



ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes

Biology Education

Chemistry Education

Mathematics Education

Physics Education

Science Education

Provided by

Universitas Negeri Surabaya, Indonesia

Version: 18 March 2022

Table of Content

A About the Accreditation Process.....	3
B Characteristics of the Degree Programmes	5
C Peer Report for the ASIIN Seal	9
1. The Degree Programme: Concept, content & implementation	9
2. The degree programme: structures, methods and implementation.....	18
3. Exams: System, concept and organisation.....	27
4. Resources	29
5. Transparency and documentation.....	35
6. Quality management: quality assessment and development	37
D Additional Documents	41
E Comment of the Higher Education Institution (10.02.2021)	42
F Summary: Peer recommendations (19.02.2021)	80
G Comment of the Technical Committees (05.03.2021).....	82
Technical Committee 09 – Chemistry, Pharmacy (02.03.2021)	82
Technical Committee 10 – Life Sciences (05.03.2021)	83
Technical Committee 12 – Mathematics (01.03.2021)	83
Technical Committee 13 – Physics (01.03.2021).....	84
H Decision of the Accreditation Commission (16.03.2021)	85
I Fulfillment of Requirements (18.03.2022).....	87
Analysis of the peers and the Technical Committees (09.03.2022)	87
Decision of the Accreditation Commission (18.03.2022)	90
Appendix: Programme Learning Outcomes and Curricula	91

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for ¹	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) ²
Program Studi Sarjana Pendidikan Biologi	Undergraduate programme in Biology Education	ASIIN		10
Program Studi Sarjana Pendidikan Kimia	Undergraduate programme in Chemistry Education	ASIIN		09
Program Studi Sarjana Pendidikan Matematika	Undergraduate programme in Mathematics Education	ASIIN		12
Program Studi Sarjana Pendidikan Fisika	Undergraduate programme in Physics Education	ASIIN		13
Program Studi Sarjana Pendidikan Sains	Undergraduate programme in Science Education	ASIIN		09, 10, 12, 13
<p>Date of the contract: 02.09.2020</p> <p>Submission of the final version of the self-assessment report: 28.10.2020</p> <p>Date of the audit (online): 15.12. – 17.12.2020</p>				
<p>Peer panel:</p> <p>Dr. Gabriele Abraham, University Erlangen-Nuernberg</p> <p>Dr. Angela Fösel, University Erlangen-Nuernberg</p> <p>Prof. Dr. Dirk Krüger, Freie Universität Berlin</p>				

¹ ASIIN Seal for degree programmes;

² TC: Technical Committee for the following subject areas: TC 09 – Chemistry; TC 10 – Life Sciences; TC 12 – Mathematics; TC 13 – Physics

A About the Accreditation Process

Dr. Nikolaus Nestle, BASF SE Prof. Dr. Hans-Georg Weigand, University Wuerzburg Fiorentina Farah Medina, student, Universitas Airlangga	
Representative of the ASIIN headquarter: Rainer Arnold	
Responsible decision-making committee: Accreditation Commission for Degree Programmes	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 28.03.2014 Subject-Specific Criteria of Technical Committee 09 – Chemistry as of 29.03.2019 Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 28.06.2019 Subject-Specific Criteria of Technical Committee 12 – Mathematics as of 09.12.2016 Subject-Specific Criteria of Technical Committee 13 – Physics as of 20.03.2020	

B Characteristics of the Degree Programmes

a) Name	Final degree (original)	b) Areas of Specialization	c) Corresponding level of the EQF ³	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Undergraduate programme in Biology Education	Sarjana Pendidikan/ Bachelor of Education in Biology	-	6	Full time	no	8 Semester	144 CSU / 228.96 ECTS	1968, Once a year (August)
Undergraduate programme in Chemistry Education	Sarjana Pendidikan/ Bachelor of Education in Chemistry	-	6	Full time	no	8 Semester	144 CSU / 228.96 ECTS	1984, Once a year (August)
Undergraduate programme in Mathematics Education	Sarjana Pendidikan/ Bachelor of Education in Mathematics		6	Full time	no	8 Semester	144 CSU / 228.96 ECTS	1984, Once a year (August)
Undergraduate programme in Physics Education	Sarjana Pendidikan/ Bachelor of Education in Physics		6	Full time	no	8 Semester	145 CSU / 230.55 ECTS	1984, Once a year (August)
Undergraduate programme in Science Education	Sarjana Pendidikan/ Bachelor of Education in Science		6	Full time	no	8 Semester	144 CSU / 228.96 ECTS	2006, Once a year (August)

³ EQF = The European Qualifications Framework for lifelong learning

For the Bachelor's degree programme Biology Education (UPBE), Universitas Negeri Surabaya (UNESA) has presented the following profile in the Self-Assessment Report:

“Graduate of Biology Education is expected to be able to be a professional as:

a. Biology educators

Able to plan, implement, evaluate, and develop high-quality modern biology learning with global insight

b. Junior researcher assistants.

Able to examine issues in biology and biology learning by implementing scientific methods and publicize the results of research in scientific forum.

c. Entrepreneurs

Able to manage a business unit to develop local biological-based potential through innovation and creativity.”

For the Bachelor's degree programme Chemistry Education (UPCE), Universitas Negeri Surabaya (UNESA) has presented the following profile in the Self-Assessment Report:

“Bachelor of Education in Chemistry who is characterized by their competences such as able to design, implement, evaluate, and reflect learning, manage laboratories, research and conduct self-development in a sustainable manner, as well as work in the field of green entrepreneurship.

Graduates of the Undergraduate Programme of Chemistry Education (UPCE), FMNS UNESA are expected to:

(a) have expertise in the field of chemistry education,

(b) make the right decisions in learning chemistry studies,

(c) be reliable communicators,

(d) play an active role as a member of society who obeys regulations,

(e) be smart managers in education,

(f) be credible researchers in the field of chemistry education, and

(g) be creators and innovators.”

For the Bachelor's degree programme Mathematics Education (UPME), Universitas Negeri Surabaya (UNESA) has presented the following profile in the Self-Assessment Report:

“This programme produces graduates who work as Mathematics Educators, Mathematics Education Research Assistants, Edupreneur, and Mathematics Education Writers. Those graduates were traced from a tracer study done by the programme for ten years. To be more specific, those can be described as follows.

1) Mathematics Educators

This field of job requires the ability in designing, implementing, and evaluating creative and innovative mathematics learning based on contextual problems, by utilizing the latest technology and being able to develop themselves in a sustainable manner.

2) Mathematics Education Research Assistant

This field of job requires the ability in translating research ideas, carrying it out, and making mathematical education research reports accompanied by experts, as well as being able to develop themselves in a sustainable manner.

3) Edupreneur

This career field requires the ability in using mathematical science or mathematics education knowledge for developing entrepreneurship based on an adequate analysis and in developing themselves in a sustainable manner.

4) Mathematics Education Writer

This job requires ability in writing ideas or solutions to problems related to the phenomenon of mathematics education that deserves to be published, and in developing themselves in a sustainable manner.”

For the Bachelor's degree programme Physics Education (UPPE), Universitas Negeri Surabaya (UNESA) has presented the following profile in the Self-Assessment Report:

“The undergraduate programme of Physics Education produces professionals who at the beginning of their careers become Physics educators. However, there are possibility that the graduates of Physics education have ability to be laboratory managers, employees of educational institutions, entrepreneurs, research assistants; have the ability to continue their studies to a higher level of education and have a superior character, environmental insight, and entrepreneurial spirit that able to compete at national and international level.”

For the Bachelor's degree programme Science Education (UPSE), Universitas Negeri Surabaya (UNESA) has presented the following profile in the Self-Assessment Report:

“Integrated science teacher, pedagogical integrated science researcher, educational program manager, and/or entrepreneur who has the ability to:

1. Applying his field of expertise in the field of pedagogical integrated science and utilizing Science and technology to design, implement, and evaluate integrated sciences learning and solve learning problems professionally in accordance with the situations and challenges faced.
2. Mastering the natural sciences, pedagogy, and methodology of problem solving and application in the field of work to support the tasks of his profession and to solve problems of learning integrated science (Professional).
3. Able to take appropriate decisions based on information and data analysis to solve integrated science learning problems and integrated science learning innovation products, both independently and in groups.
4. Responsible for carrying out the duties of his profession and can be given responsibility in the organization of his profession to solve the problem of learning integrated science.”

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Webpage Ba Biology Education: <http://biologi.fmipa.unesa.ac.id/>
- Webpage Ba Chemistry Education: <http://pendidikan-kimia.fmipa.unesa.ac.id/>
- Webpage Ba Mathematics Education: <http://pendidikan-matematika.fmipa.unesa.ac.id/>
- Webpage Ba Physics Education: <http://pendidikan-fisika.fmipa.unesa.ac.id/>
- Webpage Ba Science Education: <http://pendidikan-sains.fmipa.unesa.ac.id/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The auditors base their assessment of the learning outcomes as provided on the websites and in the Self-Assessment Reports of the five Bachelor's degree programmes under review.

For all five undergraduate programmes, Universitas Negeri Surabaya (UNESA) has described and published Programme Educational Objectives (PEO) and Programme Learning Outcomes (PLO). While the PEO are rather general and refer to the vision and mission of the Faculty of Mathematics and Natural Sciences (FNMS), the PLO cover a number of specific competences students should acquire in their respective degree programme. Both, PEO and PLO of each degree programme are published on the programme's website and can be found in the Curriculum Summary.

The auditors refer to the Subject-Specific Criteria (SSC) of the Technical Committee Life Sciences as a basis for judging whether the intended learning outcomes of the Bachelor's degree programmes Biology Education and Science Education, as defined by UNESA, correspond with the competences as outlined by the SSC. They come to the following conclusions:

Graduates of the Bachelor's degree programme Biology Education (UPBE) should understand the basic biological processes and be capable of applying the scientific and pedagogical methods of the biological sciences. In addition, graduates should acquire relevant scientific knowledge in the different biological areas such as botany, zoology, biotechnology, microbiology, molecular biology, cell biology, and related natural sciences (chemistry, physics). Furthermore, the students should be able to conduct independent laboratory and fieldwork, plan, implement, assess, and follow up the educational biology learning process and be able to design and perform experiments in biology learning to collect, analyse, and interpret data to solve biological issues. Finally, students should be qualified to conduct long-life learning and work effectively, both individually and in a team, to demonstrate scientific, critical, and innovative attitude in biology learnings, laboratory works, and environmental care.

UPBE is designed to produce competitive graduates with competences to work as biology educators/teachers, who are able to plan, implement, evaluate, and develop modern biology learning. As junior researcher assistants, graduates should be able to examine issues in biology and biology learning by implementing scientific methods. As entrepreneurs, graduates should be qualified to manage a business unit and to develop local biological-based business ideas through innovation and creativity.

The PLO of the Bachelor's degree programme Science Education (UPSE) focus on conveying basic scientific and pedagogical knowledge of physics, chemistry, and biology. In addition, students should be able to design, implement, and evaluate integrated science learning and teaching methods in order to be able to prepare, conduct and analyse research activities about learning and teaching of integrated sciences. Moreover, students should acquire the ability to work practically in a laboratory and should demonstrate critical and innovative attitudes in integrated science learning and teaching. UPSE students should acquire interdisciplinary knowledge through courses, which integrate two or more natural sciences (e.g. Biomechanics, Biochemistry) or courses, which combine natural sciences with other field, such as technology (Biotechnology) and culture (Ethnoscience).

Graduates in science education mainly aim at finding a suitable occupation as science educators/teachers in high schools, as junior educational researchers, as managers of educational institutions, as high school laboratory managers, or as entrepreneurs in the field of science education.

The peers refer to the Subject-Specific Criteria (SSC) of the Technical Committee Chemistry as a basis for judging whether the intended learning outcomes of the Bachelor's degree programme Chemistry Education (UPCE), as defined by UNESA, correspond with the competences as outlined by the SSC. They come to the following conclusions:

UPCE graduates should acquire a basic knowledge of natural sciences and gain methodological and educational competences in the chemical sciences (analytical chemistry, organic chemistry, inorganic chemistry, physical chemistry, and biochemistry) in order to learn about the structure, dynamics, and energy, as well as the basic principles of separation, analysis, synthesis and characterization of chemicals. Furthermore, graduates should also be able to carry out practical work in laboratories and to prepare experiments. Moreover, students should be familiar with the safe handling of and have knowledge of safety and environmental issues. In addition, graduates should acquire the necessary skills to work scientifically as well as in the field of education, adhering to modern methodologies and theoretical concepts in chemistry learning and teaching. This includes designing, implementing, and evaluating chemistry learning media by utilizing Information and Communication Technology. This should qualify graduates to handle chemistry-learning problems and to provide quality chemistry learning that is conducted in classroom or institutions based on scientific data and analysis. Most of the UPCE graduates will find a suitable occupation as high school teachers, managers of educational institutions, junior researchers, and entrepreneurs.

The aim of the Bachelor's degree programme Mathematics Education (UPME) is to convey scientific and pedagogical knowledge in designing, implementing and evaluating mathematics learning and teaching. To this end, students should develop a mathematical and logical reasoning and be familiar with the different areas of mathematics such as analysis, algebra, applied mathematics, computational mathematics, combinatorics, and geometry. Finally, graduates should be able to work with and manipulate mathematical properties and have an understanding of the underlying mathematical concepts. This should enable them to develop critical thinking skills and the ability to use modern mathematical learning and teaching methods.

UPME graduates will mostly work as mathematics educators (designing, implementing, and evaluating creative and innovative mathematics learning), mathematics education re-

search assistants (translating and carrying out research ideas, making mathematical education research reports), “edupreneurs” (developing business ideas in the area of mathematics education), and mathematics education writers (writing ideas or solutions to problems related to the phenomenon of mathematics education).

The intended learning outcomes of the Bachelor’s degree programme Physics Education (UPPE) focus on conveying scientific and educational methods for observing, understanding, analysing, and solving physical phenomena and problems. This includes that graduates should acquire fundamental physics-relevant knowledge of mathematics, computer sciences, and natural sciences. Furthermore, graduates need to know how to conduct and prepare experiments, including the application of scientific methods. In addition, graduates should be capable to apply and evaluate modern methods and instruments of physics learning and teaching by using information and communication technology.

UPPE aims at producing professionals who at the beginning of their careers become physics educators. However, graduates have also the ability to be laboratory managers, employees of educational institutions, entrepreneurs, or research assistants.

Supplementing the subject-related qualification objectives, students of all five Bachelor’s programmes should have adequate competences in oral and written communication skills, be capable of working autonomously as well as in a team-oriented manner, and be able to conduct research activities. Furthermore, they should have trained their analytical and logical abilities, are able to apply information and communication technology in the field of education, and show a social and academic attitude. Finally, students should acquire communicative and language skills and should develop a strategy for life-long learning.

During the audit, the peers discuss with students, teachers, and alumni where the graduates can find suitable jobs. They learn that graduates mostly work as teachers in senior and junior high schools. However, students not only acquire educational competences but also competences related to entrepreneurship (ecopreneurship, edupreneurship). For examples, one graduate has founded a mushroom farm, another has established a business to produce products based on shrimps and a UPPE graduate has founded a company that develops probiotic and prebiotic products like yoghurt from fermented soya milk. Graduates also publish books on education, run digital platforms to support teachers and students, or develop instruments for high school laboratories apparatus and material for primary and secondary schools

In summary, the auditors are convinced that the intended qualification profiles of the five undergraduate programmes under review allow students to take up an occupation, which corresponds to their qualification. The degree programmes are designed in such a way that they meet the goals set for them. The peers conclude that the objectives and intended

learning outcomes of the degree programmes adequately reflect the intended level of academic qualification and correspond sufficiently with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 10 – Life Sciences (UPBE and UPSE), the SSC of the Technical Committee 09 – Chemistry (UPCE), the SSC of the Technical Committee 12 – Mathematics (UPME), and the SSC of the Technical Committee 13 – Physics (UPPE).

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Reports

Preliminary assessment and analysis of the peers:

UNESA awards a Bachelor of Education (B.Ed.) or Sarjana Pendidikan (S.Pd.) degree to the graduates of the five undergraduate programmes.

The names of the degree programmes properly reflect the respective focus and content of the undergraduate programmes, which is on education in the respective scientific area.

The auditors confirm that the English translation and the original Indonesian names of all five Bachelor's degree programmes correspond with the intended aims and learning outcomes as well as the main course language (Indonesian).

Criterion 1.3 Curriculum

Evidence:

- Study plans of the degree programmes
- Module descriptions
- UNESA Academic Guidelines
- Webpage Ba Biology Education: <http://biologi.fmipa.unesa.ac.id/>
- Webpage Ba Chemistry Education: <http://pendidikan-kimia.fmipa.unesa.ac.id/>
- Webpage Ba Mathematics Education: <http://pendidikan-matematika.fmipa.unesa.ac.id/>
- Webpage Ba Physics Education: <http://pendidikan-fisika.fmipa.unesa.ac.id/>
- Webpage Ba Science Education: <http://pendidikan-sains.fmipa.unesa.ac.id/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

All five undergraduate programmes are offered by the Faculty of Mathematics and Natural Sciences (FMNS) of Universitas Negeri Surabaya (UNESA).

The Bachelor's degree programme under review are designed for four years and are offered as full time programmes. In UPBE, UPCE, UPME, and UPSE 144 credit semester units (CSU) need to be achieved by the students (this is equivalent to 228.96 ECTS points). Only in UPPE, the curriculum encompasses 145 CSU (230.55 ECTS points).

All undergraduate programmes at UNESA are designed to be completed in 8 semesters or four academic years with a maximum of 14 semesters or 7 academic years. Each semester is equivalent to 14 weeks of learning activities. Besides these learning activities, there is one week for midterm exams and one week for final exams. The odd semester starts in August and ends January of the following year, while the even semester last from February to July.

The curriculum consists of university requirements and compulsory and elective courses determined by the Faculty of Mathematics and Natural Sciences and the respective departments. University requirements are courses that need to be attended by all undergraduate students at UNESA. There are seven university requirements with 14 CSU: Pancasila, Religion, Bahasa Indonesia, Citizenship Education, Physical Education and Sports, Digital Literacy, and Social and Cultural Studies. These courses are almost all offered in the first two semesters of studies, in addition to courses conveying basic knowledge of natural sciences and mathematics.

Courses on the different subject-specific educational sciences are offered from third to eighth semester. Elective courses can be taken from the third year of study. Students usually choose elective courses that relate to their thesis and/or their individual interests. During the eight semesters, students must also complete the undergraduate thesis (6 CSU) and the community service (3 CSU).

The peers discuss with the programme coordinators in which courses practical work in schools is included. They learn that for providing in-field learning experience, the educational undergraduate programmes include an internship programme, which is called "Introduction to School Field (PLP)". Students will spend one to two months at a school in order to gain practical teaching experience. They also learn pedagogical strategies from their mentor teacher at the school. By the end of the program, students are required to write a fieldwork report. The final grade for the internship programme is based on the students' performance at the school and the fieldwork/internship they submit. Internships are usually conducted in secondary (high) schools or international schools either in Surabaya or in other Indonesian cities.

Usually during the last year of studies, students must complete the community service. The peers discuss with the programme coordinators about the content and goal of this course. The programme coordinators explain that community service is compulsory for all Indonesian students. It has a minimum length of eight weeks and often take place in villages or rural areas where students stay and live together with the local people. The course is designed “to allow students to apply their knowledge based on their field in order to empower society.” Since the community service usually takes place in remote areas, the students cannot attend any classes during this time. The students work in interdisciplinary teams during the community service in order to advance the society and bring further development about. This course was introduced at all Indonesian Universities in 1971. The assessment of the community service consists of a work plan, programme implementation, and activity report. The peers understand that students should work for the benefit of the community and the Indonesian society during the community service and support this concept.

Since UNESA has the goal to become internationally more visible and wants to further internationalise its degree programmes, the peers discuss with the programme coordinators and students if any classes at FMNS are taught in English. The programme coordinators explain that there is an “excellence class” in each of the five educational undergraduate programmes, which is completely taught in English. Students can apply for entering the excellence class and are selected in the second semester based on GPA and English proficiency. Usually, there are 25 places in the excellence class in each study programme. The peers appreciate the existence of an English taught class, which helps students to find jobs in international schools or international education providers.

In the “regular classes” all courses are delivered in Bahasa Indonesia (Indonesian language), however part of the teaching materials and most of the textbooks are provided in English. Information about the curriculum is available for students in the digital academic information system and on the programme’s homepage. Furthermore, students are encouraged to attend summer courses that are held in English with international students and guest lecturers.

The peers see that many members of the teaching staff in the Faculty of Mathematics and Natural Sciences have international experience or contacts (e.g. have graduated from an international university and/or collaborate with colleagues from abroad). This is a good starting point for establishing more international co-operations in order to further promoting the students’ academic mobility (see criterion 2.1).

The members of the teaching staff explain on demand of the peers that they offer possible topics for the final projects according to their own research projects. All members of the teaching staff supervise theses. Students have to design a research proposal (this proposal

is developed in the “seminary course”, which usually takes place in the seventh semester) with a time schedule for the project, which is discussed with the academic advisor. If they agree, the students apply formally for being allowed to work on the suggested topic.

The peers gain the impression that the graduates of all degree programmes under review are well prepared for entering the labour market and can find adequate jobs in Indonesia.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Reports
- UNESA Academic Guidelines
- Decree of Minister of Research, Technology and Higher Education No. 2, 2015
- UNESA webpage: <https://www.unesa.ac.id/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Reports, admission procedures and policies for new students follow the National Regulation No.2, 2015. The requirements, schedule, registration venue, and selection test are announced on UNESA’s webpage and thus accessible for all stakeholders.

There are three different ways by which students can be admitted to a Bachelor’s programme at UNESA:

1. National Entrance Selection of State Universities (Seleksi Nasional Masuk Perguruan Tinggi Negeri, SNMPTN), a national admission system, which is based on the academic performance during the high school (25 % of the students at UNESA are admitted through this selection system).
2. Joint Entrance Selection of State Universities (Seleksi Bersama Masuk Perguruan Tinggi Negeri, SBMPTN). This national selection test is held every year for university candidates. It is a nationwide online test (subjects: mathematics, Bahasa Indonesia, English, physics, chemistry, biology, economics, history, sociology, and geography). It accounts for 45 % of the admitted students at UNESA.
3. New Student Admission Selection (Seleksi Penerimaan Mahasiswa Baru, SPMB) students are selected based on an online-test (similar to SBMPTN) specifically held by UNESA for prospective students that haven not been accepted through SNMPTN or SBMPTN. SPMB is carried out twice per year. First after the results from SNMPTN and the second time after

the announcement of the SBMPTN results. (30 % of the students at UNESA are admitted through this test).

Based on the number of lecturers, the condition of the facilities and infrastructure, the senate of FMNS decides the number of intakes, which is subsequently proposed to the university. In recent years, intake numbers for the undergraduate programmes have been constant at around 100 students (UPBE), 103 students (UPCE), 90 students (UPSE), 100 students (UPME) and 110 students (UPPE).

The number of applicants exceeds by far the number of available places. For example, within the last five years, an average of 2100 students applied for admission to UPBE and only 100 new students were accepted. This is equivalent to an admission rate of only 4.8 %. In UPPE, the numbers are similar: Within the last five years, an average of 1100 students applied every year, of which 110 were accepted (10 %).

UPME is the most desired degree programme at FMNS with 2151 and 2512 applicants in 2017 and 2018 respectively. This number is quite high compared to the available study places (95 in 2017 and 101 in 2018).

For UPCE, there were between 1161 and 1524 applications within the last 5 years. Thus, the acceptance rate was on average 8 %.

In the last three years, the number of new UPSE was 91, while there was an average of 191 applications. The number of new students accepted every academic year is always around 91, due to maintaining the suitability of the ratio of lecturers, staff and students.

Undergraduate students at UNESA have to pay tuition fees. However, a tuition waiver scheme is available upon request and the amount depends on the parents' economic status. In addition, several grants for students with financial difficulties are available, such as from the government, industries, foundations, and UNESA alumni association. Some senior students work as laboratory assistants to earn some money for financing their studies.

The details of the application process at UNESA and further information on admissions criteria and deadlines can be found in the National Regulation No. 2, 2015 and the UNESA Academic Guidelines, which are also published on the university's webpage.

From their discussion with the students, the peers gain the impression that the admission system is very effective and only very motivated and high-performing candidates are admitted. The peers consider the highly selected and motivated students to be one of the strong points of the five undergraduate programmes under review.

In summary, the auditors find the terms of admission to be binding and transparent. They confirm that the admission requirements support the students in achieving the intended learning outcomes.

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

The peers thank UNESA for correcting the data on accepted students. In UPSE, the number of new students has averaged 90 in the last three years, but the applications for UPSE have increased: 1338 in 2017, 1668 in 2018, and 1727 in 2019. This confirms the programme's attraction.

The peers consider criterion 1 to be mostly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Webpage Ba Biology Education: <http://biologi.fmipa.unesa.ac.id/>
- Webpage Ba Chemistry Education: <http://pendidikan-kimia.fmipa.unesa.ac.id/>
- Webpage Ba Mathematics Education: <http://pendidikan-matematika.fmipa.unesa.ac.id/>
- Webpage Ba Physics Education: <http://pendidikan-fisika.fmipa.unesa.ac.id/>
- Webpage Ba Science Education: <http://pendidikan-sains.fmipa.unesa.ac.id/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The curriculum of all four Bachelor's degree programmes under review are designed for eight semesters. Nevertheless, it is also possible for excellent students to complete the degree in only seven semesters. Students cannot cover more than 24 CSU per semester. All

students have to complete the undergraduate programme within seven years. The students' individual study plans are different from each other, but have to be approved by their academic advisors.

A systematic university-wide review of the curriculum is conducted every five years but minor changes may be implemented every year after endorsement by the FMNS senate.

The curriculum in the first two semesters is very similar for all five undergraduate programmes. Courses in the first two semesters convey basic knowledge of natural sciences, mathematics, education and languages (Indonesian and English). In addition, students need to attend obligatory courses, such as religion and ethics, Pancasila and civic education, and sports, which are university requirements and need to be attended by all students at UNESA. From the third semester on, more subject-specific classes are offered, with a focus on the respective science area (biology, chemistry, mathematics, physics, and general sciences). In addition, several educational courses (Fundamentals of Education, Innovative Learning I + II, Research Methodology in Education, Microteaching, Assessment of Learning, The Field of Schooling or Teaching Practice). In the third year of studies, advanced concepts in pedagogics and the respective science are taught. During the seventh and eighth semester, students must complete the Community Service and the undergraduate thesis.

In the Bachelor's degree programme Biology Education, students are required to complete 144 credit units (CSU), which equivalent to 228.96 ECTS, including 123 CSU of compulsory courses and 21 CSU of elective courses.

The Bachelor's degree programme Chemistry Education requires students to complete 123 CSU of compulsory courses and a minimum of 21 CSU of elective courses.

In order to complete the Bachelor's degree programme Mathematics Education, students need to take 144 credit units (CSU) including 128 CSU for compulsory modules and 16 CSU for electives.

The Bachelor's degree programme Physics Education requires 145 CU (equivalent to 230.52 ECTS) consisting of 135 CSU (214.65 ECTS) compulsory courses and 10 CSU (15.87 ECTS) electives.

In the Bachelor's degree programme Science Education, students are required to complete 144 credit units (CSU), including 132 CSU of compulsory courses and 12 CSU of elective courses.

After analysing the module descriptions and the study plans, the peers confirm that all degree programmes under review are divided into modules and that each module is a sum of coherent teaching and learning units. All practical lab work and internships are well integrated into the curriculum and the supervision by FMNS guarantees for their respective

quality in terms of relevance, content, and structure. However, the peers point out that there is a large number of small modules in each degree programme which increases the exam load of the students. For this reason, it would be useful to revise the curricular structure by combining related courses to joint modules. An example is UPPE, where the laboratory course and the related lecture (e.g. “Basic Electronics” and “Electronic Practicum”) could be combined in one larger module. In addition, inconsistencies between the study plans and other official documents should be resolved (e.g. in UPCE, the SAR mentions a compulsory course in Physical Chemistry but it is not listed in the study plan).

In summary, the peers gain the impression that the choice of modules and the structure of the curriculum ensures that the intended learning outcomes of the respective degree programme can be achieved.

International Mobility

UNESA provides some opportunities for students to conduct internships and exchange programmes abroad. Students who take part in student exchanges through cooperation programmes can gain recognition of the acquired credits after obtaining approval from their undergraduate programme.

Although, some international co-operations exist, especially the number of Indonesian students spending some time abroad is rather low. For example, the Department of Biology cooperate with Permata Sakti and Tarlac Agricultural University Philippines, but only two UPBE students are sent there for attending some special courses. The situation is very similar in UPCE: In 2018, two students were studying abroad at Tarlac Agricultural University. For UPME, no relevant statistical data on students’ academic mobility was given in the Self-Assessment Report.

In UPPE, there was one student in 2019 visiting Khon Kaen University, Thailand, and two students were studying at Tarlac Agricultural University. In addition, some students (10 in 2020) visited other Indonesian university. On the other hand, there were 22 incoming students from other Indonesian universities in 2020.

UPSE students can take part in exchange program both in Indonesia and abroad. To this end, UPSE supports the SEA Teacher Project, which offers students the opportunity to gain practical teaching experience in schools in Southeast Asian countries. Selection for the SEA Teacher project is carried out by the Office of International Affairs of UNESA. Several 4th-year UPSE students have participated in the SEA Teacher Project. Moreover, students can join the Immersion Programme for practical teaching at international schools in Indonesia. The selection process is carried out by FMNS and the Institute for Learning Development and Quality Assurance of UNESA.

In addition, every year several students from UNESA take part at international competitions (sports, academics).

The credits acquired abroad are transferable to UNESA, although this transfer of credits is only possible if an agreement exists between UNESA and the involved international university. This agreement regulates the details of the transfer, such as the list of courses that can be transferred, the minimum grade, equivalency of curriculum between universities, etc. The students confirm that credit transfer is possible, however, the peers notice that there is no official guideline describing the necessary procedure. For this reason, the peers expect UNESA to draft an official guideline how credits achieved outside UNESA are recognised by the degree programme.

To promote academic mobility, UNESA has an Office of International Affairs (OIA). Students can get all information about academic mobility from OIA, which also offers a website that can be accessed anytime, which provides complete information such as the requirements that students need to know before applying for one of the exchange programmes. A positive aspect of the educational undergraduate programme is the internship that can be conducted at an international school in Indonesia or a school abroad. Students confirm that FMNS provides opportunities to join national and international schools, which have adopted the Cambridge curriculum. However, the students' academic mobility is very limited despite students' high interest. Only few Bachelor's students are studying abroad for a limited period. The number of available places in the exchange programmes is limited and there are restrictions due to a lack of sufficient financial support.

The auditors emphasize that it is very useful for students to spend some time abroad already during their Bachelor's studies to improve their English proficiency, to get to know other educational systems, and to enhance their job opportunities. Furthermore, FMNS should invite more visiting lecturers, initiate more international exchange programmes, offer more places at international schools, and provide more scholarships for students. FMNS should extend the collaboration with international schools, both in Indonesia and in other ASEAN countries.

A good starting point for initiating international co-operations are the personal international contacts of the faculty members. It is also possible for students and teachers to apply to international organisations like ERASMUS or the German Academic Exchange Council (DAAD) for receiving funds for stays abroad.

In summary, the peers appreciate the effort to foster international mobility and support FMNS to further pursuing this path. However, the academic mobility is still low and there is room for improvement.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Based on the National Standards for Higher Education of Indonesia (SNPT), all five undergraduate programmes under review use a credit point system called CSU.

For regular classes, 1 CSU of academic load for the undergraduate programme is equivalent to 3 academic hours, which equals 170 minutes. This includes:

- 50 minutes of scheduled contact with the teaching staff in learning activities,
- 60 minutes of structured activities related to lectures, such as doing the assignments, writing papers, or literature study,
- 60 minutes of independent activities outside the class room to obtain a better understanding of the subject matters and to prepare academic assignments such as reading references.

For lab work, final project, fieldwork, and other similar activities, 1 CSU is equivalent to 3 to 5 hours a week of student's activities. The details and the students' total workload are described in the respective module description.

The minimum workload of an undergraduate programme at UNESA is 144 CSU, which corresponds to 5.712 hours or 228.96 ECTS (1 ECTS is equivalent to 25 hours of students' workload). The normal workload per semester is 18 - 20 CSU; for 20 CSU this is: 20×170 (minutes / week) $\times 14$ (week / semester) = 47,600 minutes / semester or 793.33 hours / semester, which is equivalent to 31.73 ECTS.

Students with high academic achievement can take more courses (up to 24 CSU) to speed up their studies; the academic advisor must approve this.

The peers point out that there can be no fixed conversion rate between CSU and ECTS point, but the ECTS points need to be calculated separately for each course. This can be easily done by dividing the students' total workload, which is described in detail in the respective module description, through 25. In addition, UNESA needs to check its calculation of ECTS point, because in the Self-Assessment Report, UNESA calculates with 25 hours per ECTS

point, on the other hand, in several module descriptions 28.5 hours per ECTS point are calculated.

The peers discuss with the students about the scope of the Bachelor's thesis, the related workload, and the awarded credit points. They gain the impression that the students regularly spent more time on the Bachelor's thesis than expected. Since the workload of the students was only estimated by the programme coordinators and seems to be too low in comparison to the actual time needed by the students, the peers suggest asking the students directly about their experiences. This could e.g. be done by including a respective question in the course questionnaires. In any case, UNESA must make sure that the actual workload of the students and the awarded ECTS points correspond with each other.

According to the Self-Assessment Reports, most of the undergraduate students at the Faculty of Mathematics and Natural Sciences can complete their degree without exceeding the expected period. For example in UPBE, only 4 % of the students leave the programme without graduation (mostly for personal reasons) and the average length of studies was 4.2 years (in 2018/19). The numbers are similar for the other undergraduate programmes. In UPCE, the drop-out-rate is around 7 % and the average length of studies was 4.2 years. The average length of studies in UPME was 4.3 years in the last two years, while between 3 and 12 students left the programme. In UPPE, during the last three years, the average length of studies was 4.2 years and around 6 % of the students drop out. The average length of studies in UPSE was 4.0 years in the last five years, because several students were able to finish the programme in less than four years. At the same time, no students left the programme.

The programmes coordinators emphasise, that drop out students are those who withdraw from the programme before completing the program at their own request due to several reasons, not because they fail to complete their studies within the maximum period set by the program. The following reasons why students leave the programme are mentioned: they are accepted at other universities/schools, they accept a job offer, or they face financial or health problems.

In summary, the peers confirm that all five undergraduate programmes have a high but manageable workload.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes

- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Various teaching and learning methods (including lectures, computer training, teaching etc.) have been implemented. In addition, students are introduced to the scientific approach (5e learning cycle, inquiry based learning, etc.). Structured activities include homework, assignments (reading or problem exercises) and practical activities. Group project assignments are given in some courses to develop students' skills in teamwork, communication, and leadership. The assignments and exercises should help students to develop their abilities with respect to critical thinking, written/oral communication, data acquisition, problem solving, and presentations.

Students are further encouraged to apply their knowledge in a series of student projects that are oriented towards teaching practice in the classroom and in laboratories. Classes and laboratories are designed in problem-based learning settings in order to introduce student-oriented teaching methods to involve all students in the learning process and to develop their thinking and analytical skills. In addition, internships in schools as practice-based learning are also part of the curriculum.

The most common method of learning is class session, with several courses having integrated laboratory practices. Lecturers generally prepare presentations to aid the teaching process. In addition, several courses include teaching practice sessions (i.e. students presenting teaching practice trials in front of their peers). With individual or group assignments, such as discussions, presentations, or written tasks, students are expected to improve their academic as well as their soft skills. Laboratory work covers laboratory preparation, pre or post-tests, laboratory exercises, reports, discussions, and presentations. In addition, practical activities should enable students to be acquainted with academic research methods.

To help students achieving the intended learning outcomes and to facilitate adequate learning and teaching methods, UNESA has developed an e-learning platform, where students and teachers can interact. Due to the COVID-pandemic, online teaching has become an essential part of delivering the courses. Online – teaching at UNESA is done via the programme v-learning, also several digital platforms are supported by UNESA, and recorded lectures are provided. Moreover, the Ministry of Education provides additional funds for students to pay for the additional costs of online-learning (e.g. mobile phone and internet fees).

In summary, the peer group considers the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, they confirm that the study concept of all four undergraduate programmes comprises a variety of teaching and learning forms as well as practical parts that are adapted to the respective subject culture and study format. It actively involves students in the design of teaching and learning processes (student-centred teaching and learning).

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Reports
- UNESA Academic Guidelines
- Discussions during the audit

Preliminary assessment and analysis of the peers:

UNESA offers a comprehensive advisory system for all undergraduate students. At the start of the first semester, every student is assigned to an academic advisor. Each academic advisor is a member of the academic staff and is responsible for approximately 20 students from his classes. He/she is a student's first port of call for advice or support on academic or personal matters.

The role of the academic advisor is to help the students with the process of orientation during the first semesters, the introduction to academic life and the university's community, and to respond promptly to any questions. They also offer general academic advice, make suggestions regarding relevant careers and skills development and help if there are problems with other teachers. During the semester, counselling activities are usually offered three times, namely at the beginning of the semester (before the courses start), mid-semester, and at the end of the semester. The students confirm during the discussion with the peers that they all have an academic advisor who they can approach if guidance is needed.

In general, students stress that the teachers are open minded, communicate well with them, take their opinions and suggestions into account, and changes are implemented if necessary.

The fourth-year students who prepare their final project have one or more supervisors, who are selected based on the topic of the final project. One supervisor could be an external supervisor, if the student performs the final project outside UNESA. The role of the final

project supervisor is to guide students in accomplishing their final project, e.g. to finish their research and complete the final project report.

All students at UNESA have access to the digital academic information system (SIKADU). The students' profiles (student history, study plan, academic transcript and grade point average/GPA, lecturer evaluation, course list) are available via SIKADU.

Finally, there are several student organizations at UNESA; they include student's activity clubs, which are divided into arts, sports, religious and other non-curricular activities.

The peers notice the good and trustful relationship between the students and the teaching staff; there are enough resources available to provide individual assistance, advice and support for all students. The support system helps the students to achieve the intended learning outcomes and to complete their studies successfully and without delay. The students are well informed about the services available to them.

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

The peers support the plans to revise the curriculum structures by combining related subjects into joint modules and to resolve inconsistencies between study plans and other official documents. The peers expect UNESA to verify the implemented changes in the further course of the procedure.

The peers thank UNESA for updating and specifying the information on academic mobility. They appreciate the efforts to send more students abroad and encourage UNESA to further promoting students' academic mobility by cooperating with more international schools and universities and by providing more funds.

The peers confirm that UNESA has verified the workload of the thesis; a similar survey should be done for all courses. Students need to be asked, if the workload is appropriate or not and if it fits the awarded credits. If discrepancies are discovered, adjustments need to be made.

The peers thank UNESA for providing additional information on the applied teaching and learning methods.

The peers consider criterion 2 to be mostly fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Self-Assessment Reports
- Module descriptions
- UNESA Academic Guidelines
- UNESA Academic Calendar

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Reports, the students' academic performance is evaluated based on their attendance and participation in class, their laboratory works and reports, assignments, homework, presentations, mid-term exam, and the final exam at the end of each semester. The form and length of each exam is mentioned in the module descriptions that are available to the students via UNESA's homepage and the digital platform SIAKADU. Usually, there are two written exams in each course (besides the assignments, homework, and presentations); the mid-term exam is conducted in 8th week of the semester and the final exam in 16th week.

As stated in the Academic Guidelines, students' performance is usually assessed by participation (20 %), assignments (30 %), mid-term exam (20%), and final exam (30 %). Participation includes attendance (minimum of 75 %), asking and answering question, active in a discussion or in an experiment (observation), and performance. Participation and assignments records are managed by each teacher, while mid-term and final exams are managed by the study programme. The grading system is different for the teaching internships, the community service, and the final project. The details, which assessment forms are used in these courses and how they contribute to the final grade, are described in the Academic Guidelines.

The most common type of evaluation used are written examinations; however, quizzes, laboratory work, assignments (small projects, reports, etc.), presentations, seminars, and discussions may contribute to the final grade. Written examinations, either closed-book or open-book, typically include short answers, essays, problem-solving or case-based questions, and calculation problems. Some lecturers also give multiple choice or true-false questions in examinations or quizzes. The grade from laboratory work usually consists of laboratory skills, discussions, reports, and oral exams. Students are informed about mid-term and final exams via the Academic Calendar. Students can access their results via UNESA's digital platform SIAKADU.

Every student in the five undergraduate programmes under review is required to do a final project (Bachelor's thesis). This project is conducted independently under the guidance of one or more supervisors and usually consists of literature study, practical research, and data analysis. Both the student and his /her supervisors might decide the topic and content of the project. In many cases, the lecturers offer particular topics connected to their research.

If a student fails, she or he usually has to repeat the entire module in the following semester; it is usually not possible to retake just parts of the course or to just retake the final exam. However, mid-term exams can be repeated (remedy) but if a student fails the final exam, she or he has to retake the whole course in the next semester.

Although, lecturers need to arrange examinations for students who have not taken the examinations due to valid reasons (e.g. illness). Some courses allow students, whose grades are still below the passing level, to improve their grades through repeating an exam. The course's final grades are: A (score 4.0, excellent), AB (3.5, good to excellent), B (3.0, good), BC (2.5, fair to good), C (2.0, fair), D (1.0, insufficient), E (0.0, failed), or T (incomplete). The further details are described the UNESA Academic Guidelines.

The students appreciate that there are several short exams instead of one big exam and confirm that the exam load is appropriate and they are well informed about the examination schedule, the examination form, and the rules for grading.

The peers also inspect a sample of examination papers and final theses and are overall satisfied with the general quality of the samples.

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

The peers thank UNESA for explaining that there are two different activities to control the quality of exams, namely, Internal Quality Audit and Learning Monitoring and Evaluation. The Internal Quality Audit is conducted once in a year; the Learning Monitoring and Evaluation is scheduled every semester.

The peers consider criterion 3 to be fulfilled

.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Reports
- Staff Handbooks
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:

At UNESA, the staff members have different academic positions. There are professors, associate professors, assistant professors and instructors. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. For example, a full professor needs to hold a PhD degree. In addition, the responsibilities and tasks of a staff member with respect to teaching, research, and supervision depend on the academic position.

According to the Self-Assessment Report, the teaching staff at the Faculty of Mathematics and Natural Sciences consists of 156 full-time teachers (21 professors, 61 associate professors, 46 assistant professors, and 28 instructors). The details are presented in the following table:

Category	Mathematics Department	Physics Department	Chemistry Department	Biology Department	Science Department
Professors	6	4	7	3	1
Associate Professors	14	11	17	16	3
Assistant Professors	12	12	7	6	9
Instructors	5	6	2	9	6
Total Teaching Staffs	37	33	33	34	19

Source: UNESA Joint Self-Assessment Report

In 2019, there were 2473 students enrolled in FMNS, resulting in a teacher – student ratio of 1:16.

Half of the faculty members at FMNS (79) hold a PhD from either a reputable Indonesian or international university (e.g. from Japan, Taiwan, Malaysia, Australia, the Netherlands,

Germany, France, or the UK). The other half (77) hold a Master's degree. Details of the academic qualifications of the teachers are described in the staff handbooks, which are accessible via the respective department's webpage. All fulltime members of the teaching staff are obliged to be involved in (1) teaching/advising, (2) research, and (3) community service. However, the workload can be distributed differently between the three areas from teacher to teacher. In addition, there are non-academic staff members consisting of librarians, technicians and administrative staff.

In general, the percentage of teachers with a doctoral degree at FMNS (50 %) is rather low compared to international standards. This observation applies in particular to the Science Department. Here, only 6 out of 19 teachers holds a PhD (32 %). The Department Head explains that they have recognised this deficit and currently six academic staff members are pursuing their doctoral studies in the fields of Science Education at either international at Indonesian universities. Thus, it is expected that in the following 2 - 5 years UPSE will have 12 staff members who hold doctoral degrees. The peers support these efforts and encourage FMNS to further increase the percentage of teachers with a PhD, either by hiring only new staff members that have already a doctoral degree or by requiring more Master's degree holders to pursue doctoral studies.

While analysing the staff handbooks, the peers notice that most of the staff members are also graduates from UNESA. For this reason, they recommend also hiring new staff members that graduated from other universities.

The peers discuss with UNESA's management how new staff members are recruited. They learn that every year the faculties and departments announce their vacancies to UNESA's management, which subsequently announces the vacancies on UNESA's webpage. Since UNESA is semi-autonomous and can suggest (after a selection procedure) to the Indonesian Ministry of Education which staff members to hire. One way to recruit new teachers is to send promising Master's students from UNESA abroad to complete their PhD and then to hire them as teachers when they are finished. Nevertheless, UNESA also hires graduates from other universities. Vacancies are announced nationally, so UNESA gets applications from other universities. During the audit, members of the teaching staff emphasise that the selection process for new teachers is now more open than in the past. Therefore, now more young teachers that have not graduated from UNESA are hired.

During the audit, the peers inquire how high the teaching load is and if are there enough opportunities for the academic staff members to conduct research activities. They learn that teachers at FMNS have a workload of around 11 to 12 credits, the national maximum is 16 credits, so that teachers have enough time for all their activities including research; their average working time is 40 hours per week. How much time staff members actually

devote to research is different from teacher to teacher, because working hours are spent flexibly for teaching, research, and community service. Usually, teaching covers about 60 %, research activities 20 %, and community service another 20 % of their available time.

The peers notice that the research output of the academic staff members could be improved, especially concerning articles in higher ranked international journals. There is, of course, a quite impressive list of publications – e.g. in mathematics education (see homepage of the Mathematics Department), - but there could be a greater variety of international peer reviewed journals. Since research activities carried out by the teaching staff should contribute to the content of the courses and students should be familiarized with independent academic research, it is important to increase the research output in science (biology, chemistry, mathematics, physics) education. Some research results seem to be in the content area of the subject and are published e.g. in the Journal of Physics as a conference proceeding. To reach international visibility, the amount of papers published in internationally peer reviewed educational journals should be increased.

In addition, the existing research activities should be made more visible (e.g. by publishing them on the English webpage of the respective degree programme).

In summary, the peers confirm that the composition, scientific orientation and qualification of the teaching staff – beside the already mentioned weak points - are suitable for successfully implementing and sustaining the degree programmes.

The auditors are impressed by the excellent and open-minded atmosphere among the students and the staff members. This atmosphere of understanding and support is one of the strong points of the degree programmes.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Reports
- Staff Handbooks
- Discussions during the audit

Preliminary assessment and analysis of the peers:

UNESA encourages training of its academic and technical staff for improving the educational abilities and teaching methods. As described in the Self-Assessment Reports, faculty members attend courses in English language training, Information and Communications Technology (ICT), laboratory safety and instrumentation, writing publications, and e-learning. In addition, teachers have attended scientific meetings both internationally in recent

years, including CAPEU (International Conference on Science Technology, Engineering and Mathematics / STEM), ICRIEMS (International Conference on Research, Implementation, and Education of Mathematics and Sciences), AASEC, MISEIC, ICGRC, Seminar on Mathematics and Natural Sciences (RME Application Experience) at the National University of Malaysia, and the International Conference on Educational Research. Furthermore, Applied Approach (AA) is a compulsory training for all staff members that focuses on advancing pedagogical knowledge. It is designed particularly for junior faculty members to introduce various teaching methods, as well as syllabus and course content development. All teachers at UNESA are obligated to attend the lecturer certification programme held by the Directorate General of Higher Education (Direktorat Jenderal Pendidikan Tinggi, DIKTI). An official teaching certificate is issued after the faculty member has completed the certification process.

Young staff members with a Master's degree are encouraged to pursue doctoral studies (usually abroad). To support this policy, UNESA provides foreign language training and organises seminars presenting scholarships from various sources.

During the audit, the peers inquire if the teaching staff has the opportunity to spend time abroad and to participate in international projects. They learn that UNESA and FMNS provides funds for joining international conferences, e.g. in Australia, USA, China, Japan, Thailand, Malaysia or other East Asian Countries but also in Europe (e.g. Turkey, Germany, Netherlands). Teachers can apply for financial support for their international activities by submitting a proposal to FMNS or UNESA. Moreover, teachers have the opportunity to receive funding from the Ministry of Research, Technology and Higher Education. The funding covers conference and publication fees, and expenses for accommodation and traveling. The teachers are satisfied with the existing opportunities and the available financial support.

The peers discuss with the members of the teaching staff the opportunities to develop their personal skills and learn that the teachers are satisfied with the internal qualification programme at UNESA, their opportunities to further improve their didactic abilities and to spend some time abroad to attend conferences, workshops or seminars; even a sabbatical leave is possible.

In summary, the auditors confirm that UNESA offers sufficient support mechanisms and opportunities for members of the teaching staff who wish for further developing their professional and teaching skills.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Reports
- Video of the facilities
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Basic funding of the undergraduate programmes and the facilities is provided by UNESA and FMNS. The financial sources are government funding, tuition fees from students, community and industry funding. Additional funds for research activities can be provided by UNESA or the Indonesian government (Bantuan Pendanaan Perguruan Tinggi Nasional, BPPTN), but the teachers have to apply for them.

UNESA distributes the budget (for education, research, community services, infrastructure, facilities, human resources) among the different schools and faculties according to the size of the student body (all undergraduate programmes have the same tuition fee). Nevertheless, some study programmes (e.g. Chemistry) need more funds than other programmes because of the necessary instruments and technical equipment. This is also considered by UNESA's management when the yearly budget is allocated.

The provided budget allows the departments to conduct the study programmes as well as some specific activities, including student exchange programmes, student financial assistance for research, and participation in international conferences. However, the budget is limited but has increased in recent years.

The academic staff members emphasise that from their point of view, all five undergraduate programmes under review receive sufficient funding for teaching and learning activities. The students confirm this positive impression and state their satisfaction with the available resources.

In the practical laboratory courses, students also learn how to prepare low cost experiments. This is very useful, because high school labs usually do not have advanced instruments. Examples of low cost experiments are:

- Detection of formaldehyde in food by curcumin from turmeric
- Use of pigments from plants (e.g. roses) as pH indicator
- DNA extraction using household chemicals
- Modelling the physics of human eye/ seeing with low cost lenses
- Dilatation in length of solid state bodies by external heat supply with e.g. knitting needles and tea candles

In advance of the audit, the peer group received videos showing some of the laboratories at the Faculty of Mathematics and Natural Sciences. They notice that there are no bottlenecks due to missing equipment or a lacking infrastructure. The technical equipment for teaching the students on a Bachelor's level is available. Moreover, the peers learn during the audit that students can use and operate the instruments in the laboratories by themselves after being trained and instructed by either senior students or lab technicians. Each laboratory has a lab supervisor, in addition, there are several senior students (4th year) that work as lab assistants.

The students confirm this positive impression during the discussion with the peers. They are satisfied with the available equipment, lab assistance, and the technical infrastructure. Laboratory equipment meets their needs and there are enough instruments so that the experiments are usually conducted by a group of two or three students. Nevertheless, the peers cannot make a final assessment of the quality of the technical equipment and the infrastructure on the basis of the videos alone. Only some laboratories are shown in the videos and especially the scope and design of the safety standards remain unclear (material and surface quality of the working benches, safety goggles, gloves, eye showers, fire extinguishers, emergency exits, chemical-proof cabinets, first-aid kits, gloves, ventilation system (quantitative information such as air exchange rates achieved both in the overall lab and in the fume hood would be required), fume hoods, etc.). For this reason, the peers point out that it is necessary to assess the technical infrastructure, safety measures, and facilities onsite at FMNS. A team of at least one expert together with an ASIIN programme manager should visit FMNS in order to confirm the impression that the infrastructure, the technical equipment and the safety measures meet the required standards.

The students also express their satisfaction with the library and the available literature there. However, the peers notice that the library opening hours are rather short (the central library closes at 3pm or 4pm in the afternoon). For this reason, they recommend extending the opening hours of the library so that students can better learn and study there.

In summary, the peer group judges the available funds, the technical equipment, and the infrastructure (laboratories, library, seminar rooms etc.) to comply – besides the mentioned restrictions- with the requirements for adequately sustaining the degree programmes.

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

The peers support UNESA's plans to increase the number of lecturers with a PhD and hope that the intended goals will be reached.

The peers confirm that all lecturers have national and international publication. Nevertheless, the number of publications in reputable international journals could be increased, especially in the different educational fields. For this reason, it is a good idea to better support the staff members in writing and publishing research papers, for example by joining more conferences and seminars and by publishing the research profiles on the department's website.

The peers appreciate that UNESA has extended the library opening hours since February 2021.

The peers consider criterion 4 to be mostly fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-Assessment Reports
- Module descriptions
- Webpage Ba Biology Education: <http://biologi.fmipa.unesa.ac.id/>
- Webpage Ba Chemistry Education: <http://pendidikan-kimia.fmipa.unesa.ac.id/>
- Webpage Ba Mathematics Education: <http://pendidikan-matematika.fmipa.unesa.ac.id/>
- Webpage Ba Physics Education: <http://pendidikan-fisika.fmipa.unesa.ac.id/>
- Webpage Ba Science Education: <http://pendidikan-sains.fmipa.unesa.ac.id/>

Preliminary assessment and analysis of the peers:

The students, as all other stakeholders, have access to the module descriptions via UNESA's homepage.

After studying the module descriptions, the peers confirm that they include almost all necessary information about the persons responsible for each module, the teaching methods and work load, the awarded credit points, the intended learning outcomes, the content, the applicability, the admission and examination requirements, and the forms of assessment.

However, the peers notice that module description do not include detailed information on how the final grade is calculated. In addition, all module descriptions should mention the students' total workload and how many ECTS points (25h per ECTS point) are awarded. A good example is the UPSE module handbook; it could serve as a role model for the other degree programmes.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Reports
- Sample Transcript of Records for each degree programme
- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the peers:

The peers confirm that the students of all five degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Diploma Supplement contains all required information about the degree programme. The Transcript of Records lists all the courses that the graduate has completed, the achieved credits, grades, and cumulative GPA.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Reports
- All relevant regulations as published on the university's webpage

Preliminary assessment and analysis of the peers:

The auditors confirm that the rights and duties of both UNESA and the students are clearly defined and binding. All rules and regulations are published on the university's website and the students receive the course material at the beginning of each semester.

As already mentioned under criterion 2.1, the peers notice that there is no official guideline describing the necessary procedure for recognizing credits acquired from outside UNESA. For this reason, the peers expect UNESA to draft an official guideline how credits achieved outside UNESA are recognised by the degree programme.

Another deficit the peers notice is the fact that not all relevant information about the degree programmes (e.g. complete module handbook, study plan, curriculum summary) is available on the English homepage of the programmes. For this reason, the peers recommend including all relevant information on the programme's English homepage. This way, it is ensured that domestic and foreign students know their rights and duties. A good example is the homepage of [UPSE](#), here all relevant information is available and the webpage can be a role model for the other undergraduate programmes.

Finally, the peers point out that the study plans (curricular map) of all undergraduate programmes should include the electives, the internship, and the awarded CSU and ECTS points of each course. Role model should be the curricular map as presented by [UPPE](#).

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

The peers confirm that UNESA has drafted an official guideline how credits achieved outside UNESA are recognized by the degree programme. The credit transfer guide is published on the university' webpage.

The peers see that UNESA has updated the homepage and that now all relevant information about the degree programmes is available. In addition, the module handbooks have been updated. The complete and updated module handbooks need to be submitted in the further course of the procedure.

The peers consider criterion 5 to be mostly fulfilled

6. Quality management: quality assessment and development

Evidence:

- Self-Assessment Reports
- UNESA Academic Guidelines
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The auditors discuss the quality management system at UNESA with the programme coordinators and the students. They learn that there is a continuous process in order to improve

the quality of the degree programmes and it is carried out through internal (SPMI) and external quality assurance (SPME).

The SPMI process involves units at three management levels, i.e. university level, faculty level and programme level. The quality assurance system at university level is run by the Quality Assurance Centre (PPM), which coordinates the Quality Assurance Groups (GPM) at faculty level. At each department, there is a Quality Assurance Unit (UPM), which is responsible for quality assurance at programme level.

PPM is the unit responsible directly to the Rector with the main role is to perform the QA process on university level. PPM is responsible for the continuous improvement of degree programmes through monitoring, assessing and analysing the educational processes. To this end, PPM prepares the guidelines and quality standards for all degree programmes and conducts internal curriculum audits. In addition, PPM also conducts different customer satisfaction surveys.

At the faculty level, the quality assurance process is organized by the Quality Assurance Group (GPM). The GPM is working directly under the respective Dean. Its role is to ensure the quality of educational processes and research activities in each degree programme. The main role of GPM is to implement academic standards and guidelines at faculty level in accordance with the quality standards developed by PPM.

The quality assurance at programme level is primarily conducted by the Programme Coordinator and by Quality Assurance Unit (UPM). One of UPM's duties is to monitor the implementation of the curriculum at programme level. In addition, the Programme Coordinator and UPM have the task to assess if the programme learning outcomes (PLO) and course outcomes (CLO) have been achieved. Every year, the Quality Assurance Units submit a report on the educational processes including recommendations how to improve the quality of the respective degree programme.

Internal evaluation of the quality of the degree programmes is mainly provided through student and alumni surveys. Students give their feedback on the courses through online questionnaires at the end of each semester. Students assess various aspects such as students' understanding, lecturer's responsiveness, course delivery, lecturer's proficiency, explanation of course objective, and references in each enrolled course. Students' opinion is quantified by means of index 1 (unsatisfactory) to 4 (excellent). Giving feedback on the classes is compulsory for the students; otherwise, they cannot access their account on the digital platform SIAKADU.

The Department Head can access the students' feedback and responses to each course via SIAKADU. Each teacher can see the average score of the students' feedback from their account in SIAKADU.

In addition, each department regularly conducts an alumni tracer study. By taking part at this survey, alumni can comment on their educational experiences at UNESA, the waiting period for employment after graduation, their professional career and can give suggestions how to improve the programme. Furthermore, there is the Career Centre at UNESA, which offers help to find suitable internships, announces job vacancies organises courses to develop soft skills.

External quality assurance focuses on both national and international accreditations. National accreditation is conducted by the National Accreditation Board for Higher Education (BAN-PT), under the Ministry of Education and Culture, Republic of Indonesia. National accreditation of the programme within the university is a legal obligation for every study programme. According to the latest evaluation by BAN-PT, all five undergraduate programmes under review have obtained the highest accreditation status (A).

During the audit, the peers learn that if there is negative feedback, the Dean talks to the respective teacher, analyses the problem, and offers guidance. The auditors gain the impression that students' feedback is taken seriously by the faculties and changes are made if there is negative feedback. There are regular meetings (ever semester) with students called "open dialog" on university, faculty and department level where students can voice their issues and suggestions. The students' representatives for those meetings are elected by their fellow students.

The peers see that there are regular meetings with all stakeholders on faculty and programme level where they discuss the needs and requirements of the employers and possible changes to the degree programmes.

As the peers consider the input of the employers to be very important for the further improvement of the degree programmes, they appreciate the existing culture of quality assurance with the involvement of external stakeholders in the quality assurance process. Moreover, UNESA and the Faculty of Mathematics and Natural Sciences stay in close contact with their alumni. As a result, through the UNESA alumni association, alumni make voluntary donations to help financing the degree programmes. The peers appreciate the comprehensive quality assurance system with involvement of all stakeholders, which is a strong point of the undergraduate programmes.

In summary, the peer group confirms that the quality management system is suitable to identify weaknesses and to improve the degree programmes. All stakeholders are involved in the process.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

The peers consider criterion 6 to be fulfilled.

D Additional Documents

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

- none

E Comment of the Higher Education Institution (10.02.2021)

UNESA provides the following statement:

CRITERIA 1. THE DEGREE PROGRAMME: CONCEPT, CONTENT & IMPLEMENTATION

In this Criteria UPME, UPPE, UPCE, UPBE, and UPSE would like to thank Peers awards that the study program has made regarding the objectives of the study program, its relation to the job market, and the curriculum that has been compiled and implemented to support. However, we will always evaluate and improve the quality and relevance of improving UPME, UPPE, UPCE, UPBE, dan UPSE services' quality to students and stakeholders.

For UPSE, we also revise the statement that in the last three years UPSE 191 registrants due to incorrect data entered. We apologize and this happened because of an error system in the Siakadu. The number of new UPSE students has averaged 90 in the last three years, but registrants in UPSE in the last three years have increased, namely from 1338 registrants (in 2017), 1668 registrants (in 2018), and 1727 registrants (in 2019).

CRITERIA 2. THE DEGREE PROGRAMME: STRUCTURES, METHODS AND IMPLEMENTATION

Criterion 2.1 Structure and Modules

FMNS would like to thank the peers for the assessment and analysis related to the structure of the curriculum and modules of the UPME, UPPE, UPCE, UPBE and UPSE. FMIPA highly appreciates the impression given by the peers regarding the choice of modules and curriculum structure in the undergraduate programme. FMNS will always ensure that the curriculum and module structures used are in accordance with the learning outcomes to be achieved in each undergraduate programme.

FMNS appreciates suggestions from peers to revise the curriculum structure by combining related subjects into joint modules and also related to inconsistencies between study plans and other official documents. The responses to these suggestions are described below.

a. UPME Responses

UPME acknowledge the positive feedback from peers related to joint modules. We plan to combine the related courses to joint modules within next restructuring curriculum activity holistically. The joint module considers the substance of the course as well as the learning outcome with regard knowledge, psychomotor and attitude of each course.

b. UPPE responses

Regarding the suggestion of combining related courses to joint modules, for example, Basic Electronic (2 CU) and Electronic Practicum (1 CU), generally speaking, we agree with this concern. UPPE will combine these two courses into one larger module. UPPE provides Basic Electronics 1 and Basic Electronics 2 for students, each of which is supported by practicum courses. Basic Electronics 1 course covers two main subjects. The first material is the basics of electronics, including direct current, alternating current, passive components and the basic principles of measuring and measuring electricity. The second material deals with active components covering the working principle and application of semiconductors, p-n junctions, diodes, bipolar transistors (BJT). The Basic Electronics 2 course covers the working principles and application of BJT transistors, JFET field-effect transistors, op-amp characteristics and circuits, and digital electronics' basic material.

c. UPCE responses

Regarding the inconsistency between the study plan and documents, UPCE has conducted a double check regarding the naming of courses. Responses that can be conveyed are that some courses that were originally named with the name of a scientific family have been changed to the name of the material / topic to be taught so that there may be some name differences between the existing documents and the updated course names. For this reason, the UPCE has standardized the naming of courses.

d. UPBE responses

We appreciate the positive feedback from peers on the joint module in UPBE. Combining related courses to joint modules, both those that are planned and implemented using a holistic approach. The approach is based on the learning theory that the acquisition of knowledge, psychomotor and attitude learning outcomes cannot be separated.

e. UPSE responses

The UPSE curriculum already has courses with a minimum weight of 1 CU or 1 SKS (1.59 ECTS). However, a restructuring of the curriculum is needed to reduce the number of courses with low ECTS and increase the courses' weight. The steps that will be taken by the UPSE programme coordinator are 1) conducting curriculum evaluations through FGDs to identify courses that have the same substance to be combined into one with a large number of studies. Subjects will be classified into basic science, integrated science, and pedagogic science education, 2) Conducting workshops for curriculum restructuring, 3) curriculum sanctioning, and 4) public testing.

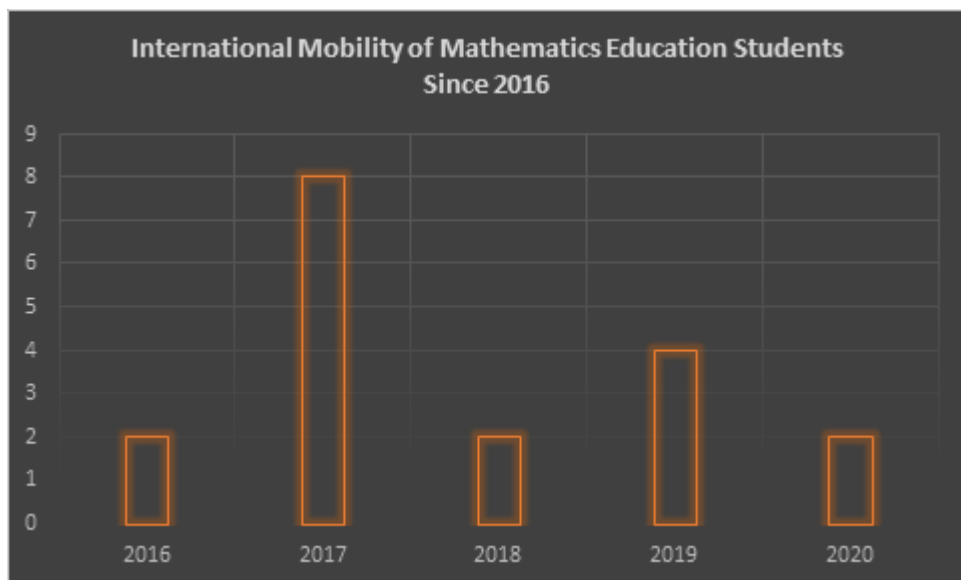
International mobility

Regarding credit transfer, peers expect UNESA to draft an official guideline how credits achieved outside UNESA are recognized by the degree programme. Responding to these suggestions, Unesa has developed a credit transfer guide that can be accessed via <http://fmipa.unesa.ac.id/pedoman-pertukaran-mahasiswa/>. For guidance on student exchange, the Permata Sakti Programme from the Ministry of Education and Culture can be accessed at <https://www.unesa.ac.id/page/kebijakan/bidang-akademik>.

The peers appreciated FMNS 'efforts to encourage international mobility even though according to the peers academic mobility was still low. The following is the response regarding this matter.

a. UPME Responses

UPME supports the students to actively participate and become involved in academic international activities such as teaching internship, students exchange, international credit transfers, as well as international seminars and conferences. As for students' international activities during this 5 years related to teaching internship, students exchange, and international credit transfer is shown in the following graphic with the details given at the table below.



No	Year	Number of students	Students	Desination	Activity
1	2016	2	Nurma Firdausi Az Zahra	Malaysia	Immersion

No	Year	Number of students	Students	Desination	Activity
			Fitri Anisa Kusumastuti	(Wadi Sofia College) https://fmipa.unesa.ac.id/2016/10/teaching-immersion-program-untuk-mahasiswa-fmipa-unesa/	
2	2017	8	M. Habib Manan Lintang Meyta Fitrani Rifdatul Karimah Nyoman Ayu Tia Cindy Nindya Waspaning Dyah Alwys Zella T. S Mahmud Dwi S. Ninik Lailatul M.	Malaysia dan Singapura (Wadi Sofia College & Touchstone Institute Teacher Immersion Program 2017 Touchstone Institute (Singapura) – FMIPA (unesa.ac.id)	Immersion
3	2018	2	Elok Kartika Sari Khoirun Nisa	Philipina (Tarlac Agricultural Univeristy, Philipine) https://fmipa.unesa.ac.id/2018/09/mahasiswa-unesa-laksanakan-ppl-di-tau-laboratory-school-filipina/	internship-SEA TEACHER
4	2019	2	Karindra Annisa Hidayati	Thailand (Khon kaen University) Student Exchange Mahasiswa UNESA di Khon Kaen University, Thailand – FMIPA	students exchange
5	2019	2	Hani Rizkia dan Masyita	Philipina Pampanga State Agricultural University (PSAU) TAU, Philipine https://fmipa.unesa.ac.id/2019/02/unesa-pampanga-state-agricultural-university-psau-philippines-intership-program-2019/	internship-SEA TEACHER

No	Year	Number of students	Students	Desination	Activity
6	2020	2	Nurul Laily Ramadina	TAU, Philippines <u>Program International Credit Transfer (ICT) di Tarlac Agricultural Uni- versity, Filipina Maha- siswa FMIPA Kelas Unggulan – FMIPA (unesa.ac.id)</u>	ICT (inter- national credit transfer)

From the graphic and the table, we can see that there are 2 students who did go Wadi Sofia College, Malaysia for immersion programme. During 2 months the students did teaching internship and learn about the school management systems. This number increased at 2017, there are 8 students who did internship at Wadi sofia college, Malaysia and also did teacher workshop at Touchstone Institute, Singapore.

Since 2018, Unesa, especially UPME are actively participated in SEA-Teacher programme held by SEAMEO Qitep. Through this programme, UPME sent two students to do teaching internship at Tarlac Agricultural University Lab School-Philippines. Meanwhile, UPME responsible to facilitate a student from Philippine (TAU-Philippines) to do her teaching practice at Surabaya International School. At 2019, UPME participated on SEA-Teacher programme by sending two students to do teaching practice at Laboratory School of Pampanga State Agricultural University (PSAU) Philippine and at Laboratory School Tarlac Agricultural University, Philippine. While for 2020, SEA-teacher program is halt due to pandemic.

Besides supporting students to do internship at international school abroad, UPME also support its students who want to do students exchange programme. At 2019, 2 students of UPME do the students exchange programme with Khon Khaen University, Thailand. As the exchange, UPME got 3 students from Thailand (Khon Khaen Univerist) who join at some courses in UPME for around two weeks. In 2020, UPME facilitate its students to learn in other university abroad by sending two students to take some courses at TAU Philipines and get credits from it.

All student who participated in international academic activity are awarded with a certificate or LoA from the parter university as follow:

- 1) Sample of certificate awarded to students who participated in teaching immersion/internship programme at Wadi sofia college, Malaysia:



2) Sample of certificate awarded to students who participated in teaching workshop at Touchstone college, Singapore:



3) Sample of certificate awarded to students who participated SEA-teacher programme year 2018:



4) Sample of certificate awarded to students who participated SEA-teacher program year 2018:



5) Sample of certificate awarded to students who participated in Students exchange 2019 (Khon kaen University)



Link for certificate or LoA:

- <https://drive.google.com/drive/folders/0Bz9Fs3XwiY32fjRCSXlxUm5WY09WTVXvtT2NMVUd6dEdISTBEUE9iS2cxa0ZSQXp tMzZIZTQ?usp=sharing>
- <https://drive.google.com/drive/folders/0Bz9Fs3XwiY32fk1uZnV5QXJ6S0s3ZXd0ZXNPNEdHLXBhbE-JFb21xWmQwblg4Z1JGOVIKQTQ?usp=sharing>

As for international conferences and seminars followed by students of UPME as follows:

- Digital Learning Material Development Using Whiteboard Animation By Southeast Asian Ministers Of Education Organization Regional Open Learning Center (2019) - Yaffi Tiara Trymelynda
- Seminar Internasional Pendidikan Multikultural Dalam Menangkal Gerakan Islamisme Radikal By Uinsa (2018) - Yaffi Tiara Trymelynda

- Holiday Be Ready - 8 July 2020 - Citra Cahyaning Pertiwi
- Personal Branding - 14 July 2020 - Citra Cahyaning Pertiwi
- Don't Afraid To Be A Leader - 20 July 2020 - Citra Cahyaning Pertiwi
- International Seminar On Innovation In Mathematics And Mathematics Education- Amirul Khumaini Sholli
- Singapore Teacher Training Workshop – 2017 - Nindya Waspaning Dyah
- Professional Development For Mathematics Educators-2020 - 7 - 13 November 2020- Mayang Purbaningrum
- Be Successful World-Wide Minded With Scholarship - 30 September 2018
- Webinar Internasional Dunia Kampus Bertema “Technische Universitat Dresden, Germany” (2020)- Rafika Kamila Sari
- Webinar Internasional Dunia Kampus Bertema “Gifu University, Japan” (2020) - Rafika Kamila Sari
- Webinar Internasional Dunia Kampus Bertema “Southern Illinois University Carbondale, Usa” (2020)- Rafika Kamila Sari
- International Webinar “ Set Up Your Mind To Be Young Entrepreneur” (2020) - Rafika Kamila Sari
- Seminar Internasional Bertema “ Personal Branding” (2020) - Rafika Kamila Sari
- Webinar Internasional “Reach Your Dream, Write Your Drama” (2020) - Rafika Kamila Sari
- International Conference On Mathematical Sciences And Technology – 2020 - Lintang Meyta Fitriani
- International Seminar On Mathematics Teaching And Learning – 2019 - Lintang Meyta Fitriani
- Upba International Seminar And Education Exhibition-2016 - Elok Kartika Sari
- Seminar Program Millenials Intrepreneur Summit Singapore 2018 - Nikmatus Savira Aprilianda

Link certificate of seminar: <https://drive.google.com/drive/folders/0Bz9Fs3XwiY32fmdrZm5sVmNLNjBFbUx4Y1JyNmR0RU9XUTFGaiB-pRk12MHhNeUZqa3BEc2M?usp=sharing>

UPME also supports its students in other academic activity including publication on proceeding and indexed journal. Students list of publication can be found in <https://ejournal.unesa.ac.id/index.php/mathedunesa/issue/archive> and other journals or proceeding as follow:

- Proceedings of the International Conference on Research and Academic Community Services (ICRACOS 2019) - 2019 - Exploring The Correlation Between Mathematics Student Teachers' Proficiency and Their Self-Efficacy in Teaching at International School - <https://www.atlantis-press.com/article/125931372.pdf>
- Journal of Physics: Conference Series-2020-Guardian high school student's conception about mathematics as sensible - <https://iopscience.iop.org/article/10.1088/1742-6596/1581/1/012031/pdf>
- MATHedunesa (Jurnal Ilmiah Pendidikan Matematika) - Volume 8 No. 2 Tahun 2019 - Critical Thinking Processes Of Junior High School Students In Solving Contextual Problems Of Direct And Inverse Proportions Based On Reflective-Impulsive Style - <https://jurnalmahasiswa.unesa.ac.id/index.php/mathedunesa/article/view/28326/25912>
- Journal of Physics: Conference Series - 1417 - 012063 - 2019 - Student Teachers' Construction of Mathematical Theorem of Set and Cardinality - <https://iopscience.iop.org/article/10.1088/1742-6596/1417/1/012063/pdf>
- MUST-5-2-2020-Giving Question as Scaffolding to Help Student in Constructing Proof - <http://103.114.35.30/index.php/matematika/article/view/5882>
- JPMI (JURNAL PEMBELAJARAN MATEMATIKA INOVATIF) - volume 1 - nomor 1 - 2021 - E-MAGMATH BERBASIS FLIPBOOK PADA MATERI HIMPUNAN DI KELAS VII SMP/MTS - <https://journal.ikipsiliwangi.ac.id/index.php/jpmi/article/view/6156/2091>
- <https://jurnalmahasiswa.unesa.ac.id/index.php/mathedunesa/search/authors/view?firstName=Alifia&middleName=&lastName=Fitranti&affiliation=Universitas%20negeri%20surabaya&country=ID>
- JRPIPM-Vol.2-No.1-2018-Analysis of Primary Students' Spatial Literacy on Reasoning - <https://journal.unesa.ac.id/index.php/jrpipm/article/view/3356/2513>
- Konferensi Nasional Penelitian Matematika dan Pembelajarannya - 2019 - Critical Thinking Processes of High School Students in Solving Direct and Inverse Proportions - <https://publikasiilmiah.ums.ac.id/handle/11617/11046>
- etc.

In terms of Area of improvement with regards to International Mobility, UPME will make more cooperation with overseas university to give opportunity to have students' international mobility. In addition, UPME will prepare supports in terms of budgeting for students in joining International conferences.

b. UPPE Responses

In terms of student mobility, it is conducted mainly through credit transfer such as via Permata Sakti programme and cooperation with Tarlac Agricultural University Philippines, both are expected to be continued in the year of 2021. It is about 40% of students programmed in international student exchange and 60% of students programmed in Indonesian student exchange (PERMATA SAKTI). The university has a mechanism to ensure the quality of courses taken outside the institution. The courses are programmed by sending college students through a cooperation mechanism with all universities throughout Indonesia and universities abroad. The score and proportion of credit obtained by students who take students in exchange Programmes to other universities through the collaboration programme conducted by Unesa can be recognized after obtaining approval from the study programme.

It will be stated that evidence of student exchange and transfer credit has been carried out by UPPE both with domestic and foreign universities. For domestic universities, through the PERMATA programme and Permata AMLI Programme (Indonesian LPTK MIPA Association) with:

- 1) Universitas Negeri Makassar (2019)
- 2) Universitas Syiah Kuala (2020)
- 3) Universitas Tadulako (2020)
- 4) Universitas Negeri Jakarta (2020)
- 5) Universitas Pendidikan Indonesia (2020)
- 6) Universitas Negeri Semarang (2018-2020)

Meanwhile, UPPE have also joined with foreign parties include

- 1) The Touchstone Institute in Singapore, in exploring the Cambridge curriculum (2017)
- 2) Immersion Programme at Wadi Sofia College Kelantan Malaysia (2012-2017).
- 3) The Internship Programme at the Singapore School (SIS) in Indonesia (2015 to 2019).
- 4) Student Exchange at Khon Khaen University, Thailand (2019).
- 5) Student Exchange with online learning in Tarlac Agriculture University, Philippine (2020).

Data of student exchange in 2020

No	Exchange Programme (Transfer Credit)		Name of Student	University	Courses
	International	Indonesian			
1	√		Hasna Nabila	Tarlac University	Astronomy

No	Exchange Programme (Transfer Credit)		Name of Student	University	Courses
	International	Indonesian			
2	√		Wanda Devianti	Tarlac University	Astronomy
3		√	Muhammad Dimaz Fitransyah	Universitas Pendidikan Indonesia	Teaching Materials Innovation
4		√	Anggi Aulidhia Rohmah	Universitas Pendidikan Indonesia	Teaching Materials Innovation
5		√	Anisa Kartikasari	Universitas Pendidikan Indonesia	Teaching Materials Innovation
6		√	Sharvina Yudiantika	Universitas Pendidikan Indonesia	Teaching Materials Innovation
7		√	Siti Meisiroh	Universitas Tadulako	<ul style="list-style-type: none"> • Natural Disaster Mitigation • Geographical Information System • Geography of Natural Disasters
8		√	Aretha Patricia Andriani	Universitas Negeri Jakarta	<ul style="list-style-type: none"> • Earthquake Engineering • Character building • Instructional Media
9		√	Eka Mufidatul Chusna	Universitas Negeri Jakarta	<ul style="list-style-type: none"> • Earthquake Engineering • Character building • Instructional Media

No	Exchange Programme (Transfer Credit)		Name of Student	University	Courses
	International	Indonesian			
10		√	Siti Nur Rahma	Universitas Syiah Kuala	<ul style="list-style-type: none"> • Physics in the Quran • Nano Technology • Ethology

Furthermore, in 2021 UPPE will invite more visiting lectures and initiate more international exchange programmes. UPPE will extend the collaboration with international schools in Indonesia, other ASEAN countries, and around in the world. We progress to make a collaboration with National Dong Hwa University Taiwan, Mahidol University Thailand, and The Australian National University. The program planned includes the academic mobility of students and lecturers.

c. UPCE Responses

FMNS carries out several activities to increase student mobility abroad through the immersion programme or through credit transfer such as via Permata Sakti programme and cooperation with universities abroad. The courses are programmed by sending college students through a cooperation mechanism with all universities throughout Indonesia and universities abroad. The score and proportion of credit obtained by students who take students in exchange programmes to other universities through the collaboration programme conducted by Unesa can be recognized after obtaining approval from the study programme.

No	Exchange Programme/ Student Mobility	Name of Student	University	Courses/ Programme	Year
1	International	Nurul Auliya	Khon Kaen University, Faculty of Education, Thailand	<ol style="list-style-type: none"> 1. Technology-enabled Active Learning for Gen Z Learners in School Education 2. CASCAP Project: Parasite Hunts 3. Education for The Next Generation 	2018

No	Exchange Programme/ Student Mobility	Name of Student	University	Courses/ Programme	Year
				4. English: Board Game 5. STEM	
2	International	Rezi Ulya Fauziah	Beijing University of Chemical Technology, People's Republic of China	BUCT International Summer Camp for Science and Technology Innovation 1. Basic of Chemistry, 2. Overview Advance of Chemistry Engineering, 3. Culture of China	2019
3	International	Kuni Abidatul Mahmudah	Khon Kaen University, Thailand	1. Analysis of Development and Planning 2. English for communication and cultural exchange 3. Management information system for decision making 4. Socio economic and political systems of ASEAN countries 5. Analysis of Development and planning	2019
4	Indonesia	Kuni Abidatul Mahmudah	Universitas Udayana, Indonesia	1. Organic Farming 2. Sustainable Agriculture Systems	2020
5	Indonesia	Nimatul Zahro	Universitas Halu Oleo, Indonesia	1. Marine natural chemicals 2. Nutrition and marine life food 3. Natural Resources Conservation Law	2020
6	Indonesia	Kholifatur Rosyidah	Universitas Negeri Padang, Indonesia	1. Development of e-learning 2. Chemical multipresentation	2020

No	Exchange Programme/ Student Mobility	Name of Student	University	Courses/ Programme	Year
				3. Conflict resolution	
7	International	Aulia Prata-madita	Tarlac Agricultural University, Philippine	1. Biochemistry 2. Technology for teaching and learning 1 3. Environmental Science	2020
8	International	Sanih Gholiyah	Tarlac Agricultural University, Philippine	Environmental Science	2020

d. UPBE Responses

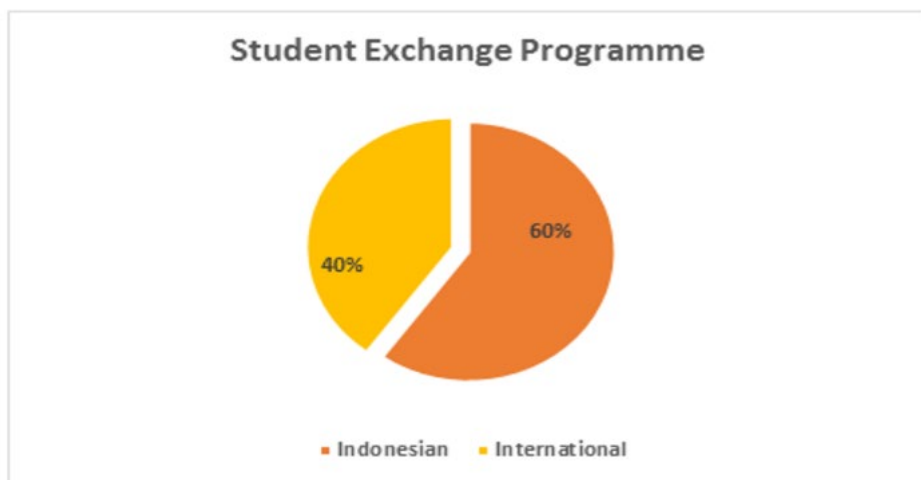
On the matter of student mobility, it is conducted mainly through credit transfer such as via Permata Sakti programme and cooperation with Tarlac Agricultural University Philippines, both are expected to be continued in the year of 2021.

Table below shows the name of the student, partnering university, and courses student programmed. About 40% of students programmed in international student exchange and 60% of students programmed in Indonesian student exchange (PERMATA SAKTI). The university has a mechanism to ensure the quality of courses taken outside the institution. The courses are programmed by sending college students through a cooperation mechanism with all universities throughout Indonesia and universities abroad. The score and proportion of credit obtained by students who take student in exchange Programmes to other universities through the collaboration programme conducted by Unesa can be recognized after obtaining approval from the study programme.

Data of Student Exchange Programme

No	Exchange Programme (Transfer Credit)		Name of Student	University	Courses
	International	Indonesian			
1	√		Jadsna Rohma Hanida	Tarlac University	Cell and Molecular Biology

2	√		Shinta Nadya Mega Ariestya	Tarlac University	Environmental Sciences
3		√	Heliza Amalini	Gorontalo State University	Bioenergy Technologies
					Integrated Natural Sciences and Environmental Science Technology
4		√	Ervi Ifadah	State University of Padang	E-Learning Development Courses
					Supply Chain Management
5		√	Ilfi Choiru Rohmatin	Halu Oleo University	Coastal Geography
					Food and Marine nutrition
					Natural Resources Conservation and Environmental Law



Student exchange distribution

e. UPSE Responses

Until now, the UPSE students' opportunity to leave the country is still meager, namely only two students per year, such as Tarlac Agriculture University in the Philippines. To

increase students' opportunities in an international learning programme, UPSE should build more networking overseas institutions. Some of the programmes that UPSE has planned in 2021 are listed in the following table:

Year	Activities	Objective
2021	Invite guest lecturer	Online lecturing with Professor of Science Education from Mumbai India for UPSE students
	Participating in international seminar/conference	Students participate in the international seminar or conference in Indonesia
	Internship	Tarlac Agriculture University/Other universities in ASEAN
	Participating in more scholarship	ASEAN or other countries
2022	Invite guest lecturer	Online lecturing with Professor of Science Education from Turkey for UPSE students
	Participating in international seminar/conference	Students participate in the international seminar or conference in Indonesia
	Internship	Tarlac Agriculture University/Other universities in ASEAN
	Participating in more scholarship	ASEAN or other countries

Criterion 2.2 Work load and credits

FMNS is grateful for the assessment and analysis regarding workload and credit carried out by Peers. The peers suggested that UNESA check the ECTS point calculation. UNESA appreciated the suggestion and responded by developing ECTS guidelines. The UNESA ECTS Guidelines can be accessed via <http://fmipa.unesa.ac.id/pedoman-ects/>. In addition, improvements were also made to the module. The following are responses to suggestions from peers.

In Unesa 1 credit unit (CU) or 1 SKS equal to 1.59 ECTS according to the Rector Decree No. 598/UN38/HK/AK/2019 dated June 6th, 2019 ([Appendix 1](#)). The minimum workload of the Undergraduate Program at Unesa is 144 CU which corresponden to 5.712

hours or 228.96 ECTS. The total hour per semester is 714 hours. The normal workload for each regular semester is limited to 793.33 hours corresponds to 20 CU (31.8 ECTS). In other hand, 1 CU equal to 170 minutes per week (National Higher Education Standards). In one semester, courses are conducted in 14 weeks (excluding mid- and end-term exam). Thus, 1 CU equals to 39.67 workhours per semester. One CU equals to 1.59 ECTS, it is noted that 1 ECTS equals to 25 workhours per semester.

In UPME, UPCE, UPBE, and UPSE students are required to complete 144 CU (228.96 ECTS). In UPPE students are required to complete 145 CU (equivalent to 230.55 ECTS). The amount of credit still meets the criteria or requirements of the university and government, which requires a minimum of 144 CU for the undergraduate level.

Peers suggest asking students directly about student experiences related to thesis workload. FMNS is grateful for the consideration given by the peers regarding the thesis workload. The thesis for the undergraduate programme has a workload of 6 CU (9.54 ECTS). The activities students do in the final project/thesis are including; preparation of proposals and instruments, data collection, literature studies, consultation with supervisors, and writing thesis manuscripts – each of which is done by students in equal time allocation. The following is the response from each undergraduate programme.

a. UPME responses

The following indicates the results of the survey participated by 37 respondents. The survey examines students' experiences regarding total time and adequacy in completing the thesis, the opportunity to take other courses besides the thesis at the same time, the adequacy of the number of credit units provided by UPME for completion of the thesis, strategy for completing the thesis in a timely manner, experience in writing a thesis, availability and adequacy of the number of theses advisor, and constraints in completing the thesis (<http://pendidikan-matematika.fmipa.unesa.ac.id/page/student-survey>).

The survey results show that students think that the thesis load of 6 credits is worth the time for completing their thesis. (6 credits mean 6 x 100 minutes of consultation, 6 x 70 minutes of structured activities for 16 weeks, for a total of 272 hours per semester). It is indicated by the majority of respondents (91.7%) agreed with the number of credit units provided by UPME for thesis. In addition, they agreed that they spent more than four hours a day working on their thesis (43.2%). Regarding the role of the thesis advisor, all agree that the role of the thesis advisor is very helpful in the process of finalizing the thesis, for example in terms of the availability of time to guide, preparation of research ideas, collecting research data, to writing in the form of a thesis and scientific article format. To complete their research project in their thesis, they use a lot of strategies

such as making good time management, increasing scientific references and discussing with lecturers and peers. Even so, they also encountered obstacles, especially in completing research projects during the pandemic, such as in terms of communication with lecturers, thesis advisors, and colleagues, constrained due to social distancing, as well as determining and taking research subjects that involved a lot of schools, which in this pandemic era There are many new adjustment rules regarding research data collection policies in schools to comply with the Covid-19 protocol.

b. UPPE responses

The UPPE has asked students' opinions regarding thesis workload. Students had asked for their opinion regarding this credit unit number, which in response 98% or respondents said that they agree that 6 CU (9.54 ECTS) is appropriate load for the final project.

c. UPCE responses

For the thesis, UPCE students carry out several activities such as: literature studies, preparation of proposals and instruments, data collection, consultation with supervisors, and writing thesis manuscripts. Each activity is carried out in accordance with the allocated time so that it is in accordance with the workload in the thesis course. A student who programs a course thesis will have a workload of 6 CU or 9.54 ECTS.

This is also in accordance with the results of the questionnaire given to students, where as many as 98,7% of students stated that they did not feel burdened by the workload in the thesis course because it was in accordance with the activities carried out in that course.

d. UPBE responses

The UPBE asked students' opinions regarding the number of thesis unit credits. Students had asked of their opinion regarding this credit unit number, which in response 93% or respondents said that they agree that 6 CU (9.54 ECTS) is appropriate load for the final project.

e. UPSE responses

We also acknowledge Peers of ASIIN for the consideration of thesis workload. We are pleased to inform you that the current thesis is the university subject with a workload of 6 CU (9.54 ECTS). However, the UPSE also initiative plan to evaluate the workload of the thesis by asking students using a questionnaire to identify students' spent time for conducting the thesis. The questionnaire questions regarding the actual thesis workload measurement available in [Appendix 2](#). The survey is also available online in the Undergraduate Program in Science Education webpage: <http://pendidikan-sains.fmipa.unesa.ac.id/page/students-survey>. The survey involved 46 students

who are conducting thesis research. The results of the survey show that 82.6% of students indicated that 6 CU (9.54 ECTS) is worth the time they spent completing the thesis.

Criterion 2.3 Teaching methodology

FMNS would like to thank Peers for the assessment and analysis related to teaching methodology. Various learning methods have been applied at FMNS to achieve learning outcomes in each undergraduate programme. Peers considers the teaching methods and instruments appropriate to support students in achieving the desired learning outcomes. FMNS appreciates the suggestions given by assessors about practical activities that allow students to become familiar with academic research methods. Regarding these suggestions, there is some information that we can convey.

a. UPME responses

There are several courses that use project/research based in UPME such as Research Methodology, Contextual Mathematics, School Mathematics Curriculum, Mathematics Learning Media, Inovative Learning 1, Innovative Learning 2, Microteaching, Seminar, Internship, Ethnomathematics, Scientific Writing, Visual Programming, Digital Literacy, Entrepreneurship, E-Learning, History of Mathematics, Thesis.

b. UPPE responses

There are several project/research-based courses at UPPE that allow students to become familiar with academic research methods such as Physics Experiment I, II and III; Innovative Learning Planning; Research Methodology; Seminar; Microteaching; Introduction to School I and II; and Thesis. In several elective courses also use a project-based approach, such as Physics Local Wisdom; Advanced Innovative Learning; STEAM Learning; Measurement and Instruments of Physics Education, Physics Communication and Media Analysis, Physics of Photography, and Physics Literacy.

c. UPCE responses

There are several educational courses at UPCE that are project / research based, such as Research Methodology, Seminars, Thesis, Microteaching, School Field Programs, and Learning Media. There are also non-educational subjects such as Industrial Chemistry and Cosmetics. In addition, several courses are also conducted based on scientific methodology, for example practicum courses or courses that use laboratory activities, such as Basic Chemistry 1 and Basic Chemistry. UPCE will always improve the development of learning methods to further improve graduate outcomes.

d. UPBE responses

In the UPBE, several courses implemented project-based research as one assessment, such as in Animal Systematic, Plant Systematics, Plant Structure and Development, Natural Resources Conservation, Innovative Learning II, and Animal Reproduction. In this course, students were trained to find the research problem by themselves, make a hypothesis, make a research design, collect data, analysis, and conclude. On the other hand, the scientific method is experienced during practical work too. So, students in the UPBE trained in laboratory works and project-based research to implement the scientific method.

e. UPSE responses

We acknowledged to ASIIN Peers for suggestions regarding teaching methods. UPSE applied various teaching and learning methodologies based on constructivist paradigm and context-based learning approaches. For example, courses that used project-based research are Natural Resources Conservation, project-based learning for Innovative Learning 1 and Innovative Learning 2, and Science, environment, technology, and society, and electricity and magnetism. Other example is inquiry-based learning and scientific approach for Living cell and household chemistry, and classroom discussion for learning theory. Context-based learning are also used for introduction biochemistry and introduction to biotechnology. However, some courses still used conventional method and laboratory-based learning, for example introduction chemistry, introduction to biology, introduction to physics. These teaching methods can be seen in module handbook and SAR of UPSE. However, in the future we have a commitment to improve the implementation quality of teaching methods in UPSE courses. We also will develop research-based teaching for more courses by improving lecturers' ability in conducting research.

Criterion 2.4 Support and assistance

FMNS would like to thank Peers for the assessment and analysis regarding support and assistance. FMNS will always optimize the role of academic advisors to support students in achieving learning outcomes and completing their studies. The advice given by the academic supervisor three times in one semester will help students during their studies. Students will get a thesis supervisor while working on their thesis. Thesis supervisors have a role in guiding students in completing the thesis properly.

Unesa has an academic information system (SIKADU) that can be accessed by lecturers and students. The academic information system used by Unesa will provide support for students in completing their studies.

FMNS will always maintain a good relationship between students and teaching staff so that they can create a system that can support students in achieving the desired learning outcomes. The support system that has been running well in FMNS will be maintained to support student studies.

CRITERIA 3. EXAMS: SYSTEM, CONCEPT AND ORGANISATION

Peers gave positive feed-backs in the summary of this criteria, that is, *“The peers also inspect a sample of examination papers and final theses and are overall satisfied with the general quality of the samples.”* FMNS would like to thank the Peers’ award, but FMNS (UPME, UPPE, UPCE, UPBE, UPSE) will always maintain and improve the quality of the evaluation and thesis examination.

We have two scheduled activities to control the quality of exams, namely, Internal Quality Audit and Learning Monitoring and Evaluation. The Internal Quality Audit is conducted once in a year. The Learning Monitoring and Evaluation is scheduled every semester.

CRITERIA 4. RESOURCES

FMNS is grateful for Peers’ feed-backs relating to resources in FMNS. The four study programmes (UPME, UPPE, UPCE, UPBE, UPSE) of FMNS try to respond the feed-backs in each resources criterion. The responses is explained below.

Criterion 4.1 Staff

1. Peers’ Feed-back: “Encouraging FMNS to further increase the percentage of teachers with a PhD”

Unesa has a Human Resources development programme in the 2021-2025 period. The target is 1243 lecturers with doctoral degree (total number of 1364 lectures). Below, it is provided a target of study programmes (UPME, UPPE, UPCE, UPBE, and UPSE) academic staffs with doctoral degree and professor qualification.

a. UPME Responses

We would like to acknowledge the confirmation from peers that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes. In terms of teacher’s qualification, 62.5% of the UPME lecturers already have doctoral degree. It is expected that the number of doctor will increase by 2025. In order to increase the number of lecturer to have doctoral studies overseas or Indonesia, UPME has sev-

eral plans such as: a) Provide opportunities to all lecturers to join national and international communities and activities so that all can access information regarded study, research and scholarship; b) Provide funding support for lecturers to join international conference and formulated in budget planning ; c) Provide support to improve english capability by sending lecturers to join English training.

The Target of UPME Academic Staffs with Doctoral Degree and Professor Qualification

	2021	2022	2023	2024	2025
Masters	9	9	8	8	7
Doctors	11	11	11	11	14
Professors	3	3	3	3	3

This year, one of UPME academic staff is currently undergoing doctoral programs. UPME project that he will get a doctorate in 2023 and 2 in 2025. UPME is also optimistic that it will get additional professors in 2023 and 2024 to replace a professor who will retire in 2022.

b. UPPE Responses

In 2019 we reported that, UPPE consisted of 33 faculty members. Currently, UPPE has 30 faculty members/ staff. It is noted that, three of our faculty members passed away in duration of 2020-beginning of 2021. Among them, there are still 53.33% of staff who have not had a doctoral degree. Therefore, it is necessary to plan the projections of staff development in the future as follows:

The Target of UPPE Academic Staffs with Doctoral Degree and

Professor Qualification

	2021	2022	2023	2024	2025
Masters	16	14	12	11	10
Doctors	14	16	18	19	20
Professors	5	6	7	8	9

c. UPCE Responses

As many as 22 UPCE lecturers (71%) have a Doctoral education qualification (S-3), 9 people (29%) have a Masters (S-2) education, where 4 of the nine staff are currently pursuing doctoral education. There are 7 professors, 15 associate professors (head lecturers), and 8 lecturers who teach subjects from each of the fields of chemistry and chemistry education. A target to increase doctoral degree and professor qualifications as shown in the following table.

The Target of UPCE Academic Staffs with Doctoral Degree and

Professor Qualification

	2021	2022	2023	2024	2025
Masters	8	8	5	5	3
Doctors	23	23	26	26	28
Professors	11	12	13	13	14

d. UPBE Responses

There are still 29.4% of lecturers in the Biology Department who have not had a doctoral degree. Therefore, it is necessary to plan further studies that the qualifications requirements will be fulfilled by planning in Table as follows:

The Target of UPBE Academic Staffs with Doctoral Degree and

Professor Qualification

	2021	2022	2023	2024	2025
Masters	9	8 (5 study on- process)	8 (3 study on- process)	8 (study on- process)	8 (study on- process)
Doctors	22	23	22	21	20
Professors	3	3	4	5	6

e. UPSE Responses

In 2021, the number of UPSE lecturers with doctoral degrees increased by 2, namely one from overseas (National Dong Hwa University, Taiwan) and one from within the country (Universitas Negeri Malang), bringing the number of UPSE doctoral lecturers to 8 people (42%). This number is expected to increase because currently, as many as three people pursuing doctoral degree in the *Universitas Negeri Malang*. So, in the next three years, the number of UPSE lecturers with doctoral degrees is 11 (58%). The description is tabled below.

The Target of UPBE Academic Staffs with Doctoral Degree and

Professor Qualification

	2021	2022	2023	2024	2025
Masters	11	11	11	8	8
Doctors	8	8	8	11	11
Professors	2	2	3	3	3

To increase the number of lecturers studying abroad, UPSE takes the following steps:

- 1) Provide opportunities for lecturers who have met the requirements for doctoral studies abroad or domestically.
- 2) Provide support to lecturers to improve the quality of English by providing a budget for attending English language training for lecturers in the UPSE's Budget Plan.
- 3) Helping lecturers to access information about study abroad through foreign and government scholarship programs.

2. Peers' Feed-back: "The peers notice that the research output of the academic staff members could be improved, especially concerning articles in higher ranked international journals."

a. UPME Responses

All UPME's lecturers has national and international publication. Some of them has International publication in high reputational International Journal as ranked in Q1, Q2, Q3 and Q4. Some research projects conducted by UPME lecturers during the last three years are listed in the page: <http://pendidikan-matematika.fmipa.unesa.ac.id/page/research-project>. Several publication in 2019 and 2020 can be seen in <http://pendidikan-matematika.fmipa.unesa.ac.id/page/research-publication>. Full publication from 2015 can be observed in scopus. In terms of research publication which could be improved especially concerning articles in higher ranked international journal, UPME supports lecturers in joining several academic writing workshop that held by Unesa. Unesa also provide proofreading program held by publication units for lecturers who has manuscript. Furthermore, as appreciation for lecturers who succed publish their article to reputable international Journal, Unesa provide incentives from 10 millions to 25 millions IDR (Indonesian Rupiah is the official currency of Indonesia) per article.

b. UPPE Responses

The lecturers are facilitated through various activities to improve their publication competence. UPPE still needs to improve the output of publication. Even though, based on the Scopus database, UPPE performed top rank publication among study programmes of UNESA. The following are the summary of the data.

List of International Publication (2019-2020) (Scopus database)

Year	Number of Article in Journal (Q1, Q2, Q3, Q4)	Number of Article in Pro- ceeding

2019	15	63
2020	16	38
Total	31	101

Among 31 articles in journal, the publication of lecturers' scientific articles in Scopus publication Q1 (6%); Q2 (48%); Q3 (27%) and Q4 (19%) that needs to be improved. The list of publications of UPPE in the last two years is grouped in a link <http://bit.ly/36Tdnv6>.

In future, several plans are made for the purpose of increasing visibility of lecturer's works and publications:

- 1) Increase of programs to support visibility of staff work and publication both national and internationally, for example joining more conferences and seminars, also publishing research profiles of each staff in the study programme website.
- 2) Addition of funds invested for laboratory facilities and work safety.
- 3) Increased cooperation with various domestic agencies and increased student and staff mobility, and writing formal regulation as guidebook for guide of implementation.

c. UPCE Responses

The following are the data summary of UPCE publication in Q1, Q2, Q3, and Q4 ranked Journals and indexed proceedings.

List of International Publication (2019-2020) (Scopus database)

Year	Number of Article in Journal (Q1,Q2,Q3,Q4)				Number of Article in Proceeding	Number of Article
	Q1	Q2	Q3	Q4		
2018	0	6	10	3	19	38
2019	1	8	4	2	11	26
2020	2	7	0	0	7	16
Total	43				37	80

UPCE always forces the lectures to increase lecturers' publications, through FMNS programme, namely, manuscript clinic.

d. UPBE Responses

The lecturers are facilitated through various activities to improve their publication competence. The data shows that the publication of lecturers' scientific articles in Scopus publication Q1 (23%); Q2 (18%); Q3 (14%) and Q4 (45%) that needs to be improved.

In future, several plans are made for the purpose of increasing visibility of lecturer's works and publications:

1. Increase of programs to support visibility of staff work and publication both national and internationally, for example joining more conferences and seminars, also publishing research profiles of each staff in the study programme website.
2. Addition of funds invested for laboratory facilities and work safety.
3. Increased cooperation with various domestic agencies and increased student and staff mobility, and writing formal regulation as guidebook for guide of implementation.

e. UPSE Responses

Since 2014, UPSE lecturers who already have doctoral degrees have been actively participating in activities to improve their manuscript writing skills for publication in reputable international journals. Unesa has provided manuscript clinic programs, such as: dispatching lecturers abroad (such as Australia) to take short courses on academic writing at IELI (Flinders University) and several other countries. Also, Unesa brings overseas academic writing experts (The Ohio State University) for manuscript clinics. As a result, some lecturers have succeeded in publishing in highly reputable international journals indexed by Scopus Q1, such as Journal of Research in Science Teaching (Willey & Sons) and International Journal of Science and Mathematics Education (Springer). In addition, several publications in international journals indexed by Scopus Q2 and Q3. To encourage lecturers to be motivated to publish in international journals, Unesa provides incentives for lecturers who successfully publish in high impact international journals indexed by Scopus Q1, Q2, Q3, and Q4.

In addition, UPSE has also provided proofreading assistance since 2020, which is currently being reviewed in highly reputable international journals (Q1 or Q2) and manuscript writing workshops. However, it is challenging to implement due to the

pandemic. In 2021, we reprogram and have already allocated it in the UPSE's Budget Plan.

Year	Program	Number	Budget Sources
2020	Proofreading for publish preparation in high impact journals	3 manuscripts	UPSE's Budget Plan
	Manuscript clinic	UPSE lecturers (19)	UPSE's Budget Plan
2021	Proofreading for publish preparation in high impact journals	5 manuscripts	UPSE's Budget Plan
	Manuscript clinic	UPSE lecturers (19)	UPSE's Budget Plan

The UPSE proofreading program and manuscript clinic workshops and Unesa incentives can increase the motivation and research capabilities of UPSE lecturers to publish their scholarly works in international journals with high impact in the future. Currently, every UPSE lecturers are writing manuscript for participating in UPSE manuscript clinic. Manuscripts aided by UPSE proofreading program are attached in a link <http://bit.ly/3aNZnnC>. Then, Article publication that has received an incentive from Unesa are listed in a link <http://bit.ly/3q5eVd2> (Publication in international journal (Scopus indexed Q3 and Q4), and articles published were as Co-Authors and International journal based on serial conferences (Scopus indexed) are not included in this response).

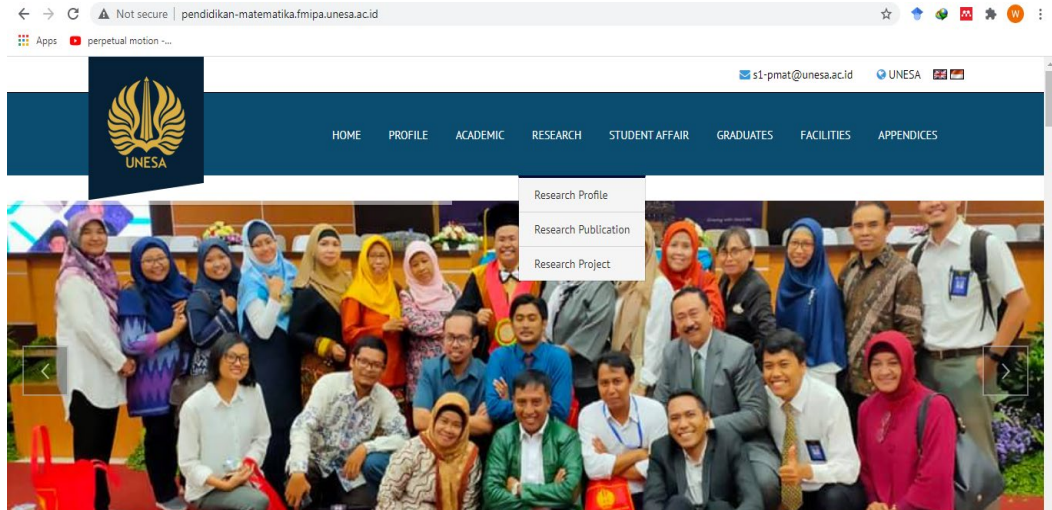
- 3. Peers' Feed-back:** "In addition, the existing research activities should be made more visible (e.g. by publishing them on the English webpage of the respective degree programme)."

Website of UPME, UPPE, UPCE, UPBE, and UPSE have already provided a menu of Research. Each website of the study programmes has at least two settings of language, Bahasa Indonesia and English (the settings are placed in the top right corner of the website). the detail of each website is mentioned below.

a. UPME Responses

Below, the home display of UPME website with the menu of Research

E Comment of the Higher Education Institution (10.02.2021)

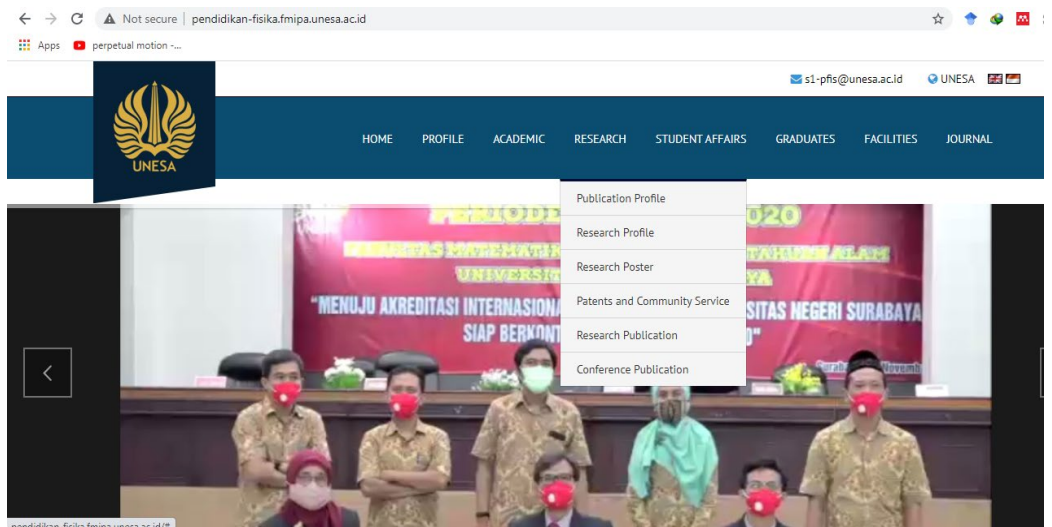


The detail of sub-menus of Research are listed in the Table below.

Sub-menus of Research	Link address
Research Profile	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84202&view=overview
Research Publication	http://pendidikan-matematika.fmipa.unesa.ac.id/page/research-publication
Research Project	http://pendidikan-matematika.fmipa.unesa.ac.id/page/research-project

b. UPPE Responses

Below, the home display of UPPE website with the menu of Research

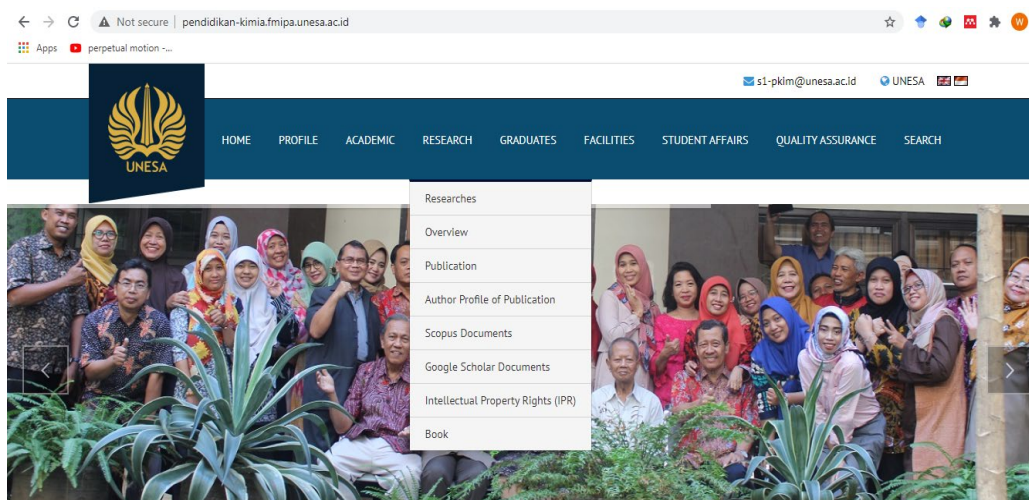


The detail of sub-menus of Research are listed in the Table below.

Sub-menus of Research	Sub of Sub-menu	Link address
Publication Profile	Overview of Publication Profile	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84203&view=overview
	Author Profile	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84203&view=authors
	Scopus Documents	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84203&view=documentsscopus
	Google Scholar Documents	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84203&view=documents
	IPR	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84203&view=ipr
	Books	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84203&view=books
Research Profile	-	http://pendidikan-fisika.fmipa.unesa.ac.id/page/profil-penelitian
Research Poster	-	http://pendidikan-fisika.fmipa.unesa.ac.id/page/poster-penelitian
Patents and Community Service	-	http://pendidikan-fisika.fmipa.unesa.ac.id/page/paten-dan-pengabdian-masyarakat
Research Publication	-	http://pendidikan-fisika.fmipa.unesa.ac.id/page/publikasi-penelitian
Conference Publication	-	http://pendidikan-fisika.fmipa.unesa.ac.id/page/conference-publication

c. UPCE Responses

Below, the home display of UPCE website with the menu of Research



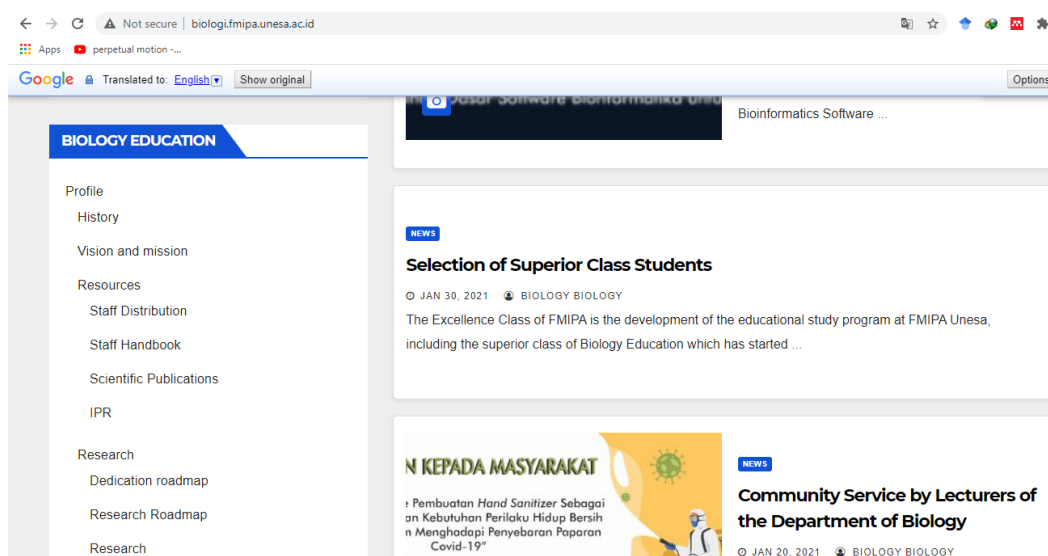
The detail of sub-menus of Research are listed in the Table below.

Sub-menus of Research	Sub of Sub-menu	Link address
Research	Research of UPCE Lecturers	http://pendidikan-kimia.fmipa.unesa.ac.id/page/research-of-upce-lecturers
	Research of UPCE Students	http://pendidikan-kimia.fmipa.unesa.ac.id/page/research-of-upce-students
Overview	-	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84204&view=overview
Publication	-	http://pendidikan-kimia.fmipa.unesa.ac.id/page/publication
Author Profile of Publication	-	http://pendidikan-kimia.fmipa.unesa.ac.id/page/author-profile-of-publication
Scopus Documents	-	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84204&view=documentsscopus

Sub-menus of Research	Sub of Sub-menu	Link address
Google Scholar Documents	-	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84204&view=documents
Intellectual Property Rights (IPR)	-	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84204&view=ipr
Book	-	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84204&view=books

d. UPBE Responses

Below, the home display of UPBE website with the menu of Research



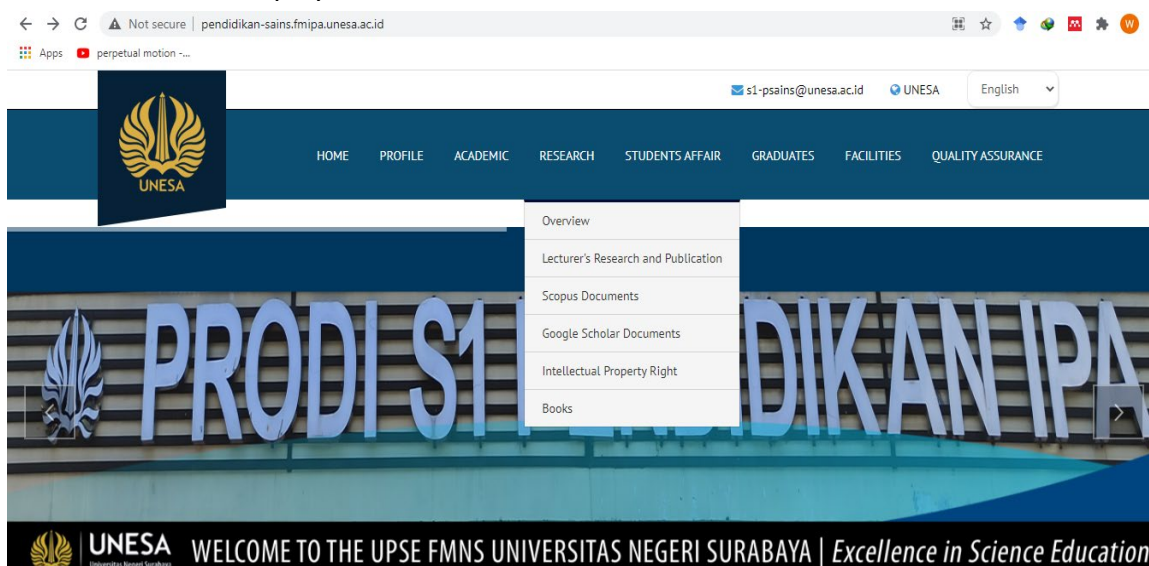
The detail of sub-menus describing research activities are listed in the Table below.

Sub-menus of Research	Link address
Staff Handbook	http://biologi.fmipa.unesa.ac.id/staff-handbook/
Scientific Publications	http://biologi.fmipa.unesa.ac.id/publikasi-ilmiah/

Sub-menus of Research	Link address
IPR	http://biologi.fmipa.unesa.ac.id/haki/
Research Roadmap	http://biologi.fmipa.unesa.ac.id/roadmap-penelitian/
Research	http://biologi.fmipa.unesa.ac.id/penelitian/

e. UPSE Responses

Below, the home display of UPSE website with the menu of Research



The detail of sub-menus of Research are listed in the Table below.

Sub-menus of Research	Link address
Overview	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84201&view=overview
Lecturer's Research and Publication	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84201&view=authors
Scopus Documents	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84201&view=documentsscopus

Sub-menus of Research	Link address
Google Scholar Documents	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84201&view=documents
Intellectual Property Rights	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84201&view=ipr
Book	https://sinta.ristekbrin.go.id/departments/detail?afil=499&id=84201&view=books

UPSE continue to improve the UPSE website's quality by adding information on the performance and achievements of lecturers and students in the field of research and international publications, seminars, and conferences, especially at international and national levels.

The UPSE always socializes international activities organized by professional organizations (e.g., the National Association for Research in Science Teaching or NARST and the publisher of the American Chemical Society or ACS) because one of the UPSE lecturers (i.e., Prof. Dr. Erman, M.Pd.) is a NCE member of NARST (Member ID 1012796) since 2016 and Reviewer Journal of Chemical Education published by ACS. The socialization aims to provide opportunities for all lecturers to participate in international activities for the development of science education through the UPSE website.

Criterion 4.2 Staff development

FMNS and Unesa would like to thank Auditors/Peers award a positive summary in terms of staff development, that "Unesa offers sufficient support mechanisms and opportunities for members of the teaching staff who wish for further developing their professional and teaching skills." Moreover, FMNS and Unesa always try to increase budget and support all staffs to follow training, seminar/conference, workshop, and other programmes relating staff development every year. Also, young lecturers of FMNS are encouraged to pursue doctoral studies in abroad.

Criterion 4.3 Funds and equipment

- 1. Peers' Feed-back:** "Only some laboratories are shown in the videos and especially the scope and design of the safety standards remain unclear (material and surface quality of the working benches, safety goggles, gloves, eye showers, fire extinguishers, emergency exits, chemical-proof cabinets, first-aid kits, gloves, ventilation system (quantitative information such as air exchange rates achieved both in the overall lab and in the fume hood would be required), fume hoods, etc.)."

UPME, UPPE, UPCE, UPBE, and UPSE try to provide a new video of the safety standard to make clearly. Each video of the study programmes are attached in the webpage of FMNS, <http://fmipa.unesa.ac.id/safety-standard-in-fmns/>.

- 2. Peers' Feed-back:** "the peers point out that it is necessary to assess the technical infrastructure, safety measures, and facilities onsite at FMNS. A team of at least one expert together with an ASIIN programme manager should visit FMNS in order to confirm the impression that the infrastructure, the technical equipment and the safety measures meet the required standards."

FMNS and UNESA would be grateful for your upcoming visit to our university.

- 3. Peers' Feed-back:** "the peers notice that the library opening hours are rather short (the central library closes at 3pm or 4pm in the afternoon). For this reason, they recommend extending the opening hours of the library so that students can better learn and study there."

Thank you for this recommendation, FMNS have coordinated with the Rector and head of the central library Unesa to extend offline service hours to students and lecturers. As a result, The library opening hours has been extended as announced in the webpage of library (<https://library.unesa.ac.id/>) since February 2021. The official circular of extended offline service hours also has been uploaded in the webpage (https://statik.unesa.ac.id/profileunesa_konten_statik/uploads/per-pustakaaan/file/4408de96-a12a-4da6-a23c-8cc09e3ed515.pdf). The library has been opened for all days in a week (before the extended opening hours, the library only open for 5 days in a week, Monday-Friday). The details of opening hours are listed below.

	Library	Opening Hours
Offline Service	Central Library (UNESA, Lidah Campus)	Monday-Friday: 08.30am – 03.00pm

		Saturday & Sunday: 08.30am – 11.30am
	Central Library (UNESA, Ketintang Campus)	Monday-Friday: 08.30am – 03.00pm Saturday & Sunday: 08.30am – 11.30am
Online Service	Central Library	24 hours (non-stop)

5. CRITERIA 5. TRANSPARENCY AND DOCUMENTATION

FMNS Unesa would like to thank the peers for their recommendations and positive appreciation of the UPME, UPPE, UPCE, UPBE, and UPSE. FMNS will always evaluate and improve the quality and relevant information of improvements webpage in each study program. The relevant information about the degree programmes at FMNS Unesa is available on the homepage. The Module handbook has been updated at link below.

Table 5.1 Update Link of the Module Handbook

No	Undergraduate Programme	Link
1	UPME	http://pendidikan-matematika.fmipa.unesa.ac.id/page/module-handbook
2	UPPE	https://drive.google.com/drive/folders/17ReFDtN-HEg4SJ_92dcH3Atnr-KB8URLo .
3	UPCE	http://pendidikan-kimia.fmipa.unesa.ac.id/page/module-handbook .
4	UPBE	http://biologi.fmipa.unesa.ac.id/module-handbook/
5	UPSE	http://pendidikan-sains.fmipa.unesa.ac.id/page/module-handbook

Unesa has developed guidelines to explain the procedure for how to credit transfer and international student exchange for making studies more transparent and thus helping to enhance the quality of higher education. The credit equivalent (Credit Unit) applied by Unesa toward the European credit transfer system can be seen in

<https://www.unesa.ac.id/files/e6fc057f25b17608b06c4abe1cfecff0/THE%20CONVERSION%20OF%20NATIONAL%20CREDIT%20SYSTEM%20TO%20EUROPEAN%20CREDIT%20TRANSFER%20SYSTEM.pdf>.

Unesa Academic Guidelines can be seen in <http://bakpk.unesa.ac.id/page/buku-pedoman-tahun-2019>. We also can access instructions how to use the credit table in this web. Unesa uses a queuing system for making document easier to support the process of taking diplomas and transcripts for student diplomas through the SIANI application. Guidelines for using the SIANI application can be seen at the link <http://bakpk.unesa.ac.id/post/permudah-pengambilan-ijazah-mahasiswa-unesa-gunakan-aplikasi-siani>.

a. UPME

(comments/responses, supporting documents, and area improvement)

We would like to appreciate to peers for the positive point and recommendation. We make several improvement in our website so that students can observe any information available in it. In terms of curricular map, UPME keeps continue to make improvement in quality through several Focus Group Discussions and those are already planned and budgeted in 2021. The updated information regarding UPME curriculum can be seen in the following link: <http://pendidikan-matematika.fmipa.unesa.ac.id/page/curriculum>.

b. UPPE

(comments/responses, supporting documents, and area improvement)

We would like to acknowledge that UPPE is being used as a role model for other undergraduate programs for the study plans (curricular map) that include the electives, the internship, and the awarded CSU and ECTS points of each course. The UPPE curricular map will continue to be improved in quality through several FGD activities and workshops involving lecturer staff and curriculum board members. Every year, we have budgeted in the RBA for self assessment activities to evaluate the curriculum structure.

We have made improvements in the form of changes to the module handbook which contains information related to the workload, here is the updated link module handbook

https://drive.google.com/drive/folders/17ReFDtNHEg4SJ_92dcH3Atnr-KB8URLo.

c. UPCE

Improvements to the Module Handbook and the Website The handbook module in UPCE has provided detailed information about the calculation of the final grade and the total student workload in credits and ECTS according to the existing template. Regarding the possibility that some documents do not include detailed information on this matter, the UPCE would like to thank them for the existing corrections and observations. UPCE will further standardize the existing handbook module documents. This includes documents on the web. UPCE has made improvements to the handbook module and website. Here is the updated link curriculum UPCE <http://pendidikan-kimia.fmipa.unesa.ac.id/page/curriculum>.

d. UPBE

We appreciate deeply the input and recommendation of the ASIIN peers. We will try to improve ease of access of students to information and details of information available on our module handbooks. We will also make various improvement in our website so that any information students have to know and need available on it. In addition to making a specific line for information inquiry for roadmap curriculum UPBE. <https://drive.google.com/file/d/1PrrZatecbpDhB-WR4A9-jJFoFLjtx3I/view?usp=sharing>.

e. UPSE

We would like to acknowledge that UPSE is being used as a model for other undergraduate programs for module descriptions (module handbook). The UPSE handbook module will continue to be improved in quality through several FGD activities and workshops involving lecturer staff and experts outside Unesa. Every year, we have budgeted in the RBA for self-assessment activities to evaluate course activities, including the module handbook and updates.

The guidelines of transfer of credit obtained by students who learn outside Unesa have been coordinated with all parties related to the program, such as Vice Rector for Academic Affairs, Institute for Learning Development and Quality Assurance (LP3M), Vice Dean for Academic Affairs of FMNS, and the Head of the UPSE, which in essence will be immediately followed up for effectiveness. Currently, the UPSE is also actively conducting student exchanges with other similar undergraduate programs in science education in various universities in Indonesia. Official guidelines for the program are under development as they are all aligned with government

policy, namely the Director-General of Higher Education, Ministry of Education and Culture. This activity aims to develop student competencies independently.

Information related to lecture guidelines, curriculum summaries, and the works of lecturers we are working on to display in English upload on the UPSE study program web. We thank you for the suggestions, as this will improve UPSE's international feasibility.

We thank you very much for the suggestions regarding the study plan (curricular map). We have made improvements according to peers ASIIN suggestions so that it is easy to implement effectively and efficiently. We will always review it so that it can be of optimal benefit for students. We at this moment attach these improvements. The revision of the study plan is included in [Appendix 3](#). This revise of study plan can access online through the UPSE webpage: <http://pendidikan-sains.fmipa.unesa.ac.id/page/study-plan>.

Criteria 6. Quality Management: Quality assessment and development

We are grateful for the positive feedback from peers, we will always maintain the quality assurance of FMNS to monitor and ensure the FMNS program's quality of services to students and stakeholders. To improve the quality of UPME, UPPE, UPCE, UPBE and UPSE programs, we will always carry out evaluations, developments and improvements based on existing data.

F Summary: Peer recommendations (19.02.2021)

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology Education	With requirements for one year	-	30.09.2026
Ba Chemistry Education	With requirements for one year	-	30.09.2026
Ba Mathematics Education	With requirements for one year	-	30.09.2026
Ba Physics Education	With requirements for one year	-	30.09.2026
Ba Science Education	With requirements for one year	-	30.09.2026

Requirements

For all degree programmes

- A 1. (ASIIN 1.3) All courses need to be listed in the study plans, including electives and internship.
- A 2. (ASIIN 2.2) Make sure that the awarded ECTS points comply with the students' total workload.
- A 3. (ASIIN 4.3) It is necessary to visit and assess the technical infrastructure, safety measures, and facilities onsite at UNESA.
- A 4. (ASIIN 5.2) The module descriptions need to include information about the composition of the final grade, the students' total workload, and the awarded ECTS points.
- A 5. (ASIIN 5.2) The ECTS conversion of students' workload needs to be adjusted, it should be 25h per ECTS point in all documents.

Recommendations

For all degree programmes

F Summary: Peer recommendations (19.02.2021)

- E 1. (ASIIN 2.1) It is recommended to further promote the academic mobility of the students and to cooperate with more international schools.
- E 2. (ASIIN 4.1) It is recommended to increase the research output in science (biology, chemistry, mathematics, physics) education and to make the research activities more visible (e.g. by publishing them on the English webpage).

G Comment of the Technical Committees (05.03.2021)

Technical Committee 09 – Chemistry, Pharmacy (02.03.2021)

Assessment and analysis for the award of the ASIIN seal:

The procedure was carried out as an online audit in December. However, since there are open questions regarding the safety standards in the laboratories and the technical infrastructure, a requirement for an on-site visit is proposed. In addition, the auditors find the curricula inconsistent and incomplete, the module descriptions need to be revised, and the credits awarded need to match the students' workload. Furthermore, the auditors note that the academic mobility of Bachelor's students is rather low and should be promoted by increasing the number of available places and scholarships and by establishing more exchange programmes. Finally, it must be clear how many working hours are assigned to an ECTS credit. All these points of criticism are typical for accreditation procedures in Indonesia. Overall, the Technical Committee agrees with the peers' assessment.

The Technical Committee 09 – Chemistry, Pharmacy recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology Education	With requirements for one year	-	30.09.2026
Ba Chemistry Education	With requirements for one year	-	30.09.2026
Ba Mathematics Education	With requirements for one year	-	30.09.2026
Ba Physics Education	With requirements for one year	-	30.09.2026
Ba Science Education	With requirements for one year	-	30.09.2026

Technical Committee 10 – Life Sciences (05.03.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and agrees with the peers' assessment without changing any requirements or recommendations.

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology Education	With requirements for one year	-	30.09.2026
Ba Chemistry Education	With requirements for one year	-	30.09.2026
Ba Mathematics Education	With requirements for one year	-	30.09.2026
Ba Physics Education	With requirements for one year	-	30.09.2026
Ba Science Education	With requirements for one year	-	30.09.2026

Technical Committee 12 – Mathematics (01.03.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee agrees with the assessment of the peers.

The Technical Committee 12 – Mathematics recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology Education	With requirements for one year	-	30.09.2026
Ba Chemistry Education	With requirements for one year	-	30.09.2026
Ba Mathematics Education	With requirements for one year	-	30.09.2026
Ba Physics Education	With requirements for one year	-	30.09.2026

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Science Education	With requirements for one year	-	30.09.2026

Technical Committee 13 – Physics (01.03.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the peers' vote without any changes.

The Technical Committee 13 – Physics recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology Education	With requirements for one year	-	30.09.2026
Ba Chemistry Education	With requirements for one year	-	30.09.2026
Ba Mathematics Education	With requirements for one year	-	30.09.2026
Ba Physics Education	With requirements for one year	-	30.09.2026
Ba Science Education	With requirements for one year	-	30.09.2026

H Decision of the Accreditation Commission (16.03.2021)

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

The Accreditation Commission discusses the procedure and agrees with the proposed requirements and recommendations.

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology Education	With requirements for one year	-	30.09.2026
Ba Chemistry Education	With requirements for one year	-	30.09.2026
Ba Mathematics Education	With requirements for one year	-	30.09.2026
Ba Physics Education	With requirements for one year	-	30.09.2026
Ba Science Education	With requirements for one year	-	30.09.2026

Requirements

For all degree programmes

- A 1. (ASIIN 1.3) All courses need to be listed in the study plans, including electives and internship.
- A 2. (ASIIN 2.2) Make sure that the awarded ECTS points comply with the students' total workload.
- A 3. (ASIIN 4.3) It is necessary to visit and assess the technical infrastructure, safety measures, and facilities onsite at UNESA.
- A 4. (ASIIN 5.2) The module descriptions need to include information about the composition of the final grade, the students' total workload, and the awarded ECTS points.

- A 5. (ASIIN 5.2) The ECTS conversion of students' workload needs to be adjusted, it should be 25h per ECTS point in all documents.

Recommendations

For all degree programmes

- E 1. (ASIIN 2.1) It is recommended to further promote the academic mobility of the students and to cooperate with more international schools.
- E 2. (ASIIN 4.1) It is recommended to increase the research output in science (biology, chemistry, mathematics, physics) education and to make the research activities more visible (e.g. by publishing them on the English webpage).

I Fulfillment of Requirements (18.03.2022)

Analysis of the peers and the Technical Committees (09.03.2022)

Requirements

For all degree programmes

- A 1. (ASIIN 1.3) All courses need to be listed in the study plans, including electives and internship.

Initial Treatment	
Peers	Fulfilled Vote: unanimous Justification: UNESA has updated the study plans for all degree programmes. They now include the electives and the internship.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 13	fulfilled Vote: unanimous Justification: The TC concurs with the assessment of the peers.

- A 2. (ASIIN 2.2) Make sure that the awarded ECTS points comply with the students' total workload.

Initial Treatment	
Peers	Fulfilled Vote: unanimous

	Justification: In order to make sure that the awarded CSU or ECTS points comply with the students' total workload, UNESA has included a respective question in the annual survey of students' satisfaction.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 13	fulfilled Vote: unanimous Justification: The TC concurs with the assessment of the peers.

- A 3. (ASIIN 4.3) It is necessary to visit and assess the technical infrastructure, safety measures, and facilities onsite at UNESA.

Initial Treatment	
Peers	Fulfilled Vote: unanimous Justification: The peers appreciate UNESA's great efforts in the field of lab safety. In addition, UNESA has taken up many concerns where many substantial investments in new equipment and technical systems was necessary. As for the need for an on-site visit, it still should be done under post-pandemic conditions.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 13	fulfilled Vote: unanimous Justification: The TC concurs with the assessment of the peers.

- A 4. (ASIIN 5.2) The module descriptions need to include information about the composition of the final grade, the students' total workload, and the awarded ECTS points.

Initial Treatment	
Peers	Fulfilled Vote: unanimous Justification: UNESA has updated the module handbooks. They now include all necessary information.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 13	fulfilled Vote: unanimous Justification: The TC concurs with the assessment of the peers.

- A 5. (ASIIN 5.2) The ECTS conversion of students' workload needs to be adjusted, it should be 25h per ECTS point in all documents.

Initial Treatment	
Peers	Fulfilled Vote: unanimous Justification: UNESA has corrected the respective documents.
TC 09	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 10	fulfilled Vote: unanimous Justification: The TC agrees with the peers.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peer group.
TC 13	fulfilled Vote: unanimous Justification: The TC concurs with the assessment of the peers.

Decision of the Accreditation Commission (18.03.2022)

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology Education	All requirements fulfilled	-	30.09.2026
Ba Chemistry Education	All requirements fulfilled	-	30.09.2026
Ba Mathematics Education	All requirements fulfilled	-	30.09.2026
Ba Physics Education	All requirements fulfilled	-	30.09.2026
Ba Science Education	All requirements fulfilled	-	30.09.2026

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Biology Education:

No.	Programme Educational Objectives (PEO)
1.	Graduates possess mastery of knowledge and methodology in biology and pedagogy and ability to apply them to solve issues in professional carrier.
2.	Graduates have the ability to continually develop knowledge on biology and biological education to do lifelong learning both formally and informally.
3.	Graduates possess mastery over scientific methods to observe, analyse, and understand issues in biology education and over induction and deduction
	methods and their application to support professional works.
4.	Graduates have understanding of ethics, responsibility, and leadership and ability to educate through up-to-date learning methodology.
5.	Graduates have the ability to communicate in professional activities both in national and international level.

No PLO	PLO	Competence
PLO-1	Able to demonstrate biological knowledge in molecular, cell, and organism level and interaction with their environment.	Knowledge 1 (KN 1)
PLO-2	Able to demonstrate application skills of biological concept and environmental issues with relevant technologies in the management of natural resources and environment.	Knowledge 2 (KN 2)
PLO-3	Able to demonstrate pedagogic knowledge on designing, conducting, and evaluating biology learning.	Knowledge 3 (KN 3)
PLO-4	Able to demonstrate knowledge related to research of biology education.	Knowledge 4 (KN 4)
PLO-5	Able to design, conduct, and evaluate biology learning by using information and communication technology (ICT).	Special competences 1 (SC 1)
PLO-6	Able to design and perform experiments in biology learning to collect, analyse, and interpret data to solve various issues.	Special competences 2 (SC 2)
PLO-7	Able to design problem-solving methods by implementing transferable skills in biology to develop ecopreneurship (<i>eco-innovation, eco-opportunity, eco-commitment</i>).	Special competences 3 (SC 3)
PLO-8	Able to communicate ideas, opinions, and results of study effectively, both orally and in writing.	General Competences 1 (GC1)
PLO-9	Able to make decisions based on data/information to finish tasks as part of their responsibility in works performed.	General Competences 2 (GC2)
PLO-10	Able to conduct long-life learning and working effectively, both individually and as a team, have passion for entrepreneurship and environmental care.	General Competences 3 (GC3)
PLO-11	Able to demonstrate scientific, critical, and innovative attitude in biology learnings, laboratory works, and their professional tasks.	Attitude 1 (AT 1)
PLO-12	Able to demonstrate religious and national cultural values and academic ethics in performing professional tasks.	Attitude 2 (AT 2)

The following **curriculum** is presented:

A. Compulsory Courses

Term I				Term II			
No	Course code	Course name	Credit unit	No	Course code	Course name	Credit unit
1	1000002033	Study of Pancasila	2	1	1000002024-9	Religion	2
2	1000002003	Bahasa Indonesia	2	2	8420402008	Digital literation	2
3	8420503049	General Biology*	3	3	1000002018	Civic Education	2
4	8420503134	General Chemistry*	3	4	8420502264	Physical education	2
5	8420503100	General Physics*	3	5	1000002039	Educational Psychology	2
6	8420503150	Basic Mathematics	3	6	8420503252	Learning Theories	3
7	8420503031	English	3	7	8420502047	Biochemistry*	2
				8	8420504271	Animal Structure and Development	4
				9	8420502138	Conservation of Natural Resources	2
Total credit			19 (30.21 ECTS)	Total credit			21 (33.39 ECTS)

*) integrated with practicum

Term III				Term IV			
No	Course code	Course name	Credit unit	No	Course code	Course name	Credit unit
1	8420502261	Entrepreneurship	2	1	8420504101	Animal physiology*	4
2	1000002011	Social and Cultural studies	2	2	8420504221	Plant systematics*	4
3	1000003006	Fundamentals of Education	2	3	8420502272	Curriculum analysis	2
4	8420502053	Cell Biology	2	4	8420504102	Plant physiology*	4
5	8420504226	Plant Structure and Development*	4	5	8420504108	Genetics*	4
6	8420503164	Microbiology*	3	6	8420502094	Assessment of Learning	3
7	8420502156	Biology Learning Medium	2				
8	8420502034	English for Biology	2				
9	8420502097	Philosophy of Science	2				
Total credit			21 (33.39 ECTS)	Total credit			21 (33.39 ECTS)

*) integrated with practicum

Term V				Term VI			
No	Course code	Course name	Credit unit	No	Course code	Course name	Credit unit
1	8420503011	Human anatomy and physiology*	3	1	8420502149	Laboratory Management	2
2	8420503060	Biostatistics and Biocomputer	3	2	8420503268	The field of schooling or teaching practice	3
						(PLP)	
3	8420503177	Innovative Learning I	3	3	8420502050	Molecular biology	2
4	8420503159	Research Methodology in Education	3	4	8420503179	Innovative Learning II	3
5	8420504080	Ecology*	4	5	8420502095	Evolution	2
6	8420504220	Animal systematics*	4	6	8420502273	Microteaching	2
				7	8420502219	Seminary	2
				8		Electives 1	2
				9		Electives 2	2
Total credit			20 (31.8 ECTS)	Total credit			20 (31.8 ECTS)

*) integrated with practicum

Term VII				Term VIII			
No	Course code	Course name	Credit unit	No	Course code	Course name	Credit unit
1	8420503270	Conservation biology	3	1	8420506222	Thesis	6
2	8420502062	Biotechnology*	2	2		Elective 6	2
3	8420503263	Community Service	3				
4		Electives 3	2				
5		Electives 4	2				
6		Electives 5	2				
Total credit			14 (22.26 ECTS)	Total credit			8 (12.72 ECTS)

B. Elective Courses

Uneven term (1 st term of academic year)				Even term (2 nd term of academic year)			
No	Course code	Course name	Credit unit	No	Course code	Course name	Credit unit
1	8420502176	ICT-based Learning	2	13	8420502086	Ecotoxicology	2
2	8420502045	Biogeography	2	14	8420502274	Aquaculture	2
3	8420502055	Applied biology	2	15	8420502118	Environmental science	2
4	8420502063	Aquatic ecology	2	16	8420502166	Applied microbiology	2
5	8420502110	Health, Nutrient, and Psychotropic Drugs	2	17	8420502167	Microtechnique	2
6	8420502111	Plant pests and diseases	2	18	8420502192	Waste Management	2
7	8420502113	Histology	2	19	8420502213	Plant reproduction	2
8	8420502139	Tissue culture	2	20	8420502211	Animal reproduction	2
9	8420502162	Mycology	2	21	8420502266	Algology	2
10	8420502094	Evaluation and Development of Curriculum	2	22	8420502269	Instruments development	2
11	8420502195	Research Trends in Biology Education	2	23	8420502207	Issues and Innovations in Biology Learning	2
12	8420502079	Ecophysiology	2				
Total credit of electives available				46 (73.6 ECTS)			

According to the Self-Assessment Report, the following **objectives and learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Chemistry Education:

PEO-01: Mastering in the concepts of chemistry, chemistry learning, laboratory management, scientific methods and ICT and is able to apply them to problem solving in their work.

PEO-02: A high-level thinking ability to communicate ideas verbally and in writing, ability to take the right initiatives and decisions, and lead working groups in relevant fields.

PEO-03: Ability to collaborate, be honest, and be responsible for work in the field of expertise and entrepreneurship in the field of education that is environmentally friendly (green entrepreneurship).

PEO-04: Capability to continue to develop and lifelong learning to continue education, both formal and informal

PEO-05: Ability to develop and apply chemical competences along with advances in science and technology and humanities values)

PLO-1. Capable to demonstrate knowledge related to theoretical concepts about structure, dynamics, and energy, as well as the basic principles of separation, analysis, synthesis and characterization of chemicals

PLO-2. Capable to demonstrate the pedagogical knowledge of chemistry in designing, implementing, and evaluating chemistry learning

PLO-3. Mastering the principles of occupational health and safety, managing laboratories, using the equipment and operating chemical instruments

PLO-4. Capable to design, implement, evaluate, learn and develop chemistry learning media by utilizing Information and Communication Technology

PLO-5. Applying logical, critical, systematic and innovative thinking in the context of development or implementation of science, technology, and art that regards and applies humanities in accordance with chemistry education in solving problems

PLO-6. Mastering the basics of the scientific method, designing and conducting research, writing scientific reports and communicating them both verbally and in writing by utilizing information and communication technology in the field of education

PLO-7. Capable to make decisions based on data/information in order to complete their responsibility assignment and evaluate the performance that has been done both individually and in groups, have an entrepreneurial spirit with environmental insight

PLO-8. Capable to adapt to various developments in chemistry, develop and learn continuously throughout life to continue education, both formal and informal

The following curriculum is presented

1 st Semester				
No	Code	Course Title	CU	ECTS
1	1000002018	Pancasila	20	31,74
2	1000003006	Principles of Education		
3	8420403015	English		
4	8420403039	General Biology		
5	8420403069	General Physics		
6	8420403123	Basic Chemistry 1		
7	8420403181	Basic Mathematics		

2 nd Semester				
No	Code	Course Title	CU	ECTS
1	1000002026	Religion	19	30,15
2	1000002039	Educational Psychology		
3	8420402018	English for Chemistry		
4	8420402094	Qualitative Analytical Chemistry		
5	8420402282	Physical Education and Sports		
6	8420403122	Basic Chemistry 2		
7	8420403185	Mathematics for Chemistry		
8	8420403271	Learning Theories		

3 rd Semester				
No	Code	Course Title	CU	ECTS
1	1000002003	Bahasa Indonesia	19	30,15
2	1000002033	Citizenship Education		
3	8420403012	Assessment		
4	8420403098	Quantitative Analytical Chemistry		
5	8420403141	Quantum Chemistry		
6	8420403164	Monofunction Organic Compound		
7	8420403270	School Curriculum Analysis		

4 th Semester				
No	Code	Course Title	CU	ECTS
1	8420402248	Practicum of Organic Chemistry	20	31,74
2	8420403101	Basics of Chemical Separations		
3	8420403119	Basic Theory of Inorganic Chemistry		
4	8420403140	Thermodynamics of Chemistry		
5	8420403162	Polyfunction Organic Compound		
6	8420403187	Learning Media		
7	8420403211	Innovative Learning 1		

5 th Semester				
No	Code	Course Title	CU	ECTS
1	8420402037	Structure and Function of Biomolecule	19	30,15
2	8420402190	Spectroscopy and Chromatography Method		
3	8420402275	Entrepreneurship		
4	8420403135	Chemical Kinetics		
5	8420403192	Research Methodology		
6	8420403212	Innovative Learning 2		
7	8420403261	Basic Statistics		

6 th Semester				
No	Code	Course Title	CU	ECTS
1	1000002011	Cultural Social Science Association	20	31,74
2	8420401245	Practicum of Analytical Instrument		
3	8420401246	Practicum of Biochemistry		
4	8420402114	Main Elements of Inorganic Chemistry		
	8420402171	School Chemistry		

	8420403034	Metabolism and Pathways of Genetics Information		
5	8420403168	Surface Chemistry		
6	8420403207	Laboratory Organization		
7	8420403226	Microteaching		

7 th Semester				
No	Code	Course Title	CU	ECTS
1	8420401247	Practicum of Inorganic Chemistry	18	28,57
2	8420403120	Transition Elements of Chemistry		
3	8420403249	School Field Program		
4	8420403277	Community Service		
5		Elective course		

8 th Semester				
No	Code	Course Title	CU	ECTS
1	8420406259	Thesis	18	28,57
2		Elective courses		

Electives:

Odd Semester					Even Semester				
No	Code	Course Title	CU	ECTS	No	Code	Course Title	CU	ECTS
1	8420402188	Chemistry Game Media	2	3.17	1	8420402090	Literature of Chemistry	2	3.17
2	8420402223	ICT Learning Media Development	2	3.17	2	8420401245	Practicum of Analytical Instrument	1	1.58
3	8420402224	Creative Learning Media Development	2	3.17	3	8420402105	Electrochemistry Analysis	2	3.17
4	8420402001	Food Analysis	2	3.17	4	8420402180	School Management	2	3.17
5	8420402011	Development of Assessment Instrument	2	3.17	5	8420402215	ICT-based Learning Chemistry	2	3.17
6	8420402152	Cosmetics	2	3.17	6	8420402216	Chemistry Learning for Vocational School	2	3.17
7	8420402167	Food Chemistry	2	3.17	7	8420402221	Career Development	2	3.17
8	8420403154	Environmental Chemistry	3	4.76	8	8420403168	Surface Chemistry	3	4.76
					9	8420402128	Pharmaceutical Chemistry	2	3.17
					10	8420402147	Industrial Chemistry	2	3.17
					11	8420402149	Nuclear Chemistry and	2	3.17

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Mathematics Education:

1. Able to master knowledge of mathematics and mathematics education, skills and their applications in solving problems in the field of works that support a professional career (PEO-1).
2. Responsible for understanding and applying professional ethics in carrying out duties and work (PEO-2).
3. Able to communicate and socialize in professional activities at the local, national and international levels (PEO-3).
4. Able to improve self-development continuously (both formal and informal), creatively, and become a reference in the related professions (PEO-4).

ASPECTS	PLO	CODE
KNOWLEDGE	Demonstrate mathematical knowledge and insight.	KNO-1
	Demonstrate pedagogical knowledge in designing, implementing and evaluating mathematics learning.	KNO-2
	Demonstrate knowledge related to mathematics education research	KNO-3
SKILL	Design, implement and evaluate mathematics teaching and learning by using ICT	SKI-1
	Implement basic principles of mathematics to solve simple mathematics problems	SKI-2
COMPETENCE	Communicate ideas and research results Effectively, orally, and literally	COM-1
	Make decision based on data/information in solving task that become students' responsibility and evaluate the work that has been done	COM-2
	Work effectively as individual as well as group, having entrepreneurship spirits and environmental cares	COM-3
ATTITUDES & SOCIAL	Demonstrate scientific, critical and innovative attitudes in mathematics teaching and learning and professional tasks	SOC-1
	Demonstrate religious values and cultures as well as academic etiquette in doing professional tasks	SOC 2

The following curriculum is presented:

No	Code	Module	C U	KNO-	KNO-	KNO-	SKI-1	SKI-2	COM-	COM-	COM-	SOC-	SOC-
1st Semester													
1	8420203043	Foundations of Mathematics	3	√				√					
2	8420204079	Differential Calculus	4	√				√					
3	1000002003	Indonesian	2						√				
4	8420203036	General Biology	3									√	
5	8420203061	General Physics	3									√	
6	8420203089	General Chemistry	3									√	
7	1000003006	Basics of Education	3		√								
8	1000002018	Pancasila	2										√
2nd Semester													
9	100000202x	Religion	2										√
		Education											√
10	1000002033	Citizenship Education	2										√
11		Digital Literacy	2		√		√		√				
12	8420203064	Geometry	3	√				√					
13	8420204083	Integral Calculus	4	√				√					
14	8420203020	English	3						√			√	
15	8420202094	Conservation of Natural Resources and Environment	2								√		√
16	1000002039	Educational Psychology	2		√								
17	8420203219	Learning Theories	3		√								

3 rd Semester												
18	8420203007	Elementary Linear Algebra	3	√				√				
19	8420203065	Analytical Geometry	3	√				√				
20	8420203127	Statistic Method	3	√				√				
21	8420202222	Elementary Number Theory	3	√				√				
22	8420203144	Innovative Learning I	3		√		√		√			√
23		Physical Education	2									√
24	8420202110	Contextual Mathematics	2		√		√		√	√		√
25	8420202197	History of Mathematics	2		√		√			√		
26	1000002011	Basic Social and Cultural Studies*)	2									√
4 th Semester												
27	8420203010	Abstract Algebra I	3	√				√				
28	8420203013	Real Analysis I	3	√				√				
29	8420203107	Discrete Mathematics	3	√				√				
30	8420203193	Operation Research	3	√				√				
31	8420203018	Assessment	3		√		√		√			
32	8420202121	Learning Media	2		√		√			√		√
33	8420203146	Innovative Learning II	3		√		√		√			√
34	8420203152	Visual Programming*)	3		√		√			√		
35	8420202186	Psychology of Mathematics Learning*)	2		√		√			√		

5 th Semester												
36	8420204085	Multivariable Calculus	4	√				√				
37	8420203111	School Mathematics	3		√		√		√	√		√
38	8420203217	Curriculum Analysis	3		√		√		√	√		√
39		Education Research Methodology	3			√	√		√	√		
40	8420202142	Probability and Statistics	3	√				√				
41	8420202047	E-Learning*)	2		√		√					√
42	8420202153	Reasoning and Proof*)	2	√	√			√				
43	8420203201	System of Geometry*)	3	√				√				
44	8420202004	Entrepreneurship *)	2				√		√	√	√	√
6 th Semester												
45	8420202057	Philosophy of Mathematics Education	2	√	√		√					
46	8420203123	Numerical Methods	3	√				√				
47	8420203173	Ordinary Differential Equation	3	√				√				
48	8420202200	Mathematics Education Seminar	2		√	√			√	√		√
49	8420202004	Microteaching	2				√		√	√		√
50	8420203067	Transformational Geometry*)	3	√				√				
51	8420202148	Problem Solving*)	2	√	√					√		
52	8420202169	Academic Writing*)	2				√		√	√		√

7 th Semester													
53	8420206202	Thesis	6	√	√	√	√		√	√		√	√
54	8420203004	Teaching Internship	4				√					√	
55	8420203096	Community Service	3				√		√	√		√	√
56	8420203149	Mathematical Modelling	3	√				√					
57	8420202093	Public Communication*)	2						√				
58	8420203221	Number Theory*)	3	√				√					
59	8420203224	Graph Theory*)	3	√				√					
60	8420203223	Fuzzy Theory*)	3	√				√					
8 th Semester													
61	8420202105	Management and Leadership*)	2									√	√
62	8420203005	Abstract Algebra II*)	3	√				√					
63	8420203006	Linear Algebra*)	3	√				√					
64	8420202056	Philosophy of Mathematics*)	2	√					√				
65	8420203012	Real Analysis II*)	3	√				√					
66	8420202052	Ethnomathematics*)	2		√			√		√			√
67	8420203206	Mathematical Statistics*)	3	√					√				

Electives:

Odd Semester				Even Semester			
No	Code	Module	C U	No	Code	Module Title	C U
1	8420202093	Public Communicatio	2	1	8420202105	Management and Leadership	2
2	8420202047	E-Learning	2	2	8420203005	Abstract Algebra II	3
3	8420202110	Contextual Mathematics	2	3	8420203006	Linear Algebra	3
4	8420202153	Reasoning and Proof	2	4	8420202056	Philosophy of Mathematics	2
5	8420202197	History of Mathematics	2	5	8420203067	Transformational Geometry	3
6	8420203201	System of Geometry	3	6	8420203152	Visual Programing	3
7	8420203221	Number Theory	3	7	8420202169	Academic Writing	2
8	8420203224	Graph Theory	3	8	8420202186	Psychology of Mathematics Learning	2
9	8420203012	Real Analysis II	3	9	8420202052	Ethnomathematics	2
10	8420203223	Fuzzy Theory	3	10	8420203206	Mathematical Statistics	3
11	8420202004	Entrepreneurship	2	11	8420202148	Problem Solving	2
12	1000002011	Basic Social and Cultural Studies	2				

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree Physics Education:

In detail, the PEOs are as follows:

1. Having capability in using pedagogical knowledge and skills to solve problems in work.
2. Having a strong commitment to developing knowledge, whether further study or working formally or informally.
3. Mastering scientific methods to analyse and develop innovations in learning physics and produce scientific work and contribute in their fields.
4. Mastering the fields of physics and learning, can apply their knowledge and expertise in various fields of work and can develop themselves in their career environment.
5. Having capability in communicating orally and or in writing effectively, creatively, innovatively, and collaboratively while working in teams or individually.

Aspects	PLO	Code	
Knowledge	1. Demonstrate their knowledge of classical physics and modern physics.	PLO-1	KNO-1
	2. Formulate a physical system as a physical model by using mathematics.	PLO-2	KNO-2
	3. Apply pedagogical knowledge in planning, teaching, and evaluating a physics learning.	PLO-3	KNO-3
	4. Apply knowledge related to physics education research.	PLO-4	KNO-4
Skill	1. Plan, do, and evaluate of physics learning by using information and communication technology.	PLO-5	SKI-1
	2. Design and conduct experiments in learning physics by applying the scientific method.	PLO-6	SKI-2
	3. Improve their knowledge and be able to continue their study in a higher degree programme.	PLO-7	SKI-3
Competences	1. Communicate the ideas and research results in verbal as well as written effectively.	PLO-8	COM-1
	2. Make a decision based on the data information and evaluation in order to fulfil the responsibility of the task.	PLO-9	COM-2
	3. Work as an individual as well as a team effectively, have an entrepreneur skill, and awareness of environmental issues.	PLO-10	COM-3
Attitude and social	1. Demonstrate good scientific manners, critical thinking, and innovation skills in educational, research, and professional fields.	PLO-11	SOC-1
	2. Demonstrate the appreciation of religious and cultural values in conducting their tasks as a professional.	PLO-12	SOC-2

The following curriculum is presented:

1 st Semester				2 nd Semester			
No	Code	Course Title	CU	No	Code	Course Title	CU
1	0001212008	Pancasila Education (Pendidikan Pancasila)	2	1	842030223x	Religious Education (Pendidikan Agama)	2
2	0001212009	Indonesian (Bahasa Indonesia)	2	2	1000002033	Civic Education (Pendidikan Kewarganegaraan)	2
3	0002213001	Basic Education (Dasar-dasar Pendidikan)	3	3	8420303013	English (Bahasa Inggris)	3
4	8420303065	Basic Physics I (Fisika Dasar I)	3	4	8420302232	Digital Literacy (Literasi Digital)	2
5	8420303029	General Biology (Biologi Umum)	3	5	1000002039	Educational Psychology (Psikologi Pendidikan)	2
6	8420303106	General Chemistry (Kimia Umum)	3	6	8420303066	Basic Physics II (Fisika Dasar II)	3
7	8420303117	Basic Mathematics (Matematika Dasar)	3	7	8420302107	Natural Resource Conservation (Konservasi Sumber Daya Alam)	2
8	8420302188	Physics Measurement System (Sistem Pengukuran Fisika)	2	8	8420303235	Mathematical Physics I (Fisika Matematik I)	3
9	8420301170	Basic Physics Practicum I (Praktikum Fisika Dasar I)	1	9	8420301171	Basic Physics Practicum II (Praktikum Fisika Dasar II)	1
				10	8420302236	Learning Theories (Teori Belajar)	2
Total 22 CU (34.98 ECTS)				Total 22 CU (34.98 ECTS)			
3 th Semester				4 th Semester			
N O	Code	Course Title	CU	NO	Code	Course Title	CU
1	8420302233	Physical Education and Fitness (Pend. Jasmani dan Kebugaran)	2	1	8420303115	Electromagnetism (Listrik Magnet)	3
2	8420304130	Mechanics (Mekanika)	4	2	8420303076	Modern Physics (Fisika Modern)	3
3	8420303218	Thermodynamics (Termodinamika)	3	3	8420302241	Basic Electronics II (Elektronika Dasar II)	2
4	8420302237	Basic Electronics I (Elektronika Dasar I)	2	4	8420303061	Waves (Gelombang)	3
5	8420303238	Mathematical Physics II (Fisika Matematik II)	3	5	8420302043	Physics Experiment I (Eksperimen Fisika I)	2
6	8420301239	Electronics Practicum I (Praktikum Eldas I)	1	6	8420301242	Electronics Practicum II (Praktikum Eldas II)	1
7	8420302240	Learning Evaluation (Evaluasi Belajar dan Pembelajaran)	2	7	8420303196	Statistics (Statistika)	3
8	0002212006	Basic Social and Cultural Sciences (ISBD)	2	8	8420302243	Educational Philosophy (Filsafat Pendidikan)	2
				9	8420302244	Innovative Learning Planning (Perencanaan Pembelajaran Inovatif)	2
Total 19 CU (30.21 ECTS)				Total 21 CU (33.39 ECTS)			

5 th Semester					6 th Semester		
NO	Code	Course Title	CU	NO	Code	Course Title	CU
1	8420302224	Entrepreneurship (Kewirausahaan)	2	1	8420302144	Optics (Optik)	2
2	8420302247	Statistical Physics (Fisika Statistik)	2	2	8420303080	Solid State Physics (Fisika Zat Padat)	3
3	8420303069	Quantum Physics (Fisika Kuantum)	3	3	8420302108	Physics Laboratory (Laboratorium Fisika)	2
4	8420303077	Physics for School (Fisika Sekolah)	3	4	8420302099	Earth and Space Science (IPBA)	2
5	8420302044	Physics Experiment II (Eksperimen Fisika II)	2	5	8420302184	Seminar	2
6	8420302250	School Curriculum (Kurikulum Sekolah)	2	6	8420302255	Physics Experiment III (Eksperimen Fisika III)	2
7	8420302129	Learning Media (Media Pembelajaran)	2	7	8420302230	Microteaching (Pembelajaran Mikro)	2
8	8420304249	Research Methodology (Metodologi Penelitian)	4	8	8420301256	Introduction to School I (Pengenalalan Lapangan Persekolahan I)	1
				9		Elective courses*	2
Total 20 CU (31.8 ECTS)				Total 18 CU (28.62 ECTS)			
7 th Semester					8 th Semester		
NO	Code	Course Title	CU		Code	Course Title	CU
1	8420303068	Nuclear Physics (Fisika Inti)	3	1	8420306189	Thesis (Skripsi)	6
2	8420301257	Introduction to School II (Pengenalalan Lapangan Persekolahan II)	3				
3	8420303226	Community Service Programme (Kuliah Kerja Nyata)	3				
4		Elective course*	2				
5		Elective course*	2				
6		Elective course*	2				
7		Elective course*	2				
Total 17 CU (27.03 ECTS)				Total 6 CU (9.54 ECTS)			

Electives:

No	CODE	COURSE TITLE	CU	No	CODE	COURSE TITLE	CU
1	8420302262	Astronomy (Astronomi)	2	15	8420302265	STEAM Learning (Pembelajaran STEAM)	2
2	8420302266	Robotics Physics (Fisika Robotika)	2	16	8420302253	Physics e-learning (E-Learning Fisika)	2
3	8420302063	Earth Science (Fisika Bumi)	2	17	8420302098	Integrated Science (IPA Terpadu)	2
4	8420302272	Energy material (Material Energi)	2	18	8420302267	School Laboratory Management (Manajemen Laboratorium Sekolah)	2
5	8420302261	Disaster Mitigation (Mitigasi Bencana)	2	19	8420302252	Audiovisual Physics (Fisika Audiovisual)	2
6	8420302132	Mechanical of Technique (Mekanika Teknik)	2	20	8420302246	Physics of Photography (Fisika Fotografi)	2
7	8420302178	Electrical Circuits (Rangkaian Listrik)	2	21	8420302143	Multimedia	2
8	8420302073	Advanced Mathematical Physics (Fisika Matematika Lanjut)	2	22	8420302269	Physics Edutainment	2
9	8420302183	History of Physics (Sejarah Fisika)	2	23	8420302259	Physics Communication and Media Analysis (Komunikasi Fisika & Analisis Media)	2
10	8420302268	Physics Argumentation (Argumentasi Fisika)	2	24	8420302264	Measurement and Instruments of Physics Education (Pengukuran & Instrumen Pend Fisika)	2
11	8420302263	Olympic Physics (Fisika Olimpiade)	2	25	8420302251	Study of UN, TIMSS, and PISA (Kajian UN, TIMSS, dan PISA)	2
12	8420302271	Development of Physics Curriculum (Pengembangan Kurikulum Fisika)	2	26	8420302245	Physics Literacy (Literasi Fisika)	2
13	8420302254	Physics Local Wisdom (Kearifan Lokal Fisika)	2	27	8420302260	Item Response Theory (Teori Respon Butir)	2
14	8420302258	Advanced Innovative Learning (Pembelajaran Inovatif Lanjut)	2	28	8420302270	Computer Base Assessment (Penilaian Berbasis Komputer)	2
Total 56 CU (89.04 ECTS)							

According to the Self-Assessment Report, the following **objectives and learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree Science Education:

In detail, the PEOs of the UPSE are as follows:

1. Mastering knowledge/skills in the field of pedagogical integrated science (physics, chemistry, and biology) to carry out their professional or entrepreneurial tasks.
2. Having responsibility in carrying out his professional duties based on professional ethics.
3. Having a strong and tough personality and be able to compete globally in carrying out the tasks of his profession or entrepreneurship.
4. Having capability to communicate and work together in carrying out professional tasks.
5. Having capability to do self-development and innovations sustainably based on the situation and challenges in their professional duties.

Competency SSC-ASIIN	Aspect	PLO	DESCRIPTION
Specialist competences	Knowledge	PLO 1	Demonstrate basic knowledge of physics, chemistry, and biology.
		PLO 2	Demonstrate knowledge of integrated science (physics, chemistry, and biology).
		PLO 3	Demonstrate pedagogical knowledge of designing, implementing, and evaluating integrated science learning.
		PLO 4	Demonstrate knowledge related to science education research.
	Special Skills	PLO 5	Design, implement, and evaluate science learning using ICT.
		PLO 6	Design and conduct research about learning of integrated science, and acquire, analyze, and interpret the research data.
Social competences	General Skills	PLO 7	Communicate ideas and research results effectively both in oral and written forms.
		PLO 8	Make decisions based on data / information in order to complete tasks and evaluate the performance that has been done.
		PLO 9	Work effectively both individually and in groups, and have entrepreneurial spirits and environmental awareness.
	Attitude	PLO 10	Demonstrate scientific, critical, and innovative attitudes in integrated science
			learning, laboratory activities, and professional-related tasks.
		PLO 11	Demonstrate religious and cultural values as well as academic ethics in carrying out their professional-related duties.

The following curriculum is presented:

No	Code	Course title	Workload			PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11
			L	P	C											
Semester I																
1	1000002020	Pancasila Education	2	-	2									√	√	
2	8420103012	English	3	-	3						√					
3	8420103045	General Physics	2	1	3	√	√									
4	8420103074	General Chemistry	2	1	3	√	√									
5	8420103023	General Biology	2	1	3	√	√									
6	1000002003	Indonesian Language	2	-	2						√					
7	8420103086	Basic Mathematics	2	1	3	√	√									
8	1000003006	Introductory of Education	2	1	3			√								
Semester II																
9	1000002026	Religion Education	2	-	2										√	
10	1000002033	Citizenship Education	2	-	2								√		√	
11	8420102183	Digital Literacy	2	-	2				√							
12	8420103088	Mathematic for Science	2	1	3	√	√									
13	1000002039	Educational Psychology	2	-	2			√								
14	8420102028	Introductory of Natural Science	2	-	2	√	√									
15	8420103155	Learning Theory	3	-	-			√								
16	8420102032	Basic Computer	2	-	2				√							
17	8420103065	Biodiversity	2	1	3	√	√									
Semester III																
18	8420102159	History and Philosophy of Science Education	2	-	2				√				√			
19	8420103154	Curriculum Review	3	-	3			√								
20	8420102176	Entrepreneurship	2	-	2											
21	8420102060	Social and Culture Study	2	-	2						√	√			√	
22	8420103053	Biomechanics	2	1	3		√									
23	8420103162	Plant Anatomy and Physiology	2	1	3		√									
24	8420103158	Matter and Energy	2	1	3		√									
25	8420103161	Management and Work Safety in the Laboratory	2	1	3							√		√		
Semester IV																
26	8420103107	Innovative Learning I	2	1	3			√		√						
27	8420103167	Animal Anatomy and	2	1	3		√									
		Physiology														
28	8420103048	Fluids	2	1	3		√									
29	8420102076	Conservation of Natural Resources and the Environment	2	-	2	√						√				
30	8420103163	Introduction to Biochemistry	2	1	3		√									
31	8420103090	Learning Media	2	1	3			√		√						
32	8420103010	Assessment and Evaluation	3	-	3			√		√						
33	8420101184	Internship I	-	1	-		√		√	√		√		√		

Semester V												
34	8420103109	Innovative Learning II	2	1	3			√		√		
35	8420103138	SETS	2	1	3			√				
36	8420103033	Ecology	2	1	3			√				
37	8420103081	Solution	2	1	3	√						
38	8420103067	Live at Cellular Level	2	1	3			√				
39	8420103068	Electricity and Magnetism	2	1	3			√				
40	8420103094	Research Method	2	1	3			√		√	√	
Semester VI												
41		Elective course *)	2	1	3	√						
42	8420103168	Statistics of Education	2	1	3					√		
43	8420102005	Science School Analysis	2	-	2	√	√					
44	8420103049	Waves and Optics	2	1	3			√				
45		Elective course*)	2	1	3			√				
46	8420102142	Seminar	2	-	2			√		√	√	√
Semester VII												
47		Elective course*)	2	1	3			√				
48	8420103178	KKN	3	-	3					√		√
49		Elective course*)	2	-	2	√						
50		Elective course*)	3	-	3							√
51	8420104182	Internship II	4	-	4			√		√	√	√
Semester VIII												
52	8420106146	Thesis	6	-	6			√		√	√	√
53	8420103038	Elective course *)	2	1	3	√						√
54	8420102029	Elective course *)	2	-	2	√						

Notes: L (lecturing), P (laboratory), C (credit unit)

Electives:

No.	Code	Course Name	CU
1	8420102029	Introductory of Biotechnology	2
2	8420103038	Ethnoscience	2
3	8420102073	Household Chemistry	2
4	8420103171	Atom and Radioactivity	3
5	8420103064	Review of Science Research Findings	2
6	8420103170	Introductory of Electronic	2
7	8420103123	Earth and Planetary Science	3