
III	23	8	1. Invertebrate Zoology (3 ECTS) 2. Practicum of Invertebrate Zoology (1 credit) 3. Plant Anatomy (3 ECTS) 4. Practicum in Plant Anatomy (1 credit) 5. Lower Plant Botany (3 ECTS) 6. Practicum of Lower Plant Botany (1 credit)		

			7. Animal Development (3 ECTS) 8. Practicum in Animal Development (1 credit) 9. Plant Ecology (3 ECTS) 10. Practicum in Plant Ecology (1 credit) 11. Genetics (3 ECTS) 12. Genetics Practicum (1 credit) 13. School Biology Curriculum Design and Development (3 credits)		
II	22	10	1. Biology Laboratory Techniques and Management (3 ECTS) 2. Plant Morphology (1 credit) 3. Practicum in Plant Morphology (1 credit) 4. Animal Structure (3 ECTS) 5. Animal Structure Practicum (1 credit) 6. Biochemistry (4.5 ECTS)		1. Religious Education (3 ECTS) 2. Civic Education (3 ECTS) 3. Teaching Profession (3 ECTS) 4. Learner Development (2KS) 5. Introduction to Education (3 ECTS) 6. Learning and Studying (2KS)
I	22	8	1. English (3 ECTS) 2. Basic Biology (4.5 ECTS) 3. Basic Physics (4.5 ECTS) 4. Basic Maths (4.5 ECTS) 5. Basic Chemistry (4.5 ECTS) 6. Environmental Education (3 ECTS) 7. Basic Statistics (3 ECTS)		1. Pancasila Education 2. Bahasa Indonesia
Total	146	67			

Notes:

No.	GROUP AND COURSE NAME	EDUCATION PROGRAMME	NON-EDUCATION STUDY PROGRAMME
1.	Mandatory Curriculum Subjects (MKWK)	8	

2.	University Characteristic Courses (MKPU)	3	
3.	Educational Courses (MKK)	8	
4.	Study Programme Expertise Courses (MKKP)	84	
5.	Courses conducted through BKP (including PLP/PKL, Thesis, and KKN)	43	
	TOTAL SKS	**146**	

LIST OF COURSE DISTRIBUTION FOR EACHSEMESTER

9.1 SEMESTER I

Table 9. List of courses per semester-I

SEMESTER I						
No.	**MK Code**	**Course (MK)**	**ECTS**			
			Theory	**Practicum**	**Practice**	**Total**
1	23X00C007	Pancasila Education	3			
2	23A41C101	English	3			
3	23A41C102	Basic Biology	3	1.5		
4	23A41C103	Basic Physics	3	1.5		
5	23A41C104	Basic Maths	4.5			
6	23A41C105	Basic Chemistry	3	1.5		
7	23A41C106	Environmental Education	3			
8	23A41C107	Basic Statistics	3			
9	23X00C011	Introduction to Education	3			
Total Study Load Semester I			28.5	4.5		33

9.2SEMESTER II

Table 10. List of courses per semester-II

SEMESTER II						
No.	**MK Code**	**Course (MK)**	**ECTS**			
			Theory	**Practicum**	**Practice**	**Total**
1	23X00C001	Islamic Religious Education	3			
2	23X00C002	Christian Religious Education	3			
3	23X00C003	Catholic Religious Education	3			

4	23X00C004	Hindu Religious Education	3			
5	23X00C005	Buddhist Education	3			
6	23X00C006	Confucian Religious Education	3			
7	23X00C008	Civil Education	3			
8	23X00C009	Bahasa Indonesia	3			
9	23A41C201	Biological Laboratory Techniques and Management	3			
10	23A41C202	Plant Morphology	3			
	23A41C203	Practicum in Plant Morphology		1.5		
11	23A41C204	Animal Structure	3			
	23A41C205	Animal Structure Practicum		1.5		
12	23A41C206	Biochemistry	3			
13	23X00C012	Learner Development	3			
14	23X00C013	Learning and teaching	3			
15	23X00C014	Educational Profession	3			
Total Study Load Semester II			45	3		48

9.3SEMESTER III

Table 11. List of courses per semester-III

SEMESTER III						
No.	**MK Code**	**Course (MK)**	**ECTS**			
			Theory	**Practicum**	**Practice**	**Total**
1	23A41C301	Invertebrate Zoology	3			
2	23A41C302	Practicum of Invertebrate Zoology		1.5		

3	23A41C303	Plant Anatomy	3			
4	23A41C304	Practicum in Plant Anatomy		1.5		
5	23A41C305	Lower Plant Botany	3			
6	23A41C306	Practicum of Lower Plant Botany/Cryptogamic botany		1.5		
7	23A41C307	Animal Development	3			
8	23A41C308	Animal Development Practicum		1.5		
9	23A41C309	Plant Ecology	3			
10	23A41C310	Practicum in Plant Ecology		1.5		
11	23A41C311	Genetics	3			
12	23A41C312	Genetics Practicum		1.5		
13	23A41C313	School Biology Curriculum Design and Development	3			
14	23A41C314	Biology Learning Media and ICT	4.5			
Total Study Load Semester III			25.5	9		34.5

9.4 SEMESTER IV

Table 12. List of courses per semester-IV

SEMESTER IV						
No.	**MK Code**	**Course (MK)**	**ECTS**			
			Theory	**Practicum**	**Practice**	**Total**
1	23A41C401	Botany of Higher Plants	3	1.5		
2	23A41C402	Practicum in Higher Plant Botany				
3	23A41C403	Vertebrate Zoology	3			
4	23A41C304	Practicum in Vertebrate Zoology		1.5		
5	23A41C405	Plant Physiology	3			
6	23A41C406	Practicum in Plant Physiology		1.5		

7	23A41C407	Animal Physiology	3	1.5		
8	23A41C408	Practicum in Animal Physiology				
9	23A41C409	Cell Biology	4.5			
10	23A41C410	Animal Ecology	3			
11	23A41C411	Animal Ecology Practicum		1.5		
12	23A41C412	Biology Learning Strategies	3			
13	23A41C413	Biology Learning Evaluation	4.5			
Total Study Load Semester IV			27	7.5		34.5

9.5SEMESTER V

Table 13. List of courses per semester-V

SEMESTER V						
No.	**MK Code**	**Course (MK)**	**ECTS**			
			Theory	**Practicum**	**Practice**	**Total**
1	23A41C501	Philosophy of Education	3			
2	23A41C502	Biology Learning Innovation	3			
3	23A41C503	Microbiology	3			
4	23A41C504	Microbiology Practicum		1.5		
5	23A41C505	Educational Research Methodology	3			
6	23A41C506	Human Anatomy and Physiology	3			
7	23A41C507	Human Anatomy and Physiology Practicum		1.5		
6	23A41C508	Introduction to Biotechnology	3			
7	23A41C509	Entrepreneurship	4.5			
8	23A41C510	*Advanced School Science*	3			
9	23A41C511	*Learning Theories*	3			
10	23A41C510	*Mycology*	3			
11	23A41C512	*Microtechnics*			4.5	
12	23A41C513	*Learning Models*	3			

13	23A41C514	*Teaching Material Development*	3			
14	23A41C515	*School Biology Practicum*			4.5	
15	23A41C516	*School-based Management*	3			
Total Study Load Semester V			40.5	3	9	52.5

9.6SEMESTER VI

Table 14. List of courses per semester-VI

SEMESTER VI						
No.	**MK Code**	**Course (MK)**	**ECTS**			
			Theory	**Practicum**	**Practice**	**Total**
1	23A41C601	Evolution	3			
2	23A41C602	Molecular Genetics	3			
3	23A41C603	Curriculum Review and Biology Lesson Planning	4.5			
4	23A41C604	Nutrition and Health Sciences	3			
5	23A41C605	Advanced Educational Research Methodology	3			
6	23A41C606	Microteaching			3	
7	23A41C607	Biology Seminar	3			
8	23A41C608	*Development of Educational Research Instruments*	3			
9	23A41C609	*Remedial Teaching*	3			
10	23A41C6010	*Plant Tissue Culture*			3	
11	23A41C6011	*Contextualised Teaching*	3			
12	23A41C6012	*Horticulture*	3			
13	23A41C6013	*Animal Behaviour*	3			
14	23A41C6014	*Circulatory Physiology*	3			
Total Study Load Semester VI			37.5		6	43.5

9.7 SEMESTER VII

Table 15. List of courses per semester-VII

SEMESTER VII						
No.	MK Code	Course (MK)	ECTS			
			Theory	Practicum	Practice	Total
1	23A41C701	PLP			6	
2	23A41C702	Community Service			6	
Total Study Load Semester VII					12	12

9.8 SEMESTER VIII

Table 16. List of courses per semester-VIII

SEMESTER VIII						
No.	MK Code	Course (MK)	ECTS			
			Theory	Practicum	Practice	Total
1	23A41C801	Thesis			9	
Total Study Load Semester VIII					9	9

9. IMPLEMENTATION OF STUDENT LEARNING RIGHTS MAXIMUM 3 SEMESTERS

10. 1 DISTRIBUTION OF LEARNING ACTIVITIES BASED ON STUDENT LEARNING RIGHTS

Table 17 MBKM implementation model

Semester	Number of ECTS	TYPES OF COURSES & FORMS OF LEARNING ACTIVITIES						
		MK - U	MK - F	MKW - PS	MKP - PS	BKP		
						In PT	Outside PT	Non PT
Sem - I	33	√	-	√	-	-	-	-
Sem - II	48	√	√	√	-	-	-	-
Sem - III	34.5	√	√	√	√	√	-	-
Sem - IV	34.5	√	√	√	√	√	-	-
Sem - V	52.5	√	-	√	√	-	√	√
Sem - VI	43.5	√	-	√	√	-	√	√
Sem - VII	12	√	-	√	√	-	√	√
Sem - VIII	9	√	-	√	-	-	-	-

10.2 COURSES (MK) THAT MUST BE TAKEN IN THE PRODI ITSELF

No.	MK Code	MK Name	ECTS	Description
1	23A41C102	Basic Biology	4.5	
2	23A41C201	Biological Laboratory Techniques and Management	3	
3	23A41C202	Plant Morphology	3	
4	23A41C203	Practicum in Plant Morphology	1.5	
4	23A41C204	Animal Structure	3	
	23A41C205	Animal Structure Practicum	1.5	
5	23A41C206	Biochemistry	3	
6	20A41C301	Invertebrate Zoology	3	
7	20A41C302	Practicum of Invertebrate Zoology	1.5	
8	20A41C303	Plant Anatomy	3	
9	20A41C304	Plant Anatomy Practicum	1.5	
10	20A41C305	Lower Plant Botany	3	
11	20A41C306	Practicum of Lower Plant Botany	1.5	

No.	MK Code	MK Name	ECTS	Description
12	23A41C307	Animal Development	3	
13	23A41C308	Animal Development Practicum	1.5	
14	23A41C309	Plant Ecology	3	
15	23A41C310	Practicum in Plant Ecology	1.5	
16	23A41C311	Genetics	3	
17	23A41C312	Genetics Practicum	1.5	
18	23A41C313	School Biology Curriculum Design and Development	3	
19	23A41C314	Biology Learning Media and ICT	4.5	
20	23A41C401	Botany of Higher Plants	3	
21	23A41C402	Practicum in Higher Plant Botany	1.5	
22	23A41C403	Vertebrate Zoology	3	
23	23A41C404	Vertebrate Practicum	1.5	
24	23A41C405	Plant Physiology	3	
25	23A41C406	Practicum in Plant Physiology	1.5	
26	23A41C407	Animal Physiology	3	
27	23A41C408	Practicum in Animal Physiology	1.5	
28	23A41C409	Cell Biology	4.5	
29	23A41C410	Animal Ecology	3	
30	23A41C411	Animal Ecology Practicum	1.5	
31	23A41C412	Biology Learning Strategies	4.5	
32	23A41C413	Biology Learning Evaluation	4.5	
33	23A41C502	Biology Learning Innovation	4.5	
34	23A41C503	Microbiology	3	
35	23A41C504	Microbiology Practicum	1.5	
36	23A41C506	Human Anatomy and Physiology	3	
37	23A41C507	Human Anatomy and Physiology Practicum	1.5	
38	23A41C508	Introduction to Biotechnology	3	
39	23A41C605	Educational Research Methodology	3	
40	23A41C601	Evolution	3	
41	23A41C602	Molecular Genetics	3	
42	23A41C603	Curriculum Review and Biology Lesson Planning	4.5	

No.	MK Code	MK Name	ECTS	Description
43	23A41C604	Nutrition and Health Sciences	3	
44	23A41C605	Advanced Educational Research Methodology	3	
Total ECTS			**126**	

10.3 FORMS OF LEARNING ACTIVITIES OUTSIDE THE STUDY PROGRAMME INSIDE AND OUTSIDE THE HEI

Table 18 learning activities inside and outside PT

No.	Defending the Court	Maximum ECTS	Description
1	Outside the study programme on campus	30	The MKs taken have the same total ECTS, have SLO compatibility and additional competencies that are relevant.
2	In the same study programme off campus	30	The MK taken has the same total weight of credits, it is recommended through MK agreed upon by the association / association of similar PRODI.
3	In a different study programme off campus	30	The MKs taken have the same total ECTS, have SLO compatibility and additional competencies that are relevant.
Total maximum ECTS		90	

10.4 FORMS OF LEARNING ACTIVITIES OUTSIDE THE STUDY PROGRAMME AT NON HEIS

Forms of Learning Activities Outside Higher Education

No.	Form of Learning Activities	Can be implemented with a ECTS		Description	Course and credits
		Regular	MBKM		
1	Internship/Work Practice, in the Education Unit	4.5	≤30	MBKM Internship activities can be converted to several MKs that have ELO compatibility and learning activity time in	1. Biology Curriculum Review and Learning Planning (4.5 ECTS) 2. PLP (6 ECTS) 3. Microteaching (3 ECTS)

	Internship/Practice Work, in industry			accordance with the MK's ECTS.	4. Remedial Teaching (3 ECTS) 5. Contextualised Teaching (3 ECTS) 6. School-based Management (2) 7. Practicum in School Biology (3 ECTS) Semester V courses and above
2	KKN/KKNT	6	≤30	The KKNT MBKM activity, which is an extension of KKN-Reguler, can be converted to several MKs that have the same ELOs and learning activity time according to the MK's ECTS.	1. KKN 2. Biology Seminar 3. PLP
3	Entrepreneurship	4.5	≤30	MBKM Entrepreneurial Activities can be converted to several MKs that have the same ELOs and learning activity time according to the MK's ECTS, including Entrepreneurship MK if any.	1. Entrepreneurship 2. Mycology 3. Horticulture
4	Assistant teaching in Education Unit (AMSP)	6	≤30	AMSP MBKM activities can be converted to several MKs that have the same ELOs and learning activity time according to the MK's ECTS.	1. Biology Learning Innovation (3 ECTS) 2. Learning theories (3 ECTS) 3. Learning Models (2KS) 4. Advanced School Science (3 ECTS) 5. Teaching Material Development (2KS)

5	Research		≤30	Can be converted to several MKs that have the same ELOs and learning activity time in accordance with the MK's ECTS.	1. Educational Research Methodology (3 ECTS) 2. Advanced Education Research Methodology (3 ECTS) 3. Educational Research Instrument Development (3 ECTS) 4. Biology Seminar (3 ECTS) 5. Thesis (9 ECTS)
6	Independent Study/Project		≤30	Can be converted to several MKs that have the same ELOs and learning activity time in accordance with the MK's credit weight.	1. Biology Seminar (3 ECTS) 2. PLP (6 ECTS) 3. Thesis (9 ECTS)
7	Humanitarian project		≤30	Can be converted to several MKs that have the same ELOs and learning activity time in accordance with the MK's ECTS.	1. Biology Seminar (3 ECTS) 2. KKN (6 ECTS) 3. PLP (6 ECTS)

11. MODULE HANDBOOK

Module Handbook files are uploaded on google drive and can be accessed via the link https://pend-biologi.fmipa.unm.ac.id/module-handbook/ or can also be accessed by scanning the following QR Qode.

REFERENCE

Biggs, J., & Tang, C. (2011). Teaching for Quality Learning at University (4th ed.). Open University Press.

Magnusson, S., Krajcik, J., & Borko, H. (1999). Nature, sources, and development of pedagogical content knowledge for science teaching. In J. Gess-Newsome & N. G. Lederman (Eds.), Examining Pedagogical Content Knowledge (pp. 95–132). Kluwer Academic Publishers.

National Research Council. (2012). A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas.

Presidential Regulation of the Republic of Indonesia Number 8 of 2012, concerningthe Indonesian National Qualifications Framework (KKNI);

Regulation of the Chancellor of Makassar State University Number: 501/UN36/HK/2020 concerning the Independent Learning-Campus Curriculum for Undergraduate and Applied Undergraduate Programmes at Makassar State University

The National Academies Press.OECD. (2019). OECD Future of Education and Skills 2030: OECD Learning Compass 2030. OECD Publishing.

Rychen, D. S., & Salganik, L. H. (Eds.). (2003). Key Competencies for a Successful Life and a Well-Functioning Society. Hogrefe & Huber.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. Educational Researcher, 15(2), 4–14.

Weinert, F. E. (2001).Concept of competence: A conceptual clarification. In D. S. Rychen & L. H. Salganik (Eds.), Defining and Selecting Key Competencies (pp. 45–65). Hogrefe & Huber.

CURRICULUM DOCUMENTS

BIOLOGY EDUCATION STUDY PROGRAM
(BESP)