ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes
Physics
Mathematics
Statistics
Information Systems

Provided by
Universitas Airlangga, Indonesia

Version: 24 September 2024

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	**(Official) English translation of the name**	**Labels applied for** [1]	**Previous accreditation (issuing agency, validity)**	**Involved Technical Committees (TC)**[2]
Fisika	Physics	ASIIN	Accredited by ASIIN (23.03.2018 – 30.09.2024) and LAMSAMA (until 18.12.2028)	13
Mathematika	Mathematics	ASIIN	Accredited by ASIIN (23.03.2018 – 30.09.2024) and LAMSAMA (until 04.09.2028)	12
Statistika	Statistics	ASIIN	Accredited by LAMSAMA (until 29.05.2028)	12
Sistem Informasi	Information Systems	ASIIN	Accredited by LAMINFOKOM (until 18.12.2027)	02, 07
Date of the contract: 19.10.2023 **Submission of the final version of the self-assessment report:** 04.04.2024 **Date of the audit:** 12.-13.06.2024				
Expert panel: Prof. Dr. Mathias Getzlaff, University of Düsseldorf Prof. Dr. Martin Buhmann, University of Giessen Prof. Dr.-Ing. Moustafa Nawito, IU International University				

[1] ASIIN Seal for degree programmes;
[2] TC: Technical Committee for the following subject areas: TC 02 – Electrical Engineering/ Information Technology; TC 07 – Business Informatics/ Information Systems; TC 12 – Mathematics; TC 13 – Physics.

Prof. Dr. Setia Pramana, Politeknik Statistika STIS Richie Mayandel Valerio, student from the Institut Teknologi Bandung	
Representative of the ASIIN headquarter: Johann Jakob Winter, M.Sc.	
Responsible decision-making committee: Accreditation Commission	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 28.03.2023 Subject-specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of September 23, 2022, Technical Committee 07 – Business Informatics/Information Systems as of December 8, 2017, Technical Committee 12 – Mathematics as of December 9, 2016, and Technical Committee 13 – Physics as of March 20, 2020	

B Characteristics of the Degree Programmes

a) Name	Final degree (original)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Physics	Sarjana Sains / Bachelor of Sciences	-	6	Full time	n/a	8 semesters	144 SKS/ 230.4 ECTS	Once a year in August, established July 1982
Mathematics	Sarjana Sains/ Bachelor of Science	-	6	Full time	n/a	8 semesters	144 SKS/ 230.4 ECTS	Once a year in August, established July 1982
Statistics	Sarjana Statistika / Bachelor of Statistics	-	6	Full time	n/a	8 semesters	144 SKS/ 230.4 ECTS	Once a year in August, established February 2011
Information Systems	Sarjana Komputer / Bachelor of Computer Science	-	6	Full time	n/a	8 semesters	144 ECTS/ 230.4 ECTS	Once a year in August, established 2008

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

Universitas Airlangga (UNAIR) is a public university in the city of Surabaya on Java Island of Indonesia. It received the status of a university in 1954 after being established already in 1948 as the medical branch of the University of Indonesia. It is regarded as third-oldest university in Indonesia. Nowadays, UNAIR hosts 16 faculties with more than 30,000 enrolled students. It is ranked as the 4th university in Indonesia, number 67 in the Asian University Ranking, and number 308 in the 2024 QS world university ranking. All four degree programmes under review are offered by the Faculty of Science and Technology.

For the Bachelor of Physics programme, UNAIR has presented the following profile on its webpage [accessed on 07.06.2024]:

"Vision:

To become an innovative and leading undergraduate program in the field of Physics and its applications, supporting scientific development, industry, and medicine at the national and international levels through education, research, and community service based on religious morals.

Mission:

1. To organize an educational program that encourages and facilitates students to have high academic capacity, professionalism, innovation, and global competitiveness.
2. To conduct internationally renowned research with an integrative approach to physics based on the development of science and technology.
3. To dedicate expertise in the field of physics and its applications for the empowerment of society.
4. To establish collaboration networks with stakeholders at the national and international levels in the fields of education, research, and community service."

For the Bachelor of Mathematics programme, UNAIR has presented the following profile on its webpage [accessed on 07.06.2024]:

"Vision:

Becoming a prominent study program in Indonesia and to be acknowledged at an international level in mathematics development and its application, especially in life science and industry; and to contribute the scientific community based on religious morality.

Mission:

1. Managing education and excellent teaching in mathematics and its application with the support of qualified resources.

2. Contribute in developing research in the field of mathematics and its application which support to increase the quality of education, science, and beneficial to the public welfare.

3. Having community service in the field of mathematics and its application through mutually reinforcing cooperation with elements of society, industry, and education."

For the Bachelor of Statistics programme, UNAIR has presented the following profile on its webpage [accessed on 07.06.2024]:

"Vision:

To become an excellent study program in Indonesia in the application of statistical modeling of life sciences, especially in the health, social, and economic fields. It intends to support the development of science and technology, play a role in fostering the quality of human resources to contribute to the national and international scientific community's development, have religious morality, and preserve the environment and strive to realize the ideals of The Best Science with Morality.

Mission:

To organize and develop education, research, and community services. It is particularly directed towards statistical modeling in life sciences, especially in the health, social and economic fields based on national values and religious morals."

For the Bachelor of Information Systems programme, UNAIR has presented the following profile on its webpage [accessed on 07.06.2024]:

"Vision:

To become an excellent and leading academic program in the field of Information Systems at the national and international levels and to contribute to the development of a knowledgeable, cultured, and morally upright society.

Mission:

1. Conduct educational and teaching processes to produce human resources capable of mastering, applying, developing, and innovating in the field of Information Systems.

2. Conduct high-quality and beneficial research in the field of Information Systems.

3. Dedicate expertise in the field of Information Systems to the community, institutions, industry, and government. Contribute in developing research in the field of mathematics and its application which support to increase the quality of education, science, and beneficial to the public welfare."

While the Bachelor programme of Physics and Mathematics have already been accredited by ASIIN in 2018 and are therefore due to reaccreditation, this procedure is the first international accreditation for the programmes.

C Expert Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Objective-module matrix
- Module handbook
- Homepage UNAIR: https://unair.ac.id/en/
- Websites of the study programmes/ departments
    - Physics: https://fisika.fst.unair.ac.id/en/
    - Mathematics: https://matematika.fst.unair.ac.id/en/
    - Statistics: https://stat.fst.unair.ac.id/en/
    - Information Systems: https://si.fst.unair.ac.id/
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The experts base their assessment of the objectives and programme learning outcomes (PLOs) provided in the study plans, on the websites, and in the Self-Assessment Report for all four study programmes.

For each of the study programmes, UNAIR has developed a mission, graduate profile, programme learning objectives and a respective curriculum. Their structures follow the Indonesian Qualification Framework of the Ministry of Education, Culture, Research, and Technology. Besides different university and faculty committees, also other stakeholders like students and industry representatives are involved in the process of designing this essential framework for the study programmes.

As published on the department´s website, the ***Objectives*** of the Bachelor of Physics (BoP) programme is to “produce graduates who

- Are capable of adapting to and solving problems in their field of work using the knowledge and methodology of physics they have acquired, enabling them to compete in the global era. (adaptability and problem-solving skills)
- Can continue to advance in their careers by enhancing their knowledge through both formal and informal processes. (continuous career development)
- Can utilize their mastery of scientific methods to observe, analyse, and understand natural phenomena, employing both inductive and deductive methods to support their career journey. (utilization of scientific methods)
- Are able to keep up with the developments in their specific field of expertise and its interactions with the dynamic global dynamics of science and technology, industry, and life in general. (keeping abreast of advancements)
- Can communicate ideas effectively, both orally and in writing, in a scientific and popular context. They should also be able to take appropriate initiatives and lead teams in relevant fields. (effective communication)"

The ***PLOs*** are divided into two categories: Specific Learning Outcomes that relate to the particular competencies of the study field of Physics, and Social Learning Outcomes that refer to the maturity of students in terms of general, social, and interpersonal skills. The PLOs are periodically reviewed and rearranged together to the course contents every five years, such that they match the competence profile. The Objectives-module matrix specifically states which courses contribute to achieving which PLOs. The PLOs are displayed in the appendix.

In the Self-Assessment Report, UNAIR presents the following intended ***Graduate Profile*** for BoP, which includes the five roles reflecting the graduates´ multiple fields of occupation and their importance for society:

- "Researcher/Scientist: Graduates are expected to have the ability to conduct scientific research, develop new theories, and contribute to the advancement of knowledge in the field of physics.
- Medical Physicist: Graduates are expected to have knowledge and skills in applying physics concepts in a medical context, such as the use of medical technology and an understanding of physics phenomena related to health.
- Industrial Physicist: The ability to apply physics principles in an industrial context is expected from graduates, including understanding production technology, process design, and product development.
- Manager: Graduates are expected to have good managerial skills, enabling them to lead teams, manage projects, and make decisions related to the field of physics.

- Entrepreneur: Graduates are expected to have creativity and entrepreneurial skills to develop and manage businesses or projects in the field of physics, such as applying physics technology for innovative business solutions."

For the Bachelor of Mathematics (BoM) programme, the department´s website and submitted documentation state the ***Objectives*** "to

1. Organize a quality learning process to produce graduates who are moral, expert and able to use mathematical concepts in solving problems related to mathematics,
2. Produce innovative, productive and quality research, both at national and international levels to support the mathematics development and its applications, especially in life and industry fields, and
3. Increase cooperation with industry and other institutions at the national and international levels in the education, research, and community service fields as the Tri Dharma of Higher Education actualization."

The programme aims at achieving nine ***PLOs,*** which, in accordance with the qualification standards of the Indonesian Mathematical Society, cover the aspects attitude, knowledge, general skills, and special skills. The qualification for each role defined in the Graduate Profile is supported by different PLOs and, conversely, the PLOs are put in relation to the individual courses via an objective-module matrix. The list of PLOs can be found in the appendix.

The programme´s ***Graduate Profile***, as defined by the university, includes the roles as

- Academics: Graduates are reliable in advancing self-development, both in the mathematics field and other relevant fields.
- Analysts and consultants: Graduates dispose of logical thinking skills, and are smart, critical, systematic, consistent, creative, innovative, and responsible.
- Managers: graduates are capable of using mathematical principles to solve problems, teamwork, well-deliver their ideas, and have motivation to develop themselves.

According to the department´s website, the ***Objectives*** of the Bachelor of Statistics (BoS) programme are "to

1. Produce graduates who are moral, capable of mastering, applying, developing and innovating in statistical modelling in the field of life, especially in the health, social and economic fields,
2. Produce productive and quality research in the field of statistical modelling, both on a national and international scale, and
3. Produce community service by empowering the community to be able to solve problems independently."

The ***PLOs*** are clustered by their focus on attitude, knowledge, general skills, or special skills, and contribute accordingly to the different Graduate Profiles. As for the other programmes, there is a table indicating which courses support achieving the different LOs. The LOs are listed in the appendix.

The intended ***Graduate Profile*** consists of the four fields Research, Academia, Consultancy, and Entrepreneurship:

- Researchers: Graduates are able to use their knowledge to conduct basic research and further research related to statistical modelling in the fields of life sciences/health, social and economics, because the results of the modelling can be used as simulations to make certain policies.
- Academics: Graduates are able to continue their studies to a higher level of education, and are able to become professional educators in the long term (long life education) or are able to become professional educators throughout their lives.
- Consultants: Graduates are able to become consultants and analysts who can use the basic concepts of statistics to design, analyse, and interpret data correctly and precisely based on the norms and professional ethics that have been taught.
- Entrepreneurs: Graduates are able to use the basic concepts of statistics to create new entrepreneurial opportunities (start-ups) such as entrepreneurship in several applied fields like health, social, economics, and several other fields by using the basics of artificial intelligence by utilizing big data.

The Bachelor of Information Systems (BoIS) programme pursues the ***Objectives*** to:

1. Provide high-quality learning processes to produce graduates who are morally upright, capable of mastering, applying, developing, and innovating in the field of Information Systems,
2. Generate innovative, productive, and high-quality research in the field of information systems, and

3. Engage in community service by empowering communities to solve problems independently and sustainably.

The corresponding ***PLOs*** were formulated based on Indonesian national standards higher education as well as guidelines by different professional associations, among others, the Informatics and Computing Higher Education Association. The PLOs target the different Graduate Profiles and are themselves achieved by the completion of the courses, as stated in a respective table. The PLOs are displayed in the appendix.

According to the department´s documentation, BoIS graduates should fit in the following four-parted ***Graduate Profile***:

- Information System Solutions Developer: Students must be able to provide effective and comprehensive information system solutions for organizations to achieve their goals. Fields of work that support include application developers, application developer consultants, IT consultants, and system analysts.
- Information System Business Enabler: Students must be able to identify business opportunities by utilizing information technology and develop process improvement solutions for optimizing the organization's business. This profile is a reflection of entrepreneurial competence.
- Information System Implementation Manager: Students must be able to manage the implementation of information systems in organizations, both operationally and in projects.
- Information System Professional with Moral Excellence: Students have an attitude of excellence with morality as information system professionals.

For every programme, UNAIR monitors the further academic and professional career paths of its graduates via a tracer studies. These studies show, among others, that the satisfaction of alumni is generally high and that more than 75% of the programmes´ graduates obtain a job within six months after their graduation. The results of these studies is part of the regular programme review, which, in an interval of five years, involves also other stakeholders like the active staff and students of the university as well as the related industries and other potential employers.

The experts discuss the concepts of the four degree programmes with the programme coordinators and assess them to be well-founded. The industry representatives state that the programmes are designed in a way to produce graduates with the knowledge and skills needed in their industries and confirm that they are involved in the regular process of curriculum revision and development. This is also confirmed by alumni, who easily found jobs

in companies and institutions related to their study fields. Also the active students are satisfied with the concept and structure of the programmes. Thus, the experts gain the impression that the graduates of all four degree programmes under review are well prepared for entering the labour market and can find adequate jobs in Indonesia. As the experts consider professionals in these areas of expertise as highly sought-for, all graduates have good and manyfold job perspectives.

In summary, the experts are convinced that the objectives, LOs and graduate profiles of all four programmes under review allow graduates pursue careers in correspondence with their acquired qualifications. The degree programmes are designed in a way that they meet the goals set for them. The objectives and intended learning outcomes of all programmes under review are reasonable, well founded and adequately reflect the intended level of academic qualification (EQF level 6). All relevant stakeholders are involved in the curriculum review process.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report
- Curricular overview
- Module handbook
- Examples of Transcripts of Records
- Websites of all four programmes
- Discussions during the audit

Preliminary assessment and analysis of the experts:
As explained in the Self-Assessment Report, the departments have named the study programmes to represent its PLOs and the minimum standards of the curricular structure set by the government and respective professional associations in the field. This is required by a regulation of the Indonesian Ministry of Education, Culture, Research, and Technology. For the BoP and BoM programmes, UNAIR awards the degree of Bachelor of Science, while the degree of the BoS programme is Bachelor of Statistics and the degree title of the BoIS programme is Bachelor of Computer Science.

The experts confirm that the English translation and the original Indonesian names of the four degree programmes correspond with the intended aims and learning outcomes as well as the main course language (Bahasa Indonesia). For the BoP, BoM, and BoS programmes,

they further confirm that the programmes´ names are concise and well-reflected and understood by stakeholders and the public.

For the BoIS programme, the experts wonder whether the current name "Information Systems" is suitable as it can relate to both the technical as well as the business related component of computer science. Given the strong application-orientation in the curriculum, they would consider this more concisely represented by a name like "Business Informatics". During the interview sessions, both the programme coordinators and students are presented with this reasoning, but state that they see the broadness of the curriculum well-represented by the current name. The experts evaluate the programme´s name "information systems" to be justified given the curriculum, but nevertheless suggest that changing the name could prevent potential misunderstandings regarding the programme.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module handbook of each degree programme
- Homepage UNAIR: https://unair.ac.id/en/
- Homepage Faculty of Science and Technology: https://unair.ac.id/en/faculty-of-science-and-technology/
- Discussions during the audit

Preliminary assessment and analysis of the experts:
Structure of the programmes

The four programmes under review are offered by the Faculty of Science and Technology and have similar programme structures. They are designed as full time bachelor´s programmes on the EQF level 6 with a regular duration of eight semesters, which requires at least of 144 Indonesian credit points (SKS, equivalent to 230.4 European Credit Transfer and Accumulation System (ECTS) credit points; see criterion 1.5) at graduation. Students can start the programmes once a year in the term that begins in the end of August. Each semester is equivalent to 14 weeks of learning activities. Besides these learning activities, there is one week for midterm exams and one week for final exams. A systematic review of the curriculum is conducted every five years, involving universities, lecturers, staff, stu-

dents, and external stakeholders like alumni and industry representatives, which is confirmed by all the before-mentioned interest groups. For example, the curriculum of the BoP programme was internally reviewed the last time in June 2021 and the curriculum adapted for the period until 2026. Meanwhile, the workload of the curriculum components is evaluated every year to facilitate the implementation and redesign of modules within the review processes. The main lecturing language of the courses is Bahasa Indonesia, although, as the experts learn in during the on-site visit, English has been established as instruction language in an increasing number of courses throughout the past years. Guest lectures are usually held in English.

In this regard, the experts further discuss the use of English as instruction language with programme coordinators, students, and lecturers. They learn that, in many courses, the study materials like lecture slides and reading materials are provided in English. However, the spoken language is Bahasa Indonesia in almost all courses. According to the module handbooks, seven subject-specific courses are taught in English in the BoP programme, and five in the BoM programme. For the BoS and BoIS programmes, English as instruction language is used only in the English language courses. However, the programme coordinators state that English can be used as instruction language of international students are present in a course. Given the very low number of incoming students, this is rarely the case however. Students and lecturers confirm that lecture materials and, partly, also the instruction language is English and consider this useful. Overall, the students show a high level of English language proficiency in the discussion with the experts. Since English has been established as the number one scientific language around the world, the experts recommend strengthening the use of English language, especially in the BoS and BoIS programmes. This would highly benefit the internationalization of the programmes intended by UNAIR through, e.g., facilitating the intake of international students, which appears to be very low at the moment. Also, Indonesian students would be prepared in a better way for their future careers in academia and the industry which are both likely to become more international in the future.

Content of the programmes

As explained in the Self-Assessment Report, the curricula of all degree programmes under review consist of sets of compulsory modules on the university level, such as “Religion”, “Pancasila” (civics/ state philosophy), and Indonesian language; compulsory modules of the Faculty of Sciences and Technology, which constitute first-semester introduction to all relevant science disciplines taught at the faculty; subject-specific compulsory courses, and a

range of elective modules. The first semester in each programme always contains university-mandated courses as well as fundamentals, while the curriculum becomes more specialized and practice-oriented with advancing study duration. The sixth semester of all programmes contains a compulsory community service project with the purpose of positively connecting the impact of research on the development of the community. During this project, students work in positions related to their field in social projects, usually in the more rural areas of the country, to gain a first practical work impression, strengthen their sense of community benefit, and help the development of the country as a whole. Moreover, all four programmes contain a mandatory internship described below. The final compulsory component of each curriculum is a thesis-like "final project" which is awarded with 6 SKS credits.

The experts highlight that the overall curriculum structure is well founded and elaborated. The organisation and order of the modules enables students to build up their basic academic skills and knowledge required in the later courses. They approve that the broad range of national compulsory modules is not related to the programmes contributes to the general education and personal development of the students. They positively highlight that, besides research methodology itself, also topics like plagiarism, academic integrity and research ethics are addressed in the Research Methodology courses. Moreover, the experts acknowledge the availability of a wide range of elective courses as beneficial for individual specialization according to the students´ interests.

A mandatory component of the curricula of all programmes is an internship with a duration of at least two months. This internship is integrated in the fifth or sixth semester and includes full-time work in a company or institution relevant to the field. The regular two-month-internship is credited with 2 SKS credits, which the experts deem to be a very low number in relation to the workload. Therefore, it is recommended to increase the number of awarded credits for the internship. Also, for additional support of independent learning achievement as one learning focus of the university´s strategy, UNAIR has implemented the option to prolong the internship through the Merdeka Belajar Kampus Merdeka (MBKM, "Independent campus – independent learning") programme. This programme is an initiative of the Indonesian Ministry of Education, Culture, Research, and Technology to facilitate more off-campus learning activities like student exchange, internships, teaching assistance, research, entrepreneurial activities, or independent study projects.

While the experts deem longer internships as highly beneficial in practical learning for the students, they wonder how students can incorporate up to six months of full-time work into their study programmes without missing courses and, thus, having the necessity of prolonging their studies. The university explains that the MBKM programme allows for longer internships and their recognition in form of up to 20 SKS credits in the curriculum.

These credits can replace the necessary credits usually obtained from elective courses. Therefore, the off-campus activities do not result in longer study durations. The students confirm that this system is in place and that they deem the opportunity for longer internships very positive. They describe to the experts that they found internship places in many different job fields and industries, such as banks, national authorities, the national railway company, private corporations, and start-ups. In multiple cases, the internship paved them a way for the first job after their graduation.

However, it is also reported that the recognition of the additional credits obtained through the MBKM programme is not determined before the programme, but depends on the internship duration, the student´s internship report, and the evaluation by the internship supervisors of the host company after completion of the programme. Thus, the number of credits obtained from the internship after its completion might differ from the credit number initially planned. As this process is not clearly transparent to the experts, they see the need of a clear and binding regulation for the recognition of credits as well as the learning outcomes and respective evaluation criteria to be used by the internship supervisor of the host company. They recommend to develop a “learning agreement”, a contract between the university, receiving company, and student, which specifies the internship duration, contents, learning outcomes, credits (workload), and assessment. This contract should be concluded before the internship and also contain the modules replaced by the internship as well as provisions for the “failure”, early termination, or other arising problems disrupting the learning process. Moreover, the regulation need to be transparently published in all the relevant handbooks. Overall, however, the experts are highly satisfied with the implemented internship as well as the apparent success of students in their work at the companies. To further increase the internship´s impact, they recommend to generally extend the minimum duration to three months and increase the number of awarded credit points to adequately reflect the effort and workload. This would also be welcome by the host companies, as stated by the industry representatives.

In the following, programme-specific features are explained and evaluated:

The BoP programme focuses on both theoretical and experimental training of physics fundamentals in order to prepare students to commence work in existing or foreseeable fields. The experts find that the curriculum provides a reasonable balance of theoretical and practical courses. Furthermore, there are courses that support soft skills and the professional development of students, like English language, communication, community Study, as well as management and entrepreneurship. Students are encouraged and supported to take

part in scientific seminars, industrial visits, and national student creativity programmes like the Robotics Contest or the National Physics Olympiad.

The curriculum consists of compulsory courses aiming at the achievement of general scientific skills and specific scientific skills. In addition, at least 14 SKS credits of elective courses have to be completed.

During the first two semesters, students have to take the basic scientific courses on the university level. From the third to the fifth semester, the programme´s focus is on mandatory physics courses including the related lab work, while the fourth and fifth semester contain the slots for the mandatory elective modules. During the sixth, seventh, and eighth semesters, students are encouraged to seize opportunities for internships or student exchange programs. In these semesters, students also have the chance to take the elective courses from other disciplines or even different universities, another opportunity implemented through the before mentioned MBKM programme. The available course offer is displayed in the appendix.

The experts are satisfied with the curriculum of the BoP programme and confirm that all the fundamental theoretical physics courses as well as the needed practical components are contained. As the curriculum was assessed as well-founded in terms of structure and content in the first ASIIN accreditation of the programme, there have not been any significant changes.

The curriculum of the BoM programme consists in 0

- 11 compulsory modules on the university level, such as Religion, Civics, and Indonesian language;
- 4 compulsory courses of the faculty of sciences, which constitute a first-semester introduction into all science disciplines taught at the faculty;
- 33 compulsory mathematics modules; and
- A credit load of at least 33 SKS credits of elective modules.

As adapted in response to the previous ASIIN accreditation requirements, the university-mandated and basic maths courses have to be taken in the first semester, while the courses become more specialized and practical with advanced study duration. The experts appreciate the update of the curriculum and are satisfied with the offered theoretical and practical content. In this programme, the compulsory internship is called “field study” which the experts find inconsitent compared to other programmes. Therefore, they recommend to change the name to “internship” to concisely reflect the purpose of the module. Apart from that, the experts are satisfied with the curriculum structure and the routine contents of the courses.

To graduate from the BoS programme, 79 compulsory statistics credits and at least 36 elective credits have to be completed alongside the mandatory courses of the university and the faculty. The programme provides all the required basics for the academic field of statistics with a special theoretical focus on non-parametric modelling. The experts generally laud the programme´s contents but inquire, how it is distinguished from other programmes like "Data Science" or "Applied Statistics" that cover similar content. It is explained that the programme specifically targets the education of statistics experts for the fields of natural and life sciences by providing them with a stronger background in mathematics, statistics theory and programming than what is common in the application-centred programmes. The experts are satisfied with the programme content but, also here, recommend to align the name of the internship modules, which in this programme is "fieldwork practice" at the moment.

Finally, the BoIS programme focuses on the analysis of information, which refers to data within a particular context. This includes activities like information capturing, storage, processing, and analysis/interpretation, all of which contribute to supporting decision-making processes. Furthermore, the discipline involves integrating information processing into organizational procedures and systems, thereby enabling ongoing and permanent capabilities for various processes. The distribution of credits in this programme encompasses 21 SKS of electives and 123 SKS credits of compulsory modules, 93 of which are subject-specific for the BoIS programme.

According to the Self-Assessment Report of the BoIS programme, the "Research" modules are as a distinctive feature within its curriculum at UNAIR. These research courses include: E-Health Interaction System Design, Biomedical Informatics, Computer Vision, Enterprise Application Development, Knowledge Based Systems, and Data Mining. The programme coordinators additionally highlight the programme´s focus on the technical component of information systems.

Based on the curriculum documents as well as the explanations given by programme coordinators and students, the experts are satisfied with the content covered by the curriculum. Nevertheless, as mentioned in section 1.2, they find that the apparently very strong application-orientation of the programme would justify a change of the programme´s name into "Business Informatics", which, in the opinion of the experts, would describe the current curriculum more concisely.

Moreover, the experts wonder about the necessity of the compulsory fundamentals courses in biology, chemistry and physics for this programme. While they generally agree that basic knowledge is highly beneficial also for the field of information systems, they consider individual courses for the three disciplines as going too far. Therefore, they suggest

to combine these three courses into a course of fundamental sciences, and incorporate additional subject-specific courses instead, like, for instance, a more detailed focus on artificial intelligence (AI).

The quickly developing fields of machine learning and AI are addressed by the experts for all four programmes. Because of its high impact especially for the academic fields with strong computational components, the experts recommend to additionally emphasize the importance of this topic by introducing AI as both theoretical course content as well as practical teaching and learning methodology/ instruments into suitable courses.

In summary, the experts confirm that all four degree programmes under review are divided into modules and that each module is a sum of coherent teaching and learning units. They confirm 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

Based on the Rector´s Decree no. 519/UN3/2017, UNAIR has established the Airlangga Global Engagement programme, which seeks to facilitate student mobility through the provision of funds for travel and accommodation assistance. It connects domestic and foreign university staff to improve the quality of operational implementation of education, research, and community service. The four programmes under review offer opportunities for student mobility mainly through national and international institutional cooperations, settled in memorandums of understanding. These include outbound and inbound mobility of students and staff, research and publication collaborations, international aspects of the Program Kreativitas Mahasiswa (PKM – student creativity programme), adjunct professorships, visiting professorships, and guest lecturing. The promoted mobility activities are, e.g., student exchanges, international workshops, seminars, and conferences.

As the experts learn, the academic mobility is supported in many ways, e.g. through different grants and scholarships as well as organizational support for the planning of outbound activities by the Airlangga Global Engagement office. Also, the process of credit transfer and recognition for outbound students is flexibly handled to reduce barriers for the participation in exchange programmes. As student mobility recognized as a supporting activity with credit points obtained from modules completed at other universities can be easily integrated into the curriculum. Therefore, outbound activities do not disrupt the study process, which is positively regarded by the experts. The students highlight the good support of the university and the transparency of available information regarding the programmes. The students confirm all statements given by UNAIR.

As examples, students of the BoP programme have participated, among others, in international exchange programmes with University of Malaya, China Academy of Traditional Chinese Medicine, and University Technology Malaysia. The programme also cooperates with domestic partners like Universitas Gajah Mada, Network Bank, Institute of Technology Sepuluh November Surabaya, National Nuclear Energy Agency of Indonesia, regional public hospital Dr Soetomo, Petrokimia Gresik Hospital, the National Education Department of East Java, and Universitas Trunojoyo.

The BoM programme has implemented memorandums of understanding with, among others, Osaka University and Meijo University from Japan, National Cheng-Kung University (Taiwan), National Taiwan University of Science and Technology, and Chang Jung Christian University of Taiwan, Sun Moon University (South Korea), Swinburne University of Technology in (Australia), Universiti Teknologi Malaysia, UCSI University (Malaysia), Universiti Teknologi PETRONAS (Malaysia), Universiti Teknologi MARA – UiTM (Malaysia), Salahaddin University Erbil (Iraq), Chulalongkorn University (Thailand); Universidade de Aveiro (Portugal) KTH Royal Institute of Technology (Sweden); Delft University of Technology (The Netherlands), University of Groningen (The Netherlands), Belanda and California State University (USA).

Similarly, also the BoS and BoIS programmes maintain different cooperation agreements with other national and international universities in Bangladesh, Malaysia and the Philippines. The different cooperation areas are joint curriculum development and teaching material creation, research collaboration, and collaboration regarding internships and community projects. However, judging based on the provided documentation, the experts note that the number and diversity of international partners is much lower than in the other two programmes and recommend to increase efforts to expand the international cooperation agreements to make them accessible to all students of the faculty.

However, as it becomes apparent from the Self-Assessment Report as well as the students´ input during the discussion session, the number of available places for student exchange is very limited and the process is very competitive. To ensure a fair distribution of participants in the exchange activities across the study programmes, each department can propose students. Students can also apply independently; however, the demand by students is much higher than the number of places offered. The experts observe that international mobility is directed mainly towards the south and south-east Asian region. Therefore, the experts strongly recommend that further opportunities for international student mobility should be created by strengthening the university´s ties with other institutions around the globe and, thus, increasing the number of available places. This could be supported by fostering cooperations and offering scholarships also on the faculty and department level to become

more independent from the competitive application processes on the university and national level. The importance and benefits of international experience could also be advertised more extensively to the students. Nevertheless, the experts also highlight that the system and structure of outbound mobility is well established and positively regarded by the students.

On the other hand, incoming mobility of foreign students appears to be very low in all four programmes under review. Given UNAIR´s reputation as well as the contents of the course offer, which could be easily integrated into the curricula of similar Bachelor´s programmes of foreign universities, the experts wonder about this fact. As mentioned earlier in this report, the experts see the language barrier of the Bahasa Indonesia requirement in many courses as well as the very unclear regulation regarding the use of English in the courses as a main reason to impede incoming mobility. The experts assess the current policy to teach courses in English only in case international students are present as not convincing and attractive for potential incoming students. Therefore, the approach should be reversed by offering high-quality English courses to attract international students. Moreover, also the credit transfer system displays multiple inconsistencies and might therefore hamper credit recognition, which would be an additional factor that makes UNAIR unattractive for international students (see section 1.5). To clarify the current state and future of the international mobility offer, the experts ask UNAIR to provide statistical data on the number of inbound and outbound exchange students per semester and study programme for the past five years since the actual number did not become clear from the provided documentation.

The experts highlight this missing incoming mobility as a crucial problem in the university´s internationalization strategy and seek to increase the awareness for the necessity of better policies to encourage and facilitate incoming mobility. A first step in that regard would be a clearer language regulation and an increase of the number of courses entirely taught in English.

In summary, the experts appreciate the university´s effort to foster international mobility and support it to further pursue this path. While the support system for outbound mobility is well established, there is a large room for improvement regarding incoming mobility and the quantity of places in international mobility programmes should be generally sought to be increased.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report

- Admission regulations for all programmes
- UNAIR Student Admission Centre website: https://ppmb.unair.ac.id/en/tentang
- UNAIR admission schedule and procedure webpage: https://iup.unair.ac.id/prospective-students/admission/
- Homepage UNAIR: https://unair.ac.id/en/
- Discussions during the audit

Preliminary assessment and analysis of the experts:
As described in the Self-Assessment Report, the admission to all four programmes is based on the university-wide regulations and carried out by the Student Admission Center. All requirements for new student admissions are explained on the Admission Centre´s website, which can be accessed through the websites of the respective study programmes.

As common in Indonesia for state universities, there are three different types of selection on the national and university level:

1. SNBP (National Selection Based on Academic Achievement): Student selection through the SNBP pathway is intended for 12th-grade high school students or equivalent who have outstanding achievements. The selection is carried out based on quotas for each school to register their best students. Schools with national accreditation “A” have the opportunity to register the top 40% of their students, accreditation “B” 25%, and accreditation “C” and others 5%.
2. SNBT (National Selection Based on Test): Student selection through a national written test (national-level selection) for high school graduates. Participants are required to take the computer-based test which includes, among others, a scholastic potential test, at test of Indonesian and English language skills, and mathematical reasoning.
3. UNAIR Independent Selection (SMUA): This selection is a scheme organized independently by Universitas Airlangga for undergraduate and vocational levels based on university regulations. Each study programme has a certain capacity, which can be found on the Admission Centre´s website.

The university has set quotas for SNBP, SNBT, and independent pathways with percentages of 20%, 30%, and 50% respectively. To register for SMUA, participants can follow the procedures on the website of UNAIR´s Student Admission Centre and first complete the online registration. All the processes for admitting new students are conducted entirely online to ensure transparency and accountability.

Students at the Faculty of Science and Technology have to pay tuition fees of 7.000.000 to 10.000.000 IDR (400 to 570 EUR) per semester, depending on the programme and a categorization of the students according to their, respectively their parents´, financial solvency. In addition, a one-time registration fee of up to 100.000.000 IDR (5.700 EUR) must be paid. The tuition fees are regarded as high, but justified by the students. Also, the university officials stress that there are many different scholarships that can be obtained by well-performing students and that the university seeks to not exclude any student because of financial problems. The experts appreciate this approach and, given the student and application numbers, see no problem in the volume of the tuition fees.

According to the Self-Assessment Report, for the BoP programme, the average ratio of applicants to accepted students is 7:1. The faculty has experienced a significant decrease of both applicants and students over the past five years from 124 in 2019 to 81 in 2022. To counter this downward trend, different measures have been implemented to increase the attractiveness and awareness of the programme. These efforts include striving for international programme accreditation, collaborations with similar programs, engagement with businesses and the industrial sector, and showcasing alumni profiles. First positive effects were observed in the past year.

In the BoM programme, one admission comes per about nine applications. The capacity of the programme is 90 students per intake and the actual intake is 88 on average. The experts are satisfied that the capacities of the BoP and BoM programmes are used well.

The BoS and BoIS programmes belong to the most competitive programmes of UNAIR, with admission quotas of 6% and 5% respectively. Therefore, the number of available study places has been increased from 80 to 120 over the past years. However, the application and admission numbers initially reported contradict this notion of high occupancy as the average cohort numbers are only half the size of the available capacities. Nevertheless, the programme coordinators affirm that the capacity of both programmes is almost full. To eliminate the discrepancies in available information, the experts request the university to provide clear and updated statistics on the number of applicants, admissions, actual students, and graduates per cohort for the past five years.

Assuming that the capacities of also these programmes are used entirely, the experts are highly satisfied with the application and student numbers in all programmes. Students affirm that UNAIR is a very popular higher education institution because of its good reputation, the high international ranking, and its excellent national accreditation. Further, it is positively stressed that the university´s internet presence is well-maintained and all the information regarding the programmes and admission rules can be easily found. Lastly, the students also explain that both the university officials as well as alumni associations

strongly engage advertising the programmes and recruit students through their alumni networks and the active promotion of the programmes in high schools. The experts consider these efforts highly beneficial to promote the scientific disciplines of the programmes under review, and encourage to keep up this practice.

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.

Criterion 1.5 Workload and credits

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:
Based on the National Standards for Higher Education of Indonesia (SNPT), all four programmes under review use a credit point system called Satuan Kredit Semester (SKS), a combined measure of students´ course load, lecturers´ teaching load, learning experience, and programme organization load. For regular classes, one SKS of academic load for the programmes is equivalent to three academic hours per week, which equals 170 minutes. This includes

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

For lab work, final project, fieldwork, and other similar activities, 1 SKS is equivalent to three hours a week of student´s activities. The details and the students´ total workload are described in the respective module description. According to the SAR, the conversion rate from SKS to ECTS points is one to three as issued by a Rector´s decree, which establishes the Airlangga Credit Transfer System (ACTS) in an attempt to create an adaptive and flexible

academic activity measurement system. According to this system, 1 SKS credit is equivalent to 1.6 ECTS credits.

In the Indonesian higher education system, there is no fix credit amount to determine a Bachelor´s degrees workload, but only a defined range of 144 to 160 SKS. All four Bachelor´s programmes under review are designed as full-time study programmes and require 144 SKS (230.4 ECTS) for the graduation. A semester is defined as a period of at least 16 weeks which is the necessary time frame for an effective learning process, including 14 weeks of academic activities and one week each for midterm and final semester exams. Although the regular programme duration is eight semesters, inducing an average study load of 18 SKS per semester, the study load of individual students can vary between 15 and 24 SKS according to their capacity and achievements in the previous semester, measured in form of the Grade Point Average (GPA).

The experts are of the opinion that all four programmes have a high but manageable workload. They learn that the workload of each course is presented by the lecturers in the first class of each course and that a formal agreement ("course contract") is concluded between students and the lecturer regarding the courses´ workload, as well as contents, exam methods and schedules. In this way, students have the theoretical opportunity to influence the distribution of their workload, although the experts wonder how this is actually done in practice and how often students object against the teachers. Moreover, feedback on the courses and the workload is collected via the course questionnaires at the end of each semester. Student generally assess their workload to be high but manageable.

While the experts find the SKS credits system well-founded, they observe that it is not entirely and exclusively based on the students´ total workload, since its main reference point is the number of weekly contact hours and the associated study load. However, the experts question whether the necessary self-study time is sufficiently taken into account for the credit calculation. Critical in that regard are the number of credits awarded for the Bachelor´s thesis ("final project"), which is 6 SKS in all programmes under review. As students are supposed to spend almost an entire semester on this project, the workload cannot be adequately represented by this comparatively low number of credits. As second notable problem is the crediting of the mandatory internship, since 2 SKS credit cannot appropriately represent two months of full-time work in a company plus the required documentation and reporting to the university. Furthermore, the experts find partly different conversion rates in various documents, which the programme coordinators say to be out of place by mistake.

Therefore, the experts require UNAIR to review its credit allocation and transfer system to ensure that all parts of the programmes´ curricula are appropriately accounted for. This is

especially important for the modules that consist mainly in independent work of the students (internships, community service, thesis), because they are difficult to be measured by the standard definition of an Indonesian SKS credit. For this purpose, a more detailed monitoring of the students´ workload outside campus would be recommended. Moreover, the applied conversion rate to ECTS credits must be harmonized across all programmes and official documents. In this regard, two-digit decimals should be avoided.

In summary, the experts consider the SKS credit system adequate for the workload evaluation. However, the number of allocated credits of various courses must be reviewed to appropriately reflect the associated workload. Also, the ECTS conversion rate needs to be harmonized.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Report
- Study plans
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The learning methods applied at UNAIR´s Faculty of Science and Technology are categorized into Concept-Based Learning, Problem-Based Learning, Project-Based Learning and Skill-Based Learning . These are explained in the Self-Assessment Report as follows:

1. “Concept-Based Learning is driven by “big ideas” rather than subject-specific content. By leading students to consider the context in which they will use their knowledge and understanding, concept-based learning brings “real world” meaning to content knowledge and skills.
2. Problem-Based Learning is a learning strategy in which the lecturer gives a real case problem, and students are expected to be able to solve the case with appropriate statistical methods.
3. Project-Based Learning is an instructional approach that engages students’ interest and motivation related to the theoretical concept students studied inside the classroom and their applications explored during the activities outside the classroom and provides more opportunities for direct interactions among students. Projects have the potential to deepen students’ learning experiences and foster classroom

engagement by combining students' interest with a variety of challenging, authentic problem-solving tasks.

4. Skill-based learning provides classroom environments where independence, thinking skills collaboration, and active learning developed at the same time as knowledge is acquired."

Accordingly, the lecturers are responsible for choosing adequate teaching strategies and formats to reach the goals of each course as documented in the Semester Learning Plan, which is confirmed by the lecturers. The most commonly used teaching instruments are teaching methods encompass lectures, discussions, experimental studies, group work, assignments, practical training (practicum, internship), guest lectures and seminars. 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. Each course can use one or a combination of several teaching and learning methods. Additionally, a strong focus is on the individual development of scientific practice skills, including literature research, writing proposals and research reports as well as giving presentations. Practical activities should enable students to be acquainted with academic research methods. As support for all courses, UNAIR provides their own online learning application called HEBAT E-Learning, which is also used for sharing teaching materials, video-lecturing, online discussion forums, as well as the collection of assignments and implementation of digital examination methods. The lectures are usually given in Bahasa Indonesia while the lecturing materials like presentation slides and reading materials are in English in most cases. However, the programme coordinators explain that the number of courses taught entirely in English has been increased since 2018. The students express their overall satisfaction with this approach and the applied teaching methods.

Generally, the experts find that all four departments appear to make use of the whole range of this teaching methodology catalogue. The lecturers explain that teaching methods used in each course are presented and discussed with the students in the first class. As an example of the BoP programme, Problem-Based Learning is used in the courses "Computational Physics and Programming", "Modelling Physics", and "Artificial intelligence", Skill-Based Learning is applied in courses like Basic Physics Lab I and II, Experimental Physics I and II, as well as the Analog and Digital Electronics Lab, while the internship and final project are examples of Project-Based Learning. The lecturers always make use of appropriate media as supporting instruments. With some distinction, the BoS and BoIS programmes focus mostly on a Student-Centred Learning approach and seek to actively engage students in learning activities by give additional rewards for students who are active in class. A second focus is on the achievement of independent learning.

The teaching methodology is regularly evaluated by the students through semester feedback surveys and revised accordingly by the teachers, which is confirmed by all the named parties during the on-site visit.

During the on-site visit, especially in the discussion session with the lecturers themselves, the experts gain a positive impression of the teaching methodology used in all four programmes. In summary, they consider the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, they confirm that the study concept of all four Bachelor´s 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).

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

Criterion 1.3/ 4.2:

UNAIR explains that the incorporation of internships and the respective regulations within the MBKM programme depend on government regulations which cannot be disregarded by the university. However, to more transparently regulate the internships, a new workflow of multilateral communication between the students and supervisors, as well as the receiving organizations shall be established in the future, which the experts welcome. This procedure should be formalized in respective official regulations and its functioning should be monitored and evaluated over the coming semesters.

This also relates to the topic of the different module titles for “internships” in the different programmes. UNAIR explains this variation with differences in the internship duration and learning objectives, which the experts find confusing. Exactly these provisions should be made clear and transparent in the above-mentioned regulation.

Criterion 1.5:

With respect to the workload calculation for modules with high independent workload, UNAIR comments that in different programmes different modules belong to the final project and, thus, constitute a higher total credit number. The module “Final Project” itself is still only credited with 6 SKS, though. In this regard, the experts wonder why the number of modules and credits directed towards research is different in all the programmes.

UNAIR also provides a credit calculation for internships, which the experts find to be inconsistent. As 1 SKS credit is equivalent to roughly 40 hours work time, a fulltime internship should therefore be awarded with about 4 SKS credits per month.

Considering the remaining inconsistencies and uncertainties, the experts regard this criterion as **mostly fulfilled**.

2. Exams: System, Concept and Organization

Criterion 2 Exams: System, Concept and Organization

Evidence:

- Self-Assessment Report
- Examination regulations for all programmes
- Module handbooks
- Academic handbook of the Faculty of Science and Technology
- Discussions during the audit

Preliminary assessment and analysis of the experts:

According to the Self-Assessment Report, the students´ academic performance is evaluated based on written exams (e.g., multiple choice, essays, quizzes, and calculations), oral exams, presentations, practical work, papers, and reports. Written exams mainly evaluate theoretical knowledge and analytical skills, whereas projects and practical demonstrations assess students' abilities to apply concepts in real-world situations. Oral presentations and group discussions are used to measure communication skills and collaborative capabilities. According to the students, mid-term examinations are usually held as written exams, while the final exams are based on practical or project work in most of the modules. The module handbook specifies the grading components and the weight they have in the computation of the final mark.

The standard examination clusters are midterm and final examinations. These are conducted each semester, complemented by continuous assessments like quizzes, presentations, group discussions, and assignments throughout the semester. Typically, midterms occur in the 8th or 9th week, while finals are scheduled for the 16th semester week or later, as specified in the academic handbook. The examination schedule for each department is aligned with the university´s academic calendar, updated regularly by the responsible Examination Committee, and accessible on the faculty website.

Each department has unique learning objectives, and the employed assessment methods of each course have to be suitable for achieving these goals. For instance, the BoP programme has adopted a project-based examination approach over the past two years, whereas the BoIS programme mostly utilizes demonstration methods. This examination

approach included the presentation of students´ computer codes, the reasoning behind coding structures, and their functioning within the given project to their instructors. Central to this framework is the recognition that examinations are more than mere assessment tools, but central to the students´ learning experience and vital for reinforcing the educational objectives of each course.

In terms of organization, the information about the exam system is submitted by each lecturer at the beginning of the course through a "course contract", which contains information about the terms of the course (prerequisites), learning objectives, learning methods, brief descriptions of classes, assignments, references, assessment processes, and passing standards. Both students and lecturers confirm this practice and deem this as a very useful instrument to organize the learning process. Exam criteria, requirements, and remedial policy are also explained in the contract.

As the experts consider the exam workload as very high due to the multiple assessments used in any of the courses. They enquire about the adequacy of the study and preparation time. The students explain that there is a "silent week" between the last lectures and the final examinations, which they find most beneficial for their preparation. Moreover, the distribution of mid-term exams as well as quizzes and similar assessments during the semester period are scheduled in agreement with the students such that the periodic culmination of exams can be avoided for the benefit of the students. The experts consider this a reasonable approach but still suggest UNAIR to consider whether this high number of different exams is necessary and beneficial for achieving the course learning outcomes.

Only students registered in a course who have attended at least 75% of lectures and 100% of practical sessions are eligible for the final exam. As regulated in the faculty´s academic guidelines, students who are unable to take the midterm or final exams for valid reasons may apply for a re-examination. Valid reasons are, e.g., illness or engagement in university or faculty activities, such as student events, competitions, or trainings, seminars, and conferences. Also students, who failed the original examination, can take the remedial examination individually arranged at the end of the semester. However, the grade of the remedial exam is capped at the minimum passing grade. Also, in some practical classes, exams can be repeated only after one year when the course is offered again. The respective course coordinators are responsible for determining the procedures for these remedial examinations, as outlined in the academic guidelines. Special care is also taken to ensure a fair and unbiased examination environment, accommodating diverse student needs, including those with disabilities or special circumstances.

Learning assessment is based on fixed criteria and stated as an absolute number and an alphabetical score according to the following scale:

Score	Letter Score	Quality Score
86-100	A	4
78-<86	AB	3,5
70-<78	B	3
62-<70	BC	2,5
54-<62	C	2
40-<54	D	1
<40	E	0

After the grading, students can securely access they marks through the university´s academic information system (cyber campus). The GPA criteria for graduates are: 2.76 – 3.00 (satisfactory), 3.01 – 3.50 (very satisfactory), and 3.51 – 4.00 (cum laude). Feedback provided to students is an integral part of the grading process, which is confirmed and appreciated by the students. The academic guidelines specify appeal mechanism provided to the students to clarify the assessment result, based on the right of the student to request explanations from instructors if they perceive discrepancies in their grades. Instructors are expected to provide detailed clarifications regarding the grades awarded in each assessment session. If errors are identified in the grading process, instructors may adjust grades accordingly. However, grade changes are restricted to the specified assessment period at the semester's end. The academic handbook as well as a corresponding Rector´s decree define violations of the academic integrity of examinations and define respective countermeasures and sanctions. The students confirm in the interview session that they are aware of the appeal mechanisms.

When asked about their opinion regarding the exam regulations, the students state that all the information about examinations and assessment methods is transparently available to them and that they feel treated fairly in the assessment. The initial feedback mechanism through the “course contract” is highly appreciated and the regulation for remedial exams is regarded as fair. However, students stress that the remedial exams must rarely be used and that because of the multiple assessments per course that can compensate each other, almost no student ever fails a course.

As outlined in the module handbook, the final examination of all four Bachelor´s degree programmes is the Bachelor’s thesis (“final project”). This project consists in a scientific work report written by students that focuses on a specific research topic and usually consists of literature study, practical research, data analysis and presentation in figures or tables, and writing the thesis under the supervision of a teacher. The programme coordinators explain that the topics usually refer to the specialization the students have chosen in their elective modules, and are mostly based on proposals by the supervisor. In many cases, the lecturers offer topics connected to their research. The students have to present their results and defend them in an open presentation (with audience) in front of a board of

examiners. During the on-site visit, the experts are presented with a selection of final project works and confirm that their quality in terms of content, extent, and applied scientific methodology is consistent with the requirements of a Bachelor´s thesis. However, as they observe the high workload the students have to put into the preparation of these project works, the experts recommend to increase the awarded credits, ideally to a two-digit number. This would also raise the weight and importance of the thesis within the curriculum, which they would deem more adequate. The experts stress the importance of the final thesis due to the fact that it is the first time during their studies that students learn to write a scientific paper with all its facets.

In summary, the experts confirm that the different forms of examination used are competence-oriented and are suitable overall for verifying the achievement of the intended learning outcomes as specified in the respective module descriptions. The form of examination is determined individually for each course and published in the respective module description as well as the "course contract". The forms of examination are based on the main content of the modules and the level is appropriate for the respective degree programme.

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

In its statement, UNAIR explains different mechanisms of the exam concept, selection of assessment methods, study load, and the incorporation of the final theses.

The experts are satisfied and regard this criterion as **fulfilled**.

3. Resources

Criterion 3.1 Staff and Staff Development

Evidence:

- Self-Assessment Report
- Staff Handbook
- Study plans
- Module descriptions
- Scholar website of the Faculty of Science and Technology: https://scholar.un-air.ac.id/en/organisations/faculty-of-science-and-technology-3
- Discussions during the audit

Preliminary assessment and analysis of the experts:
At UNAIR, there is academic and non-academic staff. While the non-academic staff´s task is to support the implementation of the learning activities (e.g. administration and facility management), the academic staff, including all lecturers and professors, has to fulfil the "Tri Dharma" activities. The "Tri Dharma" is an Indonesian framework for higher education personnel and includes the three components education and teaching, research, and community service that mutually support each other. Additionally, the faculty members are involved into committee work and supportive administrative duties at UNAIR.

In terms of staff numbers, UNAIR describes in the Self-Assessment Report that the Indonesian Higher Education Law requires a staff to student ratio of at least 1:20 for the Science, Technology, Engineering, and Mathematics disciplines.

In the BoP programme, this ratio is currently about 1:16. The following tables from the Self-Assessment Report displays the numbers and qualifications of the department´s academic staff:

Table 3.1: Academic qualification of BoP academic staff

Academic Qualifications	Quantity	Percentage
Doctor (S3)	14	63.63%
Masters (S2)	8	36.37%
Total	22	100%

Table 3.2: Functional position of BoP academic staff

Functional Position	**Quantity**	**Percentage**
Professor	4	18.18%
Associate Professor	5	22.73%
Assistant Professor	10	45.45%
Lecturer	3	13. 64%
Total	22	100%

The teaching staff´s average workload is 13.99 credits per semester and a staff satisfaction survey presented to the experts shows that the staff is generally satisfied with workloads and the available resources for teaching, supervision, and administration. The department´s academic staff is clustered into six groups of interest: Medical Physics, Photonics, Material Physics, Electronics and Instrumentation, Computational Physics, and Theoretical Physics. During the on-site visit the experts notice, that, while the number of academic staff is sufficient, the number of technical staff to assist students with the experiments should be increased, especially in the photonics lab.

The BoM programme has 20 academic staff in total with different academic qualifications, as displayed in the following tables. The resulting staff to student ratio is 1:16.5.

Table 3.3 Lecturer Composition based on Academic Qualifications

Academic Qualifications	**Quantity**	**Percentage**
Masters (S2)	9	45%
Doctor (S3)	11	55%
Total	20	100%

Table 3.4 Composition of Lecturers by Functional Position

Functional Position	**Quantity**	**Percentage**
Professor	1	5%
Associate Professor	3	15%
Assistant Professor	12	60%
Lecturer	4	20%
Total	20	100%

The staff of the Department of Mathematics is divided into the four research groups Analysis, Algebra, Operation Research and Computation, and System Modelling.

For the BoS programme the required staff to student ratio is 1:25, which, given a staff number of 13 and a student number of 321, is barely met. The staff functions and qualifications are displayed in the following tables:

Table 3.5 Lecturer Composition based on Academic Qualifications

Academic Qualifications	Quantity	Percentage
Masters (S2)	9	69.23%
Doctor (S3)	4	30.77%
Total	13	100%

Table 3.6 Composition of Lecturers by Functional Position

Functional Position	Quantity	Percentage
Professor	0	0.00%
Associate Professor	5	38.46%
Assistant Professor	6	46.15%
Lecturer	2	15. 39%
Total	13	100%

In addition, the department employs part-time lecturers and guest lecturers from various industrial fields as well as government agencies, and research institutions. The non-academic staff of the department includes four laboratory assistants/ technicians, and four administrative staff, including a librarian.

For the BoIS programme, there are currently 16 academic staff serving 372 students. Therefore, the current ratio of academic staff to students is 1:23,4 which exceeds the level of 1:20 required by the ministry. Thus, the staff burdens a high workload and the university explains that recruiting measures are in place to address the shortage. Furthermore, the department relies on the services of additional guest lecturers. The distribution of staff is shown in the following two tables:

Table 3.7 Lecturer Composition based on Academic Qualifications

Academic Qualifications	Quantity	Percentage
Masters (S2)	12	75%
Doctor (S3)	4	25%
Total	16	100%

Table 3.8 Composition of Lecturers by Functional Position

Functional Position	Quantity	Percentage
Professor	0	0.00%
Associate Professor	1	6.25%
Assistant Professor	11	68.75%
Lecturer	4	25.00%
Total	16	100%

The experts generally find the academic staff to be sufficient to cover the teaching load in all programmes. However, in certain labs, the number of technical staff to oversee and manage the labs should be increased. Also, given the recent expansion of the capacity of the BoS and BoIS programmes, the experts stress the need of appropriately adapting the number of staff to the current and future increase of the students. The experts also note that many of the lecturers only have a master´s degree and that many lecturers are graduates of UNAIR. The university explains that, for undergraduate programmes, a Master´s degree is sufficient to be hired as teacher. However, many of these lecturers are pursuing PhD degrees at the same time. The experts welcome the university´s support for the further qualification of junior lecturers, as they deem it necessary to increase the staff qualification. They also recommend to increase external expertise by continuous development of the UNAIR staff as well as the incorporation of guest lecturers to equip their staff body with outside perspectives as well.

During the audit, the experts enquire how high the teaching load is and if enough opportunities are provided to conduct research. They learn that the lecturers of all study programmes have a regular teaching load six SKS credits, corresponding to around 18 hours per week. The lecturers inform the experts that the balance between teaching, research and community service is determined according to their academic positions. The distribution of these Tri Dharma activities also varies depending on the staffs´ academic positions. The lecturers, however, affirm that they are very busy with administrative tasks, which can take up to one quarter of their total workload. The experts notice this as a common problem among all departments and recommend to reduce the load of administrative duties for the lecturers. Since the options for research sabbaticals or similar programmes are comparatively rare as they can only be taken every seven years, which the experts do not consider sufficient. To support professional development, they therefore suggest that UNAIR should allow more research visits to institutions and industry. They also generally recommend reviewing and increasing the available research time of the lecturers in the course of this workload redistribution.

In summary, the experts confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining both degree programmes. Improvements regarding their research capacities should be made by hiring additional technical staff and support staff to reduce the administrative burden of the lecturers.

Staff Development

As described in the Self-Assessment Report, UNAIR provides various opportunities for staff development. Besides an initial pedagogical training, which is compulsory for every newly recruited lecturer, the lecturers explain that senior lecturers are mentoring junior lecturers to support them in their development as both teachers and researchers. Moreover, both the university as well as the individual departments provide funding for further training and also offer courses and workshops to guarantee continuous education. As the experts learn in the discussion session with the lecturers, these courses are not compulsory and the experts note the subject-specific course offer to be very small. However, as many topics related to the four study programmes under review are continuously developing, such as computational methods, AI, and big data, the experts highly recommend to expand the continuous education offer opportunities for all the academic staff members to keep up with the relevant developments of the field. These developments are of crucial importance for the students in these subjects. Furthermore, the experts consider that the staff should receive support for improving their English-speaking skills and English didactics to help them preparing for the switch of teaching language in more modules.

UNAIR describes in its Self-Assessment Report that it offers project-based grants for research. This internal funding scheme is accessible to all lecturers of the university and does not distinguish between academic ranks. However, the lecturers explain to the experts that the application process to obtain funding is very competitive. Nevertheless, the lecturers express their general satisfaction with the overall research support. For successful publications in indexed and renowned academic journal, UNAIR provides financial rewards. An additional motivation for the junior academic staff is the promotion to higher academic ranks as a step up in their careers. Basis for this is the completion of a PhD degree, which is supported by the university, as the lecturers state. The academic careers at UNAIR are determined by a fixed career development plan based on experience and the number of completed hours in all Tri Dharma activities. Furthermore, via the Airlangga Global Engagement (AGE) programme, the university supports outbound mobility of the teaching staff to attend international conferences, hold guest lectures at domestic and foreign institutions and conduct joint research with foreign partners by the acquisition of research funds. Guest lecturing shall broaden the understanding and academic perspectives of the lecturers and facilitate research cooperations, which is very welcomed by the experts.

In summary, the experts note that there is a system of staff development at UNAIR. However, the experts are of the opinion that it should be expanded in different regards such as subject-specific continuous education.

Criterion 3.2 Student support

Evidence:

- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the experts:
UNAIR and the Faculty of Science and Technology offer different instruments of student support. In terms of technical support, all students at have access to the learning management system, which provides access to all online facilities such as student history, study plan, academic transcript and grade point average/GPA, lecturer evaluations, course lists etc.

According to both students and lecturers, the relationship between them is very close both in terms of academic and administrative matters. 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. In the preparation for the examinations, the students also receive support by their senior colleagues through tutoring sessions. For the support of the students´ careers, there is also a Career Development Office, and students with entrepreneurial ambitions can get support by a Start-up Board and a Business Incubator. Both these institutions were established as part of UNAIR´s strategic plan to strengthen its ties with the industry and foster the creation of businesses, as the representatives of the Rector´s office explain.

Furthermore, there are many support facilities of which the students can make use if needed, such as the Universitas Airlangga Hospital and an affordable child care service for students with children. On campus, there are separate male and female dormitories for students not from Surabaya. A language centre provides language classes for the improvement of English language skills (for free), a well as other selected languages (usually at small fees).

The recently established Airlangga Inclusive Centre provides help for students with disabilities. The programme coordinators state that UNAIR currently hosts 38 students with disabilities and has one of the highest shares of students with disabilities and special needs among all Indonesian universities.

Additional support in case of administrative problems or mental health issues is provided by UNAIR´s guidance and counselling centre (DPKKA). Finally, there are several student organizations at UNAIR including student's activity clubs, which are divided into arts, sports, religious and other non-curricular activities. The students confirm that they are aware of

the available support facilities as they are introduced to them during the orientation week for first year students.

The experts 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.

Criterion 3.3 Funds and equipment

Evidence:

- Self-Assessment Report
- Visitation of the facilities
- Discussions during the audit

Preliminary assessment and analysis of the experts:
As a public university, UNAIR is supported by the Indonesian government as well as public funds. Around 20% of the university´s income consists in revenues from services of the university and its facilities. The funding for all four programmes is ensured by the university-wide one-year Annual Work Plan and Budget. This plan is arranged by the Directorate of Finance at the university level based on the budget planning handed in by the faculties. It specifies the necessary planning and budget allocation for management, operations, and development for achieving the goals of the individual study programmes. The fund arrangement in UNAIR has been standardized through ISO 9001:2015. The programme coordinators state that they are satisfied with the process of budget allocation and the overall financial resources available for their study programmes

As important part of the audit, the experts visit both common and faculty-specific facilities. UNAIR has three campuses in total which all provide learning facilities such as differently-sized lecturing halls with modern presentation equipment, libraries and study spaces for students. The library provides a broad selection of recent journals and academic literature both online and offline. This includes the access to scientific publishers, among which are ScienceDirect, SpringerLink, EBSCOhost, ProQuest, SAGEjournals, JSTOR, ACS Publications, HUKUMONLINE.COM, HeinOnline, Oxford Academic, and Taylor & Francis. On the faculty level, there are only smaller and more specialized libraries, called reading rooms. Other facilities offered by the university are a mosque, a hospital, sport facilities, hall, student organizations, polyclinic, and student centre facilities. Specifically designated for research

purposes, UNAIR has established a centralized research centre, which is equipped with advanced machinery and tools for experimental setups, which is positively highlighted by the experts. This facility can be used by all university associates, including the students. However, the equipment is supervised and operated by skilled lab technicians. During the on-site visit, the experts have the chance to visit some of the facilities and can confirm their availability. Also students confirm their satisfaction with the provided facilities.

In addition to the UNAIR general facilities, the departments have their own laboratories. For the BoP programme, there are 10 laboratories: the Material Laboratory, the Medical physics Laboratory, the nuclear Physics Laboratory, the Photonic Laboratory, the Electronics and Instrumentation Laboratory, the Computational Physics Laboratory, the Theoretical physics Laboratory, Basic Physics Laboratory, Electricity Magnetism Laboratory, Mechanics Laboratory and Mechanical and Glass mechanical works. The department was provided recently with an additional floor in an external building to accommodate more labs. The laboratories are designated both for practical teaching and learning activities, as well as research. The experts confirm that the labs are equipped with all basic instruments needed for teaching. However, these are in part due to renewal. Nevertheless, the experts acknowledge the improvements and investments made after the last accreditation procedure in 2018. As example, the programme got funding from the university to purchase high-quality equipment for experiments of electricity magnetism and mechanics as well as basic physics experiments from *Phywe* in 2022. For activities in which more sophisticated and advanced instruments are needed, the department collaborates with different departments, institutes or labs of UNAIR or externally.

During the on-site visit, the experts gain the impression that the department is on a very good track to renew its entire equipment, which is necessary to keep up with modern research and teaching standards. They positively highlight that, as observed, students can use and operate the instruments in the laboratories by themselves after being trained and instructed by either senior students or lab technicians. The labs with new tools are also well-equipped to accommodate the cohorts of up to 30 students per lab session and allow them to work in groups of two. However, the older lab facilities appear comparatively small for large student numbers and the students also state, that not all experiments are conducted in groups of two, but groups of up to four people. As hands-on experience is crucial for the learning experience in a BoP programe, the experts urge the department to continue investing in more new technology to give all the students the opportunity conduct experiments personally. Also, as the experts note that the instruction manuals of multiple instruments are provided only in Bahasa Indonesia, they recommend to provide all manuals also in English language to improve further the students´ subject-specific English competency and help incoming students from abroad.

As a general remark, the experts point out that the safety measures should be further improved. Fire extinguishers are missing in some of the laboratories, and attention should also be paid to their correct storage. Further, the experts recommended to design the cable setups for electricity distribution more transparently and install an emergency switch, which can stop the electricity in all cable cycles at once in case a problem arises. Additionally, there should be signs where to find fire extinguishers and electric emergency stops easily. The students should be informed about that at the beginning of each lab course. Lastly, is should be made sure that every lab has an emergency exit besides the regular door.

For the BoM, BoS, and BoIS programmes, the practical training takes place in computer laboratories, which are partly shared among these three departments. Computer laboratories for practical activities have been fully equipped with modern hardware and software packages needed in learning and research processes, such as Maple, SPSS, MATLAB, C++, WinQSB, Minitab, R Studio, and Python. Mostly the students access the software through integrated development environments like RStudio for R and Jupyter Notebooks for Python. The standard procedure of laboratories usage is available and the students follow the instruction to keep the computer lab clean and secure. Each lab hosts five to six groups of students of the same academic year and each group consists of two to four students, which the experts find reasonable for programming projects. During the on-site visitation, the students demonstrate the projects they are developing, explaining in detail how the work is organized and how the supervision process takes place. After discussing with the students and examining the infrastructure of the labs, the experts confirm that the labs provide good and adequate environment for fulfilling the teaching goals.

The students are satisfied with the available equipment and the experts are generaly pleased with the state and maintenance of the computer facilities, as well as with the software packages and licenses provided to the students. However, they recommend to keep updating the lab equipment quality and numerical availability to provide the computational power needed in the quickly developing scientific and technological field, especially in the field of information systems. Moreover, they stress that the capacities of the facilities as well as the numbers of hardware equipment and software licenses must be accordingly increased to match the higher number of students to come because of the elevated intake of the BoS and BoIS programmes. The teaching also could be further facilitated by installing more large-size screens used for the demonstration by teachers. Also, the experts recommend to enhance collaboration of the departments with other national institutions and private cooperations with respect to the shared access to and use of high-capacity computational resources. Generally, however, the experts confirm that the equipment, facilities,

and supervision by technical staff are adequate for the respective teaching and learning purposes of the Bachelor´s programmes under review.

In terms of digital administrative and support facilities, UNAIR has implemented an extensive, university-wide information system with multiple components. This relies on the permanent Wi-Fi access in all the university facilities, which is confirmed by the students. Furthermore, the online systems can also be accessed from outside campus via a VPN, which both the students and experts highlight as very important and helpful. The most important components of the system are:

- Cyber campus: A web-based software for the support of almost all academic activities. It is used by students, faculty and administrative staff to manage the teaching process, communicate, and seek or provide information related to academic activities. This can also be accessed remotely from outside the campus.
- Airlangga University e-learning: A web-based virtual classroom for online teaching.
- Financial and inventory system: A tool that administrative staff use to manage finances, organize and manage assets owned by universities and faculty.
- Online Library (lib.unair.ac.id): A medium for searching and accessing references, books, journals, and other databases to support the teaching process.

As students and lecturers confirm that the information systems are in place and widely used for the organization and facilitation of the teaching processes, the experts are satisfied with the support facilities.

In summary, the expert group judges the available funds, the technical equipment, and the infrastructure (laboratories, library, seminar rooms, digital facilities etc.) to comply with the requirements for adequately sustaining the degree programmes. Both students and teachers confirm their satisfaction with the provided facilities and equipment. However, the experts further room for improvement regarding the equipment and safety measures in some of the physics labs. Furthermore, in light of the recent and future increase of the students in the BoS and BoIS programmes, the computer labs should be further expanded and equipped both quantitatively and qualitatively. To enable the access to advanced computational resources, UNAIR should also consider partnerships with other universities and research institutions.

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

Criterion 3.3:

UNAIR provides evidence of different measures that have already been taken after the audit to improve the safety measures in the laboratories and strive for updated equiment. Further measures are in planning. Furthermore, the statement points out that different collaborations with respect to the use of up-to-date equipment are about to be established, which the experts positively note.

Overall, the experts regard this criterion as **fulfilled**.

4. Transparency and documentation

Criterion 4.1 Module descriptions

Evidence:

- Self-Assessment Report
- Module handbooks of all programmes
- Homepage UNAIR: https://unair.ac.id/en/
- Websites of the study programmes under review

Preliminary assessment and analysis of the experts:

UNAIR provides well-structured module handbooks for all study programs under review. The module handbooks contain course code, module title, the teaching team, language used, teaching methods, credits and workload, course prerequisite, intended learning outcomes, module content, examination forms, examination requirements, recommended literature, and date of last amendment. The module handbooks are distributed to the students at the beginning of their studies. For the BoM and BoS programmes, the handbooks are also available on the programmes´ websites. Exceptions are the module handbooks of the BoP and BoIS programmes, which are not published online. To increase the transparency for all stakeholders of the university, the experts suggest to publish the handbooks on the websites of these programmes as well.

The experts confirm that there are well-structured module handbooks which contain all the relevant information on the individual modules of each programme.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report

- Sample Certificate and Transcript of Records for each degree programme
- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the experts:
The experts confirm that the UNAIR students are awarded a Diploma Certificate, Transcript of Records and a Diploma Supplement upon completion of their degrees. While the Transcript of Records lists all courses and the respectively awarded grades and credits as well as the cumulative GPA, the Diploma Supplement contains all required information about the degree programme and the relation with the national higher education system.

However, the experts note that the Transcript of records lists only the number of SKS credits and not the ECTS credits. As it is crucial for the international recognition of the courses, the experts require UNAIR to include the number of ECTS credits. In addition, to explain the relation between SKS and ECTS credits, information on the credits systems and the conversion between both has to be provided in the Diploma Supplement.

Criterion 4.3 Relevant rules

Evidence:

- Self-Assessment Report
- Homepage UNAIR: https://unair.ac.id/en/
- Websites of the study programmes under review
- Discussions during the audit

Preliminary assessment and analysis of the experts:
Based on the provided documentation as well as the affirmation by students and faculty members, the auditors confirm that the rights and duties of both UNAIR and the students are clearly defined and binding. All rules and regulations are published on the university's website as well as the programmes´ individual websites and hence available to all relevant stakeholders.

In addition, the students receive all relevant course materials in the language of the degree programme at the beginning of each semester. Almost all the relevant information is also available on the English websites of the programmes.

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

Criterion 4.1:

The experts acknowledge that the module handbooks of all programmes have been published on the programmes´ websites by now.

Criterion 4.2:

UNAIR states that this number of ECTS will be displayed on the Diploma Supplement from the next academic year on. The experts positively note this, but, for now, regard this criterion only as **mostly fulfilled**.

5. Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- UNAIR Academic Guidelines
- Discussions during the audit

Preliminary assessment and analysis of the experts:
According to the Self-Assessment Report, UNAIR and the Faculty of Science and Technology employ a comprehensive system of external (EQA) and internal quality assurance (IQA), as prescribed by Indonesian law.

In terms of IQA, UNAIR has developed the Quality Assurance Information System Management which is led by the Quality Assurance Board (QAB). Besides this university-wide agency, there are also quality assurance bodies on the faculty and study programme level. These coordinative bodies run a quality assurance cycle called internal quality audit, which evaluates the study programmes based on different criteria. The internal quality audit is based on a self-evaluation online report filed by the study program coordinators have to file which is evaluated and audited by a committee of the QAB.

For the programmes under review, this internal audit most recently resulted in different quality improvement issues that have already been addressed in part:

- BoP programme: constant renewal of technical instruments, acquisition of young faculty staff, implementation of new information system to reduce administrative burden
- BoM programme: increase of faculty staff to spread the teaching burden and increase research capacities

- BoS programme: increase number of faculty staff
- BoIS programme: update PLOs and hire higher-qualified staff

Besides the internal auditors, also students and lecturers participate in the IQA system. The curriculum, courses, academic activities, facilities, academic and non-academic staff, and academic services are evaluated semi-annually by students, lecturers and staff.

The evaluation by students is parted into three different types: (1) The first-year evaluation monitors the initial satisfaction of student entrants and whether their expectations were fulfilled. (2) The class evaluation is done for each class in each semester to assess the learning experience for the modules. Lastly, (3) a graduation evaluation at the end of a students´ careers at UNAIR assesses the management and organization of graduation processes. In addition to that, a tracer study monitors the student´s career paths after their graduation. These regular, structured evaluation channels may be appended by unstructured evaluation formats to meet special needs and/or regular voluntary monitoring, as it was done to assess the quality of online learning during the COVID-19 pandemic. The students explain that they are satisfied with the provided feedback mechanisms.

The results of all surveys are discussed on the faculty level during the annually-held Management Review Meeting. This meeting was established to coordinate the needs and ideas of all stakeholders of the study programmes, including also industry representatives, by discussing their progress, achievements, and future plans. The results are also discussed in the Quality Assurance Units which decide measures and necessary actions to improve the quality of the programs. This board is also responsible for addressing the needs on higher levels of the university administration, if necessary.

The lecturers are also given the opportunity for providing feedback on the leadership of the faculty as well as the facilities and other services, which they confirm during the interview session. The results of this evaluation are discussed in faculty meetings. Lastly, also external third parties and alumni have the option to evaluate the curriculum and provide suggestions for enhancing the programmes´ quality through online forms and annually held faculty events.

The experts discuss the IQA system in all interview sessions. They learn that UNNAIR pursues a path of multidisciplinary development for all study programmes. This involves foremost the continuous development of the programmes, which is adopted through the regular revision of the programmes´ learning outcomes and curricula every five years. As the students explain, they are involved in this process through student representatives, which collect and discuss the students´ points of view and recommendations in meetings prior to the Curriculum Committee meeting. The industry representatives as well as alumni also confirm to be invited into this committee.

Furthermore, the students also confirm that different surveys are conducted during the semester and at the end of each course via the cyber campus. The course evaluations are compulsory, as students cannot access their grades without having completed the online questionnaires. Additionally, the close contact between students and lecturers allows the exchange and discussion of feedback also through many informal channels. The experts are satisfied with the manifold instruments and features of the IQA system. However, they notice that the students do not receive any information or feedback on the consequences of their comments or the implementation of respective measures. Therefore, the experts require the university to close the structured feedback cycle by developing a process of informing students about their feedback and respectively taken measures to keep them motivated to engage in the programme development.

In terms of external quality assurance, all the programmes under review have been reviewed and graded as “excellent” (the highest possible grade) by the national Indonesian accreditation agencies LAMSAMA (Physics, Mathematics, and Statistic) and LAM INFOKOM (Information Science). In addition to national accreditation, UNAIR encourages faculties to be accredited by international bodies and set this goal in their strategic performance management system (SPMS). The BoP and BoM programme had already been accredited by ASIIN in 2018. In total, nearly 100 UNAIR study programmes have been accredited by international agencies.

In conclusion, the experts laud UNAIR´s courageous efforts to enhance the quality of its programmes also through international external quality assurance. The efforts have shown to be very successful, as, among others, the high gain in the QS world university ranking reflects. However, most importantly, the high quality education is mirrored in the reputation of UNAIR among students, alumni and the industry.

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

UNAIR explains that the Faculty of Science and Technology makes use of an electronic complaint platform that can be used by all students and staff members. People who file complaints will receive information about the measures taken to address it via email/ WhatsApp. The experts generally approve this kind of system as very useful to resolve individual matters. However, they point out that anonymity in the feedback cycle has to be maintained and that feedback about criticism and implemented measures should be discussed openly and not only with the one person who technically files the complaint.

Based on these findings, the experts regard this criterion as **mostly fulfilled**.

D Additional Documents

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

- Cohort analysis including statistics on application numbers, student intake, numbers of active students, and graduates per year for the four study programmes under review for the past five years
- Statistics of both incoming and outgoing exchange students per semester/ year for the four study programmes under review for the past five years
- Examples of course contracts

E Comment of the Higher Education Institution (13.08.2024)

UNAIR provides the following statement:

1. The Degree Programme: Concept, content & implementation

1.2 Name of the degree programme

- In this section, experts say that **f**or all four programmes, UNAIR awards the degree of the Bachelor of Science (B.Sc).

Response

The Bachelor of Science (B.Sc) degree is only for two study programs: BoP and BoM. For the BoIS, it should be a Bachelor of Computer Science, and for the BoS, it should be a Bachelor of Statistics.

- For the BoIS programme, the experts wonder whether the current name “Information Systems” is suitable as it can relate to both the technical as well as the business related component of computer science. Given the strong application-orientation in the curriculum, they would consider this more concisely represented by a name like “Business informatics”. During the interview sessions, both the programme coordinators and students are presented with this reasoning, but state that they see the broadness of the curriculum well-represented by the current name. The experts evaluate the programme´s name “information systems” to be justified given the curriculum, but nevertheless suggest that changing the name could prevent potential misunderstandings regarding the programme.

Response

Thank you for suggestion regarding the name of our study program. However, the current name we use has taken into consideration national and international regulations and guidelines. According to the ASIIN Subject-Specific Criteria of the Technical Committee 07 – Business Informatics/Information Systems, we understand that there is no distinction between the two terms 'Business Informatics' and 'Information Systems'.

The naming of study programs at universities in Indonesia is regulated by the Decree of the Director General of Higher Education, Ministry of Education, number: 163/E/KPT/2022

(page 10). Regarding the field of computing, there are six designated study program names for the Bachelor's program, which are awarded the title Bachelor of Computer Science:

1. Computer Science or Informatics
2. Software Engineering
3. Computer System Engineering
4. Information Systems
5. Systems and Information Technology
6. Information Technology

The naming of the study program and the BoIS curriculum also refers to the Bachelor of Information Systems Curriculum Guide published by the Informatics and Computing Higher Education Association (APTIKOM) in Indonesia.

The naming of the study program also refers to the Computing Curricula (CC 2020) and its previous version (CC 2005). In CC 2020, there are seven disciplines:

1. Computer Engineering (CE)
2. Computer Science (CS)
3. Cybersecurity (CSEC)
4. Information Systems (IS)
5. Information Technology (IT)
6. Software Engineering (SE)
7. Data Science (DS)

For the Information Systems discipline, there are the Information Systems Curriculum Guidelines for Undergraduate Degree Programs in Information Systems (IS2020) made by the Association for Computing Machinery (ACM) and the Association for Information Systems (AIS).

The development of the graduate profile, learning outcomes, and curriculum for the Bachelor's program in Information Systems refers to the Information Systems Curriculum Guidelines for Undergraduate Degree Programs in Information Systems (IS2020) made by the Association for Computing Machinery (ACM) and the Association for Information Systems (AIS).

Thus, the name of the Information Systems study program complies with both national and international regulations and guidelines. The name "Information Systems" for the BoIS program also reflects the curriculum offered and the graduate profile.

We have attached documents for the evidence in Appendix 1:

1. ASIIN Subject-Specific Criteria
2. Decree of the Director General of Higher Education on study program names (page 10)
3. CC2020 Document
4. IS2020 Document
5. APTIKOM Bachelor's in Information Systems Curriculum Guide

1.3 Curriculum

Structure of the programmes

- The experts comments that the main lecturing language of the courses is Bahasa Indonesia, although, as the experts learn in during the on-site visit, English has been established as instruction language in an increasing number of courses throughout the past years. Guest lectures are usually held in English.

For the BoS and BoIS programmes, English as instruction language is used only in the English language courses. However, the programme coordinators state that English can be used as instruction language of international students are present in a course. Given the very low number of incoming students, this is rarely the case however. Students and lecturers confirm that lecture materials and, partly, also the instruction language is English and consider this useful. Overall, the students show a high level of English language proficiency in the discussion with the experts. Since English has been established as the number one scientific language around the world, the experts recommend strengthening the use of English language, especially in the BoS and BoIS programmes. This would highly benefit the internationalization of the programmes intended by UNAIR through, e.g., facilitating the intake of international students, which appears to be very low at the moment. Also, Indonesian students would be prepared in a better way for their future careers in academia and the industry which are both likely to become more international in the future.

Response

Thank you for the suggestion. Currently, the proposal seminar (2 credits) and thesis defense (6 credits) are conducted in English. This is regulated by the Dean's decree number 6262/B/UN3.FST/HK.04/2024 (Appendix 2)

For now, BoS and BoIS has implemented English into lectures in the form of reference books and papers used. In the future BoS and BoIS will design English language lectures. BoS initiated the implementation of lectures with 3 of the 14 meetings using English for the subjects Machine Learning, Data Exploration and Visualization, Nonparametric Regression. And also for BoIS, in the next academic year, the study programme will gradually expand the use of English as the instruction language in lectures with 3 of the 14 meetings using English for the subjects Software Testing, Information System Audit, and Interaction Design in E-Health. This will help attract international students to study at BoS and BoIS. We have updated the module handbook by including English as an instruction language alongside Indonesian for those courses. The module handbook for BoS can be seen in https://stat.fst.unair.ac.id/en/curriculum-structure/, and for BoIS can be seen in https://si.fst.unair.ac.id/syllabus/. We also attach these modules to Appendix 3.

Content of the programmes

- In this programme (BoM), the compulsory internship is called “field study” which the experts find inconsitent compared to other programmes. Therefore, they recommend to change the name to “internship” to concisely reflect the purpose of the module.

Response

BoM refers to it as a field study because it lasts only one month and primarily focuses on academic learning rather than professional skills. In terms of academic components, it involves significant data collection, analysis, and possibly a research project, integrating academic learning with practical application. Thus, the learning outcome of this activity is to deepen understanding of a subject through practical observation and analysis rather than direct industry work experience.

- A mandatory component of the curricula of all programmes is an internship with a duration of at least two months. This internship is integrated in the fifth or sixth semester and
  includes full-time work in a company or institution relevant to the field. The regular two month-internship is credited with 2 SKS credits, which the experts deem to be a very low
  number in relation to the workload. Therefore, it is recommended to increase the number of awarded credits for the internship.

Response

We acknowledge and appreciate ASIIN's recommendation regarding the credit allocation for our internship program. We have conducted a detailed re-calculation of the workload:

- Daily internship hours: 8 hours
- Monthly internship hours: 160 hours
- 1 SKS credit: 170 minutes
- Therefore, 170 minutes x 2 sks x 14 weeks / 60 minutes = 80 hours for 1 SKS

Job characteristics for internships vary for the four study programs. So, the internship work period and the credits depend on the type of work carried out.

BoM and BoS

Field study for BoM students is aimed at increasing analytical and problem-solving skills. Typical work is teaching in schools and solving organizational problems with a mathematical approach. For BoS, the work carried out is usually related to solving organizational problems using a statistical approach. The internship period for BoM and BoS is 1 month full-time with 2 credits. For 1 month (20 days) of work with a total time of 160 minutes, this is equivalent to 2 credits.

BoP

Based on the type of work carried out by students during internship and their work period that takes 2 months for full-time work, the BoP carefully reevaluates the time commitment required by our students during their internships. Based on the re-calculation, we recognize that the current credit allocation of 2 SKS does not adequately reflect the actual workload. Consequently, the BoP has decided to increase the number of credits awarded for the internship to 4 SKS for 2 months of full-time work in the next redesign curriculum.

BoIS

The work type of internship for BoIS students is usually related to the development or operation of information systems in the organization. Based on suggestions from stakeholders (industry), the appropriate period for BoIS internship is 3 months. So, for now, the BoIS program has awarded an internship with 6 SKS credits, which involves 3 months for full-time work. This information can be found in the internship guidelines on the BoIS website at the provided link https://si.fst.unair.ac.id/download/.

- From our SAR Report, the experts say that the recognition of the additional credits obtained through the MBKM programme is not determined before the programme, but depends on the internship duration, the student´s internship report, and the evaluation

by the internship supervisors of the host company after completion of the programme. Thus, the number of credits obtained from the internship after its completion might differ from the credit number initially planned. As this process is not clearly transparent to the experts, they see the need of a clear and binding regulation for the recognition of credits as well as the learning outcomes and respective evaluation criteria to be used by the internship supervisor of the host company. They recommend to develop a "learning agreement", a contract between the university, receiving company, and student, which specifies the internship duration, contents, learning outcomes, credits (workload), and assessment. This contract should be concluded before the internship and also contain the modules replaced by the internship as well as provisions for the "failure", early termination, or other arising problems disrupting the learning process. Moreover, the regulation need to be transparently published in all the relevant handbooks. Overall, however, the experts are highly satisfied with the implemented internship as well as the apparent success of students in their work at the companies. To further increase the internship´s impact, they recommend to generally extend the minimum duration to three months and increase the
number of awarded credit points to adequately reflect the effort and workload. This would also be welcomed by the host companies, as stated by the industry representatives.

Response

Thank you for the suggestion. We have discussed the ASIIN recommendations with the faculty and emphasized the benefits of implementing these changes. However, since this policy involves regulations set by the university and the Indonesian Ministry of Education, the faculty must follow up with the university administration and relevant authorities.

In BoP, the collaboration with the National Railway Manufacturer has been initiated since May 2024, and the document for the assessment and its guidelines are on the way to be developed.

For now, to ensure that the MBKM conversion plan prepared at the beginning of the semester aligns with the conversion grades obtained at the end of the semester, the following procedure has been established:

1. Students consult with their academic advisor regarding the MBKM internship. The consultation process with the academic advisor is to ensure that the content of the MBKM program taken by the students aligns with the course learning outcomes whose grades will be converted.

2. Students explain the material that will be carried out in MBKM, this is related to the conversion of courses which will be included in the Course Plan sheet (KRS), which is reinforced with documents provided by the study program with a maximum credit of 20 credits
3. After implementing MBKM, students make an MBKM report and submit it to the study program
4. The study program's MBKM conversion team evaluates the MBKM report and determines assessments related to the conversion of courses that have been included in the KRS
5. The study program submits the grade of the MBKM conversion results.

Regarding the MBKM activities from the scheme organized by the Ministry of Higher Education, the guidelines for implementation and assessment of MBKM can be seen at the link https://dikti.kemdikbud.go.id/wp-content/uploads/2024/06/Buku-Panduan-Merdeka-Belajar-Kampus-Merdeka-MBKM-2024.pdf.

The MBKM partners also provide information on the syllabi of the offered programs, which can be used as a consideration by students and academic advisors to choose programs that align with the course learning outcomes. For example, as seen in the 'Bangkit MSIB Program' at the following https://grow.google/intl/id_id/bangkit/?tab=cloud-computing.

For internships conducted independently by study programs and their partners, refer to the implementation and assessment guidelines at the following links:

BoP: https://fisika.fst.unair.ac.id/aktivitas/

BoM: https://matematika.fst.unair.ac.id/en/document/

BoS: https://stat.fst.unair.ac.id/en/mbkm/

BoIS: https://si.fst.unair.ac.id/download/

- For BoIS, the experts wonder about the necessity of the compulsory fundamentals courses in biology, chemistry and physics for this programme. While they generally agree
  that basic knowledge is highly beneficial also for the field of information systems, they consider individual courses for the three disciplines as going too far. Therefore, they suggest to combine these three courses into a course of fundamental sciences, and incorporate additional subject-specific courses instead, like, for instance, a more detailed

focus
on artificial intelligence (AI).

Response

Thank you for the suggestion. We will consider the compulsory fundamental courses in biology, chemistry, and physics for the BoIS program in the next curriculum redesign, as suggested by ASIIN experts.

International Mobility

- About the cooperation agreements, expert comments that the BoS and BoIS programmes maintain different cooperation agreements with other national and international universities in Bangladesh, Malaysia and the Philippines. The different cooperation areas are joint curriculum development and teaching material creation, research collaboration, and collaboration regarding internships and community projects. However, judging based on the provided documentation, the experts note that the number and diversity of international partners is much lower than in the other two programmes and recommend to increase efforts to expand the international cooperation agreements to make them accessible to all students of the faculty.

Response

Thank you for the suggestion. Implementation of outbound activities must be based on overseas cooperation by the Faculty. Forms of collaboration related to the Three Pillars of Higher Education include joint classes with university partners abroad, international conferences collaborating with overseas partners as co-hosts. For example, BoIS has been working to expand cooperation with countries outside of Asia, specifically South Africa, Tanzania, and the United Kingdom. The activities carried out so far include joint research and publication. In the future, we will increase the number and types of activities representing collaborations with universities outside of Asia. Document of cooperation with non-Asian partners can be seen in additional data in Appendix 4. Study programs can leverage collaboration with partners that the Faculty already has to expand their network of collaborators.

- The experts comment that incoming mobility of foreign students appears to be very low in all four programmes under review. Given UNAIR´s reputation as well as the contents of the course offer, which could be easily integrated into the curricula of similar Bachelor´s programmes of foreign universities, the experts wonder about this fact. As mentioned earlier in this report, the experts see the language barrier of the Bahasa Indonesia requirement in many courses as well as the very unclear regulation regarding the use of English in the courses as a main reason to impede incoming mobility. The

experts assess the current policy to teach courses in English only in case international students are present as not convincing and attractive for potential incoming students. Therefore, the approach should be reversed by offering high-quality English courses to attract international students. Moreover, also the credit transfer system displays multiple inconsistencies and might therefore hamper credit recognition, which would be an additional factor that makes UNAIR unattractive for international students (see section 1.5). To clarify the current state and future of the international mobility offer, the experts ask UNAIR to provide statistical data on the number of inbound and outbound exchange students per semester and study programme for the past five years since the actual number did not become clear from the provided documentation. The experts highlight this missing incoming mobility as a crucial problem in the university´s internationalization strategy and seek to increase the awareness for the necessity of better policies to encourage and facilitate incoming mobility. A first step in that regard would be a clearer language regulation and an increase of the number of courses entirely taught in English.

Response:

Thank you for the suggestions and we appreciate your recommendations regarding the expansion of international student mobility opportunities. We have added data on incoming and outgoing exchange students for four study programs for the past five years in Table 2 (additional document folder).

We recognize that many of our students face challenges related to English language proficiency and come from lower-income backgrounds, which can impact their ability to participate in international exchange programs. However, we believe that by enhancing language support and increasing financial aid, we can better support our students in accessing valuable international experiences. The study program will also gradually expand the use of English as the language of instruction in other courses (besides the English Language Course).

1.4 Admission requirements

- From the SAR report the expert knew that the BoS and BoIS programmes belong to the most competitive programmes of UNAIR, with admission quotas of 6% and 5% respectively. Therefore, the number of available study places has been increased from 80 to 120 over the past years. However, the application and admission numbers initially reported contradict this notion of high occupancy as the average cohort numbers are only

half the size of the available capacities. Nevertheless, the programme coordinators affirm that the capacity of both programmes is almost full. To eliminate the discrepancies in available information, the experts request the university to provide clear and updated statistics on the number of applicants, admissions, actual students, and graduates per cohort for the past five years.

Response

The BoS and BoIS programmes belong to the most competitive programmes of UNAIR. We have added data Statistics on application numbers, student intake, numbers of active students, and graduates for four study programs for the past five years in Table 1 (additional document folder).

1.5 Workload and credits

- The experts question whether the necessary self-study time is sufficiently taken into account for the credit calculation. Critical in that regard are the number of credits awarded for the Bachelor´s thesis ("final project"), which is 6 SKS in all programmes under review. As students are supposed to spend almost an entire semester on this project, the workload cannot be adequately represented by this comparatively low number of credits.

The second notable problem is the crediting of the mandatory internship, since 2 SKS credits cannot appropriately represent two months of full-time work in a company plus the required documentation and reporting to the university. Furthermore, the experts find partly different conversion rates in various documents, which the programme coordinators say to be out of place by mistake.

Response

Thank you for your feedback on the SKS credit system. We understand the concerns regarding the adequacy of credit allocation for the Bachelor's thesis and mandatory internship.

For BoP, there are currently **11 credits** related to the final project (thesis), consisting of research methodology (3 credits), proposal (2 credits), and the final project (6 credits). For BoM, there are currently **10 credits** related to the final project (thesis), consisting of research methodology (2 credits), proposal (2 credits), and the final project (6 credits). For BoS and BoIS, there are currently **8 credits** related to the final project (thesis), consisting of research methodology (2 credits) and the final project (6 credits). We are considering the

suggestion to add credits for the thesis in the curriculum redesign for next year, by adding 2 credits for the proposal.

For internship, see the response in criterion 1.3.

- Furthermore, the experts find partly different conversion rates in various documents, which the programme coordinators say to be out of place by mistake.

Therefore, the experts require UNAIR to review its credit allocation and transfer system to ensure that all parts of the programmes´ curricula are appropriately accounted for. This is especially important for the modules that consist mainly in independent work of the students (internships, community service, thesis), because they are difficult to be measured by the standard definition of an Indonesian SKS credit. For this purpose, a more detailed monitoring of the students´ workload outside campus would be recommended. Moreover, the applied conversion rate to ECTS credits must be harmonized across all programmes and official documents. In this regard, two-digit decimals should be avoided.

In summary, the experts consider the SKS credit system adequate for the workload evaluation. However, the number of allocated credits of various courses must be reviewed to appropriately reflect the associated workload. Also, the ECTS conversion rate needs to be harmonized.

Response

Thank you for your attention regarding the rules for converting ACTS to ECTS. The conversion rules from ACTS to ECTS are stated in the Rector decree number 350/UN3/2023. Based on these rules, for bachelors, 1 credit is converted into 1.6 ECTS (one-digit decimal). We attach the decree in the Appendix 5. We have conducted a recheck and ensured that all credit conversions to ECTS are in accordance with the regulations

2. Exams: System, Concept and Organization

- The experts consider the exam workload as very high due to the multiple assessments used in any of the courses. They enquire about the adequacy of the study and preparation time. The students explain that there is a “silent week” between the last lectures and the final examinations, which they find most beneficial for their preparation. Moreover, the distribution of mid-term exams, as well as quizzes and similar assessments during the semester period, are scheduled in agreement with the students such that the periodic culmination of exams can be avoided for the benefit of the students. The experts consider this a reasonable approach but still suggest UNAIR to consider

whether this high number of different exams is necessary and beneficial for achieving the course learning outcomes.

Response

Thank you for the insightful feedback on the exam workload and its impact on students. We appreciate the concern regarding the adequacy of study and preparation time, given the multiple assessments used in our courses. In Section 2.2 of the SAR report, we have explained how lecturers choose assessment methods. The selection of assessment methods is grounded in the aspects evaluated within the learning outcomes. For example, written exams mainly evaluate theoretical knowledge and analytical skills, whereas projects and practical demonstrations assess students' abilities to apply concepts in real-world situations. Oral presentations and group discussions are used to measure communication skills and collaborative capabilities.

Here is a detailed response to address your concerns and suggestions:

a. Adequacy of Study and Preparation Time

At Universitas Airlangga (UNAIR), we have implemented several measures to ensure that students have sufficient time for study and preparation, which include:

- **Silent Week**: As the students mentioned, there is a "silent week" between the last lectures and the final examinations. This dedicated preparation period is designed to allow students to consolidate their learning and prepare effectively for their exams.
- **Distributed Assessments**: We also distribute mid-term exams, quizzes, and other assessments throughout the semester. These schedules are coordinated with the students to prevent the clustering of exams, thereby reducing stress and allowing for more focused preparation.

b. Distribution and Scheduling of Assessments

The current assessment system is structured to provide continuous feedback and opportunities for students to demonstrate their learning progress throughout the semester. This continuous assessment approach is aligned with the learning outcomes and includes a variety of assessment methods, such as quizzes, projects, presentations, and mid-term exams.

c. Necessity and Benefits of Multiple Assessments

We acknowledge the concern about the high number of assessments and their necessity for achieving course learning outcomes. Here are the reasons why we consider this approach beneficial:

- **Comprehensive Evaluation**: Multiple assessment types (e.g., written exams, practical demonstrations, projects) allow for a comprehensive evaluation of both theoretical knowledge and practical skills.
- **Skill Development**: Different types of assessments target various skills, such as critical thinking, problem-solving, and practical application of knowledge, which are essential for holistic learning.
- **Feedback Mechanism**: Continuous assessments provide regular feedback to students, helping them identify areas of improvement and adjust their learning strategies accordingly.

We believe that the diverse and distributed assessment methods currently employed play a crucial role in achieving comprehensive learning outcomes. However, we will continue to evaluate and refine our assessment practices, ensuring they are balanced and conducive to effective learning while maintaining academic rigor. Your feedback is invaluable in this ongoing process, and we appreciate your suggestions to enhance our academic programs further.

d. Review and Adaptation of Assessment Methods

In response to your suggestion, we are committed to regularly reviewing and evaluating our assessment methods to ensure they remain effective and beneficial for student learning. This review process involves:

- **Student Feedback**: Gathering feedback from students on the assessment workload and its impact on their learning and preparation time.
- **Academic Performance Analysis**: Analyzing student performance data to determine if the current assessment methods effectively measure learning outcomes.
- **Benchmarking**: Comparing our assessment practices with those of other leading institutions to identify best practices and potential areas for improvement.

At the beginning of the course, the assessment components are outlined and agreed upon in the course contract. Grades are based on these assessment components. Students can view their grades on the cybercampus and have the option to verify them with the course coordinator, who is expected to respond to any queries about the grades. Examples of

course contract that explains the assessment methods and appeal mechanisms can be found at additional document folder.

- During the on-site visit, the experts are presented with a selection of final project works and confirm that their quality in terms of content, extent, and applied scientific methodology is consistent with the requirements of a Bachelor´s thesis. However, as they observe the high workload the students have to put into the preparation of these project works, the experts recommend increasing the awarded credits, ideally to a two-digit number. This would also raise the weight and importance of the thesis within the curriculum, which they would deem more adequate. The experts stress the importance of the final thesis due to the fact that it is the first time during their studies that students learn to write a scientific paper with all its facets.

Response

We appreciate the expert reviewers' observation and feedback regarding the quality and workload associated with the final project works for our Bachelor's programs. The following response addresses the concerns and recommendations provided:

a. Acknowledgment of Quality and Workload

We are pleased to hear that the experts have confirmed the quality of our final project works, noting that they meet the requirements of a Bachelor's thesis in terms of content, extent, and applied scientific methodology. We also acknowledge the significant effort and time that students invest in preparing these projects.

b. Importance of the Final Thesis

The final thesis is indeed a critical component of our Bachelor's programs, as it provides students with their first substantial experience in writing a scientific paper. This experience is crucial for developing essential research skills, critical thinking, and the ability to synthesize and present complex information.

c. Recommendation to Increase Awarded Credits

The recommendation to increase the awarded credits for the final thesis to a two-digit number is well noted. This would not only better reflect the workload involved but also emphasize the importance of the thesis within the curriculum.

d. Proposal for Curriculum Adjustment

In response to the recommendation, we propose the following adjustments to the curriculum to increase the awarded credits for the final thesis:

- **Credit Reassessment**: We will conduct a thorough review of the credit allocation for the final thesis, comparing it with the workload and credit allocation in similar programs at other leading universities.
- **Increment in Credits**: Based on this reassessment, we will consider increasing the credits for the final thesis to a two-digit number, such as 10 or 12 credits. This adjustment will be aligned with the European Credit Transfer and Accumulation System (ECTS) standards to ensure international comparability.
- **Enhanced Support and Resources**: To support this increase in credits, we will also enhance the resources and support available to students during their thesis preparation. This includes additional guidance from supervisors, access to research materials, and workshops on scientific writing and methodology.

e. Implementation and Communication

- **Consultation with Stakeholders**: We will consult with academic staff, students, and other stakeholders to ensure the proposed changes meet the needs and expectations of all parties involved.
- **Curriculum Update**: The updated credit allocation will be incorporated into the curriculum documents and communicated clearly to students and faculty members.
- **Monitoring and Evaluation**: We will monitor the impact of these changes on student workload, performance, and satisfaction, and make further adjustments as necessary based on feedback and outcomes.

For the final project (thesis) workload, we have explained in criterion 1.5.

- In summary, the experts confirm that the different forms of examination used are competence-oriented and are suitable overall for verifying the achievement of the intended
learning outcomes as specified in the respective module descriptions. The form of examination is determined individually for each course and published in the respective module
description as well as the “course contract”. The forms of examination are based on the
main content of the modules and the level is appropriate for the respective degree programme. Any conclusions on the final thesis? Also, how to the lecturers choose the assessment methods? How is the diversity of the assessment methods? Do students know how to appeal a result – is this clearly defined?

Response

a. Selection of Assessment Methods by Lecturers

Lecturers choose assessment methods based on several key factors:

- **Learning Outcomes**: The primary consideration is the alignment with the learning outcomes specified for each course. Assessment methods are selected to effectively measure whether students have achieved these outcomes.
- **Course Content**: The nature of the course content influences the choice of assessment methods. For example, theoretical courses may rely more on written exams and essays, while practical or applied courses may use project-based assessments, demonstrations, or fieldwork.
- **Competence Development**: Different assessment methods are employed to develop and evaluate a range of competencies, including analytical skills, practical application, communication, and teamwork.

b. Diversity of Assessment Methods

UNAIR employs a diverse range of assessment methods to ensure comprehensive evaluation and to cater to different learning styles and competencies. These methods include:

- **Written Exams**: Multiple-choice questions, short answer tests, and essays to evaluate cognitive abilities and theoretical knowledge.
- **Practical Demonstrations and Projects**: Hands-on activities and projects to assess the practical application of concepts and skills.
- **Oral Presentations and Group Discussions**: These methods measure communication skills and collaborative abilities.
- **Continuous Assessments**: Quizzes, assignments, and presentations throughout the semester provide ongoing feedback and measure continuous learning.
- **Fieldwork and Internships**: Real-world experiences that integrate theoretical knowledge with practical skills.
- **Case Studies**: Application of theoretical knowledge to solve real-life problems.

3. Resources

3.1 Staff and Staff Development

Staff Development

- However, as many topics related to the four study programmes under review are continuously developing, such as computational methods, AI, and big data, the experts highly recommend to expand the continuous education offer opportunities for all the academic staff members to keep up with the relevant developments of the field. These developments are of crucial importance for the students in these subjects. Furthermore, the experts consider that the staff should receive support for improving their English-speaking skills and English didactics to help them preparing for the switch of teaching language in more modules.

In summary, the experts note that there is a system of staff development at UNAIR. However, the experts are of the opinion that it should be expanded in different regards such as subject-specific continuous education.

Response

Thank you for your attention to the development of our staff. Regarding the need for improving English language skills, the university has a Language Center that can be utilized by both staff and students to enhance their English proficiency. The university and faculty will encourage staff to make more optimal use of the facilities at the Language Center.

Regarding training for staff on subject-specific topics, the university has collaborated with organizations such as Oracle, Microsoft, CISCO, Publon (WoS Academy), and BNSP. A list of skill certifications from the training that has been completed can be found in Appendix 6.

- During the on-site visit the experts notice, that, while the number of academic staff is sufficient, the number of technical staff to assist students with the experiments should be increased, especially in the photonics lab.

Response

We have discussed the workload of technical staff with the faculty and head of the physics department. The work arrangements for technical staff are managed by the Department. The number of technical staff in the physics department is sufficient for the laboratories managed. Therefore, we are reorganizing and restructuring the workload for the technical staff. The number of laboratory staff is appropriate as there are two technical staff for the Photonics laboratory, which is adequate for the services. Next, the faculty will reevaluate the need for technical staff across all laboratories in the Physics Department.

3.3 Funds and equipment

- The experts recommend to enhance collaboration of the departments with other national institutions and private cooperations with respect to the shared access to and use of high capacity computational resources. Generally, however, the experts confirm that the equipment, facilities, and supervision by technical staff are adequate for the respective teaching and learning purposes of the Bachelor´s programmes under review.

Response

BoS has collaborated with agencies outside universities through IA (Implementation Agreement), for example in 2024 BoS collaborate with Banyuwangi Regency Central Statistics Agency and Department of Culture, Tourism, Youth and Sports, Madiun Regency, and this Collaboration model will be developed for the coming year.

- The labs with new tools are also well-equipped to accommodate the cohorts of up to 30 students per lab session and allow them to work in groups of two. However, the older lab facilities appear comparatively small for large student numbers and the students also state, that not all experiments are conducted in groups of two, but groups of up to four people. As hands-on experience is crucial for the learning experience in a BoP programme, the experts urge the department to continue investing in more new technology to give all the students the opportunity conduct experiments personally. Also, as the experts note that the instruction manuals of multiple instruments are provided only in Bahasa Indonesia, they recommend to provide all manuals also in English language to improve further the students´ subject-specific English competency and help incoming students from abroad.

Response

Thank you for your feedback on our laboratory facilities and instructional materials. We acknowledge that while our new labs accommodate up to 30 students per session and allow group work in pairs, the older labs are smaller and sometimes require larger groups. We will continue investing in upgrading our facilities and technology to ensure all students have hands-on experience. Additionally, we will translate all instructional manuals into English to enhance students' subject-specific English skills and support international students.

- As a general remark, the experts point out that the safety measures should be further improved. Fire extinguishers are missing in some of the laboratories, and attention should also be paid to their correct storage. Further, the experts recommended to design the cable setups for electricity distribution more transparently and install an emergency switch, which can stop the electricity in all cable cycles at once in case a problem arises. Additionally, there should be signs where to find fire

extinguishers and electric emergency stops easily. The students should be informed about that at the beginning of each lab course. Lastly, is should be made sure that every lab has an emergency exit besides the regular door.

Response

We have discussed your safety recommendations with the Dean, who will consider them in light of the faculty's blueprints and plans. We appreciate your positive feedback and agree that these measures are crucial for the safety and well-being of our students. The Dean is committed to addressing these concerns and will ensure that the necessary improvements are made to enhance safety in our laboratories. Regarding the fire extinguishing equipment, we have provided these tools in their designated locations in the mechanics laboratory and magnetic electricity laboratory, as shown below.

We have also provided an emergency exit, as suggested by the expert during their visit to our laboratory, as shown below.

4.1 Module descriptions

- Experts said that the module handbooks of the BoP and BoIS programmes, are not published online. To increase the transparency for all stakeholders of the university, the experts suggest to publish the handbooks on the websites of these programmes as well.

Response

For BoIS, we have added the complete module handbook (in a single file), which can be downloaded from the BoIS website, at the link https://si.fst.unair.ac.id/syllabus/, as shown in the following screenshot.

Information Systems Undergraduate Program Curriculum and Syllabus

Semester 1

No	Subject		Workload (Credits)				Pre-requisite
	Code	Name	Course	Tutorial	Practice	Total	
1	2	3	4	5	6	7	8
1st Semester							
Compulsory							
1	AGI101	Religion I (Islam)	2	-	-	2	
	AGP101	Religion I (Protestant)					
	AGK101	Religion I (Catholic)					
	AGH101	Religion I (Hindu)					
	AGB101	Religion I (Buddhism)					
	AGC101	Religion I (Confucianism)					
2	NOP103	Five Principles of Indonesia	2	-	-	2	
3	NOP101	Civic Education	2	-	-	2	
4	KID107	Fundamental of Chemistry	2	-	-	2	
5	BID108	General Biology	2	-	-	2	
6	MAA101	Calculus	2	-	-	2	
7	BAI101	Indonesian Language	2	-	-	2	

For BoP, we have now updated the links and you can access the module handbooks for the BoP programs through the following updated link: https://fisika.fst.unair.ac.id/modul/. We appreciate your patience and understanding, and we are committed to ensuring that all program materials are readily available online.

4.2 Diploma and Diploma Supplement

- The experts note that the Transcript of records lists only the number of SKS credits and not the ECTS credits. As it is crucial for the international recognition of the
  courses, the experts require UNAIR to include the number of ECTS credits. In addition,
  to explain the relation between SKS and ECTS credits, information on the credits systems and the conversion between both has to be provided in the Diploma Supplement.

Response

Thank you for your valuable feedback. We agreed that such information is useful for international recognition. Therefore, we will add the credit equivalence to other grading system, such as ECTS, American University Credit System, etc. The transcript and diploma supplement will be provided with **the equivalent index** to several international grading systems. UNAIR is a state university established by the government with the status as an autonomous public legal entity. In this context we are authorized to modify the format of transcript and diploma supplement. All study programmes have filed the proposal to the University. Currently, the Directorate of Education is reviewing the proposal based on the ASIIN expert recommendation as input. We expect the outcome to be implemented in the next academic calendar.

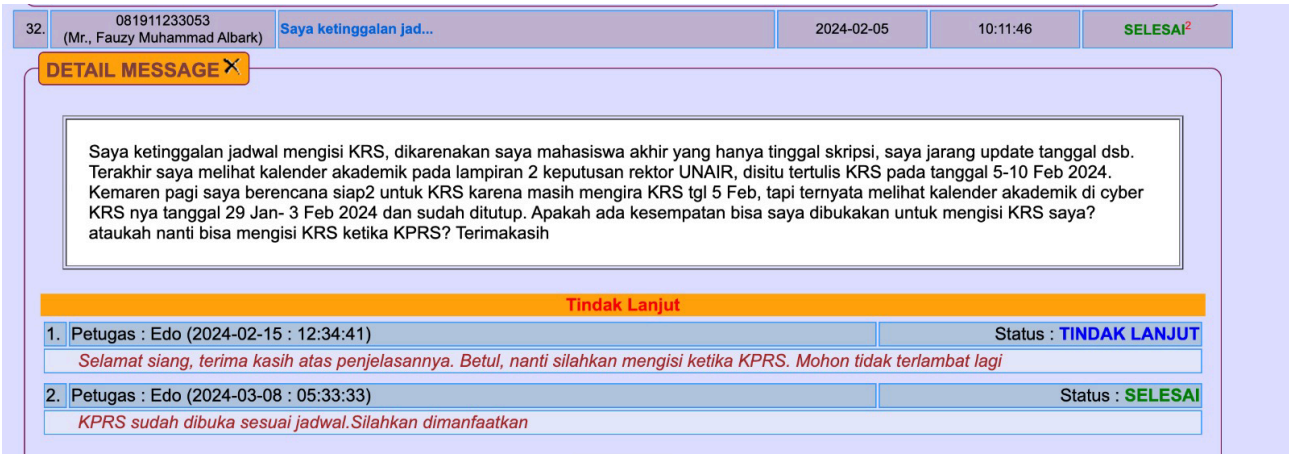
5. Quality management: quality assessment and development

- The experts noticed that the students do not receive any information or feedback on the consequences of their comments or the implementation of respective measures. Therefore, the experts require the university to close the structured feedback cycle by developing a process of informing students about their feedback and respectively taken measures to keep them motivated to engage in the programme development.

Response

The university has a platform in quality assurance management information system (qa.unair.ac.id). This platform is a dashboard to monitor and evaluate all the QA-related activities, including student feedback. All the information can be accessed by QA personnel at the level of university to study program. Such information is used for management review and all the action plans will be communicated to students during the hearing forum. From this mechanism, students are provided with a more comprehensive result. However, not all the faculties display the result on the website.

In regard to complaints that required immediate response, the Faculty of Science and Technology has mechanisms for the submission and handling of complaints and feedback from students and also staff. Complaints can be submitted through the e-complaint system (https://usi.fst.unair.ac.id/saran/saran.php). After the complaint is received and addressed by the Faculty, students or staff will receive a notification about the outcome via WhatsApp/email directly, as shown in the following example: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(Mr., Fauzy Muhammad Albark)
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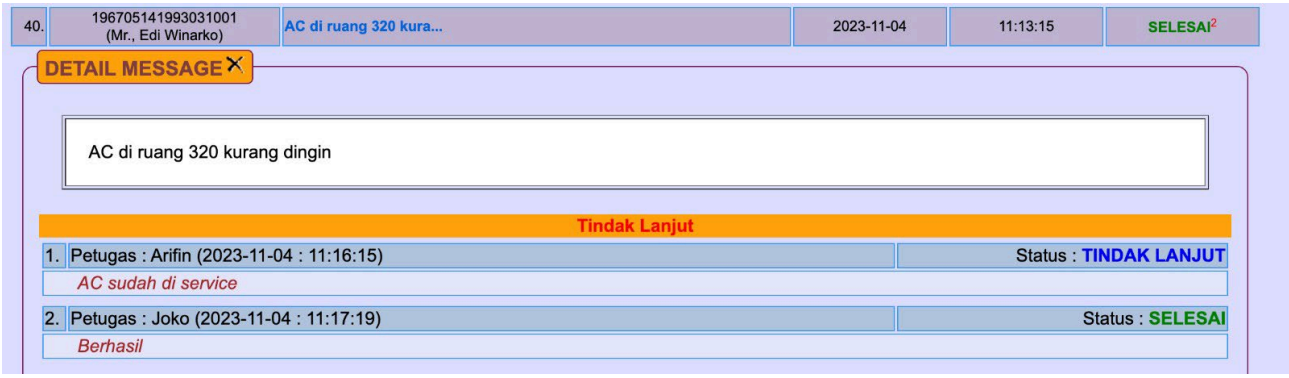
DETAIL MESSAGE
Saya ketinggalan jadwal mengisi KRS, dikarenakan saya mahasiswa akhir yang hanya tinggal skripsi, saya jarang update tanggal dsb. Terakhir saya melihat kalender akademik pada lampiran 2 keputusan rektor UNAIR, disitu tertulis KRS pada tanggal 5-10 Feb 2024. Kemaren pagi saya berencana siap2 untuk KRS karena masih mengira KRS tgl 5 Feb, tapi ternyata melihat kalender akademik di cyber KRS nya tanggal 29 Jan- 3 Feb 2024 dan sudah ditutup. Apakah ada kesempatan bisa saya dibukakan untuk mengisi KRS saya? ataukah nanti bisa mengisi KRS ketika KPRS? Terimakasih
Tindak Lanjut
1. Petugas : Edo (2024-02-15 : 12:34:41)
Status : TINDAK LANJUT
Selamat siang, terima kasih atas penjelasannya. Betul, nanti silahkan mengisi ketika KPRS. Mohon tidak terlambat lagi
2. Petugas : Edo (2024-03-08 : 05:33:33)
Status : SELESAI
KPRS sudah dibuka sesuai jadwal.Silahkan dimanfaatkan


40.
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(Mr., Edi Winarko)
AC di ruang 320 kura...
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Status : TINDAK LANJUT
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Status : SELESAI
Berhasil

F Summary: Expert recommendations (20.08.2024)

Taking into account the additional information and the comments given by UNAND, the experts 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 Physics	With requirements for one year	-	30.09.2030
Ba Mathematics	With requirements for one year	-	30.09.2030
Ba Statistics	With requirements for one year	-	30.09.2030
Ba Information Systems	With requirements for one year	-	30.09.2030

Requirements

For all programmes

A 1. (ASIIN 1.3/ 4.1) Clearly define the duration and compensation schemes of the different internship opportunities and make regulations for the planning, execution and recognition of the different internship programmes transparent for students and companies (e.g. by concluding “learning agreements” between the university, student, and receiving institution before the internship).

A 2. (ASIIN 1.5) Review and adapt the credit allocation for the modules with high independent workload (especially Bachelor´s thesis and internship). The credit allocation and conversion system needs to be harmonized across all official documents.

A 3. (ASIIN 4.2) Include the number of ECTS credits in the Transcript of Records and provide information on the credit conversion in the Diploma Supplement.

A 4. (ASIIN 5) Close the structured feedback cycle by informing students about their feedback and respectively taken measures to keep them motivated to engage in the programme development.

Recommendations

For all programmes

E 1. (ASIIN 1.3) It is recommended to extend the minimum duration of the internship to at least three months to ensure that students can gain a deep insight into the industry.

E 2. (ASIIN 1.3) It is recommended to include AI as both content as well as methodology into suitable courses.

E 3. (ASIIN 1.3) It is recommended to enhance collaboration among departments and with other national institutions and companies to enhance the access opportunities to high-capacity computational resources.

E 4. (ASIIN 1.3) It is recommended to establish a strategic plan and time schedule regarding both programmes´ internationalization, including

a. Increasing the number and quality of lectures in English,

b. Facilitating and encouraging incoming student mobility, and

c. Further increasing outbound student mobility by strengthening ties with international universities and providing more exchange positions.

E 5. (ASIIN 3.1) It is recommended to reduce the administrative workload of the academic staff to increase their available time for research activities.

E 6. (ASIIN 3.1) It is recommended to expand the continuous education course offer for the staff members.

E 7. (ASIIN 3.3) It is recommended continue to modernize the lab equipment and ensure that sufficient physical equipment and adequate software licenses as well as supporting staff are available for the number of students.

E 8. (ASIIN 4.1) It is recommended to align the module titles of the internship in all four programmes.

Bachelor's Degree in Physics

E 9. (ASIIN 3.1) It is recommended to increase the number of technical staff for the management of the photonics lab.

E 10. (ASIIN 3.3) It is recommended to further improve the safety measures in the labs.

E 11. (ASIIN 3.3) It is recommended to keep updating the equipment of the educational labs to ensure that all students can get the hands-on learning experience in the group lab sessions (2 students per setup in all experiments).

E 12. (ASIIN 3.3) It is recommended to provide all instruction manuals in the labs not only in Bahasa Indonesia but also in English.

Bachelor's Degree in Information Systems

E 13. (ASIIN 1.3) It is recommended to unite the courses of biology, chemistry, and physics in one course and use the capacity for additional subject-specific courses instead, e.g., on AI.

G Comment of the Technical Committees

TC 02 – Electrical Engineering/Information Technology (28.08.2024)

Assessment and analysis for the award of the ASIIN seal:

The TC members discuss the procedure and agree with the experts' vote without any changes.

The Technical Committee 02 – Electrical Engineering/Information Technology recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Information Systems	With requirements for one year	-	30.09.2030

Vote: unanimous

TC 12 – Mathematics (09.09.2024)

Assessment and analysis for the award of the ASIIN seal:

The expert committee briefly discusses the procedure and agrees with the proposed conditions and recommendations overall.

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Mathematics	With requirements for one year	-	30.09.2030
Ba Statistics	With requirements for one year	-	30.09.2030

Vote: unanimous

TC 13 – Physics (13.09.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee 13 discusses the procedure and recommends to upgrade the recommendation E9 with respect to lab safety measures to a requirement. Furthermore, it recommends to cancel the recommendation E2 which regards the use of AI, as, although the TC considers AI as a useful and important tool for all programmes, they do not see any foundation for this in the applied criteria. Also, minor changes are suggested to improve the clarity of the requirements and recommendations.

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Physics	With requirements for one year	-	30.09.2030

Vote: unanimous

Requirements

For all programmes

A 1. (ASIIN 1.3/ 4.1) Clearly define the duration and compensation schemes of the different internship opportunities and make regulations for the planning, execution and recognition of the different internship programmes transparent for students and companies (e.g. by concluding “learning agreements” between the university, student, and receiving institution before the internship).

A 2. (ASIIN 1.5) Review and adapt the credit allocation for the modules with high independent workload (especially Bachelor´s thesis and internship). The credit allocation and conversion system needs to be harmonized across all official documents.

A 3. (ASIIN 4.2) Include the number of ECTS credits in the Transcript of Records and provide information on the credit conversion in the Diploma Supplement.

A 4. (ASIIN 5) Close the feedback cycles and inform the students directly about the results of the course questionnaires.

Bachelor's Degree in Physics

A 5. (ASIIN 3.3) The safety measures in the laboratories need to be aligned with international safety standards.

Recommendations

For all programmes

E 1. (ASIIN 1.3) It is recommended to extend the minimum duration of the internship to at least three months to ensure that students can gain a deep insight into the industry.

E 2. (ASIIN 1.3) It is recommended to enhance collaboration among departments and with other national institutions and companies to enhance the access opportunities to high-capacity computational resources.

E 3. (ASIIN 1.3) It is recommended to establish a strategic plan and time schedule regarding both programmes´ internationalization, including

a. Increasing the number and quality of lectures in English,

b. Facilitating and encouraging incoming student mobility, and

c. Further increasing outbound student mobility by strengthening ties with international universities and providing more exchange positions.

E 4. (ASIIN 3.1) It is recommended to reduce the administrative workload of the academic staff to increase their available time for research activities.

E 5. (ASIIN 3.1) It is recommended to expand the continuous education course offer for the staff members.

E 6. (ASIIN 3.3) It is recommended to continue modernizing the lab equipment and ensure that sufficient physical equipment and adequate software licenses as well as supporting staff are available for the number of students.

E 7. (ASIIN 4.1) It is recommended to align the module titles of the internship in all four programmes.

Bachelor's Degree in Physics

E 8. (ASIIN 3.1) It is recommended to increase the number of technical staff to assist students, especially, in the photonics lab.

E 9. (ASIIN 3.3) It is recommended to keep updating the equipment of the educational labs to ensure that all students can get the hands-on learning experience in the group lab sessions (2 students per setup in all experiments).

E 10. (ASIIN 3.3) It is recommended to provide all instruction manuals in the labs not only in Bahasa Indonesia but also in English.

Bachelor's Degree in Information Systems

E 11. (ASIIN 1.3) It is recommended to unite the courses of biology, chemistry, and physics in one course and use the capacity for additional subject-specific courses instead, e.g., on AI.

H Decision of the Accreditation Commission (24.09.2024)

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

The Accreditation Commission discusses the procedure, especially regarding the upgrade of the lab safety requirement proposed by the TC 13. In the end, the Accreditation Commission follows all the suggestions of the TC 13. Additionally, the Accreditation Commission decides to cancel the former expert recommendation E13 since the basic science subjects are standards of the faculty which are beneficial also to the Information Systems programme.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Physics	With requirements for one year	-	30.09.2030
Ba Mathematics	With requirements for one year	-	30.09.2030
Ba Statistics	With requirements for one year	-	30.09.2030
Ba Information Systems	With requirements for one year	-	30.09.2030

Vote: unanimous

Requirements

For all programmes

A 1. (ASIIN 1.3/ 4.1) Clearly define the duration and compensation schemes of the different internship opportunities and make regulations for the planning, execution and recognition of the different internship programmes transparent for students

and companies (e.g. by concluding “learning agreements” between the university, student, and receiving institution before the internship).

A 2. (ASIIN 1.5) Review and adapt the credit allocation for the modules with high independent workload (especially Bachelor´s thesis and internship). The credit allocation and conversion system needs to be harmonized across all official documents.

A 3. (ASIIN 4.2) Include the number of ECTS credits in the Transcript of Records and provide information on the credit conversion in the Diploma Supplement.

A 4. (ASIIN 5) Close the feedback cycles and inform the students directly about the results of the course questionnaires.

Bachelor’s Degree in Physics

A 5. (ASIIN 3.3) The safety measures in the laboratories need to be aligned with international safety standards.

Recommendations

For all programmes

E 1. (ASIIN 1.3) It is recommended to extend the minimum duration of the internship to at least three months to ensure that students can gain a deep insight into the industry.

E 2. (ASIIN 1.3) It is recommended to enhance collaboration among departments and with other national institutions and companies to enhance the access opportunities to high-capacity computational resources.

E 3. (ASIIN 1.3) It is recommended to establish a strategic plan and time schedule regarding both programmes´ internationalization, including

a. Increasing the number and quality of lectures in English,

b. Facilitating and encouraging incoming student mobility, and

c. Further increasing outbound student mobility by strengthening ties with international universities and providing more exchange positions.

E 4. (ASIIN 3.1) It is recommended to reduce the administrative workload of the academic staff to increase their available time for research activities.

E 5. (ASIIN 3.1) It is recommended to expand the continuous education course offer for the staff members.

E 6. (ASIIN 3.3) It is recommended to continue modernizing the lab equipment and ensure that sufficient physical equipment and adequate software licenses as well as supporting staff are available for the number of students.

E 7. (ASIIN 4.1) It is recommended to align the module titles of the internship in all four programmes.

Bachelor's Degree in Physics

E 8. (ASIIN 3.1) It is recommended to increase the number of technical staff to assist students, especially, in the photonics lab.

E 9. (ASIIN 3.3) It is recommended to keep updating the equipment of the educational labs to ensure that all students can get the hands-on learning experience in the group lab sessions (2 students per setup in all experiments).

E 10. (ASIIN 3.3) It is recommended to provide all instruction manuals in the labs not only in Bahasa Indonesia but also in English.

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report and the course handbooks, the following **Learning Objectives (intended qualifications profile)** shall be achieved by the Bachelor of Physics programme:

LO 1	Specific	Students have knowledge of classical and modern physics and the fields´ relevant problems.
LO 2	Specific	Students have the ability to apply mathematical methods to solve problems in physics.
LO 3	Specific	Students have the ability to apply concepts and principles of physics for theoretical analysis, modeling and simulation.
LO 4	Specific	Students know the conduct of scientific methods, can apply them to physics problems and develop them in interdisciplinary problems.
LO 5	Specific	Students have the ability to conduct measurement methods and experiments in physics problems and their applications.
LO 6	Specific	Students are familiar with information technology and able to apply it to relevant physics problems.
LO 7	Specific	Students are able to apply knowledge and principles of physics in industry and medical field as well as other interdisciplinary fields.
LO 8	Social	Students are able to solve problems continuously and self-reliantly, and are familiar with suitable learning strategies.
LO 9	Social	Students are able to solve basic problems and present their results.
LO 10	Social	Students are able to communicate orally and in writing as well as to work in team.

The following **curriculum** is presented:

A. General Scientific Skills						
No	**Course Code**	**General Scientific Skills**	**Year**	**Sem**	**cr**	**ECTS er-eq**
1	FID101	Basic Physics I	1	1	2	3.17
2	FID102	Basic Physics I (Practical)	1	1	1	1.59
3	FID104	Basic Physics II	1	2	4	6.35
4	FID105	Basic Physics II (Practical)	1	2	1	1.59
5	KID105	Basic Chemistry	1	1	2	3.17
6	BID101	Basic Biology	1	1	2	3.17
7	MAA101	Calculus	1	1	3	4.76
8	BAE111	English I	1	2	2	3.17
9	BAE112	English II	4	7	2	3.17
10	AG101	Religion I	1	1	2	3.17
11	AG401	Religion II	6	3	2	3.17
12	BAI101	Bahasa Indonesia	1	1	2	3.17
13	NOP101	Civics	1	1	2	3.17
14	NOP103	Pancasila	1	1	2	3.17
15	MNM107	Introduction of Scientific Collaboration	1	2	2	3.16
16	PHP103	Logics and Critical Thinking	1	2	2	3.17
17	SIP107	Data dan Scientific Literacy	1	1	2	3.17
18	MNM106	Communication and Self Improvement	1	2	2	3.17
19	MNW405	Industrial Management	4	7	2	3.17
20	KLT301	Internship	3	6	2	3.17
21	KNT401	Community Development Participation	4	7	3	4.76
22	MNW402	Management and Enterpreneurship	1	2	2	3.17
		Total			**58**	**105.3**
End of Table						

B. Specific Scientific Skills						
No	Course Code	General Scientific Skills	Year	Sem	cr	ECTS er-eq
23	FID201	Modern Physics	2	3	4	6.35
24	FIT 201	Mathematical Physics I	1	2	4	6.35
25	FIT 202	Mathematical Physics II	2	3	4	6.35
26	FIT212	Mathematical Physics III	2	4	3	4.76
27	FIE210	Electronics I	2	3	3	4.76
28	FIE211	Electronics (Practical)	2	3	1	1.59
29	FIE212	Electronics II	2	4	2	3.17
30	FIE211	Electronics II (Practical)	2	4	1	1.59
31	FII201	Experimental Physics I	2	4	2	3.17
32	FII202	Experimental Physics II	3	5	2	3.17
33	FIB101	Biophysics	2	3	2	3.17
34	FIK203	Computational Physics I	2	4	2	4.76
35	FIK204	Computational Physics I (practical)	2	4	1	1.59
36	FIK313	Computational Physics II	3	5	3	4.76
37	FIK314	Computational Physics II (practical)	3	5	1	1.59
38	FII101	Mechanical Work	1	2	2	3.17
39	PNT492	Research Method in Physics	3	6	3	4.72
40	FIT203	Mechanics	2	4	4	6.35
41	FIT213	Mechanics (practical)	2	4	1	1.59
42	FIT204	Thermodynamics	2	3	3	4.76
43	FIT206	Physics of Wave	2	3	3	4.76
44	FIT303	Electricity and Magnetism	3	5	4	6.35
45	FIT312	Electricity and Magnetism (practical)	3	5	1	1.59
46	FIT301	Quantum Physics	2	4	4	6.35
47	FIT302	Statistical Physics	3	5	3	4.76
48	FIM301	Solid State Physics	3	6	3	4.76
49	FIN401	Nuclear Physics	3	6	3	4.76
50	PNT498	Final Project Proposal	4	7	2	3.17
51	FIT310	Fisika Atomik dan Molekuler	3	5	2	3.17
52	FIT311	Mekanika Fluida	3	6	2	3.17
53	FIT404	Fisika Partikel	4	7	2	3.17
54	PNT499	Final Project	4	8	6	9.52
55	FIM202	Material Physics	2	4	3	4.76

56	FIM302	Biomaterial	3	5	2	3.17
57	FIM304	Spectroscopy	4	7	2	3.17
58	FIM309	Material Analysis	3	5	3	4.76
59	FIO306	Biophotonic	2	4	2	3.17
60	FIB204	Radiological Physics and Dosimetry	2	4	2	3.17
61	FIB302	Radiobiology	2	4	2	3.17
62	FIB310	Health Physics and Radiation Protection	3	5	2	3.17
63	FIB311	Radiotherapy Physics	3	5	2	3.17
64	FIT	Mekanika Kuantum Banyak Benda	3	5	2	3.17
65	FIE304	Microprocessor and Microcontroller	3	6	2	3.17
66	FIE308	Controlling System	3	5	2	3.17
67	FIE309	Interfacing	3	6	2	3.17
68	FIO301	Modern Optics	3	5	3	4.76
69	FIO201	Optika Laser dan Serat	3	6	3	4.76
70	FIK309	Modeling Physics	3	6	2	3.17
71	FIK315	Sistem Cerdas	3	5	2	3.17
72	FIK312	Pengolahan Citra Digital	3	5	2	3.17
73	FIT211	Kapita Selekta Fisika Teori	2	4	2	3.17
74	FIB312	Anatomi dan Fisiologi	3	6	2	3.17
75	FIT309	Komputasi Atom dan Molekul	3	6	3	4.76
76	FIT405	Komputasi Material	4	7	3	4.76
77	FIK402	Modalitas Citra Medis	4	7	2	3.17
78	FIE310	Sensor dan Pengukuran	3	5	2	3.17
79	FIO305	Sensor Serat Optik	4	7	2	3.17
80	FIA402	Instrumentasi Industri	4	7	2	3.17
81	FIA403	Instrumentasi Medis	4	7	2	3.17
		Total			**71**	**102.7**
End of Table						

According to the Self-Assessment Report and the course handbooks, the following **Learning Objectives (intended qualifications profile)** shall be achieved by the Bachelor of Mathematics programme:

LO 1	Specific	Students are able to apply mathematical concept, in area of mathematics and other relevant areas.
LO 2	Specific	Students are able to recognize analogies and basic patterns through abstraction.
LO 3	Specific	Students are able to utilize mathematical power, such as the ability to think logically, critically and systematically in a creative and innovative way.
LO 4	Specific	Students are able to use mathematical principles to solve mathematical problems extensively.
LO 5	Specific	Students are able to identify problems, arrange the mathematical model, determine the completion strategy, solve and interpret the result.
LO 6	Social	Students are able to classify, identify, formulate and solve the problems related to the field of mathematics.
LO 7	Social	Students are able to use software to support problem solving.
LO 8	Social	The students are able to develop themselves independently and sustainably.
LO 9	Social	Students are able to show good communication skills and can work well in teams

The following **curriculum** is presented:

No.	Courses		Workload (credits/ECTS)		
	Code	Name	Course	Practice	Total
Semester 1					
Compulsory					
1	AGI101	Islam Religion	2		2
	AGK101	Catholic Religion			
	AGP101	Protestant Religion			
	AGB101	Buddha Religion			
	AGH101	Hindu Religion			
2	NOP103	Pancasila	2		2
3	NOP104	Civics	2		2
4	BAI101	Indonesian Language	2		2
5	SIP107	Data and Libraries	2		2
6	BID101	Basic Biology	2		2
7	KIM105	Basic Chemistry	2		2
8	MAA101	Calculus	3		3
9	MAL101	Fundamentals of Mathematic I	2		2
Sub-Total Semester 1					19
Semester 2:					
Compulsory					
10	PHP103	Logic and Critical Thinking	2		2
11	MNM107	Introduction to Scientific Collaboration	2		2
12	MNM106	Communication and Self Development	2		2
13	MAL203	Fundamentals of Mathematic II	2		2
14	MAA105	Advanced Calculus	4		4
15	MAL201	Elementary Linear Algebra	3		3
16	FID113	Basic Physics	2		2
17	BAE213	English	2		2
Sub-Total Semester 2					19
Elective					0-4
18	MAT103	Business Mathematics	2		2
19	MAA108	Number Theory	2		2
20	MAA109	Introduction to Geometry	2		2

Semester 3					
Compulsory					
21	MAT101	Algorithm and Programming	3		3
22	MAT102	Algorithm and Programming (Practical)		1	1
23	MAS102	Statistics I	2		2
24	MAT203	Linear Programming	3		3
25	MAL204	Discrete Mathematics	3		3
26	MAT210	Ordinary Differential Equation	3		3
27	MAA201	Analytical Geometry	3		3
28	MAA104	Calculus (Practical)		1	1
Sub-Total Semester 3					19
Elective					0-4
29	MAT202	Insurance	2		2
30	MAL202	Matrix Algebra	2		2
31	MAL206	Fuzzy Logic	2		2
32	MNO301	Organization Management	2		2
Semester 4					
Compulsory					
33	MAS201	Statistics II	2		2
34	MAS115	Statistic (Practical)		1	1
35	MAL302	Linear Algebra	3		3
36	MAA203	Multivariable Calculus	4		4
37	MAT201	Numerical Method	3		3
38	MAT212	Operations Research	2		2
39	MAT213	Operations Research (Practical)		1	1
40	MAT211	Partial Differential Equation	2		2
Sub-Total Semester 4					18
Elective					0-6
41	MAT204	Population Dynamic	3		3
42	MAT205	Data Structure and Algorithm	3		3
43	MAT211	Numerical Differential Equation	2		2
44	MAT206	Data Base	2		2
45	MAL205	Discrete Geometrics	2		2
46	MAT215	Integer Linear Programming	3		3
Semester 5					
Compulsory					
47	MAL301	Abstract Algebra	3		3
48	MAT208	Simulation	3		3
49	MAL307	Algebra (Practical)		1	1
50	MAA310	Real Analysis I	2		2
51	MAS316	Mathematical Statistics	4		4
52	MAA307	Introduction to Complex Variable	2		2
53	MAT304	Mathematical Modelling I	2		2

Sub-Total Semester 5					**17**
Elective					0-7
54	MAT301	Artificial Intelligence	3		3
55	MAT305	Boundary Value Problem	2		2
56	MAA204	Differential Geometrics	3		3
57	MAL310	Graph Theory	3		3
58	BAE213	Advanced English	2		2
59	MAL309	Coding Theory	2		2
60	MAT309	Advanced Operations Research	3		3
Semester 6					
Compulsory					
61	KLT301	Field Study*	2		2
62	MAT402	Mathematical Modelling II	2		2
63	PNT497	Research Methodology	2		2
64	KNT401	Community Study*	3		3
65	MAA302	Real Analysis II	2		2
Sub-Total Semester 6					**11**
Elective					7-13
66	MAL305	Cryptography	2		2
67	MAL308	Linear Control Theory	3		3
68	MAT308	Optimization	3		3
69	MAT310	Data Mining	3		3
70	MAT311	Fractional Modelling	3		3
71	AGI401	Advanced Islam Religion	2		2
	AGK401	Advanced Catholic Religion			
	AGP401	Advanced Protestant Religion			
	AGB401	Advanced Buddha Religion			
	AGH401	Advanced Hindu Religion			
72	MAA308	Complex Variable	2		2
Semester 7					
Compulsory					
73	PNT498	Final Project Proposal*	2		2
Sub-Total Semester 7					**2**
Elective					2-20
74	KST410	Special Topics in Algebra	2		2
75	KST403	Special Topics in Analysis	2		2
76	KST411	Special Topics in System Modelling	2		2
77	KST412	Special Topics in Operations Research and Computation	2		2
78	MAT403	Discrete Control Theory	2		2
79	MNW201	Entrepreneurship	2		2
80	MAT404	Data Security System	2		2
81	MAT404	Artificial Neural Network	3		3
82	MAA306	Metric Space Theory	3		3
Semester 8:					
Compulsory					
83	PNT499	Final Project*	6		6
Sub-Total Semester 8					**6**
Total credit of the study programme			**191**	**5**	**196**

Note: * open semester

According to the Self-Assessment Report and the course handbooks, the following **Learning Objectives (intended qualifications profile)** shall be achieved by the Bachelor of Statistics programme:

LO 1	Attitude	Working together and having social sensitivity and concern for society and the environment.
LO 2	Attitude	Demonstrate a responsible attitude towards work in the field of expertise independently.
LO 3	Attitude	Obey the regulations that apply.
LO 4	Attitude	Discipline in following the teaching and learning process and academic activities.
LO 5	General Skills	Able to apply statistical methods to real problems and be able to explain in a form that is easily understood both in writing and orally.
LO 6	General Skills	Able to carry out ethics in the application of statistics.
LO 7	General Skills	Compile a scientific description of the results of the above study in the form of a final project report or final course project.
LO 8	General Skills	Document, store, secure, and retrieve data correctly to ensure validity and prevent plagiarism.
LO 9	Knowledge	Correctly explain statistical and mathematical theoretical concepts according to their definitions
LO 10	Knowledge	Describe several statistical methodologies (methods and modeling) to be used in solving problems in several fields, either with or without software.
LO 11	Knowledge	Create an algorithm for solving a problem correctly.
LO 12	Knowledge	Design the stages of data analysis correctly.
LO 13	Knowledge	Designing a data analysis consulting business framework that fits the needs of society properly, based on religious morality.
LO 14	Specific competences	Explain the basic concepts of statistical science and methods of statistical analysis that can be applied to various applied fields.
LO 15	Specific competences	Operate at least two statistical software, including software based on open source.

LO 16	Specific competences	Appropriately apply appropriate statistical methods to specific problems in the life, economic and social fields.
LO 17	Specific competences	Collect data with the appropriate method correctly.
LO 18	Specific competences	Determine the appropriate statistical method according to the existing problems.

The following **curriculum** is presented:

No	Courses		Workload (ECTS)		
	Code	Name	Course	Practice	Total
(1)	(2)	(3)	(4)	(5)	(6)
Semester 1					
Compulsory					
1	AGI101	Islamic Religious Education	3.2		3.2
	AGK101	Catholic Religious Education			
	AGP101	Protestant Religious Education			
	AGH101	Hindu Religious Education			
	AGB101	Buddhist Religious Education			
2	NOP103	Pancasila	3.2		3.2
3	NOP104	Civics	3.2		3.2
4	BAI101	Indonesian Language	3.2		3.2
5	SIP107	Data and Literature	3.2		3.2
6	BID101	Introduction to Biology	3.2		3.2
7	KID101	Introduction to Chemistry	3.2		3.2
8	MAA101	Calculus	4.8		4.8
9	MAS101	Statistics 1	3.2		3.2
		Subtotal of Semester 1	**30.4**	**0**	**30.4**
Semester 2					
Compulsory					
10	MAS121	Introduction to Logic and Set Theory	3.2		3.2
11	MNM106	Communication and Self-Development	3.2		3.2
12	MNM107	Introduction to Scientific Collaboration	3.2		3.2
13	PHP103	Logic and Critical Thinking	3.2		3.2
14	MAS201	Statistics 2	3.2		3.2

No	Courses		Workload (ECTS)		
	Code	Name	Course	Practice	Total
(1)	(2)	(3)	(4)	(5)	(6)
15	MAS115	Statistics Practicum		1.6	1.6
16	MAS216	Calculus for Statistics	4.8		4.8
17	MAS217	Algebra for Statistics	4.8		4.8
18	MAT101	Algorithms and Programming	3.2		3.2
19	MAT102	Algorithms and Programming Practicum		1.6	1.6
		Subtotal of Semester 2	**28.8**	**3.2**	**32**
Semester 3					
Compulsory					
20	SID205	Data Exploration and Visualization	3.2	1.6	4.8
21	MAS206	Experimental Design	4.8		4.8
22	MAS407	Categorical Data Analysis	3.2		3.2
23	MAS103	Probability	6.4		6.4
24	MAS215	Introduction to Databases	3.2	1.6	4.8
25	MAS204	Multivariate Methods	4.8		4.8
26	MAS240	Introduction to Linear Models	4.8		4.8
27	MAS303	Computational Statistics	3.2		3.2
28	MAS304	Computational Statistics Practicum		1.6	1.6
		Subtotal of Semester 3	**33.6**	**4.8**	**38.4**
Semester 4					
Compulsory					
29	MAS240	Survey Design	3.2		3.2
30	MAS301	Inference Statistics 1	6.4		6.4
31	MAS307	Time Series Analysis	4.8		4.8
32	MAS210	Nonparametric Regression	4.8		4.8
33	MAS308	Lifetime Analysis	3.2		3.2
34	PNT496	Research Methods	3.2		3.2
35	FID113	Introduction to Physics	3.2		3.2
36	BAE111	English Language	3.2		3.2
Elective (4 credits)			6.4		6.4
		Subtotal of Semester 4	**38.4**	**0**	**38.4**
Semester 5					
Compulsory					
37	MAS305	Inference Statistics 2	6.4		6.4
38	MAS405	Statistical Consultancy	3.2		3.2
39	KLT301	Fieldwork Practice	3.2		3.2
40	MAS406	Statistical Modeling	4.8		4.8
41	MAS325	Machine Learning	3.2		3.2
Elective (10 credits)			16		16

No	Courses		Workload (ECTS)		
	Code	Name	Course	Practice	Total
(1)	(2)	(3)	(4)	(5)	(6)
Subtotal of Semester 5			**33.6**	**0**	**33.6**
Semester 6					
Compulsory					
42	AGI401	Religious Education 2 *)	3.2		3.2
43	KNF401	Community Service Program *)	4.8		4.8
Elective (16 credits)			25.6		25.6
Subtotal of Semester 6			**33.6**	**0**	**33.6**
Semester 7					
Compulsory					
44	PNT499	Final Project *)	9.6		9.6
Elective (16 credits)			25.6		25.6
Subtotal of Semester 7			**35.2**	**0**	**35.2**
Semester 8					
Compulsory					
Elective (6 credits)			9.6		9.6
Subtotal of Semester 8			**9.6**	**0**	**9.6**
Total credits of the study program			**160**		**160**

No	Courses		Workload (ECTS)		
	Code	Name	Course	Practice	Total
(1)	(2)	(3)	(4)	(5)	(6)
Semester 5, 6					
Elective Courses					
45	MAS214	Social Research Methods	3.2		3.2
46	MAS410	Actuary 2	3.2		3.2
47	MAS418	Risk Theory	3.2		3.2
48	MAS420	Multivariate Time Series Analysis	3.2		3.2
49	MAS419	Longitudinal Data Analysis	3.2		3.2
50	MAS203	Nonparametric Methods	3.2		3.2
51	MAS218	Official Statistics	3.2		3.2
52	MAS327	Statistical Quality Control	3.2		3.2
53	MAS408	Reliability Analysis	3.2		3.2
54	MAS321	Decision Theory	3.2		3.2
55	MAS219	Marketing Research	3.2		3.2
56	MNW201	Entrepreneurship	3.2		3.2
57	MAS213	Medical Statistics	3.2		3.2
Subtotal			**41.6**		**41.6**

No	Courses		Workload (ECTS)		
	Code	Name	Course	Practice	Total
(1)	(2)	(3)	(4)	(5)	(6)
Semester 4, 6, 8					
Elective Courses					
58	MAS243	Demographic Statistics	3.2		3.2
59	MAS237	Financial Mathematics	3.2		3.2
60	MAS207	Applied Regression Analysis	3.2		3.2
61	MAS333	Structural Equation Modeling	3.2		3.2
62	MAS301	Econometrics	3.2		3.2
63	MAS216	Advanced Experimental Design	3.2		3.2
64	MAS421	Epidemic Data Analysis	3.2		3.2
65	MAS409	Actuary 1	3.2		3.2
66	MAT304	Statistical Simulations	3.2		3.2
67	MAS403	Capita Selecta in Statistics	3.2		3.2
68	MAS317	Spatial Data Analysis	3.2		3.2
69	MAS326	Artificial Neural Network	3.2		3.2
70	MAS220	Bayesian Statistics	3.2		3.2
Subtotal			**41.6**		**41.6**
Total credits of the study program			**256**		**256**

According to the Self-Assessment Report and the course handbooks, the following **Learning Objectives (intended qualifications profile)** shall be achieved by the Bachelor of Information Systems programme:

LO 1	Attitude	Demonstrate an attitude of excellence with morality. This LO is summarized from LOs related to attitude stipulated by the directorate of higher education (DIKTI) through SN-DIKTI and the university value "Excellent with Morality".
LO 2	General Skills	Demonstrate an ability for life-long learning This LO is summarized from LOs related to general skills stipulated by the directorate of higher education (DIKTI) through SN-DIKTI and the university value "Excellent with Morality".
LO 3	Knowledge	Demonstrate an ability to solve common business problems using IS development with appropriate methodologies, software tools and innovative methods for improving processes and organizational change.
LO 4	Knowledge	Able to use logic and algorithm concepts to solve problems and apply them to several programming languages.
LO 5	Knowledge	Able to explain mathematical and statistical concepts used in information systems.
LO 6	Specific competences	Demonstrate an ability to develop databases.
LO 7	Specific competences	Able to apply appropriate theories, models, and techniques that provide a basis for problem identification and analysis, software design, development, implementation, verification, and documentation.
LO 8	Specific competences	Able to apply a code of ethics in the use of information and data when designing, implementing, and using a system.
LO 9	Specific competences	Able to create long-term plans for implementing and using organizational information systems to achieve strategic organizational goals and objectives.
LO 10	Specific competences	Able to apply the concepts, techniques and methodologies of information systems project management.

LO 11	Specific competences	Able to create secure an IT infrastructure plan, including network architecture and physical/cloud services.
LO 12	Specific competences	Able to apply the concept of business intelligence to solve problems in the organization.
LO 13	Specific competences	Able to identify opportunities created by IT innovation to become organizational value through a systematic process.

The following **curriculum** is presented:

No	Courses		Workload (credits/ECTS)			
	Code	Name	Course	Tutorial	Practice	Total
1	2	3	4	5	6	7
Semester 1						
Compulsory						
1	AGI101	Religion I (Islam)	3.2	-	-	3.2
	AGP101	Religion I (Protestantism)	3.2	-	-	3.2
	AGK101	Religion I (Catholic)	3.2	-	-	3.2
	AGH101	Religion I (Hinduism)	3.2	-	-	3.2
	AGB101	Religion I (Buddhism)	3.2	-	-	3.2
	AGC101	Religion I (Confucius)	3.2	-	-	3.2
2	NOP103	Pancasila	3.2	-	-	3.2
3	NOP104	Civil Education	3.2	-	-	3.2
4	KID107	General Chemistry	3.2	-	-	3.2
5	BID108	General Biology	3.2	-	-	3.2
6	MAA101	Calculus	4.8	-	-	4.8
7	BAI101	Indonesian Language	3.2	-	-	3.2
8	SIP107	Data and Libraries	3.2	-	-	3.2
9	SII103	Introduction to Information Systems	3.2	-	-	3.2
				Sub-Total Semester 1		30.4
Semester 2						
Compulsory						
1	FID112	General Physics	3.2	-	-	3.2
2	PHP103	Logic and Critical Thinking	3.2	-	-	3.2
3	MAL103	Matrix & Linear Transformation	3.2	-	-	3.2
4	MAT101	Algorithms and Programming	4.8	-	-	4.8
5	MAT102	Algorithms and Programming (Practicum)	-	-	3.2	3.2
6	MNM107	Introduction to Scientific Collaboration	3.2	-	-	3.2
7	MNM106	Communication and Self Development	3.2	-	-	3.2
8	MAS118	Descriptive Statistics	3.2	1.6	-	4.8

No	Courses		Workload (credits/ECTS)			
	Code	Name	Course	Tutorial	Practice	Total
1	2	3	4	5	6	7
9	BAE111	English I	3.2	-	-	3.2
					Sub-Total Semester 2	32
Semester 3						
Compulsory						
1	SIA204	Business Processes and Function	3.2	-	-	3.2
2	SIA205	Business Processes and Function (Practicum)	-	-	3.2	3.2
3	SID201	Database	3.2	1.6	-	4.8
4	SID203	Database (Practicum)	-	-	3.2	3.2
5	SIR201	Object-Oriented Programming	3.2	-	-	3.2
6	SIR203	Object-Oriented Programming (Practicum)	-	-	1.6	1.6
7	MAS234	Inferential Statistics	3.2	1.6	-	4.8
8	SIJ201	Operating System	3.2	-	-	3.2
9	SIJ205	Operating System (Practicum)	-	-	1.6	1.6
10	MAL204	Discrete Mathematics	3.2	-	-	3.2
					Sub-Total Semester 3	32
Semester 4						
Compulsory						
1	SII301	Analysis and Design of Information System	3.2	-	-	3.2
2	SII316	Analysis and Design of Information System (Practicum)	-	-	1.6	1.6
3	SIC201	Machine Learning	3.2	-	-	3.2
4	SIC202	Machine Learning (Practicum)	-	-	1.6	1.6
5	SIJ202	Computer Network	4.8	-	-	4.8
6	SIJ204	Computer Network (Practicum)	-	-	1.6	1.6
7	SIS202	Enterprise System	3.2	-	-	3.2
8	MNM203	Leadership and Organizational Management	4.8	-	-	4.8
9	SIS204	Web Programming	3.2	-	-	3.2
10	SIS205	Web Programming (Practicum)	-	-	1.6	1.6
11	SIS304	Mobile Programming	3.2	-	-	3.2
12	SIS305	Mobile Programming (Practicum)	-	-	1.6	1.6
					Sub-Total Semester 4	33.6
Semester 5						
Compulsory						
1	SII213	Innovation in Information System and Technology	3.2	-	-	3.2
2	BAE112	English II	3.2	-	-	3.2
3	SIS309	Information Systems Security	4.8	-	-	4.8

No	Courses		Workload (credits/ECTS)			
	Code	Name	Course	Tutorial	Practice	Total
1	2	3	4	5	6	7
4	MNW401	Entrepreneurship and Business in Information Systems	3.2	-	-	3.2
5	SII208	Interaction Design	3.2	-	-	3.2
6	SII209	Interaction Design (Practicum)	-	-	1.6	1.6
7	SII318	Software Development	3.2	-	-	3.2
8	SII319	Software Development (Practicum)	-	-	1.6	1.6
9	SID303	Data Visualization and Analysis	3.2	-	-	3.2
10	SID304	Data Visualization and Analysis (Practicum)	-	-	1.6	1.6
11	SIA301	Enterprise Architecture Planning	3.2	-	-	3.2
12	SIA302	Enterprise Architecture Planning (Practicum)	-	-	1.6	1.6
					Sub-Total Semester 5	33.6
Semester 6						
Compulsory						
1	KNT401	Community Services	-	-	4.8	4.8
2	ETT301	Professional Ethics	3.2	-	-	3.2
3	SII323	Information Technology Governance	3.2	1.6	-	4.8
4	PNT497	Research Methodology	3.2	-	-	3.2
5	KLT301	Internship	-	-	9.6	9.6
Elective (9.6 ECTS)						
1	MNG206	Information Technology Service Management	4.8	-	-	4.8
2	MAS235	Quantitative Methods of Business	4.8	-	-	4.8
3	SII214	Information Systems Theory	4.8	-	-	4.8
4	SII322	Information Retrieval	4.8	-	-	4.8
5	SIS308	Enterprise Application Development	4.8	-	-	4.8
6	MNG310	Information Technology Project Management	4.8	-	-	4.8
					Sub-Total Semester 6	35.2
Semester 7						
Elective (27 ECTS)						
1	SIC401	Knowledge Based Systems	3.2	1.6	-	4.8
2	SIC402	Data Mining	3.2	1.6	-	4.8
3	SIR301	Biomedical Informatics	3.2	1.6	-	4.8
4	MAS324	Business Data Analytics	4.8	-	-	4.8
5	SII404	Information System Audit	4.8	-	-	4.8
6	SIC404	Computer Vision	4.8	-	-	4.8
7	SII408	Software Testing	3.2	1.6	-	4.8
8	MNG402	Information Technology Risk Management	4.8	-	-	4.8
9	SII317	E-Health Interaction System Design	4.8	-	-	4.8
					Sub-Total Semester 7	24
Semester 8						
Compulsory						
1	PNT4991	Final Project	-	-	9.6	9.6
					Sub-Total Semester 8	9.6
					Total credit of the study programme	230.4