ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes
Biology
Chemistry

Provided by
Universitas Sebelas Maret, Indonesia

Version: 22 September 2023

Table of Content

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 Biologi	Undergraduate programme in Biology	ASIIN	BAN-PT[3]: A 2020 - 2025	10
Program Studi Sarjana Kimia	Undergraduate programme in Chemistry	ASIIN	BAN-PT: A 2017 - 2022	09
Date of the contract: 26.11.2020 **Submission of the final version of the self-assessment report:** 10.03.2022 **Date of the audit (online):** 17.05. – 19.05.2022				
Peer panel: Prof. Dr. Karl-Josef Dietz, University of Bielefeld Prof. Dr. Jürgen Grotemeyer, University of Kiel Prof. Dr. Agoes Soegianto, Universitas Airlangga Dr. Emma Thompson, BASF SE Azalea Rahma Septianti, Universitas Airlangga, student				
Representative of the ASIIN headquarter: Rainer Arnold				
Responsible decision-making committee: Accreditation Commission for Degree Programmes				

[1] ASIIN Seal for degree programmes;
[2] TC: Technical Committee for the following subject areas: TC 09 – Chemistry, Pharmacy; TC 10 – Life Sciences
[3] National Accreditation Board of Higher Education / Badan Akreditasi Nasional Perguruan Tinggi (BAN-PT)

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, Pharmacy as of 29.03.2019 Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 28.06.2019	

B Characteristics of the Degree Programmes

a) Name	Final degree (original)	b) Areas of Specialization	c) Corresponding level of the EQF[4]	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	Sarjana Sains / Bachelor of Science in Biology	-	6	Full time	no	8 Semester	144 SKS / 205.15 ECTS	1997, Once a year (August)
Undergraduate programme in Chemistry	Sarjana Sains / Bachelor of Science in Chemistry	-	6	Full time	no	8 Semester	144 SKS / 204.92 ECTS	1997, Once a year (August)

[4] EQF = The European Qualifications Framework for lifelong learning

For the Bachelor's degree programme Biology, Universitas Sebelas Maret (UNS) has presented the following profile on its webpage:

"Mission

The mission of higher education of Biology program are:

To perform education in the field of Biology that can encourage self-development and independence of the students in pursuing education, skills, and attitude.

To perform research leading to bioproducts development.

To perform research-based community service activities that can benefit society.

Aims/ Goals

To create an environment that encourages academia to develop an optimal self-capability.

To produce bachelor's degree in Biology with integrity, independence, attitude, perceptive to global progress, and contribute to the development of science and technology.

To produce research in the field of Biology beneficial for developing bioproducts, such as biomaterial, bioenergy, and bioinformatics (note: useful for the development of education, research, and community service).

To increase quantity and quality of service and collaboration in the field of Biology with government institutions, the business and industry world on a national and international scale.

To bring the Biology program FMIPA UNS as a well-known and reputable study program internationally by 2025."

For the Bachelor's degree programme Chemistry, Universitas Sebelas Maret (UNS) has presented the following profile on its webpage:

"Vision

Become a chemistry study program that excels in research and able to contribute to the development of chemistry teaching and human welfare up to the international level.

Mission

Organizing undergraduate chemistry education programs towards international quality.

Carrying out research in the field of chemistry that is of high quality and published both nationally and internationally.

Organizing programs for the application of chemistry and the results of chemical research to the public.

Goals

Produce chemical graduates who have professional academic abilities to international standards.

Produce research products in the field of chemistry of international standard.

Applying chemistry and the results of chemical research to the public.

Build cooperation with stakeholders in the fields of academics, research and community service to the international level."

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 Report
- Study plans of the degree programmes
- Module descriptions
- Homepage UNS: https://uns.ac.id/en/
- Homepage Ba Biology: https://biology.mipa.uns.ac.id/
- Homepage Ba Chemistry: https://chemistry.mipa.uns.ac.id/
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors base their assessment of the learning outcomes on the information provided on the websites and in the Self-Assessment Reports of both Bachelor's degree programmes under review.

For both undergraduate programmes, Universitas Sebelas Maret (UNS) 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 (FMIPA), 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.

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

The peers 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 as defined by UNS correspond to the competences as outlined by the SSC. They come to the following conclusions:

Graduates of the Bachelor's degree programme Biology should understand the basic biological processes and should be capable of applying the scientific and technological methods of the biological sciences. In addition, graduates should acquire relevant scientific knowledge in the different biological areas such as botany, zoology, biochemistry, biostatistics, molecular biology, cell biology, ecology, plant & animal physiology, and related natural sciences (chemistry, physics). They learn to work in a team and to carry out practical work in a laboratory and in the field. In addition, graduates should be able to work scientifically and be familiar with technological innovations and the use and preservation of biological resources.

The programme is designed as a general biology programme with some specialization options by selecting elective modules and particularly in the course of the final research project. The programme educational objectives and learning outcomes are expected to equip the graduates with life skills required to develop and adapt to the wide spectrum of possible occupations. Biology graduates have a broad occupational area. Their occupational profile includes researcher, teacher/lecturer, entrepreneur, and they could work in industry, academia, or public institutions.

The results of the latest tracer study from 2020 show that the occupational profile of biology graduates consists of industry practitioners (70.6 %), educators (9.4 %), entrepreneurs (7.1 %), researchers (4.7%), and others, including postgraduate students (8.2 %).

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

The goal of the chemistry programme is to impart essential competencies in mathematics, the natural sciences and the core subjects of chemical sciences (biochemistry, organic, inorganic, physical, and analytical chemistry). In addition, the graduates should learn about the different substance classes, their properties, reaction possibilities and uses, and be able to independently plan and carry out practical work. They also should be familiar with modern experimental methods of chemistry, the safe handling of chemicals, have a sound knowledge of safety and environmental issues and the underlying legal framework, and be able to interpret, critically assess, present and communicate relevant information and new research results, and to discuss them with specialist colleagues. Moreover, the graduates

should be capable of using the acquired knowledge and skills to find solutions to practical chemical problems and for conducting scientific work. Finally, they should be familiar with chemical hazards and problems that are relevant for the community and be able to apply appropriate means to solve these problems, in order to improve the quality of people's lives. The programme is designed as a general chemistry programme with some specialization options by selection of elective modules and in particular in the course of the final research project.

Graduates of the chemistry programme have several job opportunities; they can work in the chemical or petrochemical industry, as teachers, at universities as well as in research institutes or in the public administration. The majority of chemistry graduates work in sectors such as chemical and pharmaceutical industry, oil and gas companies, mining and polymer industries, environmental research and monitoring institutions, public agencies, and educational institutions by becoming teachers or lecturers.

Based on survey results from 1997 to 2020, 34 % of graduates of the chemistry programme work as practitioners in the field of chemistry either in government agencies or in the industrial sector. This includes areas such as product quality assurance, test laboratories, and managerial positions in organizations that require knowledge or application of chemistry. 20 % of the graduates work as educators (teachers and lecturers). Only 1 % work either as researchers or entrepreneurs, and 8 % pursue further studies. 33 % of the graduates work in fields not directly related to chemistry or education (e.g. administration and finance).

Supplementing the subject-related qualification objectives, students of both 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, be able to apply information and communication technology, and show a social and academic attitude. Finally, students should acquire communicative and language skills and should develop a strategy for life-long learning.

In summary, the peers are convinced that the intended qualification profiles of both undergraduate programmes under review allow graduates 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 objectives and intended learning outcomes of both degree programmes under review are reasonable and well founded.

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 (Ba Biology) and the SSC of the Technical Committee 09 – Chemistry, Pharmacy (Ba Chemistry).

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the peers:
UNS awards a Bachelor of Science (B.Sc.) or Sarjana Sains (S.Si.) degree to the graduates of both undergraduate programmes.

The peers confirm that the English translation and the original Indonesian names of both 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
- UNS Academic Guidelines
- Homepage UNS: https://uns.ac.id/en/
- Homepage Ba Biology: https://biology.mipa.uns.ac.id/
- Homepage Ba Chemistry: https://chemistry.mipa.uns.ac.id/
- Discussions during the audit

Preliminary assessment and analysis of the peers:
Both undergraduate programmes are offered by the Faculty of Mathematics and Natural Sciences (FMIPA) of Universitas Sebelas Maret (UNS).

The Bachelor's degree programmes under review are designed for four years and are offered as full-time programmes. In the Biology programme, 144 credit semester units (SKS) need to be achieved by the students (this is equivalent to 205.15 ECTS points). The curriculum of the Chemistry programme encompasses 144 SKS (204.94 ECTS points).

All undergraduate programmes at UNS 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 in 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 UNS and the respective departments. University requirements are courses that need to be attended by all undergraduate students at UNS. There are five university requirements: English, Bahasa Indonesia, Religion, Pancasila, and Civic Education. 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 sciences are offered from the third to the 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 SKS) and the community service (2 SKS).

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 four weeks and often takes 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.

Both degree programmes include an internship. In both Bachelor’s programmes, the internship lasts a minimum of four weeks or 160 hours. However, the actual length may vary, depending upon the agreement between the undergraduate programme and the host institution. The internship can be conducted in research institutions or companies. Students can get information about available places from the programme coordinators, the UNS Career Center, or the internship supervisor and need to submit an internship proposal. Yet, the employers pointed out during the audit that they would be open to internships but

were not getting students. For this reason, UNS should better inform students about this opportunity.

Since UNS 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 FMIPA are taught in English. The programme coordinators explain that there is not yet an international class, neither in the Biology nor in the Chemistry programme. However, English textbooks are used and some presentations are done in English. In addition, some lectures are given in English, e.g., in "Animal Physiology" and "Lab Techniques". The peers appreciate the use of English in some lectures; nevertheless, they are convinced that it would be very useful to offer an international class, in which all lectures are delivered in English, in the Biology as well as the Chemistry programme. This would further improve the students' English proficiency and better prepare them for the job market. In the discussion with the peers, students and alumni support this point of view.

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; every teacher may not supervise more than seven students conducting their final projects. Students have to design a research proposal (this proposal is developed in the "proposal seminar", which usually takes place in the sixth semester) with a time schedule for the project, which is discussed with the academic advisor. If they agree, students apply formally for being allowed to work on the suggested topic. Students can also develop their own concepts for their Bachelor's thesis and it is possible to conduct the Bachelor's thesis outside UNS.

The peers gain the impression that the graduates of both degree programmes under review are well prepared for entering the labour market and can find adequate jobs in Indonesia. Most of the Bachelor's graduates enter the job market directly, only few (approximately 8 %) continue with a Master's degree either at UNS or at other universities. 60 % to 70 % of the graduates work for private companies and there is still a high demand from the industry for Bachelor's graduates in chemistry and biology. Consequently, the job perspectives are very good, and approximately 50 % of the graduates start their first job within three months after graduation.

In general, all graduates have good and manyfold job perspectives.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report

- UNS Academic Guidelines
- Homepage UNS: https://uns.ac.id/en/
- Homepage Ba Biology: https://biology.mipa.uns.ac.id/
- Homepage Ba Chemistry: https://chemistry.mipa.uns.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 regulations in Indonesia. The requirements, schedule, registration venue, and selection test are announced on UNS'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 UNS:

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.

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).

3. UNS Independent Selection (SM-UNS) students are selected based on a test specifically held by UNS for prospective students that haven not been accepted through SNMPTN or SBMPTN.

4. International Admission, UNS offers opportunities for international bachelor students to join the Biology and the Chemistry programmes.

The entrance requirements are prepared by the universities and then forwarded to the National Testing Agency for State Universities to be accessible to all SNMPTN and SBMPTN applicants. In 2021, with the change of UNS status to PTN-BH (Legal Entity State University), the student admission composition has changed. The general requirement for UNS student admission is presented in the Self-Assessment Report: through SNMPTN a minimum of 20 %, through SBMPTN a minimum of 30 %, and through the independent selection a maximum of 50 %. In 2021, a total of 7212 new students applying for Bachelor's degrees were admitted: via SNMPTN (20%), SBMPTN (35%), and independent selection (45%).

To support foreign students, UNS offers various types of scholarships, which include tuition waivers, dormitory rooms, Indonesian language courses, and support for living costs. Management of admissions and services of foreign students is handled by the Technical Implementation Unit for International Cooperation and Services at university level, and the International Office Teams in each faculty.

The number of available study places is between 70 to 90 students per year in both undergraduate programmes. The quota is based on the number of teachers and the capacity of the available facilities.

The details are depicted in the following tables:

Biology:

Year	Applicants A	Accepted B	Registered C	Acceptance rate (A/B)	Percentage (%) C/B
2017	3,205	94	80	1:34 (3%)	85
2018	3,036	111	76	1:28 (3.5%)	68
2019	1,244	112	90	1:11 (9%)	80
2020	1,796	133	92	1:20 (5%)	71
Total	**12,138**	**556**	**397**	**Average 1:24 (4%)**	**71**

Chemistry:

Year	Applicants A	Accepted B	Registered C	Acceptance rate (A/B)	Percentage (%) C/B
2017	1,810	92	81	1:20 (5%)	88
2018	2,136	91	70	1:24 (4%)	77
2019	1,128	109	83	1:11 (9%)	76
2020	1,485	116	88	1:13 (7.5%)	76
Total	**6,559**	**408**	**322**	**Average 1:17 (6%)**	**79**

The Bachelor's programme Biology has an average acceptance rate of 4 % and the Bachelor's programme Chemistry of 6 %. However, the number of applications dropped significantly from 2018 to 2019. In response to this decrease, the study programmes have imposed an admission strategy by organising more events for high school students (e.g., open house and science competitions) and promoting other collaborative activities. Through these efforts, the number of applicants in 2020 increased again.

Undergraduate students at UNS have to pay tuition fees (UKT). The fees for each study programme vary according to the operational costs of learning. In addition, UKT for each student is also different according to the financial ability of their parents. The lowest UKT in 2021 for the biology and chemistry programmes were IDR 475,500 (EUR 29.28) and the highest IDR 11 193 500 (EUR 722.58) for the biology programme and IDR 10 761 500 (EUR

694.69) for the chemistry programme per year. This is valid for admission through SNMPTN and SBMPTN. Students admitted through the UNS entrance selection have to pay higher tuition fees, which range between IDR 10 000 000 (EUR 645.53) and IDR 20 000 000 (EUR (1291.06).

In addition, several grants for students with financial difficulties are available, such as from the government, industries, foundations, and UNS alumni association. Some senior students work as laboratory assistants to earn some money for financing their studies.

The details of the application process at UNS and further information on admissions criteria and deadlines can be found in the National Regulation No. 2, 2015 and the UNS 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 suitable to select motivated and high-performing candidates. The peers consider the highly selected and motivated students to be one of the strong points of both 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:

UNS does not comment on this criterion in its statement.

The peers consider criterion 1 to be 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
- Homepage Chemistry : https://chemistry.mipa.uns.ac.id/

- Homepage Biology : https://biology.mipa.uns.ac.id/
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The curriculum of both 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 SKS 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 FMIPA.

The curriculum in the first two semesters is very similar for both undergraduate programmes. Courses in the first two semesters convey basic knowledge of natural sciences, mathematics, and languages (Indonesian and English). In addition, students need to attend obligatory courses, such as religion and ethics, Pancasila and civic education, which are university requirements and need to be attended by all students at UNS. From the third semester on, more subject-specific classes, with a focus on the respective science area (biology, chemistry), and several educational courses are offered. In the third year of studies, advanced courses in the respective science are taught. During the seventh and eighth semester, students must complete the Community Service and the Bachelor's thesis. A lecture on biosafety in the laboratory is given in the first week of the semester to provide new students with awareness about laboratory safety as early as possible. In addition, the topics of biosafety and animal welfare are discussed in depth in compulsory courses namely laboratory techniques and bioethics.

Students also gain research experience outside of the study programme through internships at research institutions, e.g., at the Biology Research Center of the Indonesian Institute of Sciences (LIPI), the Center for Research and Development on Biotechnology and Forest Plant Breeding, the Center for Research and Development on Medicinal Plants and Traditional Medicine, and the Center for Research and Development on Agricultural Biotechnology and Genetic Resources (BB-Biogen).

The internship course is designed to strengthen the students' social and practical competences and to increase their chances in the job market. The Students Internship Course (SIC, in Bahasa: Kuliah Magang Mahasiswa (KMM)) or Fieldwork Practices (FP, in Bahasa Indonesia: Praktek Kerja Lapangan (PKL)) is a practice-based and non-theoretical course. It is designed to implement the theories learned during the course of studies into field practices

or within partners' institutions. Both programmes provide an Internship Guidebook for informing students about the goals and content of the internship course. UNS awards two SKS for the internship, which is equal to a period of 20 working days (8 hours/day) or a minimum of 160 hours.

The Bachelor's degree programme Biology requires students to complete 144 SKS (205.15 ECTS), which includes compulsory courses (97 SKS) and a minimum of 47 SKS of elective courses.

In the Bachelor's degree programme Chemistry, students are also required to complete 144 SKS, which is equivalent to 204.92 ECTS, including 114 SKS of compulsory courses and 30 SKS of elective courses.

As mentioned in the Self-Assessment Report, the share of practical work is 26 SKS (18 %) in the Biology programme and 23 SKS (16 %) in the Chemistry programme. The peers point out that this share is rather low by international standards. Obtaining practical hands-on experience in the laboratories is an essential part of biology and chemistry programme and, therefore, students should spend sufficient time on conducting experiments in order to build up their chemistry- or biology-related practical skills. For this reason, the peers suggest increasing the share of practical work in both Bachelor's programmes.

As the Vice-Rector explains during the audit, the main research areas of UNS are Food Science, Renewable Energy, Sustainability, and Climate Change. However, both Bachelor's programmes under review are rather general programmes without a specific focus. This is fine with the peers, because students can follow their own interests by choosing electives and the topic of their final projects. Nevertheless, UNS's partners from private companies mention that they would also appreciate if the graduates would have a specific area of specialisation. For example, the electives could be grouped so that students have a better orientation where they could specialise. These areas of specialisation should be aligned with the research groups at the Chemistry and Biology Departments.

The employers also suggest better training of the students in soft skills (e.g., communication and team skills); this would further improve their job opportunities. The peers support this point of view and suggest introducing more group projects and students' presentations into the courses. In addition, the employers suggest better promoting internships and final scientific projects in private companies. They would appreciate if FMIPA would expand the co-operation with private companies and if more students would conduct their final projects there.

The results of the course questionnaires (satisfaction survey) show that the students' English proficiency should be further improved (graduates of FMIPA UNS are required to have

a minimum TOEFL score of 475). To overcome this deficit, the Quality Control Division suggested that international activities such as the number of international guest lecture programmes must be increased. In addition, the degree programme should encourage students to participate more in the Biology English Club, in international competitions, and send more students abroad through student exchange programmes. The peers explicitly support all these measures (see *International Mobility*).

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 FMIPA guarantees for their respective quality in terms of relevance, content, and structure.

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

International Mobility

UNS 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. The credits acquired abroad are transferable to UNS, although this transfer of credits is only possible if an agreement exists between UNS 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..

Students' international academic mobility is supported by UNS. For example, through scholarships such as the UNS Global Challenge Program (since 2016), and International Students Mobility Awards (IISMA), a scholarship programme from the Ministry of Education and Culture starting from 2021. In addition, lecturers are encouraged to carry out joint research activities with international partners and to involve students in their projects.

As mentioned in the Self-Assessment Report, chemistry students have taken part in exchange programmes with international universities, including the University of Utrecht, the Netherlands; Gifu University, Japan; and University Sabah, Malaysia. The Chemistry Department has a co-operation agreement with Leipzig University and between four and six teachers and students spend some time in Leipzig every year, for attending courses and joining research projects. In addition, students and lecturers participate in international chemist

associations such as the Royal Society of Chemistry (UK) and the American Chemical Society, which supports the internationalisation and enables students and teachers to attend international chemistry seminars. A domestic student mobility programme has also been implemented, particularly in conducting final projects at other Indonesian universities or research institutions.

Biology students have participated in several international student exchange programmes with international universities such as Chulalongkorn University, Thailand, Kyoto Sangyo University, Japan, and Vrije Universiteit, Amsterdam. The number of participating students is rather low and it is planned to increase the participation in the future.

To promote academic mobility, UNS has an International Office, where students can get information about academic mobility. It also offers a website, which provides information such as the requirements that students need to know before applying for one of the exchange programmes.

The new policy of the Indonesian government actively supports any activities outside of the university by releasing a regulation on the Merdeka Belajar-Kampus Merdeka (MBKM), which requires the university to promote students who want to spent part of their Bachelor's programme outside UNS (Minister of Education and Culture Regulation Number 3, Year 2020). UNS recognizes the courses taken by the students outside UNS, based on the comparability of the intended learning outcomes. The peers consider this regulation sufficient. However, according to the opinion of the peer group, the academic mobility of the students should be further promoted. The number of Bachelor's students who participate in international exchange programmes is still low despite students' high interest. Since 2016, 17 students from the Chemistry programme have spent some time abroad. At the same time, there were three incoming students. The numbers are even lower in the Biology programme. Here, only 6 students participated in an international programme since 2017 and there was just one incoming student.

The students confirm during the discussion with the peers that some opportunities for international academic mobility exist and that the credits acquired abroad are recognised at UNS. However, they also point out that they wish for more places and better endowed scholarships for long- and short-term stays abroad. The number of available places in the exchange programmes is still limited and there are restrictions due to a lack of sufficient financial support. UNS can provide only limited travel grants, while the demand from students is rising. The lack of financial support hinders students from joining the outbound programmes. National scholarships are available, but they are highly competitive, so only a few students receive them.

The peers understand these problems; however, they recommend increasing the effort to further internationalising UNS by offering more places in international exchange programmes and more scholarships. In addition, the peers see that most of the faculty members have international contacts, which can be used for establishing more international cooperations.

The peers 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, FMIPA should invite more visiting lecturers, initiate more international exchange programmes, and provide more scholarships for students.

A good starting point for initiating more international cooperations are the personal international contacts of the faculty members and the guest lecturers. 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 FMIPA 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), both undergraduate programmes under review use a credit point system called SKS.

For regular classes, 1 SKS 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 studying literature,

- 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 SKS 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.

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

The peers point out that there can be no fixed conversion rate between SKS and ECTS points, 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, by the number of hours that is required for one ECTS.

Since the workload of the students was only estimated by the programme coordinators, the peers expect UNS to re-evaluate the calculation of ECTS points also by asking the students about their actual workload, especially the time they need for self-studies, for each course. For example, this could be done by including a respective question in the course questionnaires. By correctly displaying students' workload in ECTS credits, UNS would facilitate academic mobility and better support their graduates if they apply for international programmes.

In any case, UNS needs to verify the students' total workload and make sure that the actual workload and the awarded ECTS points correspond with each other. This information should be made transparent in the module descriptions and the study plans.

Several of the students take longer than the targeted four years to finish the degree programme. As described in the Self-Assessment Report, the average study period for the Biology and the Chemistry programmes is 4.5 years (entry years 2013 – 2016). About 29 % graduate from the Biology programme in less than four years, 36 % graduate after 4 to 4.5 years, and the rest (35 %) needs more than 4.5 years. In the Chemistry programme, only 10 % of the students graduate in less than four years, the majority needs between 4 and 4.5 years (49 %) and 34 % need more than 4.5 years.

There are some reasons for prolonging the studies, namely extended research periods, restrictions on laboratory activities due to the COVID pandemic, and financial issues (some students have to work besides studying). To overcome such problems, the study programmes have implemented several measures such as appointing thesis supervisors in a timelier manner, simplifying the process of research proposal seminars, and involving students in lecturers' research projects. The programmes also conduct annual monitoring and

evaluation processes and the academic advisors counsel and motivate students to complete their studies in time.

The dropout rate in both Bachelor's degree programmes is rather low. The average percentage of dropouts for the last five years is 9.5 % in the Biology programme and 8.5 % in the Chemistry programme. The main reasons why students withdraw is that they transfer to a different academic programme, either at UNS or at another university.

In summary, the peers confirm that both undergraduate programmes have a high but manageable workload. Students can give their feedback on the courses and comment if they think that the workload is too high. However, there should be a regular and institutionalised survey on students' workload in every course. For example, this could be done by including a respective question in the course questionnaires that students have to fill out at the end of each semester.

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:

The learning method applied in the Biology and Chemistry programmes is a combination of teacher-centred learning (TCL) such as classroom teaching/tutorials, demonstrations, and laboratory sessions, and student-centred learning (SCL) such as group discussions, case studies, cooperative and project-based learning, field studies, and laboratory work. Each course can use one or a combination of several teaching and learning methods. Approximately 50 % of the courses have implemented the SCL-based learning methods. For example, in the Biology programme, the case study method is used in the courses "Forensic Botany" and "Morphometry". In the course "Pathogenesis of Bacteria", a project-based learning method is used.

The most common method of learning is class session, with several courses having integrated laboratory work. Lecturers generally prepare presentations to support the teaching process. In addition, several courses include teaching practice sessions (i.e., students pre-

senting 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.

Learning activities are carried out on-site and online. On-site learning is conducted face-to-face in classrooms, laboratories, or during field trips. Assignments are submitted directly to the lecturer during a face-to-face meeting or via e-mail, Google Classroom, and other learning media systems. Online learning was applied intensively during the COVID pandemic. It is carried out through the online learning system (SPADA), an online learning portal within UNS that is managed by the Institute of Development and Quality Assurance of Education (Lembaga Pengembangan dan Penjaminan Mutu Pendidikan, LPPMP). Online learning also uses various media such as WhatsApp, Google Classroom, or Zoom. Restrictions on practical activities during the pandemic have constrained the laboratory work. In response to this situation, simulations were performed in the laboratory and the video demonstration was then discussed online with the students. In addition to demonstrations, several experimental learning videos from various websites were presented. This method is certainly not optimal but was the best solution during the pandemic.

Neither the Biology nor the Chemistry programme have international classes. However, lectures in English are also conducted by inviting guest lecturers/professors from overseas who deliver courses either in person or online. In addition, English is usually used in lecture materials (PowerPoint slides) and references in most courses.

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 both 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
- UNS Academic Guidelines
- Discussions during the audit

Preliminary assessment and analysis of the peers:
UNS 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 13 to 15 students from her/his classes. He/she is the 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, whom 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 UNS. The role of the final project supervisor is to guide students in accomplishing their final project, e.g., to finish their research and complete their final project report.

All students at UNS have access to the digital academic information system (SIAKAD). The students' profiles (student history, study plan, academic transcript and grade point average/GPA, lecturer evaluation, course list) are available via SIAKAD. In addition, course materials and supporting documents compiled by the lecturers are presented at SPADA, which is the e-learning platform of UNS. Students who have registered for certain courses can access all the materials at SPADA.

Finally, there are several student organizations at UNS; 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 sup-

port 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 thank UNS for pointing out that the share of practical work, including lab work, internship, community service, and undergraduate thesis is 47.98 ECTS (23.3 %) in the Biology programme and 42.66 ECTS (20.8 %) in the Chemistry programme. Since this is still below international standards (approximately 30 %), the peers appreciate that UNS plans to increase the practical work, especially in electives, which are relevant for the undergraduate thesis.

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
- UNS Academic Guidelines

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Reports, the students' academic performance is evaluated based on written exams (e.g., multiple choice, essays, quizzes, and calculations), oral exams, presentations, practical work, papers, and reports.

The form of each exam is mentioned in the module descriptions that are available to the students via UNS's homepage and the digital platform SIAKAD. 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.

The information about the exam system is submitted by each lecturer at the beginning of the course through a "Course Contract", which contains information about the terms of the course (pre-requisites), learning objectives, learning methods, brief descriptions of classes,

assignments, references, assessment processes, and passing standards. Exam criteria and requirements & remedial policy are also explained in the contract.

According to the rules at UNS, students who do not have at least 75 % attendance will not be allowed to take part at the final exam. The grading system is different for the internship, 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 respective module descriptions and the course contract.

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 UNS's digital platform SIAKAD.

The "Research Methodology Course", which is offered in the third semester of the Biology programme and the fourth semester of the Chemistry programme, is designed to introduce students to scientific methods and research activities. Students conduct research activities in the laboratories under the guidance of a supervisor, including proposal preparation, implementation of laboratory research, and report preparation. In addition, the study programmes provide briefings on scientific writing materials and latest research materials. Moreover, when a thesis supervisor has been appointed, students can further discuss their research proposals with the supervisor.

Every student in the Biology and Chemistry programmes 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, data analysis and presentation in figures or tables, and writing the thesis. 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. The students have to present their results and defend them in an oral presentation in front of the Thesis Examiner Team, which consist of four persons, namely the chairperson, secretary of examiners, and first and second examiners. The first and second examiners are the students' thesis supervisors.

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. The absence of students in the midterms and finals due to illness or otherwise is remediable by taking the exam later. Students, who cannot attend practical courses for acceptable reasons, can repeat the practicum later; the lecturers are responsible for the arrangement. Students with special needs are provided with support to enable them to participate in the academic activities and exams. There is a fixed period after the announcement of the final grades, during which students can ask for explanations and can appeal their grades.

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. However, sometimes there is more than one exam scheduled for the same day. Students can address this issue with the teachers and ask for a change in the exam schedule; usually this is possible. The peers point out that it would be better if there were a central exam schedule in which all teachers have to take down the exam dates so that overlaps can be directly avoided.

The peers also inspect a sample of examination papers and final theses and are overall satisfied with the general quality of the samples. However, they point out that in the written thesis, students should make transparent what is discussion of scientific literature and what are the concrete results obtained by their own experiments. It also should be made transparent if they conduct the experiments together with other students and thus share the results. Such essential details, also if appropriate on sample number and applied statistics, should be given in each legend to figures or tables.

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

UNS does not comment on this criterion in its statement.

The peers consider criterion 3 to be fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Report
- Staff Handbooks

- Study plans
- Module descriptions
- Discussions during the audit

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

According to the Self-Assessment Report, the teaching staff in the Biology programme consists of 21 full-time teachers (4 full professors, 3 associate professors, 12 assistant professors, and 2 lecturers). Most of the teachers (15) hold a PhD, the rest (6) hold a Master's degree. Four teachers are currently pursuing a PhD degree. The teacher to student ratio is 1:16.

There are 24 permanent teachers in the Chemistry programme (6 full professors, 8 associate professors, and 10 assistant professors). 21 teachers hold a PhD and 3 have a Master's degree. Two teachers are currently pursuing a PhD degree. The teacher to student ratio is 1:15.

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.

The peers positively notice that in both degree programmes several guest lecturers from national and international universities as well as professionals are invited to give classes and act as keynote speakers in seminars. The purpose of inviting domestic and foreign guest lecturers is to provide students with a different learning experience, and to improve standard of lectures at UNS. In addition, practitioners and experts from research and industrial institutions give virtual field lectures, webinars, and take part at seminars.

The peers discuss with UNS's management how new staff members are recruited. They learn that every year the faculties and departments announce their vacancies to UNS's management, which subsequently announces the vacancies on UNS's webpage. One way

to recruit new teachers is to send promising Master's students from UNS abroad to complete their PhD and then to hire them as teachers when they are finished. Nevertheless, UNS also hires graduates from other universities. Vacancies are announced nationally, so UNS gets applications from other universities. The new policy at UNS is to hire only new teachers with a PhD degree or sending promising Master graduates abroad for achieving a PhD and hire them as staff members afterwards. UNS will establish a PhD programme in Chemistry in the next few years, this is already fixed in the current UNS strategic plan and the necessary funds will be provided, a PhD programme in Biology was just recently established. The goal is to have only teachers with a PhD degree at UNS.

During the audit, the peers inquire how high the teaching load is and if enough opportunities are offered to the academic staff members to conduct research activities. They learn that teachers at FMIPA have a workload of 12 to 16 credits; the national maximum is 16 credits. The average credit load per semester for teachers in the Biology programme is 15.9 credits and 15.6 credits in the Chemistry programme. One credit is equivalent to 170 minutes of work per week with about one hour contact time. 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.

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

UNS encourages training of its academic and technical staff for improving the educational abilities and teaching methods. As described in the Self-Assessment Report, faculty members attend courses in English language training, Information and Communications Technology (ICT), laboratory safety and instrumentation, writing publications, and e-learning. Furthermore, Applied Approach (PEKERTI-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, learning strategies, preparation of

assessments, class management, as well as syllabus and course content development. All teachers at UNS are obligated to attend the lecturer certification programme held by the Directorate General of Higher Education (Direktorat Jenderal Pendidikan Tinggi Ditjen, DIKTI). An official teaching certificate is issued after the faculty member has completed the certification process. In addition, the study programmes organise trainings to upgrade lecturers' pedagogical content knowledge on a regular basis.

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

At UNS, the Institute for Research and Community Service (Lembaga Penelitian dan Pengabdian kepada Masyarakat, LPPM) conducts mentoring for lecturers in the fields of research and community service. Moreover, the Institute for Education Quality Assurance and Development (LPPMP) is responsible for improving the teachers' pedagogical and didactic skills.

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 UNS and FMIPA provide funds for joining international conferences. 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 UNS, 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 UNS 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 UNS and FMIPA. The financial sources are government funding, tuition fees from students, community and industry funding. Additional funds for research activities can be provided by UNS or the Indonesian government (Bantuan Pendanaan Perguruan Tinggi Nasional, BPPTN), but the teachers have to apply for them.

The composition of UNS's budget in 2021 was government funds 26 %, tuition fees 42 %, business and non-academic services 15 %, partnership funds from the industry 6 %, interest and provision 1 %, unused funds from the previous year (ending balance) 11 %. Budget planning for the Chemistry and Biology programmes is specified by a planning and development team, which prepares a yearly budget plan. Allocation planning and financial management for the programmes are carried out jointly between the study programmes, FMIPA, and UNS.

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. The academic staff members emphasise that from their point of view, both undergraduate programmes under review receive sufficient funding for teaching and learning activities.

The Faculty of Mathematics and Natural Sciences has three main buildings, which are used for learning and teaching activities. The buildings provide well-equipped classrooms, lecturer rooms, administration rooms, discussion rooms for lecturers, meeting rooms, and laboratories.

The Chemistry programme has eight laboratories consisting of three laboratories for practical courses and five laboratories for research activities (physical chemistry, inorganic chemistry, analytical chemistry, organic chemistry, and computing laboratory). Teaching activities in the laboratories (practicum) are conducted according to a predetermined schedule. In addition, the laboratories are also used for students' and teachers' research activities. Currently, the ratio of the instruments to students is 1:4 (one instrument is used by four students).

The Biology programme has six laboratories (biosystematics, organismal structure and development, microbiology, biochemistry and molecular biology, physiology and cell culture, and ecology). Besides these, there are additional rooms for students' practical work such as a herbarium and rooms for working with microscopes.

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 that work as lab assistants.

During the discussion with the peers, the alumni point out that in the early years of both undergraduate programmes, the technical equipment and the available instruments were very limited, however, the situation has greatly improved in recent years. New and more instruments were purchased and new laboratories for teaching and research were established. So now, teachers and students are satisfied with the technical equipment and the facilities. The peers point out that it would be useful purchase some additional advanced devices. For the Chemistry Department, the teachers and alumni suggest acquiring instruments as a Gas Chromatography Mass Spectrometer (GC-MS), a Transmission Electron Microscope (TEM), an X-ray Photoelectron Spectrometer (XPS), an Inductively Coupled Plasma Mass Spectrometer (ICP-MS), and a Raman Spectrometer so that all characterization tests can be carried out directly on campus. For the Biology Department, it would be useful purchasing New Generation PCRs and Confocal microscopes. In addition, the students point out during the discussion with the peers that some basic instruments are outdated and need to be replaced and more technical staff for maintaining the instruments would be needed. Finally, students would appreciate if funding of the final projects could be increased.

The peer group understands that modern research equipment for sophisticated laboratory work, sufficient in terms of quality and quantity, is not readily available and that the funds are restricted. This is partly compensated by the fact that in addition to the laboratories in the different departments, there is the UNS Central Laboratory, which is used by staff members from all faculties. In the Central Laboratory, some advanced instruments are available and it is possible for teachers and senior students to use the technical equipment upon appointment.

During the audit, the peers learn that experiments in both Bachelor's programmes are usually done by a group of two to five students; the exact group size depends on the specific class. The peers point out that all students need to have the opportunity to get hands on experience with carrying out laboratory experiments. For this reason, it would be useful reducing the number of students conducting one experiment. For this reason, the peers expect UNS to submit a schedule and financing plan on how to update and increase the

basic instruments and the technical equipment in the teaching laboratories within the next five years so that experiments can be done by groups of not more than two to three students. The first steps towards concrete implementation should be taken as soon as possible.

In order to further promoting the research activities, both programmes have established cooperations with several national and international partners. Foreign institutions that collaborated with the Chemistry programme include e.g., University Leipzig Germany, Technical University Braunschweig, Germany, Osaka University Japan, Rey Juan Carlos University Spain, and Gyeongsang National University in South Korea. In addition, there are cooperation agreements with the National Nuclear Energy Agency of Indonesia (BATAN), the State Oil and Natural Gas Mining Company of Indonesia (PERTAMINA), and the Conservation Office of Sangiran Early Man Site.

The Biology programme collaborates in research with national institutions such as the Research and Development Center for Medicinal Plants and Traditional Medicines, the Development Agency in Central Java, the West Bali National Park, the Eijkman Institute (Forensic Section of the Indonesian Police, and Mount Merbabu National Park. The activities that have been carried out at these and other institutions are internships, research projects, and community service. In addition, several international cooperation schemes have been established, e.g., with Gakushuin University, Japan, Osaka University, Japan, and Bahir Dar University in Ethiopia.

The students also express their satisfaction with the library and the available literature there. Remote access via VPN is possible and UNS offers access to several scientific digital databases such as ScienceDirect and Scopus, so that teachers and students access current scientific papers, e-books, and papers.

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 acknowledge that UNS provides a five-year budget plan for purchasing basic instruments for the teaching laboratories. The plan has been submitted to the UNS Vice-Rector for Planning, Partnership, Business, and Information Affairs and has received approval. By increasing the number of instruments for practical lab work, UNS hopes to reduce the number of students conducting one experiment to two to three students per group.

The peers confirm that several new lab instruments for students' experiments have already been purchased. These instruments are scheduled to arrive at UNS next semester (September-October 2022). The peers expect UNS to submit the list of the new instruments that have been installed in the laboratories in the further course of the procedure.

The peers consider criterion 4 to be mostly fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-Assessment Reports
- Module descriptions
- Homepage UNS: https://uns.ac.id/en/
- Homepage FMIPA: https://mipa.uns.ac.id/en/
- Homepage Chemistry : https://chemistry.mipa.uns.ac.id/
- Homepage Biology : https://biology.mipa.uns.ac.id/

Preliminary assessment and analysis of the peers:
The students, as all other stakeholders, have access to the module descriptions via UNS's homepage.

After studying the module descriptions of the Biology programme, the peers point out that they do not include all necessary information. Especially the information about the person(s) responsible for each module, the teaching methods, the students' work load, the awarded credit points (SKS and ECTS), the intended learning outcomes, the content, the applicability, the admission and examination requirements, and the literature references are either missing or are incomplete.

In addition, the module descriptions should make clear what course is a lecture and what course includes laboratory work. The module descriptions also need to specify how many hours students spend in the laboratory in each course and what laboratory work is done.

For this reason, the peers expect an update of the module descriptions for the Biology programme that should include all necessary information. The module descriptions of the Chemistry programme are acceptable.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- 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 both 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 almost 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. However, the peers point out that the Diploma Supplement should also include information on the relative grade (e.g., A, B, C, D) or statistical information about the distribution of the final grade in order to assess the individual performance in comparison to other graduates.

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 UNS 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.

In addition, all relevant information about the degree programmes (e.g., module handbook, study plan, profile) is available on the English homepage of the programmes.

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

The peers confirm that the module descriptions for the Biology programme have been updated and now include information about the person(s) responsible for the module, the

teaching methods, the awarded credit points (SKS and ECTS), the intended learning outcomes, the content, the applicability, and the literature references. However, some important information is still missing. The students' total workload (hours spend in classes and on self-studies per week) and how many hours students spend in the laboratory in each course and what laboratory work is done is still not mentioned in the module descriptions. The peers expect UNS to eliminate this deficit.

The peers consider criterion 5 to be mostly fulfilled.

6. Quality management: quality assessment and development

Evidence:

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

Preliminary assessment and analysis of the peers:
The peers discuss the quality management system at UNS with the programme coordinators. The peers learn that there is an institutional system of quality management aiming at continuously improving the degree programmes.

This system relies on internal (SPMI) as well as external (SPME) quality assurance. SPMI encompasses all activities focused on implementing measures for improving the teaching and learning quality at UNS. SPME focuses on both national and international accreditations. Every degree programme and every Higher Education Institution in Indonesia has to be accredited by the National Accreditation Board of Higher Education / Badan Akreditasi Nasional Perguruan Tinggi (BAN-PT). UNS as an institution as well as both degree programmes under review have received the highest accreditation status (A) from BAN-PT.

Internal assessment of the quality of the degree programmes is mainly provided through student, alumni, and employer surveys. The students give their feedback on the courses by filling out the questionnaire online 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 SIAKAD. The peers point out that there should be a regular and institutionalised survey on students' workload in every course. For example, this could be done by including a respective question in the course questionnaires that students have to fill out at the end of each semester (see Criterion 2.2).

The peers acknowledge that UNS has established a comprehensive quality assurance system that is generally suitable to identify weaknesses and to improve the degree programmes. The Department Head can access the students' feedback and responses to each course via SIAKAD. Each teacher can see the average score of the students' feedback from their account in SIAKAD.

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

The auditors gain the impression that the departments take the students' feedback seriously and changes are made if necessary. In case of negative feedback, the Head of Department talks to the respective teacher, analyses the problem, and offers guidance. There are regular meetings (every semester) with students where they can voice their issues and suggestions. During these "Aspiration Meetings", students' representatives can raise any topics they want to discuss. However, the peers point out that it is necessary to close the feedback cycles and to directly inform the students about the results of the course questionnaires in every course. This way, students can get first-hand information on any issues and on the measures planned to improve the situation.

During the audit, the peers learn that students are only represented in the university's Board of Trustees but not in any other board on faculty or department level. Thus, students are not directly involved in the decision-making processes. The peers are convinced that it would be very useful to have student members in the different boards. For this reason, they recommend that student representatives should be members of the boards at UNS at least on department and programme level and be actively involved in the decision-making processes for further developing the degree programmes.

The peers discuss with the representatives of UNS's partners from public institutions, and private companies if there are regular meetings with the partners on faculty or department level, where they discuss the needs and requirements of the employers and possible changes to the degree programmes. They learn that some employers and alumni are invited to give their feedback on the content of the degree programmes in the course of the

tracer studies. The peers appreciate that UNS stays in contact with its alumni and has a close relation with its partners from the industry, schools, and public institutions.

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 appreciate that UNS will conduct a regular and standardised survey on students' workload in every course. The Institute for Development and Quality Assurance of Education (LPPMP) has developed a new survey to this regard, which will be provided via the digital platform SIAKAD. Students can access the survey at the end of each semester, starting this semester (Feb-July 2022). The program's Quality Assurance Division (Gugus Kendali Mutu) will evaluate the results to identify areas for improvement. Survey results will also be communicated to the students every semester. The peers expect UNS to provide the results of the new workload survey in the further course of the procedure.

The peers consider criterion 6 to be mostly fulfilled.

D Additional Documents

Before preparing their final assessment, the panel asks 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 (30.06.2022)

UNS provides the following statement:

UNS appreciates the attention, support, and detailed comments the peers have provided to us. In general, we acknowledge all the feedback, and we will continue all the good reviews from peers and make further improvements following your valuable comments. Please find below the statement regarding each criterion.

Criterion 1.
We do not have comments on this criterion.

Criterion 2.
Peer's comment: *As mentioned in the Self-Assessment Report, the share of practical work is 26 SKS (18 %) in the* Biology *programme and 23 SKS (16 %) in the Chemistry programme. The peers point out that this share is rather low by international standards*.

We think it would be more appropriate to calculate the percentage based on ECTS since the conversion rate between SKS and ECTS differs among the regular practical work in the lab (practicums), internship, community service, and undergraduate thesis. Hence, in the updated calculation, the Biology programme shares 47.98 ECTS (23.3%), and Chemistry programme shares 42.66 ECTS (20.8%) of practical work only from compulsory courses (Appendix 1). However, we realise that the numbers are still below the international standard (30%). Therefore, in the future, we will increase the practical workload for elective courses relevant to the thesis topics so that the total practical workload becomes around 30% of the total modules.

Correction on the homepage of both programmes.
Before correction (page 17):

- Homepage Biology: https://biologi.fkip.uns.ac.id/en/
- Homepage Chemistry: https://kimia.fkip.uns.ac.id/

Correction:

- Homepage Ba Biology: https://biology.mipa.uns.ac.id/
- Homepage Ba Chemistry: https://chemistry.mipa.uns.ac.id/

Criterion 3.
We do not have comments on this criterion.

Criterion 4.

Appendices 2-3 are the 5-year budget plan of purchase of basic instruments for the teaching laboratories. The plan has been submitted to the UNS Vice-Rector for Planning, Partnership, Business, and Information Affairs and received approval (see Appendix 4 for

Letter of commitment UNS). By increasing the number of instruments for practicums, we hope to reduce the number of students conducting one experiment to two to three students per group.

In the earliest implementation of the plan this year (2022), both programmes have purchased additional lab instruments for students' experiments, such as vertical/horizontal electrophoresis systems, an autoclave, Sedgewick Rafter counting chambers (Biology programme), and bomb calorimeter, UV-vis spectrophotometer, rotary evaporator (Chemistry programme). Details on the list are available in Appendices 2-3. These instruments are scheduled to arrive next semester (September-October 2022).

Criterion 5.

The Biology programme has updated the contents of module handbooks. It contains all necessary information, such as the person(s) responsible for each module, the teaching methods, the students' workload, the awarded credit points (SKS and ECTS), the intended learning outcomes, the content, the applicability, the admission and examination requirements, and the literature references (Appendix 5).

This section also contains typos on the faculty homepage and the homepage of both programmes.

Before correction (page 35):

- Homepage FMIPA: https://fkip.uns.ac.id/en/
- Homepage Biology: https://biologi.fkip.uns.ac.id/en/
- Homepage Chemistry: https://kimia.fkip.uns.ac.id/

Correction:

- Homepage FMIPA: https://mipa.uns.ac.id/eng/
- Homepage Ba Biology: https://biology.mipa.uns.ac.id/
- Homepage Ba Chemistry: https://chemistry.mipa.uns.ac.id/

Criterion 6.

Responding to the peer's suggestion that there should be a regular and standardised survey on students' workload in every course, the Institute for Development and Quality Assurance of Education (LPPMP) has developed a new survey regarding students' workload (Appendix 6). UNS will add the survey via the digital platform SIAKAD. Students can access the survey at the end of each semester, starting this semester (Feb-July 2022). The program's Quality Assurance Division (*Gugus Kendali Mutu*) will evaluate the survey results to identify areas for improvement and put in place a genuine process of continuous. Survey results will also be communicated to students every semester (see Appendix 6 for the list of questions).

List of Appendix

Appendix 1. Distribution of workload between theory and practicum in the biology and chemistry programmes
Appendix 2. Lab Budget_ Chemistry 2022-2026
Appendix 3. Lab Budget_ Biology 2022-2026
Appendix 4. Letter of commitment UNS
Appendix 5. Module Handbook Biology

Appendix 6. Survey on students' workload

F Summary: Peer recommendations (31.07.2022)

Taking into account the additional information and the comments given by UNS, 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	With requirements for one year	-	30.09.2028
Ba Chemistry	With requirements for one year	-	30.09.2028

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly.

A 2. (ASIIN 4.3) Submit a schedule and financing plan on how to update and increase the basic instruments and the technical equipment in the teaching laboratories so that experiments can be done by groups of not more than two to three students within the next five years. Demonstrate which new and additional instruments have been purchased and installed in the laboratories.

A 3. (ASIIN 6) Close the feedback cycles and inform the students directly about the results of the course questionnaires.

For the Bachelor's degree programme Biology

A 4. (ASIIN 5.2) Rewrite the module descriptions to include information about the students' total workload (hours spend in classes and on self-studies per week). In addition, the module descriptions need to specify how many hours students spend in the laboratory in each course and what experiments are conducted.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is recommended to further promote the students' academic mobility and to provide more places and scholarships for international exchange programmes.

E 2. (ASIIN 2.1) It is recommended to offer international classes, which are taught in English.

E 3. (ASIIN 2.1) It is recommended to improve the students' soft skills, e.g. communication and team skills.

E 4. (ASIIN 6) It is recommended to make student representatives members of the quality assurance units at UNS at programme or department level and to directly involve them in the decision making processes for further developing the degree programmes.

G Comment of the Technical Committees (06.09.2022)

Technical Committee 09 – Chemistry, Pharmacy (29.08.2022)

Assessment and analysis for the award of the ASIIN seal:

Universitas Sebelas Maret is one of the most renowned universities in Indonesia, which is reflected, for example, in the high number of applicants, also in natural science degree programmes. Overall, the expert group had a positive impression of the two study programmes and the points of criticism (academic mobility, conversion into ECTS points, technical equipment, module descriptions, involvement of students in the further development of the study programmes, and feedback to students on the results of the course questionnaires) are typical for accreditation procedures in Indonesia.

The Technical Committee discusses the procedure and agrees to the proposed requirements and recommendations.

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	With requirements for one year	-	30.09.2028
Ba Chemistry	With requirements for one year	-	30.09.2028

Technical Committee 10 – Life Sciences (06.09.2022)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and agrees to the proposed requirements and 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	With requirements for one year	-	30.09.2028
Ba Chemistry	With requirements for one year	-	30.09.2028

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly.

A 2. (ASIIN 4.3) Submit a schedule and financing plan on how to update and increase the basic instruments and the technical equipment in the teaching laboratories so that experiments can be done by groups of not more than two to three students within the next five years. Demonstrate which new and additional instruments have been purchased and installed in the laboratories.

A 3. (ASIIN 6) Close the feedback cycles and inform the students directly about the results of the course questionnaires.

For the Bachelor's degree programme Biology

A 4. (ASIIN 5.2) Rewrite the module descriptions to include information about the students' total workload (hours spend in classes and on self-studies per week). In addition, the module descriptions need to specify how many hours students spend in the laboratory in each course and what experiments are conducted.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is recommended to further promote the students' academic mobility and to provide more places and scholarships for international exchange programmes.

E 2. (ASIIN 2.1) It is recommended to offer international classes, which are taught in English.

E 3. (ASIIN 2.1) It is recommended to improve the students' soft skills, e.g. communication and team skills.

E 4. (ASIIN 6) It is recommended to make student representatives members of the quality assurance units at UNS at programme or department level and to directly involve them in the decision making processes for further developing the degree programmes.

H Decision of the Accreditation Commission (23.09.2022)

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

The Accreditation Commission discusses about the procedure, especially about the need to submit a schedule and financing plan on how to update and increase the basic instruments and the technical equipment in the teaching laboratories (requirement A2). The AC agrees with the peers that it is appropriate to give UNS enough time for equipping the laboratories and that in the course of the re-accreditation, it will be verified in detail, how the laboratory equipment has been improved. Overall, the AC agrees with the proposed requirements and suggestions.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology	With requirements for one year	-	30.09.2028
Ba Chemistry	With requirements for one year	-	30.09.2028

Requirements

For all degree programmes

A 1. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly.

A 2. (ASIIN 4.3) Submit a schedule and financing plan on how to update and increase the basic instruments and the technical equipment in the teaching laboratories so that experiments can be done by groups of not more than two to three students within the next five years. Demonstrate which new and additional instruments have been purchased and installed in the laboratories.

A 3. (ASIIN 6) Close the feedback cycles and inform the students directly about the results of the course questionnaires.

For the Bachelor’s degree programme Biology

A 4. (ASIIN 5.2) Rewrite the module descriptions to include information about the students' total workload (hours spend in classes and on self-studies per week). In addition, the module descriptions need to specify how many hours students spend in the laboratory in each course and what experiments are conducted.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is recommended to further promote the students' academic mobility and to provide more places and scholarships for international exchange programmes.

E 2. (ASIIN 2.1) It is recommended to offer international classes, which are taught in English.

E 3. (ASIIN 2.1) It is recommended to improve the students' soft skills, e.g. communication and team skills.

E 4. (ASIIN 6) It is recommended to make student representatives members of the quality assurance units at UNS at programme or department level and to directly involve them in the decision making processes for further developing the degree programmes.

I Fulfillment of Requirements (22.09.2023)

Analysis of the peers and the Technical Committees (05.09.2023)

Requirements

For all programmes

A 1. (ASIIN 2.2) Verify the students' total workload and award the ECTS points accordingly.

Initial Treatment	
Peers	Fulfilled Vote: unanimous Justification: The Institute for Development and Quality Assurance of Education (LPPMP) has conducted surveys on the workload of UNS students via the SIAKAD digital academic system, with all students being able to access the survey at the end of the semester before receiving their grade. The survey took place on July 2022 (even semester) and on January 2023 (odd semester). Based on the results, UNS has adjusted the awarded ECTS points.
TC 09	Fulfilled Vote: unanimous Justification: The TC agrees with the experts' assessment.
TC 10	Fulfilled Vote: unanimous Justification: The TC agrees that the requirement is fulfilled.

A 2. (ASIIN 4.3) Submit a schedule and financing plan on how to update and increase the basic instruments and the technical equipment in the teaching laboratories so that experiments can be done by groups of not more than two to three students within the next five years. Demonstrate which new and additional instruments have been purchased and installed in the laboratories.

Initial Treatment	
Peers	Fulfilled Vote: unanimous

	Justification: Already in 2022, the University has purchased additional equipment for laboratory work, e.g., a laminar flow, a digital microscope, a microplate reader and a chlorophyll meter. This list comprises items of €75000. The planning for the upcoming years submitted to the Vice Rector for Planning, Collaboration, Business and Information foresees the purchase of equipment equivalent to about €40000 per year. The Vice Rector supports the submitted list. This would allow to update and increase the basic instruments and the technical equipment. Not addressed appears to the purchasing of large equipment such as mass spectrometers and confocal scanning microscopes.
TC 09	Fulfilled Vote: unanimous Justification: The TC agrees with the experts' assessment.
TC 10	Fulfilled Vote: unanimous Justification: The TC agrees that the requirement is fulfilled.

A 3. (ASIIN 6) Close the feedback cycles and inform the students directly about the results of the course questionnaires.

Initial Treatment	
Peers	Fulfilled Vote: unanimous Justification: The results of questionnaires obtained from the period of August 2022 - January 2023 are displayed through the programme`s homepage and social media. Besides, both programmes also inform students about the results and the follow-up measures during the aspiration meeting held at the end of each semester.
TC 09	Fulfilled Vote: unanimous Justification: The TC agrees with the experts' assessment.
TC 10	Fulfilled Vote: unanimous Justification: The TC agrees that the requirement is fulfilled.

For the Bachelor's degree programme Biology

A 4. (ASIIN 5.2) Rewrite the module descriptions to include information about the students' total workload (hours spend in classes and on self-studies per week). In addition, the module descriptions need to specify how many hours students spend in the laboratory in each course and what experiments are conducted.

Initial Treatment	
Peers	Fulfilled Vote: unanimous Justification: The Biology programme has updated the content of the module descriptions with respect to the students' workload. The practicum-based courses have separated module description that include information on the experiments.
TC 10	Fulfilled Vote: unanimous Justification: The TC agrees that the requirement is fulfilled.

Decision of the Accreditation Commission (22.09.2023)

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Biology	All requirements fulfilled	-	30.09.2028
Ba Chemistry	All requirements fulfilled	-	30.09.2028

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:

Code	Description
PEO 1	Capable of applying the principles of biological knowledge and skills in industries related to biology
PEO 2	Capable of expanding knowledge through higher education
PEO 3	Demonstrate characters of leadership and independence in the society

Program Learning Outcomes		
PEO 1	PLO 1	Mastering the concepts of biology as well as knowledge and technology related to biology
	PLO 2	Mastering the basic principles and analytical skills for instruments in the field of biology and its applications
	PLO 3	Produce scientific article or innovative products based on research
	PLO 4	Analyzing the potential of biological resources
PEO 3	PLO 5	Demonstrate professional and well-mannered work ethics
	PLO 6	Demonstrate a logical and systematic problem-solving ability
	PLO 7	Demonstrate effective communication in either Indonesian or English language
	PLO 8	Build networking and collaboration with various parties
PEO 2	PLO 9	Demonstrate fluency of information technology (IT) and keep abreast of the latest development in science and technology

The following **curriculum** is presented:

Semester 1						
No.	Code	Course Title	Credit (SKS)			ECTS Cr-eq
			Theory	Practicum	Total	
1	09043112010	Indonesian Language	2	-	2	2.67
2	09043142001	English	2	-	2	2.67
3	09043142006	General Biology	2	-	2	2.67
4	09043141007	General Biology Practicum	-	1	1	1.33
5	09043142003	Basic Physics	2	-	2	2.67
6	09043142008	Environmental Science	2	-	2	2.67
7	09043142004	Basic Chemistry	2	-	2	2.67
8	09043141005	Basic Chemistry Practicum	-	1	1	1.33
9	09043142002	Basic Mathematic	2	-	2	2.67
10	09043112008	Civics Education	2	-	2	2.67
11	09043142009	Biodiversity	2	-	2	2.67
Sum			**18**	**2**	**20**	**26.69**

Semester 2						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09043242022	Biochemistry	2	-	2	2.67
2	09043241023	Biochemistry Practicum	-	1	1	1.33
3	09043212009	Pancasila Education	2	-	2	2.67
4	09043242024	Cell Biology	2	-	2	2.67
5	09043242025	Biostatistics	2	-	2	2.67
6	09043242026	Microbiology	2	-	2	2.67
7	09043241027	Microbiology Practicum	-	1	1	1.33
8	09043212001	Religion Education	2	-	2	2.67
9	09043243028	Animal Structure and Development	3	-	3	3.99
10	09043241029	Animal Struct. and Dev. Practicum	-	1	1	1.33
11	09043243030	Plant Structure and Development	3	-	3	3.99
12	09043241031	Plant Structure and Dev. Practicum	-	1	1	1.33
Sum			**18**	**4**	**22**	**29.32**

Semester 3						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09043142010	Molecular Biology	2	-	2	2.67
2	09043141011	Molecular Biology Practicum	-	1	1	1.33
3	09043142012	Animal Physiology	3	-	3	3.99
4	09043141013	Animal Physiology Practicum	-	1	1	1.33
5	09043142014	Plant Physiology	3	-	3	3.99
6	09043141015	Plant Physiology Practicum	-	1	1	1.33
7	09043142016	Genetics	3	-	3	3.99
8	09043141017	Genetics Practicum	-	1	1	1.33
9	09043142018	Research Methodology	2	-	2	2.67
10	09043142019	Industrial Microbiology	2	-	2	2.67
11	09043141020	Laboratory Techniques	1	-	1	1.33
12	09043141021	Laboratory Techniques Practicum	-	1	1	1.33
Sum			**16**	**5**	**21**	**27.96**

Semester 4						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09043241032	Bioethics	1	-	1	1.33
2	09043242033	Bioinformatics	2	-	2	2.67
3	09043241034	Bioinformatics Practicum	-	1	1	1.33
4	09043243035	Biosystematics	3	-	3	3.99
5	09043241036	Biosystematics Practicum	-	1	1	1.33
6	09043243037	Ecology	3	-	3	3.99
7	09043241038	Ecology Practicum	-	1	1	1.33
8	09043242039	Evolution	2	-	2	2.67
9	09043242040	Microbial Physiology	2	-	2	2.67
10	09043242041	Cell and Tissue Culture	2	-	2	2.67
11	09043241042	Animal Cell and Tissue Cult. Pract.	-	1	1	1.33
11	09043241043	Plant Cell and Tissue Cult. Pract.	-	1	1	1.33
13	09043242044	Bioproducts	2	-	2	2.67
Sum			**17**	**5**	**22**	**29.31**
Semester 5						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09043322002	Student Internship	-	-	2	5.34
2		Elective Courses (or MBKM activities)	-	-	17	22.61
Sum					**19**	**27.95**
Semester 6						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09043052034	Entrepreneurship	-	-	2	2.67
2		Elective Courses (or MBKM activities)	-	-	16	21.28
Sum					**18**	**23.95**
Semester 7						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09043322001	Community Service Program	-	-	2	5.34
2		Elective Courses (or MBKM activities)	-	-	14	18.62
Sum					**16**	**23.96**
Semester 8						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09043322004	Thesis	-	-	6	16.02
Sum					**6**	**16.02**

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:

PEO	Description
Academic Accomplishment	1) To master the theoretical concepts of chemistry in general and one of the branches in chemistry thoroughly and to formulate solutions for procedural problems 2) To apply the chemistry principles and utilize science and technology in the field of chemistry to solve problems and adapt to situations at hand
General/Social Accomplishment	To be responsible for own work and be entrusted with responsibilities for the achievement of the organization's work
Professional Accomplishment	To make the right decisions based on information and data analyses and to provide instructions for choosing various alternative solutions independently and in groups

Code	Description
PLO1	Ability to become professional experts in the industry, academic, and other relevant fields
PLO2	Ability to apply scientific methods in chemistry and other fields
PLO3	Mastery of theory and working as a researcher in the field of science and technology with the ability to solve community problems with an orientation to sustainable development and to disseminate research results in scientific meetings and scientific publications
PLO4	Mastery of basic principles and ability to use software in determining the structure and energy of micro molecules, analysis, and synthesis in general or more specific field in chemistry (organic, biochemistry, or inorganic), and data processing (analytical chemistry)
PLO5	Expertise in practical work in the laboratory, handling general and special chemicals, and implementing work safety and security systems
PLO6	Mastery of the theoretical concepts of structure, properties, changes, kinetics, and energetics of molecules and chemical systems and identification, separation, characterization, transformation, synthesis, and application of micromolecular chemicals
PLO7	Mastery of the knowledge of work safety and security in the laboratory and understanding environmental issues and related regulations
PLO8	Mastering complete operational knowledge about functions, the operation of common chemical instruments, and data and information analyses of these instruments
PLO9	Having knowledge and expertise in interdisciplinary fields such as economics and sociocultural studies
PLO10	Ability to apply ethical principles according to religious, legal, and social norms based on the noble values of the nation's culture
PLO11	Having an honest, diligent, creative, and innovative nature
PLO12	Ability to work effectively individually and in groups in a diverse cultural environment by applying managerial fundamentals

The following **curriculum** is presented:

Semester 1						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	09331125001	Religion	2	-	2	2.66
2	0933122006	Fundamental Mathematics	2	-	2	2.66
3	0933124001	Fundamental Chemistry	4	-	4	5.32
4	0933121003	Experimental of Fundamental Chemistry 1	-	1	1	1.33
5	0933124511	Fundamental Physic	3	-	3	3.99
6	0933121514	Experimental of Fundamental Physic	-	1	1	1.33
7	0933112520	Indonesian	2	-	2	2.66
8	0933122005	English	3	-	3	3.99
9	0933112502	Civics	2	-	2	2.66
10	0933122006	Laboratory Management	2	-	2	2.66
Sum			**20**	**2**	**22**	**29.26**
Semester 2						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	0933223510	Molecular Visualization	2	-	2	2.66
2	0933212519	Experimental of Fundamental Chemistry 2	-	1	1	1.33
3	0933232102	Chemical Equilibrium	2	-	2	2.66
4	0933233201	Structure of Inorganic Compound	3	-	3	3.99
5	0933233401	Structure of Organic Compound	3	-	3	3.99
6	0933133301	Fundamental Analytical Chemistry	3	-	3	3.99
7	0933131302	Experimental of Fundamental Analytical Chemistry	-	1	1	1.33
8	0933222518	Pancasila	2	-	2	2.66
9	0933222508	Elemental Differential Equation	2	-	2	2,66
10	0933222512	Fundamental Biology	2	-	2	2.66
Sum			**19**	**2**	**21**	**27.93**
Semester 3						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	0933132101	Chemical Thermodynamic	3	-	3	3.99
2	0933233403	Reaction of Organic Compound	3	-	3	3.99
3	0933131402	Experimental of Organic Compound Isolation	-	1	1	1.33
4	0933131202	Experimental of Inorganic Compound Synthesis	-	1	1	1.33
5	0933231103	Experimental of Thermodynamics and Equilibrium	-	1	1	1.33
6	0933233301	Fundamental Spectrometry Analysis	3	-	3	3.99
7	0933231303	Experimental of Fundamental Spectrometry Analysis	-	1	1	1.33
8	0933233203	Reaction of Inorganic Compound	3	-	3	3.99
9	0933133105	Chemical Bond and Molecular Structure	3	-	3	3.99
10	0933232419	Physical Organic Chemistry	3	-	3	3.99
Sum			**18**	**4**	**22**	**29.26**

Semester 4						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	0933133104	Chemical Kinetic	3	-	3	3.99
2	0933231204	Experimental of Inorganic Compound Characterization	-	1	1	1.33
3	0933231404	Experimental of Organic Compound Synthesis	-	1	1	1.33
4	0933232008	Research Methodology	2	-	2	2.66
5	0933233107	Microscopic Characteristic	3	-	3	3.99
6	0933132306	Electrometry and X-ray Spectroscopy	2	-	2	2.66
7	0933131106	Experimental of Kinetic and Molecular Spectroscopy	-	1	1	1.33
8	0933132305	Separation Chemistry and Chromatography	2	-	2	2.66
9	0933133406	Organic Compound Synthesis	2	-	2	2.66
10	0933132409	Structure of Biomolecule	2	-	2	2.66
11	0933233205	Elemental Chemistry	3	-	3	3.99
Sum			**19**	**3**	**22**	**29.26**
Semester 5						
No.	Code	Course Title	Credit (SKS)			
			Theory	Practicum	Total	ECTS cr-eq
1	0933223509	Statistic for Chemistry	2	-	2	2.66
2	0933132409	Biochemical Reaction	2	-	2	2.66
3	0933133409	Organic Compound Structure Elucidation	3	-	3	3.99
4	0933232410	Chemistry of Natural Products	2	-	2	2.66
5	0933231408	Experimental Biochemistry	1	-	1	1.33
6	0933232207	Inorganic Compound Structure Elucidation	2	-	2	2.66
7	0933131307	Experimental of Separation Chemistry and Electrometry	-	1	1	1.33
8	0933233409	Environmental Chemistry	2	-	2	2.66
9		Elective Course 1	-	-	2	2.66
10		Elective Course 2	-	-	2	2.66
11		Elective Course 3	-	-	2	2.66
Sum					**21**	**27.93**
Semester 6						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	0933212504	Entrepreneurship	2	-	2	2.66
2	0933252009	Student Internship	-	-	2	5.34
3		Elective Course 4	-	-	2	2.66
4		Elective Course 5	-	-	2	2.66
5		Elective Course 6	-	-	2	2.66
6		Elective Course 7	-	-	2	2.66
7		Elective Course 8	-	-	2	2.66
8		Elective Course 9	-	-	2	2.66
Sum					**16**	**23.96**

Semester 7						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	0933222519	Community Service Program	-	-	2	5.34
2		Elective Course 10	-	-	2	2.66
3		Elective Course 11	-	-	2	2.66
4		Elective Course 12	-	-	2	2.66
5		Elective Course 13	-	-	2	2.66
6		Elective Course 14	-	-	2	2.66
7	0933146010	Elective Course 15	-	-	2	2.66
Sum					**14**	**21.3**
Semester 8						
No.	Code	Course Title	Credit (SKS)			ECTS cr-eq
			Theory	Practicum	Total	
1	0933146010	Thesis	-	-	6	16.02
Sum					**6**	**16.02**