



ASIIN Seal & Eurobachelor®

Accreditation Report

Bachelor's Degree Programmes

Biology

Biotechnology

Chemistry

Provided by

Universitas Brawijaya, Indonesia

Version: 18 March 2022

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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 Sarjana Biologi	Bachelor programme in Biology	ASIIN	BAN-PT, 2024	10
Program Sarjana Bioteknologi	Bachelor programme in Biotechnology	ASIIN	BAN-PT, 2025	10
Program Sarjana Kimia	Bachelor programme in Chemistry	ASIIN, Euro-bachelor®	BAN-PT, 2024	09
Date of the contract: 30.03.2021				
Submission of the final version of the self-assessment report: 26.08.2021				
Date of the audit (online): 25.10. – 27.10.2021				
Peer panel: Prof. Dr. Tilman Achstetter, University of Applied Sciences Bremen Prof. Dr. Martin Jäger, University of Applied Science Niederrhein Dr. Wibke Lölsberg, BASF SE, Ludwigshafen Prof. Dr. Erlia Narulita, Universitas Jember Azalea Rahma Septianti, Student, Universitas Airlangga				
Representative of the ASIIN headquarter: Rainer Arnold				
Responsible decision-making committee: Accreditation Commission				

¹ ASIIN Seal for degree programmes;

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

<p>Criteria used:</p> <p>European Standards and Guidelines as of 15.05.2015</p> <p>ASIIN General Criteria as of 28.03.2014</p> <p>Subject-Specific Criteria of Technical Committee 09 – Chemistry as of 29.03.2019</p> <p>Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 28.06.2019</p>	
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B Characteristics of the Degree Programmes

a) Name	Final degree (original)	b) Areas of Specialization	c) Corresponding level of the EQF ³	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Bachelor in Biology	Sarjana Sains (S.Si.) Biologi / Bachelor of Science in Biology	-	6	Full time	no	8 Semester	144 SKS / 216 ECTS	1987, Once a year (August)
Bachelor in Biotechnology	Sarjana Sains (S.Si.) Bioteknologi / Bachelor of Science in Biotechnology	-	6	Full time	no	8 Semester	144 SKS / 216 ECTS	2015, Once a year (August)
Bachelor in Chemistry	Sarjana Sains (S.Si.) Kimia / Bachelor of Science in Chemistry		6	Full time	no	8 Semester	146 SKS / 219 ECTS	1987, Once a year (August)

³ EQF = The European Qualifications Framework for lifelong learning

For the Bachelor's degree programme Biology, (BPB) Universitas Brawijaya (UB) has presented the following profile in the Self-Assessment Report:

Vision

The vision of the Biology Study Program is that in 2030 it will become an exemplary study program in providing undergraduate Biology education in accordance with the best international standards through research and participating in the development of modern biology concepts for the preservation of biodiversity and human welfare, which supports sustainable global development.

Mission

Organizing undergraduate biology education, who understands the concepts of modern biology and bio-conservation, has good academic integrity, lifelong learning, and is able to work together professionally.

Educate students to have sensitivity to solving problems related to biology while still paying attention to safety and bioethics, practical skills, capable of supervising research and development of biology.

Educate students to be able to work in teams and learn with independence to apply methods and disseminate research results, support solving problems in the community, and take advantage of business opportunities related to the field of Biology.

For the Bachelor's degree programme Biotechnology, (BPBt) Universitas Brawijaya (UB) has presented the following profile in the Self-Assessment Report:

Vision

To become a science and technology development centre that produces globally competitive human resources in the field of industrial biotechnology.

Mission

To provide quality education programme in industrial biotechnology that can compete nationally and internationally.

To perform research in industrial biotechnology that produces useful products for human welfare.

To conduct diffusion of science and technology to the community in the face of the bio-economic era.

Objectives

To produce quality human resources in industrial biotechnology.

To produce quality research in the form of scientific publications and intellectual property rights (IPs) that are beneficial for the development of industrial biotechnology at the national and international level.

To take an active role in the diffusion of science and technology related to the development of industrial biotechnology.

For the Bachelor's degree programme Chemistry (BPC), Universitas Brawijaya (UB) has presented the following profile in the Self-Assessment Report:

Vision

To become a leading institution in the field of chemical education and research in the exploration of natural resources by means of environmentally friendly methods.

Mission

Carry out chemical education in a professional and international standard.

Develop research based on natural materials that have the potential to become featured products.

Implement research results to develop an environmentally friendly industry.

Goals and Strategic Plan

Produce graduates who are professional, qualified and able to compete in the chemical field nationally and internationally.

Have the ability to explore potential natural resources wisely and responsibly.

Empowering the community through the application of science and technology and services in collaboration with various parties.

Produce research products that have the potential for intellectual property rights (IPR).

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Webpage Ba Biology: <https://biologi.ub.ac.id/>
- Webpage Ba Biotechnology: <https://thp.ub.ac.id/en/education/undergraduate/biotechnology/>
- Webpage Ba Chemistry: <https://kimia.ub.ac.id/en/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

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

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

Graduates of the Bachelor's degree programme Biology (BPB) 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, 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.

The programme is designed as a general biology programme with some specialization options in the course of the student's 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. BPB graduates have a broad occupational area. Their occupational profile includes researcher, teacher/lecturer, entrepreneur, and they could work in industry, academia, or government. The recent tracer study for graduates of 2014-2019 shows that from 194 tracked alumni, 96 % are employed. 3 % of them work as researchers, 46 % are employed by the industry or governmental institutions, 9 % work as educators/ teachers and 10 % as bio-entrepreneurs, and 28 % are continuing their academic education as post-graduate students.

As a cross-sectional discipline from microbiology, biochemistry and bioprocess engineering, biotechnology is dedicated to the technical use of biological processes and the development of processes based on renewable raw materials. The Bachelor's degree programme Biotechnology (BPBt) has a special focus on living systems (molecules, cells, tissues, and organisms) as agents for making bio-products. The interdisciplinary qualification profile of graduates combines natural and engineering sciences from the fields of chemistry, biochemistry, micro- and molecular biology as well as reaction, process and bioprocess engineering. Employment is in companies, authorities and associations, preferably for the production and quality assurance of food, food supplements, cosmetics, biocatalysts, cellulose, bioplastics, pharmaceuticals, agrochemicals and fine chemicals.

Data from the 2020 tracer study show that 36% of BPBt graduates work as an entrepreneur while the remaining 64% work as a staff at private or national corporations (food industry, fragrance industry, pharmaceutical company, biotech company, national research institute, or in retail). Of those working as an entrepreneur, 21% work in a field unrelated to biotechnology. Of those alumni that are not yet working (54%), 33% are preparing for further study while the remaining are applying for jobs.

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 (BPC), as defined by UB, correspond with the competences as outlined by the SSC. They come to the following conclusions:

The goal of the BPC programme is to impart essential competencies in mathematics, the natural sciences and the core subjects of chemical sciences (organic, inorganic, physical, analytical, and theoretical 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. Finally, the graduates should be capable of using the acquired knowledge and skills to find solutions to practical chemical problems and for conducting scientific work.

The graduates of the BPC 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 BPC 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. The latest graduates' survey of 2014-2018 shows that 33 % of BPC graduates work in the area of quality control or quality assurance. 18.5 % are working as researchers, 11 % develop their own business as entrepreneurs, and 10.5 % are employed as teachers or educators. Another 27 % are working in finance, marketing, and administration or are continuing their academic education in a postgraduate programme.

Finally, graduates of all three undergraduate programmes should have adequate competencies in oral and written communication skills, be adaptive to the development of sciences, and have adequate English proficiency as well as a social and academic attitude.

In addition to the subject-related qualification objectives, students of all three Bachelor's programmes should be capable of working autonomously as well as in a team-oriented manner, and be able to conduct research activities. Furthermore, they are able to solve subject-relevant problems, can present their results, have trained their analytical and logical abilities, and have an awareness of possible social and ethical effects of their actions. During the course of their studies, the students have acquired communicative and language skills, and have developed a strategy for life-long learning.

For the award of the subject-specific ASIIN label and the Eurobachelor® label, Bachelor's programmes must achieve learning outcomes that are divided into the categories "subject-specific competences" and "generic competences". The Subject-Specific Criteria (SSC) of ASIIN are the result of a regular assessment by the ASIIN Technical Committees, which summarise what is understood as good practice in higher education or demanded as future-oriented training quality in the labour market supported equally by academia and professional practice.

Based on the Self-Assessment Report and the discussions during the online audit, the peers see that the graduates of the BPC programme acquire the subject-specific competences defined in the SSC of the Technical Committee 09 – Chemistry, Pharmacy. Thus, chemistry-

relevant mathematical and scientific basic knowledge as well as sound knowledge in the chemical core subjects Inorganic, Organic and Physical Chemistry as well as Analytical Chemistry are taught. Finally, students are enabled to do practical chemical work and learn how to handle chemicals independently and safely in laboratory works.

In the course of their studies, students should also acquire social skills, such as the ability to work in a team and to communicate with each other. In addition, they should be familiar with the implementation of projects and be prepared for entry into professional life in a company or scientific environment through sufficient practical relevance of the study programme. According to the assessment of the peers, both of these are achieved in the BPC programme.

The peers point out that one possible area of occupation for the graduates is work as a teacher in high school. For this reason, UB should make transparent that an additional certificate is necessary for becoming a teacher in a public school in Indonesia. Graduates of the scientific Bachelor's programmes require completing an additional course and receive a certification in order to become a teacher after finishing their Bachelor's degree.

In summary, the auditors are convinced that the intended qualification profiles of the three undergraduate programmes under review allow students to take up an occupation, which corresponds to their qualification. The degree programmes are designed in such a way that they meet the goals set for them. The objectives and intended learning outcomes of all three 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 (BPB and BPBt) and the SSC of the Technical Committee 09 – Chemistry, Pharmacy (BPC).

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Reports

Preliminary assessment and analysis of the peers:

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

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Webpage Ba Biology: <https://biologi.ub.ac.id/>
- Webpage Ba Biotechnology: <https://thp.ub.ac.id/en/education/undergraduate/biotechnology/>
- Webpage Ba Chemistry: <https://kimia.ub.ac.id/en/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The Biology and the Chemistry undergraduate programmes are offered by the Faculty of Mathematics and Natural Sciences while the Biotechnology programme is offered by the Faculty of Agricultural Technology.

All three Bachelor's degree programme under review are designed for four years, and at least 144 credit semester units (SKS) need to be achieved by the students in the Biology and Biotechnology programmes and 146 SKS in the Chemistry programme (this is equivalent to approximately 216 ECTS points respectively 219 ECTS points).

All undergraduate programmes at UB are designed to be completed in eight semesters or four academic years with a maximum of 14 semesters or seven academic years. Each semester is equivalent to 16 weeks of learning activities including one week for midterm exams and one week for final exams. The odd semester starts in August and ends January of the following year, while the even semester lasts from February to July. In addition, there is an optional summer semester, which is designed for students, who need to make up on missed or failed courses.

The curriculum consists of university requirements and compulsory and elective courses determined by UB and the respective departments. University requirements are courses that need to be attended by all undergraduate students at UB. There are seven university requirements: English, Bahasa Indonesia, Religious Education, Civic Education, Entrepreneurship, Pancasila, and Community Service. 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 (3 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 take place in villages or rural areas where students stay and live together with the local people. The course is designed “to allow students to apply their knowledge based on their field in order to empower society.” Since the community service usually takes place in remote areas, the students cannot attend any classes during this time. The students work in interdisciplinary teams during the community service in order to advance the society and bring further development about. This course was introduced at all Indonesian Universities in 1971. The assessment of the community service consists of a work plan, programme implementation, and activity report. The peers understand that students should work for the benefit of the community and the Indonesian society during the community service and support this concept.

Regular students take 18 credits in every semester, while outstanding students may take up to 24 credits. Therefore, outstanding students are enabled to complete the Bachelor’s degree in less than 4 years. However, this case is rare since the workload of the undergraduate programmes is rather high anyway and designed for a four-year study programme.

The regular class of the Biotechnology programme is conducted in Indonesian, in addition an English class is offered. The courses for this class are conducted in English, and are offered to foreign students or Indonesian students who wish to attend the courses in English. Approximately 50 % of the students in the Biotechnology programme attend the English class. Biotechnology students have to pass an English test conducted by the Faculty of Agricultural Technology in order to be able to enrol in the international class.

Since UB has the goal to become internationally more visible and wants to further internationalising its degree programmes, the peers discuss with the programme coordinators and students if any classes in BPB and BPC are taught in English. The programme coordinators explain that usually all courses are delivered in Bahasa Indonesia (Indonesian language) but most of the teaching materials (teaching slides) are provided in English. Sometimes parts of a lecture are held in English, for example if there is an international guest lecturer. Sometimes, even the whole course is offered in English in order for international student to attend the classes. Information about the curriculum is available for students in the digital

academic information system and on the programme's homepage. The students confirm that some presentations are done in English, and English textbooks are used. However, students should be encouraged to actively speaking English. This could be achieved e.g. by discussing international papers or giving oral presentations in English. Moreover, the thesis can be delivered in English, which happens only in rare cases.

The members of the teaching staff explain on demand of the peers that they offer possible topics for the final projects according to their own research projects. All members of the teaching staff supervise theses. Students have to design a research proposal with a time schedule for the project, which is discussed with the academic advisor. If they agree, the students apply formally for being allowed to work on the suggested topic.

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

Criterion 1.4 Admission requirements

Evidence:

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

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Reports, admission procedures and policies for new students follow the National Regulation No.2, 2015. The requirements, schedule, registration venue, and selection test are announced on UB'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 UB:

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 (30 % of the students at UB are admitted through this selection system).
2. Joint Entrance Selection of State Universities (Seleksi Bersama Masuk Perguruan Tinggi Negeri, SBMPTN). This national selection test is held every year for university candidates.

It is a nationwide written test (subjects: mathematics, Bahasa Indonesia, English, physics, chemistry, biology, economics, history, sociology, and geography). It accounts for 40 % of the admitted students at UB.

3. Independent Selection (Seleksi Mandiri) students are selected based on a written test (similar to SBMPTN) specifically held by UB for prospective students that haven't been accepted through SNMPTN or SBMPTN (30 % of the students at UB are admitted through this test).

The number of applicants exceeds by far the number of available places. From 2017 to 2020, there were around 1500 students applying for admission to the Biology programme per year and only 120 new students were accepted (180 in 2019/20). This is equivalent to an admission rate of only 8 %. The numbers in the Chemistry programme are similar. From 2017 to 2020, there were around 2200 students applying for admission per year and only 140 new students were accepted (190 in 2019/20). This is equivalent to an admission rate of only 6 %. For the Biotechnology programme, there are even more applications. From 2017 to 2020 an average of 2500 students applied for admission, of whom 70 (115 in 2019/20) were admitted. This is equivalent to an admission rate of only 3 %.

For undergraduate students from the routes of SNMPTN or SBMPTN (via national selection exams), the maximum tuition fee is Rp 5,300,000 (~EUR 322.67) per semester. For undergraduate students from the routes of independent selection (Seleksi Mandiri), the tuition fee is slightly higher.

Approximately 15 % of all undergraduate students at UB are fully funded by the government including their daily expenditures. A tuition waiver scheme is available upon request and the amount depends on the parents' economic status. The amount of waiver ranges from 20 to 100 % of the total fee.

The peers inquire of the programme coordinators why there are so many students applying for studying at UB. They learn that biology, biotechnology, and chemistry are popular subjects because the job perspectives are very good. In addition, there are many high school graduates in Indonesia and UB is one of the most prestigious universities in the country. Consequently, UB only accepts the very best candidates. From their discussion with the students, the peers gain the impression that the admission system is very effective and only very motivated and high-performing candidates are admitted. The peers consider the highly selected and motivated students to be one of the strong points of the three undergraduate programmes under review.

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

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

The peers thank UB for explaining that the Indonesian Ministry of Education has issued a regulation in 2009, which regulates teacher professional education, which is a requirement for participating in the teacher certification. Graduates of Bachelor education programmes and non-educational Bachelor programmes are treated the same when they join the teacher professional education.

The peers appreciate that some courses in BPC and BPB will be taught in English from the academic year 2022-2023 (In BPBt, already all courses are delivered in English). In addition, several teachers will join English courses and in BPBt, it will be possible to write the thesis in English.

The peers consider criterion 1 to be mostly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Reports
- Study plans of the degree programmes
- Module descriptions
- Academic Handbooks
- Webpage Ba Biology: <https://biologi.ub.ac.id/>
- Webpage Ba Biotechnology: <https://thp.ub.ac.id/en/education/undergraduate/biotechnology/>
- Webpage Ba Chemistry: <https://kimia.ub.ac.id/en/>
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The curriculum of all three 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. The students' individual study plans might differ from each other, but have to be approved by their academic advisors and the Vice Dean of Academic and Student Affairs. The curricula include theoretical and practical courses, thesis proposal and thesis, community service, and electives.

Elective courses can be chosen by the students in accordance with their areas of interest and after consultation with their academic advisor. The courses in the first two semesters of the Bachelor's programmes convey basic knowledge of natural sciences, mathematics and languages (Indonesian and English). Courses on the different sciences are offered from the third to the sixth semester. During the seventh and eighth semester, students must complete the Community Service and the undergraduate thesis.

The general structure of the Bachelor's programmes under review is depicted in the following table:

Courses		Bachelor Programme in Chemistry		Bachelor Programme in Biology		Bachelor Programme in Biotechnology	
		Credit Unit	ECTS Conversion*	Credit Unit	ECTS Conversion*	Credit Unit	ECTS Conversion*
Compulsory courses	General Courses	26	39	25	37.5	25	37.5
	Specific Courses	90	135	90	135	89	133.5
Elective courses		30	45	29	43.5	30	45
TOTAL		146	219	144	216	144	216

One critical aspect is the relative small share of practical laboratory work in BPC. The programme coordinators confirm that only 11 SKS (16.5 ECTS) are awarded for practical work. In addition there is the final thesis (9 ECTS), capstone design project (6 ECTS), and electives. Nevertheless, the share is lower than either in the BPB (39 ECTS) or the BPBt programme (48 ECTS). Since it is very important for chemistry students to gain sufficient practical experience in laboratory work, the peers strongly recommend increasing the scope of practical laboratory work in the BPC programme.

In addition, the peers learn during the audit that students of all three degree programmes under review usually do the experiments together in groups of four to six students (depending on the course). However, there should be enough instruments and laboratory

space so that the experiments can be conducted by groups of two to three students. Otherwise, students may not acquire the necessary hands-on experience in conducting experiments.

During the discussion with the peers, the employers and UB's partner from the industry and from governmental institutions suggest to invite more guest lecturers from the industry to give classes about current developments in the respective scientific area. Moreover, they stress that it would be useful to prolong the duration of the internship (work practise). An internship of four weeks is considered too short; employers would like students to spend more time in the companies. Otherwise, UB's partners are very satisfied with the qualification profile of the graduates of all three programmes under review.

The students express their wish towards the peers to give them more opportunities to improve their soft skills with respect to team leadership, presentation, and communication. The peers support this point of view, because it will provide students with more competences that are needed when entering the job market. In addition, the students point out that conducting hybrid classes for the practical work would be useful, showing only videos is not sufficient. The peers emphasise that even after the end of the COVID-pandemic digital learning and teaching methods should be continued, which includes hybrid learning. Furthermore, the peers point out that all students should be better informed about legal regulations e.g. for handling chemicals and hazardous substances like in REACH (Registration, Evaluation, Authorisation of Chemicals), GMP (Good Manufacturing Practice), and GLP (Good Laboratory Practice).

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

UB provides opportunities for students to conduct internships and exchange programmes abroad. A list of available exchange and internship programmes that students can participate in is available at UB's International Relation Office. For example, international cooperations with more than 40 different universities and institutes, in countries such as Australia, Japan, South Korea, Thailand, Germany, USA, Turkey, Netherlands, and New Zealand exist. Student exchange activities are aimed at enhancing students' international insights through learning exchange programs and interacting across cultures.

In the Biotechnology programme, there is the opportunity for students to take part in a double degree programme. This programme is offered for Bachelor's and Master's students, where part of the lectures is conducted at UB and some need to be taken at the

corresponding international partner university. Students who take part in this programme will get a diploma from UB and from the partner university. The double degree program that is already underway is conducted with Taiwan's National Pingtung University of Science and Technology (NPUST).

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 take outside their Bachelor's programme for up to three semesters (Minister of Education and Culture Regulation Number 3 Year 2020). UB recognizes the courses taken by the students outside university 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.

The students confirm during the discussion with the peers that some opportunities for international academic mobility exist. 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. UB can provide only limited travel grants, while the demand from students is rising. The lack of financial support hinders students from joining the outgoing programmes.

The peers understand these problems; however, they recommend increasing the effort to further internationalising UB by establishing more international co-operations and exchange programmes and by offering more and better-endowed scholarships. In addition, the peers see that most of the faculty members have international contacts, which can be used for establishing more international co-operations. 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 both Faculties and the respective Departments to further pursuing this path.

Criterion 2.2 Work load and credits
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Evidence:

- Self-Assessment Reports

- Study plans of the degree programmes
- Module descriptions
- Academic Handbooks
- Discussions during the audit

Preliminary assessment and analysis of the peers:

Based on the National Standards for Higher Education of Indonesia (SNPT), all three undergraduate programmes under review use a credit point system called SKS. The minimum workload of an undergraduate programme in UB is 144 SKS, which corresponds to 5.760 academic hours or 200 ECTS (1 ECTS is equivalent to 28.8 hours of students' workload). One academic hour is 50 minutes. The normal workload of each regular semester is 720 academic hours, which corresponds to 18 SKS (25.2 ECTS).

To complete the degree programme in time, Bachelor students need to take on average of 18 SKS per semester excluding co-curricular contents. However, the regular schedule usually covers 20-21 SKS per semester to give more space in the last semesters for resits, or more electives. If a student is not satisfied with his/her GPA, she or he can repeat the classes, but this will lead to a prolongation of the study time.

For regular classes, 1 SKS of academic load for the undergraduate programme is equivalent to 3 academic hours, which equals 150 minutes. This includes:

- one academic hour of scheduled contact with the teaching staff in learning activities,
- one academic hour of structured activities related to lectures, such as doing the assignments, writing papers, or literature study,
- at least one academic hour of independent activity 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.

In addition, based on the newest national regulation (Permendikbud No. 3/2020), an Indonesian credit unit is defined as activity hour, which is not only limited to attending regular teaching class. The activity may also include internships, student exchange programmes, community service, research, independent study, and teaching. Such activities can be conducted up to two semesters (equivalent to 40 SKS) and must be supervised by an academic advisor.

During the audit, the students confirm that their workload is adequate and that it is possible to finish the degree programme within the expected four years.

Criterion 2.3 Teaching methodology

Evidence:

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

Preliminary assessment and analysis of the peers:

Various teaching and learning methods (including lectures, computer training and classroom and lab exercises, field trips, individual and group assignments, seminars and projects, etc.) have been implemented. Structured activities include tutorials, homework, assignments (reading or problem exercises) and practical activities. Group project assignments are given in some courses to develop students' skills in teamwork, communication, and leadership. The assignments and exercises should help students to develop their abilities with respect to critical thinking, written/oral communication, data acquisition, problem solving, and presentations.

UB has the goal to support the transition from a teacher-centred to a student-oriented and outcome-based education (OBE) in order to involve all students in the learning process and to develop their thinking and analytical skills.

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

To help students achieving the intended learning outcomes and to facilitate adequate learning and teaching methods, UB has developed an e-learning platform, where students and teachers can interact.

In summary, the peer group considers the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, they confirm that the study concept of all three 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
- Academic Handbooks
- Discussions during the audit

Preliminary assessment and analysis of the peers:

UB 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 5 to 15 students from his classes. He/she is a student's first port of call for advice or support on academic or personal matters.

The role of the academic advisor is to help the students with the process of orientation during the first semesters, the introduction to academic life and the university's community, and to respond promptly to any questions. They also offer general academic advice, make suggestions regarding relevant careers and skills development and help if there are problems with other teachers. The students confirm during the discussion with the peers that they all have an academic advisor.

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

UB has established the Center for Disability Studies and Services (PSLD UB) in 2012, which functions as a research centre on disability issues and the provision of services for people

with disabilities at UB. The establishment was motivated by the low number of people with disabilities that are enrolled in higher education in Indonesia. Due to the limited access to higher education for persons with disabilities, less than one percent of persons with disabilities have an undergraduate degree. In Indonesia, the education model for persons with disabilities is still separated, namely by providing special education through special schools or boarding schools. This model separates people with disabilities from non-disabled people in different environments, so that after the completion of the study period, people with disabilities are still not ready to blend in with the environment. Access to higher education is also difficult for persons with disabilities because of the requirement to enter higher education with “no disability”. This also happened at UB, where previously there was no infrastructure, which could be accessed by people with disabilities. This has changed with the establishment of PSLD UB and now students with disabilities are accepted in all programmes at UB and can access the facilities.

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

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

The only weak point the peers notice in an otherwise very comprehensive advisory system is the lack of institutionalised psychological support for students. As the stress for the students during their university education is rather high, there is always the danger of a psychological breakdown or burnout. The students confirm during the discussion with the peers that these problems exist and that they can receive help if they specifically ask for it. However, students have to make the first step and need to seek actively for psychological support. For this reason, the peers are convinced that it would be useful to establish a point of contact for helping students with psychological problems. The respective contact should be made known to all students.

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

The peers acknowledge that UB supports student mobility and international exchange programmes. For example, in the last semester, BPC and BPB have established a collaboration with FH Aachen University of Applied Sciences, Germany. In addition, BPBt has an ongoing cooperation with the Department of Biological Science and Technology, National Pingtung University of Science and Technology (NPUST), Taiwan and students have stays abroad to

the United Kingdom and Taiwan. Moreover, UB provides tuition waivers and financial support for students taking part at international mobility programmes. The peers encourage UB and the Departments to increase their efforts and to further promote the academic mobility of the students and to cooperate with more renowned international universities.

The peers see that all study programmes will conduct hybrid classes with practical work being done offline in the lab and will continue to apply digital learning and teaching methods (hybrid learning) after the end of the COVID-pandemic.

The peers thank UB for pointing out that BPC, BPB, and BPBt introduce students on occupational health and safety environment (OHSE) and good laboratory practices (GLP) before starting with their practical laboratory work. A formal testing with certificates has been implemented in BPC and BPB as a mandatory requirement for students before working in the lab. BPBt will implement the same formalised testing starting this year.

The peers appreciate that UB already offers counselling for students with psychological problems. Student can consult with counsellors online or face-to-face.

The peers consider criterion 2 to be mostly fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation
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Evidence:

- Self-Assessment Reports
- Module descriptions
- Academic Handbooks
- UB Academic Calendar

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Reports, the students' academic performance is evaluated based on their attendance and participation in class, their laboratory works and reports, assignments, homework, presentations, mid-term exam, and the final exam at the end of each semester. The form and length of each exam is mentioned in the module descriptions that are available to the students via UB's homepage and the digital platform SI-AM.

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. The final grade is the result of the different activities in the course (e.g. laboratory work, mid-term exam, the final exam, quizzes or other given assignments).

Students must write a report about their internship, which will be evaluated by the responsible teacher at UB using an internship rubric. Students are also obliged to present the results of their internship and share their experiences.

If a student fails, she or he usually has to repeat the entire module in the following year; it is usually not possible to retake just parts of the course or to just retake the final exam. Although, lecturers need to arrange examinations for students who have not taken the examinations due to valid reasons. Some courses allow students, whose grades are still below the passing level, to improve their grades through repeating an exam.

The peers discuss with the students how many and what kind of exams they have to take each semester. They learn that for each course there is one mid-term exam and one final exam in every semester. Usually, there are additional practical assignments or oral tests. The final grade is the sum of the sub-exams. The students appreciate that there are several short exams instead of one big exam and confirm that they are well informed about the examination schedule, the examination form, and the rules for grading.

Every student in the three undergraduate programmes under review is required to do a final project (Bachelor's thesis). This project is conducted independently under the guidance of one or more supervisors and usually consists of literature study, practical research, and data analysis. Both the student and his /her supervisors might decide the topic and content of the project. In many cases, the lecturers offer particular topics connected to their research. The final project is divided into two parts, namely Final Project 1 (seventh semester) and Final Project 2 (eighth semester). The Final Project 1 consists of literature studies about the possible research project and the preparation of a research plan to be carried out in the Final Project 2. The report about the final project is then presented in front of a group of examiners in a seminar format. The examiners consist of the respective supervisors and at least two other lecturers from the faculty (or assigned institutions). It is also possible to conduct an external final project e.g. in co-operation with a company. In

this case, one co-supervisor comes from the respective company. With respect to the final project, the peers point out that it would be useful to call it Bachelor's thesis in all programmes and not to use different terms such as final project or graduation project. The term Bachelor's thesis is accepted and understood worldwide; using other terms would leave room for doubts about its scope and goals.

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

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

The peers appreciate that UB will use the term Bachelor's thesis in all study programmes.

The peers consider criterion 2 to be fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

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

Preliminary assessment and analysis of the peers:

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

According to the Self-Assessment Report, the teaching staff at the Chemistry Department consists of 37 fulltime teachers (24 with a PhD, 13 with a Master's degree) who are supported by 14 non-academic staff members (administration, lab technicians). At the Biology

Department, there are 35 full time teachers (30 with a PhD, 5 with a Master's degree), and 9 non-academic staff members (administration, lab technicians). With respect to the Biotechnology programme, there are 353 full time teachers (22 with a PhD, 11 with a Master's degree), which are supported by 12 non-academic staff members (administration, lab technicians). The current teacher to student ratio for BPC is 1:15, for BPB 1:15 and for BPBt 1:11. This is a very good ratio by international standards.

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.

The majority of the teachers have graduated from universities outside of the UB. Several hold a PhD from overseas (for example, from France, Germany, Australia, USA, Japan, Taiwan, and Thailand) or are currently pursuing a PhD overseas (for example, in Austria, Belgium, Malaysia, Korea, Taiwan, and Thailand). The peers appreciate this international background.

The peers discuss with UB's management how new staff members are recruited. They learn that every year the faculties and departments announce their vacancies to UB's management, which subsequently announces the vacancies on UB's webpage. One way to recruit new teachers is to send promising Master's students from UB abroad to complete their PhD and then to hire them as teachers when they are finished.

In summary, the peers confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes.

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

Criterion 4.2 Staff development

Evidence:

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

Preliminary assessment and analysis of the peers:

UB encourages training of its academic and technical staff for improving the didactic abilities and teaching methods. As described in the Self-Assessment Reports, faculty members and non-academic staff regularly participate in training or workshops. Every year, the teachers together with the Heads of Departments and Study Programmes map the competencies of their staff, analyse organisational needs for continuous improvement, and make plans for annual work programmes in line with the faculty's and university's strategic plans.

To this end, UB has established several programmes to support staff development. New staff members are required to undertake an intensive basic training programme called Pre-Service or Pra-Jabatan. Following Pra-Jabatan, lecturers are required to undertake Training for the Development of Basic Skills in Instructional Techniques (PEKERTI) and Applied Approach (AA) to develop teaching and management skills. In addition, lecturers are required to take a lecturer certification and obtain an educator certificate (SERDOS) that shows their recognition as a professional staff. In addition, lecturers are mentored by their seniors to develop their expertise and to advance their career. Finally, UB provides awards for high performing and high achieving staffs, such as the Governance, Innovation, Reputation, Alumni, Faculty, Fund, and Efficiency (GIRAFFE) Award.

Faculty members can also further develop their competencies through several activities such as post-doctoral programmes, training, workshops, joint research, etc. Moreover, they are encouraged to present their research papers in national and international conferences, and to collaborate with colleagues from international universities.

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 UB, 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 UB 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
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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 UB, the Faculty of Mathematics and Natural Sciences, and the Faculty of Agricultural Technology. Additional funds for research activities can be provided by UB or the Indonesian government (Bantuan Pendanaan Perguruan Tinggi Nasional, BPPTN), but the teachers have to apply for them. In addition, there are several co-operations with industrial partners.

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 programme coordinators emphasise that from their point of view, all three undergraduate programmes receive sufficient funding for teaching and learning activities. Hence, the Departments do not face any financial shortages. Of course, there is limited funding to modernize or add laboratory equipment, but there are sufficient resources for adequately teaching the classes.

From the provided documents and videos of the laboratories, the peers deduct that there seem to be no severe bottlenecks due to missing equipment or a lacking infrastructure. The basic technical equipment for teaching the students is available, although it is not state of the art in all cases. The students confirm during the discussion with the peers that, in general, they are satisfied with the available equipment, but several instruments are outdated. 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, which work as lab assistants. In addition, teachers and students can use the facilities of UB's central laboratory. Here, more sophisticated instruments are available and lab technicians are present to operate them. Teachers have to apply for using the facilities and are charged for the provided services.

The peers emphasise that all students need to have the opportunity to get hands on experience with chemicals and carrying out laboratory experiments. For this reason, the number of students conducting one experiment should be reduced. In order to gain sufficient practical experience in the laboratories, groups conducting one experiment should be limited to 2 to 3 students.

The students also express their satisfaction with the library and the available literature there.

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

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

The peers are glad that UB is committed to expand the number of industry partners and guest lecturers and to involve them in teaching and research activities.

It is very important that UB will provide additional laboratory space, increase the number of laboratory equipment, renew outdated laboratory equipment, and provide advanced laboratory instruments for high quality research. The peers expect UB to verify these plans 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
- Webpage Ba Biology: <https://biologi.ub.ac.id/>
- Webpage Ba Biotechnology: <https://thp.ub.ac.id/en/education/undergraduate/biotechnology/>
- Webpage Ba Chemistry: <https://kimia.ub.ac.id/en/>

Preliminary assessment and analysis of the peers:

After studying the module descriptions, the peers see that the degree programmes all make use of different templates and that the provided information is not complete in the case of the BPBt and BPC programmes. For example, the module descriptions do not always make transparent, how each exam contributes to the final grade and what kind of exam is required. In addition, the calculation of the students' total workload and the conversion into credits is either missing or not transparent.

Moreover, for the BPBt programme, it is necessary to break down the descriptions of the large blocks (basic module, core module I, II, III, IV, personality module, final project module) into their components and provide module descriptions for each part; the same applies to the electives. Finally, the literature references are outdated. For this reason, it is necessary to submit the complete and updated module handbooks for the BPBt and BPC programmes. A good example is the module handbook for the BPB programme; here all necessary information is included. UB should also use the same template for all module descriptions.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Reports
- Sample Diploma for each degree programme
- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the peers:

The peers confirm that the students of all three degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Diploma Supplement contains all necessary information about the degree programme including acquired soft skills and awards (extracurricular and co-curricular activities). The Transcript of Records lists all the courses that the graduate has completed, the achieved credits, grades, and cumulative GPA.

Criterion 5.3 Relevant rules

Evidence:

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

Preliminary assessment and analysis of the peers:

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

However, the peers notice that the English websites of the BPC programme do not include much information. For this reason, the peers expect UB to update the English websites of the BPC programme and to include information about the intended learning outcomes, study plan, module descriptions, and academic guideline and make them thus available to all relevant stakeholders.

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

The peers see that the module handbook has been updated, however, the module descriptions still do not include information about the form of assessment and the composition of the final grade. In addition, the time students need for self-studies should be included.

As the English website of the BPC programme has been updated and now includes all relevant information about the degree programme (intended learning outcomes, study plan, module descriptions, academic handbook), the peers are satisfied to this respect.

The peers consider criterion 5 to be mostly fulfilled.

6. Quality management: quality assessment and development

Evidence:

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

Preliminary assessment and analysis of the peers:

The auditors discuss the quality management system at UB with the programme coordinators and the students. They learn that there is a continuous process in order to improve the quality of the degree programmes and its improvement is assessed through internal (IQAS) and external quality assurance (EQAS).

There are three levels of quality assurance implementation. At the university level, it is conducted by the Quality Assurance Centre (Pusat Jaminan Mutu, PJM), at the faculty level, it is conducted by the Quality Assurance Group (Gugus Jaminan Mutu, GJM), and at the department level it is conducted by the Quality Assurance Unit (Unit Jaminan Mutu, UJM). At the end of

every year, PJM conducts internal audits for all Bachelor's degree programme. During this process, the programme coordinators assess the quality of all learning and teaching procedures based on the KPIs set by PJM. From these evaluations, room for improvement is identified. The Heads of Department lead a meeting to evaluate the teaching and learning processes within the department once each semester. In the meeting, availability of supporting resources, i.e., laboratory equipment, teaching methods, and administration services are discussed. At faculty level, a coordination meeting is conducted every semester to evaluate teaching and learning processes and supporting resources.

Internal evaluation of the quality of the degree programmes is mainly provided through student surveys. The students give their feedback on the courses by filling out the questionnaire online. Giving feedback on the classes is compulsory for the students; otherwise, they cannot access their account on UB's digital platform. The questionnaires are used to monitor and evaluate the learning processes and are distributed every semester to the lecturers before the final exam is done. A summary of the students' feedback is sent to the respective lecturers. Based on the results, the programme coordinator and the teachers reassess every course and possibly some changes are made. If there are negative results, the Department Head invites the concerned teacher to discuss about his or her teaching methods and thus, they are expected to enhance their performance in the future.

In addition, UB has established the "OpenTalk", which is held once a year on department level. Students, Head of Department, programme coordinators, laboratory and administrative staff, and teacher are all taking part in this forum. The goal of the forum is to discuss with all people involved in running the degree programme to discuss about weaknesses and possible measures for improvement. For example, last year an important issue was how to conduct laboratory work during the COVID-pandemic and how online-lectures could be held. As a result of the discussion, lecture recordings via zoom were provided and students can now download the lecture recordings themselves. There are similar formats in the Biology Department and also in the Biotechnology programme. The peers appreciate this format and consider "OpenTalk" to be a best practise example for getting direct feedback from students and the staff members.

Finally, students also have the opportunity to give direct feedback via the suggestion box. The community inside and outside of the university can give online feedback to the university, faculty, and department through UB-care, which can be openly accessed.

The auditors gain the impression that the Departments take the students' feedback seriously and changes are made if necessary. Nevertheless, the peers see that the results of the course questionnaires are not discussed with the students. Consequently, the peers expect UB to inform students about the results of the questionnaires and the teachers

should discuss with them about possible improvements in the respective course. The feedback loops need to be closed.

Moreover, students confirm during the audit that they are not represented in the university's boards and, thus, 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 boards at UB (at least on programme and faculty level) and be actively involved in the decision-making processes for further developing the degree programmes.

UB regularly conducts an alumni tracer study. By taking part at this survey, alumni can comment on their educational experiences at UB, the waiting period for employment after graduation, their professional career, and they can give suggestions how to improve the programme. Moreover, the employers are asked to give feedback to UB on employability and acquired competencies of UB's graduates. During the audit, the employers express their general satisfaction with the qualification profile. They just recommend inviting more guest lecturers from the industry to give lectures on current developments in the respective area and prolonging the internship (work practise). This is also discussed under criteria 2.1.

External quality assurance focuses on both national and international accreditations. National accreditation is conducted by the National Accreditation Board for Higher Education (BAN-PT), under the Ministry of Education and Culture, Republic of Indonesia. National accreditation of the programme within the university is a legal obligation for every study programme.

The peers discuss with the representatives of UB'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. The peers appreciate that UB stays in contact with its alumni and has a close relation with its partners from the industry. However, no Academic Advisory Board exists. As the peers consider the input of the employers to be very important for the further improvement of the degree programmes, they appreciate the existing culture of quality assurance with the involvement of employer in the quality assurance process. Nevertheless, they recommend establishing an Academic Advisory Board at each department. The advisory board should consist of a group of professionals, employers, and experts of the relevant fields from outside the university (e.g. companies, high schools, and governmental institutions).

In summary, the peer group confirms that the quality management system at UB is, besides the mentioned deficits, suitable to identify weaknesses and to improve the degree programmes.

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

As the peers cannot access the published results from the questionnaires, they still expect UB to close the feedback cycles and to make sure that the teachers discuss with their students about the results of the questionnaires and what changes might be possible.

The peers confirm that with the change of UB's status to Legal Entity State University (PTNBH), a Board of Trustees has been established with a student member. In addition, an Academic Advisory Board has been established on department level consisting of a group of professionals, employers, and experts from outside the university. The peers support these efforts, however, they point out that it would also be useful to make student representatives members of the boards at programme or department level and to directly involve them in the decision making processes for further developing the degree programmes.

The peers consider criterion 6 to be mostly fulfilled.

D Additional Documents

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

- none

E Comment of the Higher Education Institution (31.01.2022)

UB provides the following statement:

No	Peers' report	Responses
1. The Degree Programme: Concept, content & implementation		
Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)		
1	For this reason, UB should make transparent that an additional certificate is necessary for becoming a teacher in a public school in Indonesia. Graduates of the scientific Bachelor's programmes require completing an additional course and receive a certification in order to become a teacher after finishing their Bachelor's degree.	Information regarding the requirement, i.e., a professional certificate (Teacher Professional Education certificate issued by the government of the Republic of Indonesia), for becoming a teacher after finishing a bachelor's degree has been changed and nationally applied around 2016. Since Law number 14 of 2005 was issued, the requirement for a person to have a certificate of "Akta IV" to become a teacher has been abolished. Instead, the government implements a teacher certification program that can be followed by alumni of educational and non-educational bachelor programs. The Ministry of Education has issued a ministerial regulation number 8 of 2009 which regulates teacher professional education which is a requirement for participating in the teacher certification. Graduates of bachelor education programs and non-educational bachelor programs are treated the same when they join the teacher professional education.
Criterion 1.3 Curriculum		
2	Students should be encouraged to actively speaking English. This could be achieved e.g. by discussing international papers or giving oral presentations in English. Moreover, the thesis can be delivered in English, which happens only in rare cases.	<p>BPC: Course taught in English will be provided in the next odd semester of academic year 2022-2023. Today, the Faculty has sent 46 lecturers in to English training, among them nine are from Bachelor Programme in Chemistry.</p> <p>BPB: Course taught in English will be held in next semester (even semester 2021/2022). In order to improve the English skill for teaching (public speaking), 10 lecturers have joined an English training facilitated by the Faculty.</p> <p>BPBt: all courses have been delivered in English run since 2015 in the Bachelor Programme in Biotechnology.</p>

		Bachelor's thesis written in English will be implemented as an optional, start from the running even semester.
	2. The degree programme: structures, methods and implementation	
	Criterion 2.1 Structure and modules	
3	The peers strongly recommend increasing the scope of practical laboratory work in the BPC programme.	BPC will include work training and community service as an expansion of the scope of laboratory work. Each module amounts 6 ECTS.
4	There should be enough instruments and laboratory space so that the experiments can be conducted by groups of two to three students	Additional laboratory space and laboratory equipment has been proposed to the university (UB) to meet the ideal ratio of the number of equipment to the number of students (1:2-3). The commitment letters from the dean dan rector are attached to this response.
5	The employers and UB's partner from the industry and from governmental institutions suggest to invite more guest lecturers from the industry to give classes about current developments in the respective scientific area	UB is committed to expand the number of industry partners, invite, and involve them in education and research activities through our 3 in 1 Programme (courses taught by visiting professor from overseas, visiting industry expert, and internal lecturer), Guest Lecture, Matching Fund (research collaboration with the industry), and others. BPC, BPB, and BPBT have and are committed to continuously run the programmes to increase the number of industry partnership.
6	Prolong the duration of the internship (work practise).	Since 2020, UB has run MBKM programmes that provide students the opportunity to do internships at industry partners for 1–2 semesters (full). Further details may be accessed through: https://mbkm.ub.ac.id
7	The students express their wish towards the peers to give them more opportunities to improve their soft skills with respect to team leadership, presentation, and communication.	To improve soft skills with respect to team leadership, presentation, and communication, UB has provided and will open more opportunities for students through a variety of MBKM programmes: student exchange, industry internship, research, teaching assistant in educational unit, humanity project, entrepreneurial activities, independent study or project, rural community development. In addition, UB has facilitated the students to improve their soft skills through student activity units (https://ub.ac.id/campus-life/student-activity-unit/) in which each unit is supervised by an appointed competence lecturer. In classes, lecturers have

		applied collaborative teaching method, i.e., case method and team-based project.
8	The students point out that conducting hybrid classes for the practical work would be useful, showing only videos is not sufficient	Starting this semester, UB has mandated that all study programmes conduct hybrid classes with practical work being done offline in the lab.
9	The peers emphasise that even after the end of the COVID-pandemic digital learning and teaching methods should be continued, which includes hybrid learning.	Digital learning and teaching methods (hybrid learning) will be continued after the end of the COVID-pandemic.
10	Furthermore, the peers point out that all students should be better informed about legal regulations e.g. For handling chemicals and hazardous substances like in REACH (Registration, Evaluation, Authorisation of Chemicals), GMP (Good Manufacturing Practice), and GLP (Good Laboratory Practice).	<p>BPC, BPB, and BPBt have conducted induction on occupational health and safety environment (OHSE) and good laboratory practices (GLP) for students before laboratory practical work and research/final project for Bachelor's Thesis. A formal testing with certificates (sample attached) has been implemented in BPC and BPB as a mandatory requirement for students before working in the lab. BPBt will implement the same formalized testing starting this year.</p> <p>In addition, Laboratory Management course has been also delivered in BPC. In BPBt, GMP is given in the Quality Management and Halal Assurance System course.</p> <p>Further information on OHSE unit and its regulation in the faculty level can be accessed:</p> <ul style="list-style-type: none"> • Faculty of Mathematics and Natural Sciences: https://mipa.ub.ac.id/en/info/unit-for-safety-health-and-environmental-protection/. • The Faculty of Agricultural Technology: https://tep.ub.ac.id/kesehatan-dan-keselamatan-kerja/
11	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	Student mobility/international exchange programmes are part of the MBKM programme that has been run by UB. For example, in the last semester, BPC and BPB has a collaboration with FH Aachen University of Applied Sciences, Germany in form of credit transfer programme and still continue for the next semester.

	exchange programmes is still low despite students' high interest.	<p>Furthermore, students from BPC and BPB also have participated in the Indonesian International Student Mobility Awards (IISMA) offered by the Ministry of Education. (Evidence: the transcript of credit transfer and the attendance of the students joining the exchange programmes).</p> <p>BPBt has an ongoing three semester joint degree programme with the Department of Biological Science and Technology, National Pingtung University of Science and Technology (NPUST), Taiwan. BPBt has also conducted international student mobility programme through MBKM IISMA to the United Kingdom and Taiwan.</p> <p>To support the international exchange programme, UB provides a tuition waiver for students enrolled in these programmes and financial support that covers tickets and accommodation.</p>
12	The number of available places in the exchange programmes is still limited and there are restrictions due to a lack of sufficient financial support. UB can provide only limited travel grants, while the demand from students is rising. The lack of financial support hinders students from joining the outgoing programmes. They recommend increasing the effort to further internationalising UB by establishing more international co-operations and exchange programmes and by offering more and better-endowed scholarships.	<p>UB is committed to supporting international exchange programmes, both those offered by the Ministry of Education and the implementation of the MoU between UB and universities abroad. To support the international exchange programme, UB provides a tuition waiver for students enrolled in these programmes, and sufficient financial support if the student enrolled this programme do not have a scholarship.</p> <p>(evidence: the letter of commitment from the dean and rector)</p>
Criterion 2.4 Support and assistance		
13	Otherwise very comprehensive advisory system is the lack of institutionalised psychological support for students.	For helping students with psychological problems, UB already has e-counselling (https://konseling.ub.ac.id), which the student can consult with counsellors through online or face-to-face. The counsellors from the Psychology Department at UB and also internal

	For this reason, the peers are convinced that it would be useful to establish a point of contact for helping students with psychological problems. The respective contact should be made known to all students.	<p>representatives, whom can be contacted by students in need. This service has been informed to the students especially during new student orientation. In the faculty level, a counselling service was also provided.</p> <ul style="list-style-type: none"> • Faculty of Mathematics and Natural Sciences: https://mipa.ub.ac.id/care/ • The Faculty of Agricultural Technology: https://tp.ub.ac.id/en/profil/struktur-organisasi/upt/bkpa/
3. Exams: System, concept and organisation		
Criterion 3 Exams: System, concept and organisation		
14	It would be useful to call it Bachelor's thesis in all programmes and not to use different terms such as final project or graduation project.	The term Bachelor's thesis will be used in all study programmes.
4. Resources		
Criterion 4.3 Funds and equipment		
15	For this reason, the number of students conducting one experiment should be reduced. In order to gain sufficient practical experience in the laboratories, groups conducting one experiment should be limited to 2 to 3 students.	<p>Additional laboratory space and laboratory equipment have been proposed to the university (UB) to meet the ideal ratio of the number of equipment to the number of students (1:2-3).</p> <p>(evidence: the letter of commitment from the dean and rector)</p>
16	in general, they are satisfied with the available equipment, but several instruments are outdated	<p>Old laboratory equipment will be renewed and improved. New equipment will also be made available to students in the near future.</p> <p>(evidence: the letter of commitment from the dean and rector, and list of equipment which will be made available for the students)</p>

5. Transparency and documentation		
Criterion 5.1 Module descriptions		
17	The module descriptions do not always make transparent, how each exam contributes to the final grade and what kind of exam is required. In addition, the calculation of the students' total workload and the conversion into credits is either missing or not transparent.	The module handbook has been revised and updated following the template. The module handbook may be accessed in the following links. Links: BPC: https://kimia.ub.ac.id/wp-content/uploads/2022/01/26012022-Module-handbook-2022.pdf BPB: https://biologi.ub.ac.id/departements/undergraduate-program/curriculum-bachelor-program/ . A complete module handbook can also be accessed: https://biologi.ub.ac.id/wp-content/uploads/2022/01/BIOLOGY-MODULE-HANDBOOK_updated.pdf BPBt: https://thp.ub.ac.id/en/education/undergraduate/bio-technology/module-description/
18	Moreover, for the BPBt programme, it is necessary to break down the descriptions of the large blocks (basic module, core module I, II, III, IV, personality module, final project module) into their components and provide module descriptions for each part; the same applies to the electives. Literature references are outdated. For this reason, it is necessary to submit the complete and updated module handbooks for the BPBt and BPC programmes	
Criterion 5.3 Relevant rule		
19	The peers notice that the English websites of the BPC programme do not include much information. For this reason, the peers expect UB to update the English websites of the BPC programme and to include information about the intended learning outcomes, study plan, module descriptions, and academic guideline and make them thus available to all relevant stakeholders.	The English websites of the BPC programme has been updated. Link: https://kimia.ub.ac.id

6. Quality management: quality assessment and development		
20	Consequently, the peers expect UB to inform students about the results of the questionnaires and the teachers should discuss with them about possible improvements in the respective course. The feedback loops need to be closed.	<p>BPC and BPB: The results of the PBM evaluation have been published through the faculty website (https://mipa.ub.ac.id/akademik/hasil-elektro-elektron-siswa-mengajar/), and the discussion is carried out through Open Talk activities so that the feedback loops will be closed.</p> <p>BPBt: The faculty has mandated that evaluation of courses be recorded in the form of course portfolios and the result of the evaluation be formally informed to the students.</p>
21	They recommend that student representatives should be members of boards at UB (at least on programme and faculty level) and be actively involved in the decision-making processes for further developing the degree programmes.	<p>With the change of UB's status to Legal Entity State University (PTNBH), a trustee board has been formed based on the Minister of Education of Indonesia Number 90199/MPK.A/KP.06.06/2021. Moh. Ali Yafie is a student representative.</p> <p>(evidence: the decree of the educational minister)</p>
22	However, no Academic Advisory Board exists. They recommend establishing Academic Advisory Boards at each department. The advisory board should consist of a group of professionals, employers, and experts of the relevant fields from outside the university (e.g. Companies, high schools, and governmental institutions).	<p>Academic Advisory Board has been formed in the department level consist of a group of professionals, employers, and experts from outside the university (UB).</p> <p>(evidence: the letter of appointment of the advisory board)</p>

F Summary: Peer recommendations (15.02.2022)

Taking into account the additional information and the comments given by UB, 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	-	30.09.2027
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemistry	With requirements for one year	Eurobachelor® upon the fulfilment of requirements	30.09.2027

Requirements

For all degree programmes

- A 1. (ASIIN 4.3) Update the instruments and the technical equipment in the laboratories. Provide enough technical equipment so that experiments can be done by groups of 2 to 3 students.
- A 2. (ASIIN 6) Close the feedback cycles and make sure that the teachers discuss with their students about the results of the questionnaires and what changes might be possible.

For the Chemistry and Biotechnology programmes

- A 3. (ASIIN 5.2) The module descriptions need to include information about the form of assessment, the composition of the final grade, the students' total workload, and the awarded ECTS points.

For the Biotechnology programme

- A 4. (ASIIN 5.2) Provide separate module descriptions for each course and not only for the large blocks.

Recommendations

For all degree programmes

- E 1. (ASIIN 2.1) It is recommended to further promote the academic mobility of the students and to cooperate with more renowned international universities.

- E 2. (ASIIN 2.1) It is recommended to provide students with more opportunities to improve their soft skills with respect to team leading, presentation, and communication.
- E 3. (ASIIN 4.1) It is recommended to invite more guest lecturers from the industry to give lectures about current developments in respective area.
- E 4. (ASIIN 5.2) It is recommended to update the literature references in the module descriptions.
- E 5. (ASIIN 6) It is recommended to make student representatives members of the boards at UB at programme or department level and to directly involve them in the decision making processes for further developing the degree programmes.

For the Chemistry programme

- E 6. (ASIIN 2.1) It is recommended to increase the share of practical laboratory work.

G Comment of the Technical Committees (04.03.2022)

Technical Committee 09 - Chemistry (01.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and agrees with the assessment of the peers.

Assessment and analysis for the award of the Eurobachelor® Label:

The Technical Committee confirms that the intended learning outcomes of the degree programme comply with the fields of knowledge set by ECTN.

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Chemistry	With requirements for one year	Eurobachelor® upon the fulfilment of requirements	30.09.2027

Technical Committee 10 – Life Sciences (04.03.2022)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and points out that it does not make sense to use the results of the teaching evaluations as a criterion when deciding on the promotion of teachers, as this could create false incentives. Furthermore, it is discussed whether the inclusion of students in the committees should be a recommendation or a requirement, as this is handled differently in the various procedures. Here it depends on whether the students are basically involved in quality assurance or whether this is not the case. In the latter case, it makes sense to impose a requirement, otherwise a recommendation is sufficient. Since the students at UB are involved, the TC votes to retain the corresponding recommendation. Overall, it follows the assessment of the peer group.

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	-	30.09.2027
Ba Biotechnology	With requirements for one year	-	30.09.2027

H Decision of the Accreditation Commission (18.03.2022)

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

The AC discusses the procedure and agrees with the suggestions of the peers and the TC's without changing the proposed requirements or recommendations.

Assessment and analysis for the award of the Eurobachelor® Label:

The AC confirms that the Eurobachelor® for the Bachelor's degree programme Chemistry can be awarded if the imposed requirements are fulfilled.

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Biology	With requirements for one year	-	30.09.2027
Ba Biotechnology	With requirements for one year	-	30.09.2027
Ba Chemistry	With requirements for one year	Eurobachelor® upon the fulfilment of requirements	30.09.2027

Requirements

For all degree programmes

- A 1. (ASIIN 4.3) Update the instruments and the technical equipment in the laboratories. Provide enough technical equipment so that experiments can be done by groups of 2 to 3 students.
- A 2. (ASIIN 6) Close the feedback cycles and make sure that the teachers discuss with their students about the results of the questionnaires and what changes might be possible.

For the Chemistry and Biotechnology programmes

- A 3. (ASIIN 5.2) The module descriptions need to include information about the form of assessment, the composition of the final grade, the students' total workload, and the awarded ECTS points.

For the Biotechnology programme

- A 4. (ASIIN 5.2) Provide separate module descriptions for each course and not only for the large blocks.

Recommendations

For all degree programmes

- E 1. (ASIIN 2.1) It is recommended to further promote the academic mobility of the students and to cooperate with more renowned international universities.
- E 2. (ASIIN 2.1) It is recommended to provide students with more opportunities to improve their soft skills with respect to team leading, presentation, and communication.
- E 3. (ASIIN 4.1) It is recommended to invite more guest lecturers from the industry to give lectures about current developments in respective area.
- E 4. (ASIIN 5.2) It is recommended to update the literature references in the module descriptions.
- E 5. (ASIIN 6) It is recommended to make student representatives members of the boards at UB at programme or department level and to directly involve them in the decision making processes for further developing the degree programmes.

For the Chemistry programme

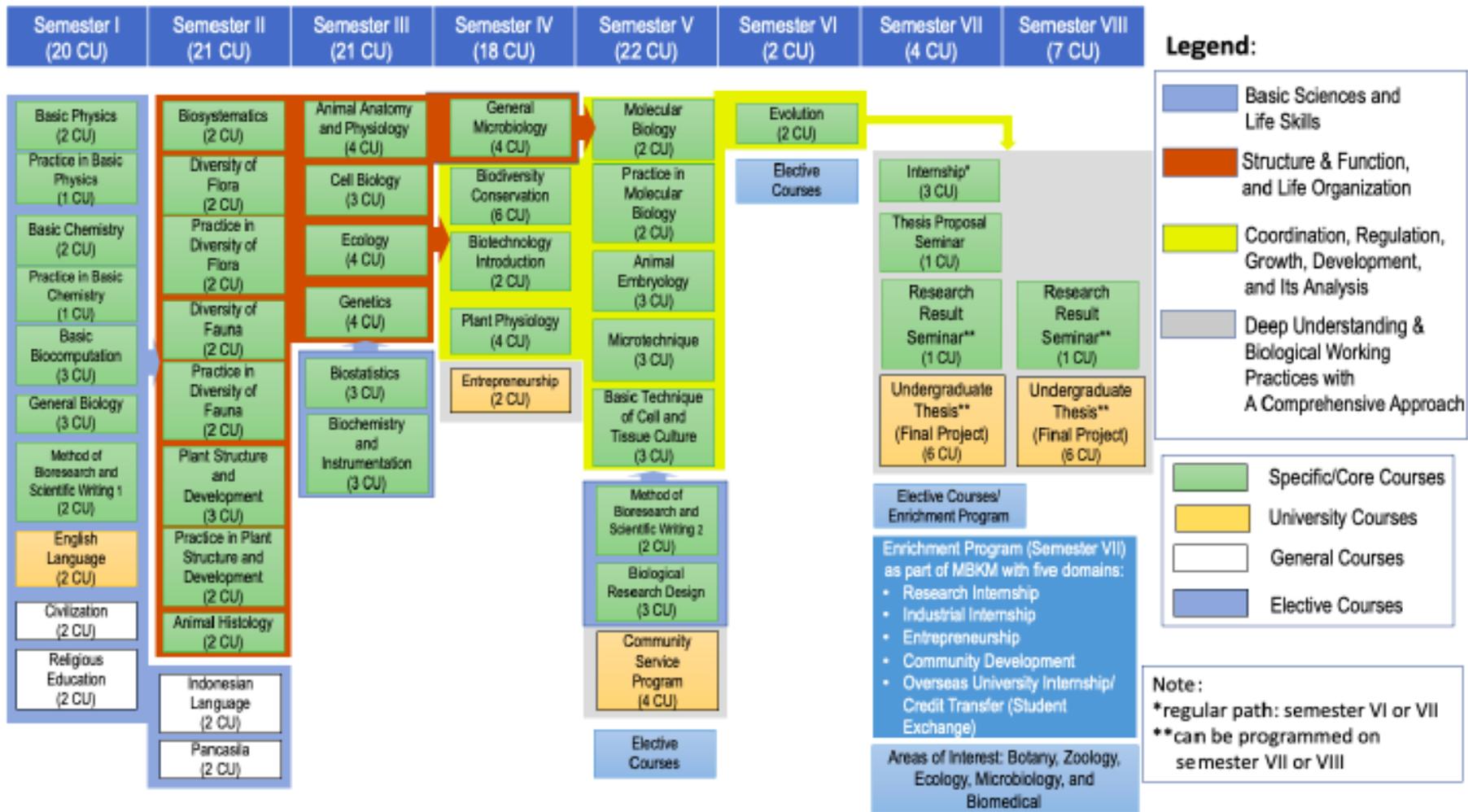
- E 6. (ASIIN 2.1) It is recommended to increase the share of practical laboratory work.

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:

Domain	Code	Intended Learning Outcomes (ILOs)
Attitude	ILO1	Able to demonstrate academic integrity and the ability to develop themselves through lifelong learning.
Knowledge	ILO2	Able to understand the biological science principles comprehensively and its supporting basic sciences, as well as keep updating the modern biology development.
	ILO3	Able to understand the methodology of biological science and its application in a bio-conservation perspective.
Specific Skill	ILO4	Able to work independently in the laboratory and the field in compliance with the standard methodology of biology concerning bioethics and safety.
	ILO5	Able to solve problems based on scientific methods by applying biological sciences, biological analysis methods and technological applications.
General Skill	ILO6	Able to demonstrate good communication skills in delivering scientific information both in Indonesian and English.
	ILO7	Have a capacity for teamwork with respecting biodiversity.
	ILO8	Able to understand and has basic entrepreneurship characters relevant to biology.

The following curriculum is presented:



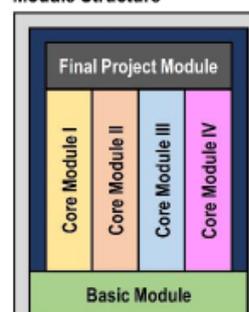
According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor’s degree programme Biotechnology:

Domain	Code	Intended Learning Outcomes (ILOs)
Knowledge	ILO1	Have acquired the foundational knowledge of mathematics and statistics and understand their relevance to industrial biotechnology.
	ILO2	Have acquired the foundational knowledge of the natural sciences (biology, chemistry, and physics) and understand their relevance to industrial biotechnology.
	ILO3	Have acquired the foundational knowledge of biotechnology and microbiology.
	ILO4	Have sound knowledge of biomass as a resource and living systems (molecules, cells, tissues, and organisms) as agents for making bioproducts.
	ILO5	Have sound knowledge of biomass-to-bioproducts conversion processes (physical, chemical, and biological) on a lab, pilot, and an industrial scale.
	ILO6	Have sound knowledge of industrial biotechnology products and services.
Skills	ILO7	Have acquired technical knowledge and proficiency in lab skills that support work in industrial biotechnology.
	ILO8	Have acquired proficiency in transferable skills (research, entrepreneurial, social, and interpersonal skills).
Aptitude	ILO9	Demonstrate the aptitude for a lifelong professional and personal development.

The following curriculum is presented:

Semester/Course (ECTS)							
I (29)	II (32)	III (32)	IV (33)	V (24+)	VI (x)	VII (x)	VIII (x)
Bahasa Indonesia (3)	Religion	Biomaterials (3)	Introduction to Bioinformatics (3)	Bioprocess Unit Design (4.5)	Electives (36)		
English (3)	Civic Education (3)	Biomaterials Practical (1.5)	Genetic Engineering (4.5)	Scientific Methods (3)	Fieldwork (4.5)		
Biology (3)	Organic Chemistry (3)	Biochemistry (6)	Genetic Engineering Practical (1.5)	Experimental Design (3)	Community Service (6)		
Biology Practical (1.5)	Organic Chemistry Practical (1.5)	Enzymology (3)	Enzyme Technology (4.5)	Seminars in Biotechnology (3)	Undergraduate Thesis (9)		
General Chemistry (3)	Statistics (4.5)	Biochemistry and Enzymology Practical (1.5)	Industrial Microbiology and Biotechnology (3)	Entrepreneurship (3)			
General Chemistry Practical (1.5)	General Microbiology (3)	Analytical Techniques in Biotechnology (3)	Industrial Microbiology and Biotechnology Practical (1.5)	Entrepreneurship Practical (1.5)			
General Physics (3)	General Microbiology Practical (3)	Analytical Techniques in Biotechnology Practical (1.5)	Product Development and Regulation in Biotechnol. (4.5)	Personality Development and Professional Ethics (3)			
General Physics Practical (1.5)	Genetics (3)	Molecular and Cell Biology (4.5)	Quality Control (3)	Pancasila (3)			
Mathematics (4.5)	Introduction to Bioprocess Technology (3)	Bioprocess Unit Operations 1 (3)	Quality Management and Halal Assurance System (3)	Electives (x, up to 12)			
Introduction to Biotechnology (4.5)	Principles of Bioprocess Engineering (4.5)	Bioprocess Unit Operations 2 (4.5)	Engineering Economics (4.5)				

Module Structure



- Elective Module
- Personality Module

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:

Domain	Code	Intended Learning Outcomes (ILOs)
Knowledge	ILO1	Have knowledge about mathematics and natural science that are relevant to chemistry.
	ILO2	Have knowledge about theoretical concepts of structure, properties and changes in molecules, and are able to identify, separate, characterize, transform and synthesize molecules.
	ILO3	Have chemical knowledge about Indonesia's natural resources and their use.
	ILO4	Have chemical laboratory work skills and know-how to handle tools and chemicals independently and safely in the laboratory.

Domain	Code	Intended Learning Outcomes (ILOs)
	ILO5	Have certain knowledge about safety and environmental issues and applicable regulations.
	ILO6	Have the ability to compile steps to solve chemical problems scientifically and apply them to other fields.
	ILO7	Have interdisciplinary knowledge, namely religion, citizenship, Pancasila, entrepreneurship and computational skills.
Skill	ILO8	Are able to obtain, interpret and evaluate valid data and draw correct conclusions by considering scientific principles, technological developments and ethics.
	ILO9	Are able to solve problems in the field of chemistry through the application of relevant science and technology independently and conveying the results.
	ILO10	Have the ability to explore knowledge independently.
Social Competence	ILO11	Are able to communicate with colleagues and the wider community about chemistry and its problems in Indonesian and English.
	ILO12	Have social and professional responsibilities in carrying out their work in accordance with professional ethical principles and chemical standards.
	ILO13	Are able to work independently and in groups whose members are diverse socially or in gender.
	ILO14	Have the working experience to complete a project and carry out an evaluation process for workgroups under its responsibility.
	ILO15	Have the readiness to face professional life in industrial and academic work environments.

The following curriculum is presented:

Course number	Year 1	Year 1	Year 2	Year 2	Year 3	Year 5	Year 4	Year 4
	Semester 1	Semester 2	Semester 3	Semester 3	Semester 5	Semester 6	Semester 7	Semester 8
1	Fundamental Mathematics 4 / 6	Mathematics for Chemistry 4 / 6	Entrepreneurship 2 / 3	Molecular Biochemistry 3 / 4.5	Chemical Structure Analysis 3 / 4.5	Elective Course 3 / 4.5	Community Service Program 4 / 6	Final Project 6 / 9
2	Physics 4 / 6	Inorganic Structure and Reactivity 4 / 6	Chemistry of the Elements 3 / 4.5	Coordination Chemistry 4 / 6	Principles of Chemical Measurement 3 / 4.5	Elective Course 3 / 4.5	Capstone Design Project 4 / 6	Elective Course 3 / 4.5
3	Biology 2 / 3	English 2 / 3	Thermodynamics and Equilibrium 4 / 6	The Basics of Quantum Chemistry 3 / 4.5	Kinetics of Chemical Reaction 3 / 4.5	Elective Course 3 / 4.5	Work Training 4 / 6	Elective Course 3 / 4.5
4	Fundamental Chemistry 4 / 6	Organic Chemistry 4 / 6	Physical Organic Chemistry 3 / 4.5	Synthesis Organic Chemistry 3 / 4.5	Research Methodology 3 / 4.5	Elective Course 3 / 4.5		Elective Course 3 / 4.5
5	Computer Literacy 2 / 3	Basic Chemical Analysis 3 / 4.5	Chemistry of Electroanalysis and Separation 3 / 4.5	Chemistry of Instrumental Analysis 3 / 4.5	Physical Chemistry Lab Practice 2 / 3	Elective Course 3 / 4.5		
6	Citizenship 2 / 3	Fundamental Chemistry Lab. Practice 1 / 1.5	Biochemistry 3 / 4.5	Biochemistry Lab Practice 1 / 1.5	Elective Course 3 / 4.5	Elective Course 3 / 4.5		
7	Religion 2 / 3	Bahasa Indonesia 2 / 3	Analytical Chemistry Lab Practice - I 1 / 1.5	Analytical Chemistry Lab Practice - II 1 / 1.5	Analytical Chemistry Lab Practice - III 2 / 3			
8			Organic Chemistry Lab Practice 1 / 1.5	Inorganic Chemistry Lab Practice 1 / 1.5	Advance Organic Chemistry Lab Practice 1 / 1.5			
9				Pancasila 2 / 3				
SCU / ECTS	20 / 30	20 / 30	19 / 30	18 / 31.5	19 / 30	18 / 27	12 / 18	15 / 23
(Lab practice)		(1) / (1.5)	(3) / (3)	(1) / (4.5)	(3) / (7.5)			