



ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes

Mathematics

Statistics

Master's Degree Programmes

Mathematics

Statistics

Provided by

Institut Teknologi Sepuluh Nopember

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A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for ¹	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) ²
Sarjana Matematika (S1)	Bachelor of Mathematics	ASIIN	/	12
Sarjana Statistika (S1)	Bachelor of Statistics	ASIIN	/	12
Magister Matematika (S2)	Master of Mathematics	ASIIN	/	12
Magister Statistika (S2)	Master of Statistics	ASIIN	/	12
Date of the contract: 01.07.2021 Submission of the final version of the self-assessment report: 31.08.2021 Date of the onsite visit: 21.-23.09.2021 Via videoconference				
Peer panel: Prof. Dr. Martin Buhmann, University of Giessen Prof. Dr. Norbert Kalus, Beuth University of Applied Sciences Berlin Dr. Marc Vandemeulebroecke, Novartis Luthfia Hastifa Sam, Student at Hasanuddin University				
Representative of the ASIIN headquarter: Jan Philipp Engelmann				
Responsible decision-making committee: Accreditation Commission				
Criteria used:				

¹ ASIIN Seal for degree programmes.

² TC: Technical Committee for the following subject areas: TC 12 – Mathematics.

A About the Accreditation Process

European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 10, 2015 Subject-Specific Criteria of Technical Committee 12 – Mathematics as of December 9, 2016	
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B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	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
Mathematics	S. Mat/ Bachelor of Mathematics	/	6	Full time	/	8 semesters	150 SKS (around 240 ECTS)	Annually in June-August
Statistics	S. Stat/ Bachelor of Statistics	/	6	Full time	/	8 semesters	150 SKS (around 240 ECTS)	Annually in June-August
Mathematics	M. Mat/ Master of Mathematics	/	7	Full time	/	4 semesters	74 SKS (around 118 ECTS)	Bi-annually in June-August and November-December
Statistics	M. Stat/ Master of Statistics	/	7	Full time	/	4 semesters	74 SKS (around 118 ECTS)	Bi-annually in June-August and November-December

For the Bachelor's degree programme Mathematics, the institution has presented the following profile on the website:

"The Undergraduate Study Program in the field of mathematics aims to provide high-quality learning process opportunities for students so that they can improve their abilities, motivation and learning behavior as well as a high work ethic. Students will be given an understanding and development of the basics of mathematics, which is divided into three clusters of courses namely analysis and algebra, applied mathematics (system modeling and simulation, optimization problems, data processing) and computer science (computational science and information systems).

Mission

³ EQF = The European Qualifications Framework for lifelong learning

1. To carry out mathematics education based of informatics technology and communications to produce graduate with believe in god, international qualification, relative with job market need, respond to development of science and technology and have entrepreneur science.
2. Increase mathematics research quality and its applications in national and international level supporting science and technology especially in industrial, energy, ocean, financial and informatic technology with environmental concept.
3. To increase community service activity to spread mathematics and its application.
4. To develop network and synergy with higher education inside and foreign indrustial, community and government in carryout Tri dharma higher education in mathematics and its application.”

For the Bachelor’s degree programme Statistics, the institution has presented the following profile on the website:

„Mission

1. The mission of the Undergraduate Program of Statistics is to contribute in the development of science and technology in the fields of statistics, data science, and its applications to realize public welfare through education, research, community service, and management based on information and communication technology.
2. The mission of the Undergraduate Program of Statistics in Education field:
 - organize undergraduate study program based on information and communication technology to produce international quality graduates in the fields of statistics, data science, and their applications;
 - produce graduates who believe and fear God Almighty and have entrepreneurial knowledge.
3. The mission of the Department of Statistics in research is to play an activate role in the development of science and technology in the field of statistics, data science, and their applications through international quality research activities.
4. The mission of the Department of Statistics in community service is to utilize the resources of the department to play an active role in solving problems faced by society, industry, and government.
5. The mission of the Department of Statistics in management:
 - professional management of resources in the department in organizing Tri-dharma Perguruan Tinggi based on information and communication technology;
 - develop networks and synergize with domestic and foreign universities, industry, society, and government in organizing Tridharma Perguruan Tinggi.

Program Educational Objectives

1. To produce graduates with careers as data analysts, data scientists, official statisticians, biostatisticians, credit-business analysts, and in industrial fields who have the ability to:
 - identify, formulate, collect, code, analyze and interpret data
 - apply statistical methods to solve problems in socio-population, environmental-health, economics-financial, industrial, and data science
 - use Statistical Process Control/Quality Control to solve problems in the industrial field
2. An individual who can contribute to the professional practice of their chosen field through effective communication, leadership, teamwork, service, and a high ethical
3. An individual who will continue life-long learning through professional activities and training, the pursuit of higher educational degrees, and individual professional improvement”

For the Master’s degree programme Mathematics, the institution has presented the following profile on the website:

“Master of Mathematics Study Program (PSMM) has produced graduates who have contributed very significantly to the development of human resources, especially in eastern Indonesia. This is supported by the knowledge in analysis, algebra and computing related to the development of applied mathematics. Since its establishment in 2003, PSMM has graduated 472 masters of science until the 121st graduation period (March 2019). Currently, the lecturers in PSMM consist of 4 professors and 15 doctors who are competent in the fields of Max-Plus Algebra, Data Science, Graph Theory, Computational Fluid Dynamics, Dynamic Systems, Financial Mathematics, Bioinformatics, Systems Theory, Data Assimilation and Digital Image Processing. PSMM has collaborated with several universities, both within and outside the country, for example Shibaura Institute of Technology (Japan), University of Oxford (UK), University of Essex (UK), Technische Universiteit Delft (The Netherlands) and Universiti Malaysia Pahang (Malaysia). Since 2019, PSMM has been accredited A with SK number 4332/SK/BAN-PT/Akred/M/XI/2019.

Mission

1. To conduct Master of Mathematics Program in order to produce graduates who have morals and master in analysis, algebra, and computation and its applications
2. To develop national and international collaboration in mathematical education and research
3. To grow and maintain academic moral and ethic

4. To improve lecturer competence in order to be more creative and professional in the line of duty“

For the Master’s degree programme Statistics, the institution has presented the following profile on the website:

„Mission

1. The mission of the Undergraduate Program of Statistics is to contribute in the development of science and technology in the fields of statistics, data science, and its applications to realize public welfare through education, research, community service, and management based on information and communication technology.
2. The mission of the Undergraduate Program of Statistics in Education field:
 - organize undergraduate study program based on information and communication technology to produce international quality graduates in the fields of statistics, data science, and their applications;
 - produce graduates who believe and fear God Almighty and have entrepreneurial knowledge.
3. The mission of the Department of Statistics in research is to play an activate role in the development of science and technology in the field of statistics, data science, and their applications through international quality research activities.
4. The mission of the Department of Statistics in community service is to utilize the resources of the department to play an active role in solving problems faced by society, industry, and government.
5. The mission of the Department of Statistics in management:
 - professional management of resources in the department in organizing Tri-dharma Perguruan Tinggi based on information and communication technology;
 - develop networks and synergize with domestic and foreign universities, industry, society, and government in organizing Tridharma Perguruan Tinggi.

Program Educational Objectives

1. The Program Educational Objectives (PEO) reflect the achievement of graduates of study programs after three years. The PEO of Master of Statistics degree program (MSP) is to produce qualified Masters in Statistics so that they can have careers as lecturers, researchers, and practitioners in the field of Statistics and Data Science with the following characteristics:
 - Able to use and develop knowledge, skills, and competence professionally to solve problems in their profession using an interdisciplinary approach [PEO-1: professional accomplishment].

B Characteristics of the Degree Programmes

- Has a character who wants to learn throughout his life so that he/she can develop himself through further studies at the Doctoral level at home and abroad, research, training, and professional activities [**PEO-2**: academic accomplishment].
- Have a good and independent personality, have professional abilities and professional ethics, have high integrity, responsibility and can develop a network system [**PEO-3**: social accomplishment].”

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

Evidence:

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

Preliminary assessment and analysis of the peers:

The auditors base their assessment on the learning outcomes as detailed in the Self-Assessment Report of the four degree programmes under review. They refer to the Subject-Specific Criteria (SSC) of the Technical Committee Mathematics as a basis for judging whether the intended learning outcomes of the programmes as defined by ITS correspond with the competences as outlined by the SSC.

ITS has described and published programme educational objectives (PEOs) and programme learning outcomes (PLOs) for each of the four degree programmes. While the PEOs are developed based on the vision and mission of the university as well as the respective faculty and are rather general and concise, the PLOs describe in greater detail the competences, which the students should acquire during their studies. By means of being published on the websites of the degree programmes, the PEOs and PLOs are easily accessible for students as well as other stakeholders. Furthermore, there are regular revision processes in place that take into account feedback by external and internal stakeholders. A minor curriculum adjustment is done every year whereas a major revision including consultations of stakeholders takes place every four years. The representatives of industry and other universities stress that the general collaboration with the degree programmes at hand is close and pro-

ductive. However, it remains unclear how exactly students and external stakeholders participate in these regular curriculum revision processes. Therefore, the peers ask ITS to provide additional information on this point.

The peers learn the students of all programmes are supposed to acquire certain attitudes, for instance responsibility, professional ethics and a commitment to life-long learning, and general competences such as problem-solving and communication skills. Besides these, the Bachelor's degree programmes are equipping the students with basic field-specific knowledge and capabilities in mathematics and statistics, respectively. The Master's degree programmes aim at consolidating and enhancing these competences in order to qualify the students to conduct research in academia or industry (for more details see the programme learning outcomes in the appendix).

In the peers' opinion, the objectives and learning outcomes of all degree programmes are clear, plausible and cover all aspects that can be expected from a programme in the respective field. They see that all four degree programmes are quite broad, regarding the learning outcomes as well as the curricula (see 1.3), covering a wide range of fields within both disciplines. This enables graduates to find suitable jobs in many different areas. In the discussions with students, teachers, and alumni the peers learn that graduates work in such fields as data analytics, finance, logistics, or quality control. Moreover, many graduates of the Master's degree programmes are employed as lecturers at various Indonesian universities. The representatives of industry and other employers emphasise the high quality of the graduates of all four programmes under review and students as well as graduates are highly satisfied with their job perspectives.

In summary, the auditors are convinced that the intended qualification profiles of the four degree programmes under review allow students to take up an occupation, which corresponds to their qualification. The peers agree that the qualification objectives of all programmes are adequate to level 6 or level 7 of the European Qualification Framework respectively, according to their status as Bachelor's and Master's programmes, and to the respective ASIIN Subject-Specific Criteria of the Technical Committee for Mathematics.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report
- Diploma Supplements

Preliminary assessment and analysis of the peers:

The titles of the degree programmes follow the rules for naming study programmes set by the Indonesian Ministry of Education. Sarjana/S1 indicates undergraduate programmes, Magister/S2 graduate programmes. The peers agree that the names of all four degree programmes adequately reflect their intended aims and learning outcomes.

Criterion 1.3 Curriculum

Evidence:

- Study plans of the degree programmes
- Module descriptions
- Objective-module matrices
- Website
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The curricula of the degree programmes are designed to comply with the programme objectives and learning outcomes and they are subject to constant revision processes (cf. chapter 1.1). Regular changes are made to ensure that the curricula are up to current requirements, for instance regarding developments in financial mathematics, machine learning, or new methods of data analysis.

Both Bachelor's degree programmes mostly contain compulsory courses that cover the fundamentals of Mathematics and Statistics respectively. Apart from these scientific courses, they also comprise courses in language (English and Bahasa Indonesia), and the Indonesian constitutional principles of Pancasila that are mandatory for all undergraduate programmes in Indonesia.

Besides these and some other courses that teach the students general competences and that lay a common scientific foundation for instance in chemistry and physics, the majority of the courses of the Bachelor's programme of Mathematics cover the usual subject areas in accordance with international standards such as analysis, algebra, probability, or numerical methods. Moreover, there are some courses that cover applications in several areas, for instance concerning algorithms, simulation, or programming. In the last three semesters, students take some elective courses from a broad offer in analysis and algebra, applied mathematics, and computer science.

The peers appreciate the overall curriculum of the programme, but they see room for improvement mainly in two areas. There are courses named "Mathematics 1" and "Mathematics 2", which is not specific enough for a programme in Mathematics. Consequently,

ITS should devise more significant names for these courses. Furthermore, in some areas the students are first taught practice and are only afterwards familiarised with the relevant theory. For example, there are courses on programming and operation research before the students learn about numerical analysis. As the students voice no complaints and are apparently able to follow the courses nonetheless, the peers do not see any immediate need for action. For the upcoming curriculum revision processes, however, it should be kept in mind that theory should be taught before practical applications.

Based on the same general and scientific foundation as the Mathematics programme, the Bachelor's programme of Statistics contains courses that cover mathematical basics as well as statistical principles and methods and their application in different areas such as business, finance, or social statistics. Through the choice of some elective courses in the later stage of the programme, students can further specialise in these fields. The peers are generally satisfied with the curricula of both programmes as they see that all the important areas of the subjects are covered, the content is well-structured and up to date.

The Master's degree programmes focus more strongly on scientific courses and contain a significantly larger degree of elective courses to give the students more room for specialisation. Furthermore, both include some compulsory courses to teach the students additional skills in core subject areas. The peers appreciate the curricula of the programmes, particularly the wide range of electives. They understand that due to the sheer number of possible electives, not all can be offered in every semester but students and lecturers confirm that there are always sufficiently many options to choose from. Furthermore, the elective courses take place as soon as five students participate (in Mathematics) or even regardless of the number of students (in Statistics).

While overall the curricula effectively implement the learning outcomes as determined by the university, both graduates and industry representatives remark that ITS should further boost the students' communication skills. These play a role in some courses, but could be anchored more broadly in the curriculum and promoted through adequate teaching and learning methods (see 2.3).

Moreover, the peers discuss with the university about how the students improve their English skills within the programmes. They learn that a certain score at an English test is necessary for graduation at ITS and the university employs several means to have the students reach the needed level. Most of the textbooks are in English, there are some international guest lecturers, trainings for writing papers in English and there is a programme in which the lecturers learn how to teach in English. Furthermore, in every semester at least two courses in each programme are taught in English, so that students also learn active com-

munication. Beyond the scope of the programmes under review, the faculty offers dedicated international undergraduate programmes that are fully taught in English. The peers appreciate these efforts and see that they are already quite effective.

In summary, the peers conclude that the curricula of all degree programmes under review are generally well-structured and that the students learn the required skills to be qualified for adequate jobs or further education in Indonesia and abroad.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Website
- Discussions during the audit

Preliminary assessment and analysis of the peers:

There are three different paths of admission into the Bachelor's degree programmes:

1. National Selection of Higher Education or University (Seleksi Nasional Masuk Perguruan Tinggi Negeri, SNMPTN), a national admission system, which is based on the academic performance during high school.
2. Joint Selection of Higher Education or University (Seleksi Bersama Masuk Perguruan Tinggi Negeri, SBMPTN). This national selection is based on the results of a test (UTBK), which is held every year for university candidates. It is a nationwide written test (subjects: mathematics, Bahasa Indonesia, English, physics, chemistry, biology, economics, history, sociology, and geography).
3. Independent Selection (Seleksi Kemitraan Mandiri, SKM): Students are selected based on criteria determined by ITS itself. It mainly follows the results of UTBK, but also considers other criteria such as achievements and motivation of the students.

For each academic year, the university determines the ratio of students admitted through these three ways.

For the Master's degree programmes, applicants need to have obtained a Bachelor's degree with a minimum GPA of 3.0 from a programme accredited A or B by the national Indonesia accreditation agency, pass the entrance exam, and submit two letters of recommendation.

According to the general admission criteria, to be admitted into any of the four degree programmes under review, an applicant needs to have full colour-vision. While the admission criteria generally appear clear and understandable to the peers, they wonder about

this need for colour-vision and learn that ITS indeed conducts tests in this regard. As there is no convincing reason for this rule, the peers consider it needlessly restrictive and ask ITS to drop it.

The admission website informs potential students in great detail about the requirements and the necessary steps to apply for admission into the programmes. Since the rules are based on decrees by the ministry of education and on the university's written regulations, the peers deem them binding and transparent.

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

As ITS did not give a statement regarding criterion 1, the peers retain their original assessment. They consider criterion 1 partly fulfilled. To achieve full compliance, ITS needs to make people with colour-blindness eligible for admission. The peers further recommend to strengthen the students' communication skills.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions
- Objective-Modules-Matrices
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The Bachelor's programmes are designed for four years and the students need to achieve 150 Indonesian Credit Points (SKS, which is roughly equivalent to 240 ECTS; cf. chapter 2.2 for more details). Roughly 90 % of these CPs are awarded for compulsory, around 10 % for elective courses. The Master's programmes encompass 74 SKS (around 118 ECTS) within two years, with around 50 % (Mathematics) or 25 % (Statistics) of electives. Each semester is equivalent to 16 weeks, including 14 weeks of learning activities and two weeks of evaluation (midterm and final exams).

After analysing the module descriptions and the study plans, the peers confirm that all degree programmes under review are divided into modules and that each module is a sum of coherent teaching and learning units. All programmes allow the students to define individual focuses through broad ranges of electives (see chapter 1.3 for more details). The students confirm that the structure of the programme allows them to reach the learning outcomes within the regular duration. This is corroborated by data provided by ITS, which demonstrates that the average study time is very close to the allocated eight and four semesters for Bachelor's and Master's degree programmes, respectively. At the same time, only around 10 % of students do not successfully finish their studies in the programmes at hand. In the peers' opinion, this shows the sound organisation of the programmes as well as sufficient means of support for the students (see 2.4).

The peers notice that for some modules, only surprisingly few credit points are awarded. While the programme coordinators point out that this is due to some regulation by ITS, the peers emphasise that the amount of credit points should only depend on the workload necessary to achieve the learning outcomes of the course. On the one hand, this workload could be determined more accurately (see 2.2), on the other hand, the average size of the modules in terms of credit points could be increased to ensure that the workload is adequately covered. In any case, the amount of credit points for a course should not be subject to arbitrary limits.

Both Bachelor's degree programmes contain a one-month internship (also called work experience), although it is mandatory for Statistics, while it is only an elective course for Mathematics. This can be done in companies or with other potential employers, although the majority of students takes part in research projects of the lecturers instead. For the students to gather practical work experience and to get in contact with potential future employers, it should be the university's goal that most of them do their internships in companies. However, the current length of only one month may make this difficult and therefore, the peers recommend to extend this length to increase the utility of the internship for students as well as for employers. ITS could also consider making it mandatory, so that all students gain sufficient practical work experience.

Besides this internship anchored in the programmes, there is a university-wide programme to recognise internships done by the students as extra-curricular activities and to award 2 to 20 credit points for them. The peers appreciate this opportunity, although they wonder why the relationship between the duration of the internship and the awarded credit points is not proportional.

Of the 74 SKS for the Master's programmes, 38 are related to so-called "Additional activities". These partly consist of additional courses, partly of activities related to the thesis,

namely literature review, support work, and publication. Besides the list of these activities, the peers do not have any further information about these activities. Therefore, they ask ITS to provide more information about the content of these activities, preferably module descriptions. These should also clarify what exactly the students have to do in the various activities and if and how they are examined and graded.

According to the Self-Assessment Report, as a requirement for all programmes, students have to prove a certain level of English skills through TOEFL and for the Bachelor's programmes, they need extracurricular activities amounting to 2 SKS to be recognised by the university. As these two elements are mandatory elements of the curricula and credit points are awarded for these, they need to be incorporated into the module handbook. These descriptions should include the usual information and particularly detail the exact requirements for the award of the credit points.

International Mobility

The Self-Assessment Report as well as the discussions make it very clear that international recognition is one of ITS's primary goals for the next years. The peers point out that international mobility, with regard to the lecturers as well as to the students, is a key factor in these efforts.

The peers learn that the university already provides various mobility opportunities for students. These include semesters abroad, short programmes, internships, and international conferences. To foster these, there are cooperation agreements with 653 partner institutions worldwide, with a certain focus on Asia, but also including many institutions in Europe and North America. Partly due to the Corona pandemic, the number of students that participated in mobility programmes in 2020 and 2021 was relatively low, but is expected to markedly increase after the pandemic. An international office has been established in order to coordinate ITS's efforts and to support the students in the planning and administration of international mobility. Moreover, the university provides scholarships for international mobility programmes.

Qualifications obtained at other universities in Indonesia or abroad are recognised in line with the courses at ITS. Before a stay abroad, the university concludes a learning agreement with the respective student to ensure that the courses taken are relevant to the study programme and can thus be recognised. As the students confirm, there are no problems with credit transfer or the organisation of student mobility. They emphasise that the international office as well as their academic advisors are eager to support them and to find adequate study programmes and courses.

The peers appreciate the efforts undertaken by the university to foster student mobility and they are very satisfied with the structures and support mechanisms for international mobility.

Criterion 2.2 Workload and credits

Evidence:

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

Preliminary assessment and analysis of the peers:

Based on the National Standards for Higher Education of Indonesia (SNPT), all four degree programmes under review use a credit point system called SKS. According to the legal requirements, an undergraduate programme in Indonesia can have between 144 and 160 SKS and a graduate programme has to include at least 36 SKS. The Bachelor's programmes under review both encompass 150 SKS, while the Master's programmes have 74 SKS.

1 SKS of academic load is equivalent to 170 minutes per semester week. For lectures, tutorials and similar classes, this means 50 minutes of face-to-face activity, 60 minutes of structured tasks and 60 minutes of independent learning per semester week, whereas for laboratory work and internships, 1 SKS equals 170 minutes of the respective activity per semester week. Regarding the conversion from SKS to ECTS, ITS explains that 1 SKS equals 45.3 hours and thus 1.6 ECTS, based on 28.3 hours per ECTS. The peers acknowledge that a credit point system based on the students' workload is in place.

In all programmes, the workload is spread relatively evenly over the semesters. Moreover, the effective number of SKS the students can take depends on their achievements in the previous semester. In the Bachelor's programmes, if their Grade Point Average is less than 2.5, they can take up to 18, between 2.5 and 3.0 up to 20, between 3.0 and 3.5 up to 22 and above 3.5 up to 24 SKS in one semester. In the Master's programmes, they can take up to 12 SKS if their GPA is less than 3 and up to 15 SKS otherwise. Here, it appears as if only the 36 SKS of regular courses are considered, not the 38 SKS of "Additional activities" (cf. chapter 2.1). This mechanism is supposed to ensure that the students can really handle the workload. It also means that students can finish their studies in less than 8 semesters, although this is relatively rare due to the high workload in general. The peers are satisfied with the distribution of the workload and they see that there are no structural peaks.

As has already been mentioned, based on the available data, the vast majority of the students manage to finish their studies on time. The students confirm that the overall workload is high but manageable. As the lecturers explain, the workload for assignments and individual study in each course is estimated by the lecturers based on their experience. There is, however, currently no mechanism in place to ensure that this estimated workload is realistic and to prevent students from having to invest disproportional effort into certain courses. As the students confirm, the workload for some courses is indeed higher than the awarded credit points could justify. Thus, the peers recommend to establish a system to monitor the actual student workload in the individual modules. This could, for instance, be incorporated into the existing course evaluation surveys.

Criterion 2.3 Teaching methodology

Evidence:

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

Preliminary assessment and analysis of the peers:

As ITS explains in the Self-Assessment Report, various student-centred learning methods are utilised in the degree programmes under review. Through the Indonesian regulations on credit points (see chapter 2.2), an adequate balance between face-to-face activities and independent learning is already ensured for all courses. Besides the regular lectures, methods such as group discussions, project- and problem-based learning are used. The students confirm that these methods are actually in use and that they are highly satisfied with the variety of teaching methods, which support them in achieving the learning outcomes. The classes are sufficiently small (no more than 25 students for electives and 50 for compulsory courses) to allow the effective use of interactive methods.

Teaching and learning is supported by a broad range of media, both traditional (books, papers) and online (videos, presentations etc.). The university's online learning management system supports teachers and students in communicating and disseminating learning material. In the course of the Covid-19 pandemic, the university has swiftly switched to online learning with videoconferences, recorded videos and other media.

The peers consider the teaching methodologies employed in the degree programmes to be diverse, interactive and to support reaching the PEOs and PLOs. They are well adapted to the aims and conditions of the individual courses. The only area, in which they see some room for improvement, concerns the students' communication skills (see 1.3). These could

further be strengthened by using even more discussions, moderated by the students themselves, as well as presentations.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Reports
- Website
- Discussions during the audit

Preliminary assessment and analysis of the peers:

In order to support students in completing their studies on time with good achievements, the university and the faculty provide academic and personal support and assistance through various means. The main contact person for every student is their academic advisor, who is assigned to them in their first semester. An academic advisor shall help them develop an adequate schedule for their studies, choose electives according to their skills and interests and support them in case of academic and non-academic problems. Each student usually meets with their academic advisor, who is also responsible for monitoring their study progress, at least twice per semester. The academic advisor also has to approve the student's study plan for the semester. As the peers learn and highly appreciate, the study progress is not only monitored by the academic advisor on an individual basis, but the faculty is automatically alerted when students fall below a certain number of credit points per semester and are thus threatened with dropping out. In these cases, additional advice can be provided.

Furthermore, there is supporting staff in the International Office (cf. chapter 2.1), the Career centre, the scholarship sector and the general academic administration. The career centre regularly organises job fairs, seminars with potential employers, trainings for writing applications etc. in order to support the students in their career planning.

During the discussions, it remains unclear to the peers how students with disabilities are supported. Therefore, they ask ITS for additional information on this point.

Apart from that, the peers conclude that there are enough resources available to provide individual assistance, advice, and support for all students. The support systems help the students to achieve the intended learning outcomes to complete their studies successfully.

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

The peers thank ITS for providing module handbooks of the “Additional Activities” within the Master’s degree programmes and information on how students with disabilities are supported.

They consider criterion 2 fulfilled, but recommend to increase the average size of modules, to establish a workload monitoring system, and to consider a longer internship programme that is also mandatory for the Bachelor of Mathematics.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation
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Evidence:

- Self-Assessment Report
- Module descriptions
- ITS Academic regulations
- Sample written exams and final theses

Preliminary assessment and analysis of the peers:

For the examination of the students’ achievement, each course has to determine objectives, which support the achievement of the overall learning outcomes of the respective programme. Accordingly, each course must assess whether all defined learning outcomes stated in the module description have been achieved. For this purpose, ITS utilises various types of examination.

In each course, at least two assignments/quizzes, a mid-term and a final examination are employed. There are different assessment methods in the programmes, such as written tests, quizzes, assignments, reports, presentations, and oral examinations. In most courses, mid-term and final exam consist of written tests and additional quizzes or assignments are used. However, the other assessment methods are also used to a certain degree.

The final course grade is calculated based on the score of these individual assessments, whereby the lecturer determines the ratio between them in accordance with the Academic Guidelines. At the first meeting of a course, the students are informed about what exactly is required to pass the module and about how the final grade is determined through the teaching and learning plan. ITS uses a grading system with the grades A, AB, B, BC, C, D and E, where a D (equivalent to a Grade Point of 1) is necessary to pass a module.

The mid-term exams are carried out in the 8th, the final exams in the and 16th week of the semester, whereas the smaller quizzes and assignments take place in the other weeks. The students confirm that they are normally well-distributed, so that there are no more than a few in any given week. However, the peers would like to know how many unscheduled quizzes or other types of assessment are used and what percentage of the final course grades they constitute. In general, they think that examinations of the students should be scheduled to ensure that they have sufficient time to prepare for them. There is a defined process of appeal against the results of examinations that goes through the head of department and of which the students are generally aware.

According to ITS regulations, students who cannot participate in the regular exams due to illness or other legitimate reasons have the right to be offered a follow-up exam in the same semester. There appear to be no specific rules regarding compensation measures for students with disabilities. The peers ask ITS to clarify whether this is actually the case and if so, they ask the university to draft such regulations so that the students' rights are clearly laid down and they can rely on them.

There are special regulations in place for Bachelor's and Master's theses that specify rules about supervision, procedure and other related issues. Amongst other things, it is required for Master's theses to be published either in a national or international SCOPUS-indexed journal or in the proceedings of an international conference. The peers are wondering whether this should be a general rule, as in some cases the scientific quality might not merit a publication and they invite ITS to think about this in the future.

Overall and with the exception of the mentioned issues, the peers are satisfied with the regulations of exams in the four degree programmes. They inspect a sample of exams and final theses and are satisfied with the general quality of the samples.

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

ITS explains that there are no unscheduled examinations in the degree programmes in the sense that the students are not informed about the dates of these examinations. The difference between mid-term and final exams and the smaller examinations is rather that the latter are not scheduled before the beginning of the courses. The peers are satisfied with this explanation.

ITS provides an official regulation, which specifies that students who could not participate in an exam due to illness or other legitimate reasons have to be given the opportunity of a follow-up exam in the same semester, which the peers appreciate.

They appreciate that students with disabilities are supported in accordance with their needs, but consider it necessary to establish binding rules for compensation measures for exams on which students can rely. These have to ensure that all students are generally able to participate in the exams on equal footing, regardless of handicaps. Depending on the kind of disability, this could include alternative types of examination, more time or other appropriate measures.

They consider criterion 3 mostly fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

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

Preliminary assessment and analysis of the peers:

At ITS, the staff members have different academic positions. There are professors, associate professors, assistant professors, and lecturers. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. This relies on regulations by the Indonesian Ministry of Education that determines certain minimum credit points of experience for reaching the next level. Every teaching staff has responsibilities in the fields of teaching, research, and community service. Some are furthermore involved in the management of the programmes, the faculty or other university bodies, for which their other responsibilities are reduced.

There are 44 teaching staff for the Bachelor of Mathematics (21 with PhD, 6 currently acquiring a PhD, 17 with Master's degree), 31 for the Bachelor of Statistics (23 with PhD, 4 currently acquiring a PhD, 4 with Master's degree), 20 for the Master of Mathematics and 23 for the Master of Statistics (all of whom have a PhD). According to ITS's current policy, all new teaching staff has to have or actively pursue a PhD and additionally, the university encourages the teaching staff with a Master's degree to pursue further qualification in order to obtain a PhD degree. These numbers mean that the ratio between academic staff

and students is between 1:2.3 and 1:4 for the Master's, and around 1:11 for the Bachelor's degree programmes. From these numbers as well as the students' feedback, the peers see that the academic staff is well able to fulfil its duties in teaching as well as in the other areas. They observe that the lecturers are engaged and that there is a good relationship to the students.

In addition, the faculty regularly invites visiting lecturers from Indonesia and abroad to facilitate academic exchange. The peers welcome this and at the same time concur that it would be useful to include even more external expertise into the programmes. They particularly recommend to use more external teaching staff from industry or business in applied courses or in guest lectures to strengthen the links to companies and to bring the students in contact with potential future employers.

Recruiting new teaching staff follows a defined procedure starting with a needs analysis of the degree programme, the proposal for new positions to the university, a public announcement and finally the recruitment based on the results of a basic competence test, a field competence test and an interview.

The academic staff is involved in research projects funded by grants from the Indonesian government, the university itself or other research funds. ITS positions itself as a university with a strong research focus, which the peers appreciate. They also learn that students can be involved in research project, for instance through undergraduate theses.

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

Criterion 4.2 Staff development
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Evidence:

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

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Report, ITS encourages the continuing professional development of its staff. For this purpose, various opportunities are provided. There is a mandatory didactic training for new academic staff that encompasses curriculum design, teaching material, and innovative teaching and learning methods. Moreover, in each semester workshops are held to refresh and to deepen various didactic competences.

All teaching staff are encouraged to study abroad or to participate in international research projects and conferences in order to enhance their knowledge, increase their English proficiency and to build international networks. For this purpose, the university informs about possible scholarships to support academic mobility. Particularly for junior lecturers with a Master's degree, ITS offers systematic training to prepare them for acquiring a PhD abroad, for instance through English courses, information on foreign education systems, administrative support, and supporting (international) research collaborations.

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

The peers appreciate the university's efforts in this regard and consider the support mechanisms for the continuing professional development of the teaching staff adequate and sufficient. They particularly recommend to continue the efforts to strengthen the lecturer's English skills, as these are a basis for fruitful international exchange and cooperation.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Report
- Videos and presentation of the facilities
- Discussions during the audit

The university and the faculty are mainly funded by the Indonesian government, through tuition fees and through grants for research projects in collaboration with industry. The figures presented by the university show that the faculty's income is stable and the funding of the degree programmes is secured. The academic staff emphasise that from their point of view, all four programmes under review receive sufficient funding for teaching and learning activities. The students confirm this positive impression and state their satisfaction with the available resources.

In preparation of the audit, the university provides a number of videos showing the facilities of the programmes, which are presented in more detail during the virtual on-site visit. The peers notice that the lecture rooms are in a good condition, well equipped and that most of them are wheelchair-accessible. As there are also restrooms for students and staff with disabilities, the peers conclude that the programmes are generally accessible. The students have access to a sufficient number of computer laboratories and they can also use high-performance computers if they need them for projects or their theses.

The departments' libraries provide students and lecturers with national and international literature. Moreover, there is access to e-books and international journals through various subscriptions, not only at the libraries themselves but also via remote access. The students point out that the department libraries already close at 4 pm in the afternoon. Notwithstanding the existing opportunities of remote access and virtual literature, the peers notice that this does not ideally fit the students' schedules, as they often have courses from morning until afternoon. Therefore, they recommend to extend the opening hours, so that students can better use the libraries for learning and studying.

In summary, the peer group judges that the available funds, the technical equipment, and the infrastructure comply with the requirements for adequately sustaining the degree programmes.

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

As ITS did not give a statement regarding criterion 4, the peers retain their original assessment. They consider criterion 4 fulfilled and recommend to include more external expertise into the programmes through external teaching staff.

5. Transparency and documentation

Criterion 5.1 Module descriptions
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Evidence:

- Module descriptions
- Website

Preliminary assessment and analysis of the peers:

The module handbooks for all four programmes have been published on the university's website and are thus accessible to the students as well as to all stakeholders. The peers observe that they contain information on many important issues such as the intended learning outcomes, the credit points awarded, the main content, prerequisites, and recommended literature.

However, some information is missing or insufficient. The responsible persons, teaching methods, the total workload and its composition (course, assignments, and individual study), the possible forms of examination and the determination of the final grade for each course are not given consistently. Therefore, the peers urge ITS to revise the module descriptions to ensure that all necessary information is presented.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample Transcript of Records for each degree programme
- Sample Diploma certificate for each degree programme
- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the peers:

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

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Report
- Website

Preliminary assessment and analysis of the peers:

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

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

As ITS did not give a statement regarding criterion 5, the peers retain their original assessment. They consider criterion 5 partly fulfilled. ITS still has to revise the module descriptions in order to include all mandatory information.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- ITS Guidebook on internal quality assurance
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The peers learn that there is an institutional system of quality management aiming at continuously improving the degree programmes. This system relies on internal (SPMI) as well as external (SPME) quality assurance.

SPME focuses on both national and international accreditations. Every degree programme and every Higher Education Institution in Indonesia has to be accredited by the national Accreditation Agency (BAN-PT). ITS as an institution as well as all four degree programmes under review have received the highest accreditation status (A) from BAN-PT.

SPMI encompasses all activities focused on implementing measures for improving the teaching and learning quality at the university. ITS has a Quality Assurance Office (KPM), which conducts regular scans of academic and non-academic quality criteria within the institution. Apart from this office, there are different quality assurance units in place, such as the Faculty Quality Team (TMF), Department Quality Team (TMD), and Degree program Quality Team (TMP). Different measures are taken to gather information about a variety of qualitative aspects of the institution.

On the institutional level, ITS annually carries out an SPMI evaluation of ten standards concerning management, resources, strategic development and quality assurance procedures. The performance of the departments is continuously checked through an information system called SIPMONEV. As has already been mentioned, there is a major curriculum revision process for each programme every four years and a minor one every year (cf. chapter 1). The graduates are followed by ITS through a regular tracer study conducted by the career centre. Internal and external stakeholders give input through these processes in various ways.

Lastly, at the end of each semester, the students are asked to fill out an evaluation survey on each course that they took. It contains several items regarding the quality of the teaching, the learning media, the adequacy of assessment methods and similar issues. Based on the results, a Lecturer Achievement Index (IPD) is calculated for each lecturer, which is used for questions of staff development.

The peers acknowledge that ITS has established a comprehensive quality assurance system that is generally suitable to identify weaknesses and to improve the degree programmes. However, they also identify some weak points. In the meetings with students and lecturers,

it becomes clear that all students have to fill out the course evaluation surveys in order to be able to access their grades through ITS's IT system. The peers are worried that this may lead to a lack of validity of the results as some students may not take enough time for the survey and not fill it out with sufficient attention. Thus, they encourage ITS to reconsider this. A more serious issue appears to be that the students' feedback is not anonymous if it is directly linked to their student ID. To facilitate honest feedback and criticism, the university has to ensure that these surveys are absolutely anonymous.

Moreover, the peers learn that while the lecturers and the head of department receive the overall results of the course evaluation surveys, there seems to be no systematic way, in which the students are informed about these and about the measures that may be taken to improve the courses. In order to close the feedback loops, they consider such a process necessary and ask ITS to establish it, if it is indeed not yet in place.

As the peers understand it, the students as crucial stakeholders of the programmes are involved in the quality assurance processes in various ways, for instance through the surveys, but also through discussions with student representatives. The student representatives are, however, currently not directly involved in the decision-making processes, be it regarding the programmes or at the various levels of university management. The peers regard the involvement of students in decision-making – not only regarding quality assurance, but in a diverse range of matters that concern them – as a good opportunity to strengthen the students' awareness and engagement and therefore, they suggest to consider whether there are ways how to achieve this.

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

As ITS did not give a statement regarding criterion 6, the peers retain their original assessment. They consider criterion 6 partly fulfilled. In order to achieve full compliance, the anonymity of the student course evaluation surveys has to be ensured and the results as well as the measures taken on their basis have to be systematically communicated to the students. Moreover, the peers recommend to involve the students more in the continuous improvement of the programmes and the institution, not only by providing information, but also by actively participating in the discussions and the decisions that are made.

D Additional Documents

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

1. How many unscheduled exams/quizzes are there? What percentage of the final grades of the courses do they constitute?
2. How exactly do students and external stakeholders participate in the regular curriculum revision processes?
3. Module handbooks for “Additional activities” (38 SKS) in the Master’s degree programmes
4. Are there any compensation measures for exams for students with disabilities? Are there other means of support for them?

E Comment of the Higher Education Institution (07.11.2021)

The institution provided the following additional information and documents:

- Number of unscheduled exam and weight for the final course grades
- Students and External Stakeholder's Participation in the Regular Curriculum Revision Processes
- Module handbooks for "Additional Activities"
- Compensation measures for students with disabilities
- Policy for students who cannot follow the evaluation due to illness, disability, or other reasons

F Summary: Peer recommendations (15.11.2021)

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Mathematics	With requirements for one year	30.09.2027	–	--
Ba Statistics	With requirements for one year	30.09.2027	–	--
Ma Mathematics	With requirements for one year	30.09.2027	–	--
Ma Statistics	With requirements for one year	30.09.2027	–	--

Requirements

For all degree programmes

- A 1. (ASIIN 1.4) ITS has to admit applicants with colour-blindness into the programmes.
- A 2. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.
- A 3. (ASIIN 5.1) Rewrite the module descriptions to incorporate all mandatory elements of the curricula and to include information about the responsible person, teaching methods, workload, examination requirements, and determination of the grade for each module.
- A 4. (ASIIN 6) The students need to be informed about the results of the course evaluations and about the measures that are taken to improve the courses.
- A 5. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3, 2.3) It is recommended to further strengthen the students' communication skills.
- E 2. (ASIIN 2.1) It is recommended to increase the average size of the modules.
- E 3. (ASIIN 2.2) It is recommended to establish a system to monitor the actual student workload in the individual modules.
- E 4. (ASIIN 4.1) It is recommended to use more external teaching staff from industry or business in applied courses or guest lectures to include external expertise into the programmes.
- E 5. (ASIIN 6) It is recommended to strengthen the students' involvement in the constant development of the programmes, for instance by involving student representatives in the relevant decision-making bodies.

For the Bachelor's degree programmes

- E 6. (ASIIN 2.1) It is recommended to consider increasing the length of the internship and making it mandatory for the Bachelor of Mathematics so that all students gain sufficient practical work experience.

G Comment of the Technical Committee 12 – Mathematics (24.11.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and agrees with the assessment of the peers and with the suggested requirements and recommendations.

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Mathematics	With requirements for one year	30.09.2027	–	--
Ba Statistics	With requirements for one year	30.09.2027	–	--
Ma Mathematics	With requirements for one year	30.09.2027	–	--
Ma Statistics	With requirements for one year	30.09.2027	–	--

H Decision of the Accreditation Commission (07.12.2021)

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

The Accreditation Commission discusses the procedure and generally agrees with the assessment of the peers and Technical Committees. The commission makes some editorial changes to requirement A1 and E3, so that they are more precise.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Mathematics	With requirements for one year	30.09.2027	–	--
Ba Statistics	With requirements for one year	30.09.2027	–	--
Ma Mathematics	With requirements for one year	30.09.2027	–	--
Ma Statistics	With requirements for one year	30.09.2027	–	--

Requirements

For all degree programmes

- A 1. (ASIIN 1.4)) ITS must not exclude students from admission on the grounds of colour-blindness.
- A 2. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.
- A 3. (ASIIN 5.1) Rewrite the module descriptions to incorporate all mandatory elements of the curricula and to include information about the responsible person, teaching

methods, workload, examination requirements, and determination of the grade for each module.

- A 4. (ASIIN 6) The students need to be informed about the results of the course evaluations and about the measures that are taken to improve the courses.
- A 5. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3, 2.3) It is recommended to further strengthen the students' communication skills.
- E 2. (ASIIN 2.1) It is recommended to increase the average size of the modules.
- E 3. (ASIIN 2.2) It is recommended to establish a system to monitor the actual student workload in relation to the content that is to be taught in the individual modules. If imbalances are found, the amount of credit points should be adjusted accordingly.
- E 4. (ASIIN 4.1) It is recommended to use more external teaching staff from industry or business in applied courses or guest lectures to include external expertise into the programmes.
- E 5. (ASIIN 6) It is recommended to strengthen the students' involvement in the constant development of the programmes, for instance by involving student representatives in the relevant decision-making bodies.

For the Bachelor's degree programmes

- E 6. (ASIIN 2.1) It is recommended to consider increasing the length of the internship and making it mandatory for the Bachelor of Mathematics so that all students gain sufficient practical work experience.

I Fulfilment of Requirements (09.12.2022)

Analysis of the peers and the Technical Committee/s (01.12.2022)

Requirements

For all degree programmes

- A 1. (ASIIN 1.4) ITS must not exclude students from admission on the grounds of colour-blindness.

Initial Treatment	
Peers	fulfilled Justification: Colour blind students are able to join the programmes now.
TC 12	Fulfilled. Vote: unanimous. Justification: The TC agrees with the opinion of the expert panel.

- A 2. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.

Initial Treatment	
Peers	fulfilled Justification: Students with disabilities receive support with exams and their implementation.
TC 12	Fulfilled. Vote: unanimous. Justification: The TC agrees with the opinion of the expert panel.

- A 3. (ASIIN 5.1) Rewrite the module descriptions to incorporate all mandatory elements of the curricula and to include information about the responsible person, teaching methods, workload, examination requirements, and determination of the grade for each module.

Initial Treatment	
Peers	fulfilled

	Justification: Module descriptions have been corrected and extended with details.
TC 12	Fulfilled. Vote: unanimous. Justification: The TC agrees with the opinion of the expert panel.

- A 4. (ASIIN 6) The students need to be informed about the results of the course evaluations and about the measures that are taken to improve the courses.

Initial Treatment	
Peers	fulfilled Justification: Evaluations and their visibility to the students have been fixed.
TC 12	Fulfilled. Vote: unanimous. Justification: The TC agrees with the opinion of the expert panel.

- A 5. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.

Initial Treatment	
Peers	fulfilled Justification: The surveys are now anonymous.
TC 12	Fulfilled. Vote: unanimous. Justification: The TC agrees with the opinion of the expert panel.

Decision of the Accreditation Commission (09.12.2022)

Having taken into consideration the assessment of the expert panel and the relevant Technical Committee, the Accreditation Commission took the following decision:

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Statistics	All requirements fulfilled		30.09.2027
Ma Statistics	All requirements fulfilled		30.09.2027
Ba Mathematics	All requirements fulfilled		30.09.2027

I Fulfilment of Requirements (09.12.2022)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ma Mathematics	All requirements fulfilled		30.09.2027

Appendix: Programme Learning Outcomes and Curricula

According to the website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Mathematics:

1. [C2] Students are able to identify and explain foundations of mathematics that include pure, applied, and the basic of computing
2. [C3] Students are able to solve simple and practical problems by applying basic mathematical statements, methods and computations
3. [C4] Students are able to analyze simple and practical problems in at least one field of analysis, algebra, modeling, system optimizations and computing sciences
4. [C5] Students are able to work on a simple and clearly defined scientific task and explain the results, both written and verbally either on the area of pure mathematics or applied mathematics or computing sciences
5. [C3] Students are able to make use of the principles of long life learning to improve knowledge and current issues on mathematics
6. Students are able to demonstrate religious attitude and tolerance
7. Students are able to demonstrate an attitude of responsibility and commitment to law enforcement, ethics, norms for community and environmental sustainability

The following **curriculum** is presented:

Semester I			
Num.	Course Code	Course	Credit
1	UG184914	English	2
2	KM184101	Mathematics 1	3
3	SF184101	Physics 1	4
4	SK184101	Chemistry	3
5	KM184102	Mathematical Logic	3
6	KM184103	Analytic Geometry	3
Total			18
Semester II			
Num.	Course Code	Course	Credit
1	UG18490X	Religion	2

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2	UG184913	National Insight	2
3	KM184201	Mathematics 2	3
4	SF184202	Physics II	3
5	KM184202	Algorithm and Programming	4
6	KM184203	Elementary Linear Algebra	4
Total			18
Semester III			
Num.	Course Code	Course	Credit
1	UG184911	Pancasila	2
2	KM184301	Multivariable Calculus	4
3	KM184302	Operation Research I	3
4	KM184303	Object Oriented Programming	3
5	KM184304	Discrete Mathematics	3
6	KM184305	Statistical Methods	3
Total			18
Semester IV			
Num.	Course Code	Course	Credit
1	KM184401	Ordinary Differential Equation	3
2	KM184402	Algebra I	3
3	KM184403	Mathematical Software	3
4	KW184901	Probability Theory	3
5	KM184404	Numerical Methods	3
6	KM184405	Operation Research II	3
Total			18
Semester V			
Num.	Course Code	Course	Credit
1	KM184501	Analysis I	4
2	KM184502	Vector Calculus	2
3	KM184503	Partial Differential Equation	3
4	KM184504	Algebra II	3
5	KM184505	Mathematical Statistics	3
6	KM184506	Simulation	3
Total			18
Semester VI			
Num.	Course Code	Course	Credit
1	UG184912	Indonesian	2
2	KM184601	Analysis II	4
3	KM184602	Function of Complex Variables	3
4	KM184603	Mathematical Methods	3
5	KM184604	Mathematical System	4
6		Elective Courses	3
Total			19
Semester VII			
Num.	Course Code	Course	Credit

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1	UG184915	Technopreneurship	2
2	KM184701	Mathematical Modeling	4
3	KM184702	Linear Algebra	3
4	KM184703	Mathematical Writing	2
5	KM184704	Combinatorial Analysis	3
6		Elective Courses	4
Total			18
Semester VIII			
Num.	Course Code	Course	Credit
1	KM184801	Final Project	6
2	UG184916	Technology Insight and Application	3
3		Elective Courses	8
Total			17

List of Elective Courses

Semester VII			
RMK	Course Code	Course Name	Credit
AA	KM184711	Number Theory	2
	KM184712	Geometry	2
	KM184713	Introduction to Graph Theory	2
MT	KM184714	Non-Linear Differential Equation	2
	KM184715	Finite Difference	2
	KM184716	Introduction to Dynamic Optimization	2
	KM184717	Practical Work	2
	KM184718	Introduction to Financial Mathematics	2
	KM184719	Stochastic Process	2
	KM184720	Quality Control	2
	KM184721	Numerical Differential Equations	2
IK	KM184731*	Mathematical System Modeling	3
	KM184722	Database Systems	2
	KM184723	Digital Image Processing	2
	KM184724	Artificial Intelligence	2
	KM184725	Data Mining	2
	KM184726	Data Structure	2
Semester VIII			
RMK	Course Code	Course Name	Credit
AA	KM184811	Measure Theory and Integration	2
	KM184812	Topics in Analysis	2
	KM184813	Topics in Algebra	2
	KM184814	Fourier and Wavelet Transforms	2
	KM184815	Differential Geometry	2
MT	KM184816	Optimum Estimation	2
	KM184817	Introduction Dynamical System	2
	KM184818	Experiment Design	2
	KM184819	Topics in Modeling, System, and Simulation	2
	KM184820	Topics in Stochastic, Optimization, and Risks	2
	KM184821	Forecasting Methods	2
	KM184822	Finite Element Methods	2

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	KM184823	Introduction to Risk Analysis	2
	KM184824	Introduction to Computational Fluid Dynamics	2
	KM184825	Numerical Partial Differential Equations	2
IK	KM184826	Design and Analysis of Algorithm	2
	KM184827	Software Engineering	2
	KM184828	Artificial Neural Network	2
	KM184829	Fuzzy Logic	2
	KM184830	Cryptography	2
	KM184831	Topics in Computing	2
	KM184832	Development of Web Application	2
	KM184833	Decision Support Systems	2
	KM184834	Database Technology	2

According to the website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Statistics:

PLO -1 Able to apply knowledge of statistical theory, Mathematics, and computation

PLO -2 Able to design and carry out data collection with the correct methodology

PLO -3 Able to analyze data with the right statistical methods and interpret them

PLO -4 Able to identify, formulate and solve statistical problems in various applied fields

PLO -5 Able to use computational techniques and modern computer devices needed in the fields of statistics and data science

PLO -6 Having knowledge of current and future issues related to the fields of statistics and data science

PLO -7 Able to communicate effectively and work together in interdisciplinary and multi-disciplinary teams

PLO -8 Have the responsibilities and professional ethics

PLO -9 Able to motivate themselves to think creatively and lifelong learning

The following **curriculum** is presented:

SEMESTER: I			
No.	Course Code	Course Name	Credit
1	SK184101	<u>Chemistry</u>	3
2	KS184102	<u>Introduction to Economy Theory</u>	4

0 Appendix: Programme Learning Outcomes and Curricula

3	KM184101	<u>Mathematics I</u>	3
4	KS184101	<u>Introduction to Statistical Method</u>	3
5	SF184101	<u>Physics I</u>	4
6	UG184914	<u>English</u>	2
	Total credit		19

SEMESTER: II

No.	Course Code	Course Name	Credit
1	UG184912	<u>Bahasa Indonesia</u>	2
2	SF184201	Physics II	3
3	KS184203	<u>Sampling and Survey Techniques</u>	3
4	KM184201	<u>Mathematics II</u>	3
5	KS184240	<u>Computer Programming</u>	4
6	UG1849XY	<u>Religion</u>	2
	Total credit		17

SEMESTER: III

No.	Course Code	Course Name	Credit
1	KS184341	<u>Numerical Analysis</u>	3
2	UG184911	Pancasila (Five Basic Principles)	2
3	KS184304	<u>Regression Analysis</u>	3
4	KS184305	<u>Linear Algebra</u>	4
5	KS184306	<u>Mathematics III</u>	

	3
Total credit	18

SEMESTER: IV

No.	Course Code	Course Name	Credit
1	KS184442	<u>Explorative Data Analysis</u>	2
2	KS184408	<u>Experimental Design</u>	3
3	KS184409	<u>Mathematics IV</u>	3
4	KS184410	Mathematical Statistics I	3
5	KS184443	<u>Statistical Computation</u>	3
6	KS184411	<u>Operation Management</u>	3
7		Extracurricular Activities	1
	Total credit		18

SEMESTER: V

No.	Course Code	Course Name	Credit
1	UG184915	<u>Technopreneurship</u>	2
2	KS184512	<u>Non Parametric Statistics</u>	3
3	KS184513	<u>Mathematical Statistics II</u>	3
4	KS184514	<u>Stochastic Process</u>	3
5	KS184544	<u>Statistical Quality Control</u>	4
6		Elective Course I	3
7		Extracurricular Activities	1

Total credit **19**

SEMESTER: VI			
No.	Course Code	Course Name	Credit
1	KS184615	<u>Multivariate Analysis</u>	4
2	KS184616	<u>Categorical Data Analysis</u>	3
3	KS184617	<u>Time Series Analysis</u>	3
4	KS184618	<u>Research Methodology</u>	2
5	KS184645	<u>Data Mining</u>	3
6		Elective Course II	3
7		Foreign Language	2
	Total credit		20

SEMESTER: VII			
No.	Course Code	Course Name	Credit
1	KS184719	<u>Official Statistics</u>	3
2	KS184746	<u>Simulation Techniques</u>	3
3	KS184720	<u>Econometrics</u>	3
4	KS184747	<u>Data Analysis</u>	3
5	KS184721	<u>On Job Training</u>	2
6		Elective Course III	3
7		Scientific Publication	2
	Total credit		19

SEMESTER: VIII

No.	Course Code	Course Name	Credit
1	UG184916	<u>Insight and Technology Application</u>	3
2	KS184822	<u>Final Project</u>	6
3	KS184823	<u>Statistical Consulting</u>	3
4	UG184913	<u>Civics</u>	2
5	KS184824	<u>Survival Analysis</u>	3
6		Elective Course IV	3
Total credit			20

List of Elective Courses

No.	Course Code	Course Name	Credit
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RMK THEORY and STATISTICAL MODELING

1	KS184625	<u>Nonparametric Regression</u>	3
2	KS184626	<u>Bayesian Analysis</u>	3
3	KS184827	<u>Time Series Econometrics</u>	3

RMK COMPUTATIONAL STATISTICS

4	KS184528	<u>Data Structure and Algorithm</u>	2
5	KS184648	<u>Management Information System</u>	3
6	KS184749	<u>Statistical Machine Learning</u>	3

RMK BUSINESS and INDUSTRIAL STATISTICS

7	KS184529	<u>Operation Research</u>	3
8	KS184530	<u>Quality Management</u>	3
9	KS184531	<u>Business Decision Analysis</u>	3

0 Appendix: Programme Learning Outcomes and Curricula

10	KS184632	<u>Six Sigma</u>	3
11	KS184633	<u>Quality Design</u>	3
12	KS184634	<u>Reliability Analysis</u>	3
13	KS184735	<u>Logistic and Supply Chain Management</u>	3
14	KS184736	<u>Marketing Research Method</u>	3

RMK ECONOMIC and FINANCE STATISTICS

15	KS184537	<u>Financial Mathematics</u>	3
16	KS184538	<u>Accounting</u>	3
17	KS184639	<u>Financial Analysis</u>	3
18	KS184650	<u>Risk Analysis</u>	3
19	KS184751	<u>Analytical Business</u>	3
20	KS184752	<u>Actuarial</u>	3

RMK SOCIAL and DEMOGRAPHIC STATISTICS

21	KS184553	<u>Demography Study</u>	3
22	KS184654	<u>Social Research Method</u>	3

RMK ENVIRONMENT and HEALTH STATISTICS

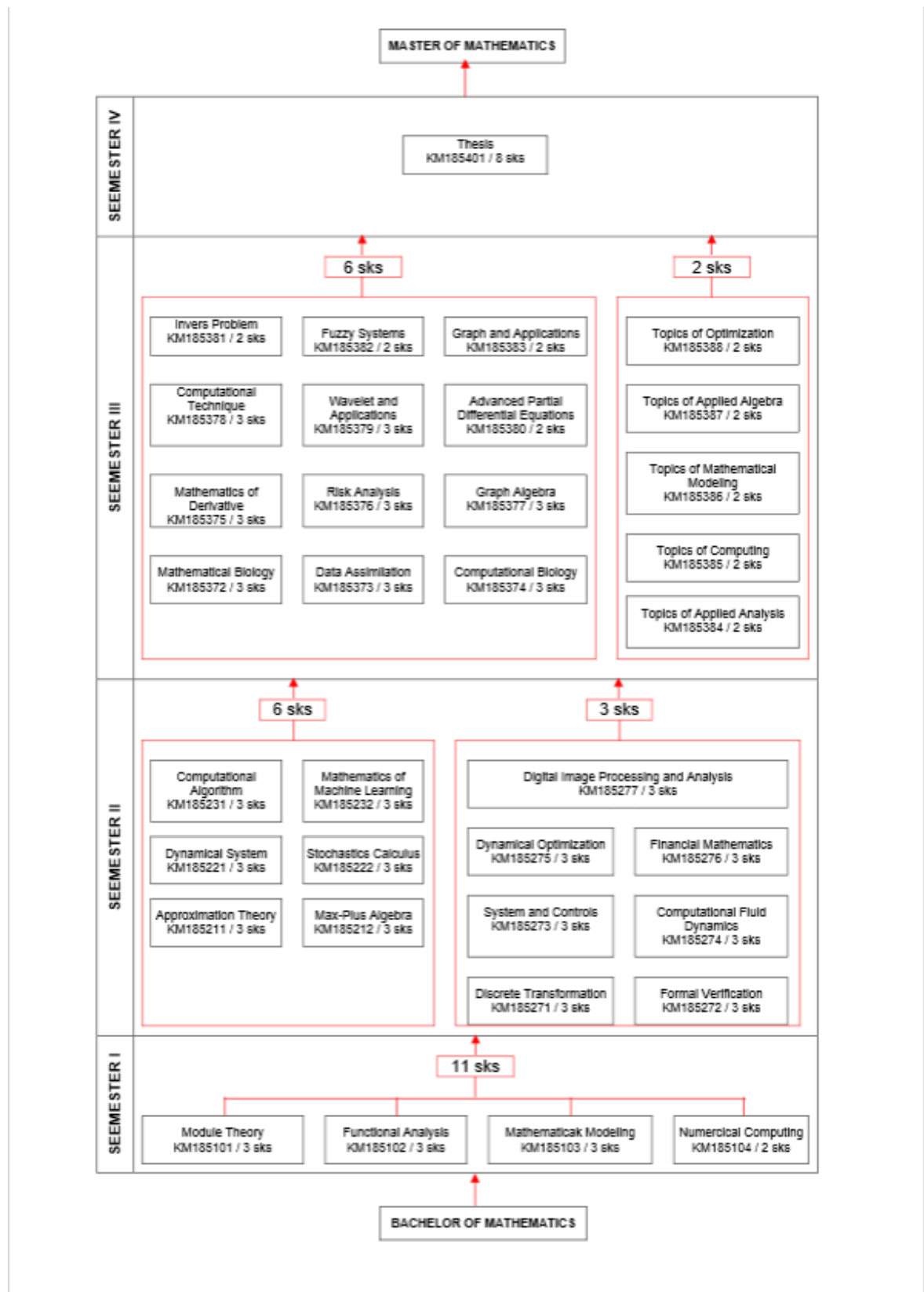
23	KS184555	<u>Biostatistics</u>	3
24	KS184757	<u>Meta Analysis</u>	3
25	KS184656	<u>Spatial Statistics</u>	3
26	KS184658	Internship	3
27	KS184459	Selected Topic	3

According to the website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Mathematics:

1. [C3] Students are able to solve mathematical problems by applying fundamental mathematical statements, methods, and computations
2. [C4] Students are able to analyze mathematical problems in one of the fields: analysis, algebra, modeling, system, optimization or computing sciences
3. [C5] Students are able to work and research collaboratively on mathematical problems within either the area of pure mathematics or applied mathematics or computing sciences
4. Students are able to communicate and present mathematical ideas with clarity and coherence, both written and verbally
5. Students are able to make use of the principles of long life learning to improve knowledge and current issues on mathematics
6. Students are able to demonstrate religious attitude and tolerance
7. Students are able to demonstrate an attitude of responsibility and commitment to law enforcement, ethics, norms for community and environmental sustainability

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula



According to the website the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master's degree programme Statistics:

PLO-1: Able to apply knowledge of statistical theory, mathematics, and computation in various fields and develop them

PLO-2: Able to design and implement data collection with the correct methodology

PLO-3: Able to identify, formulate, and analyze data with appropriate statistical methods and interpret them to solve statistical problems in various applied fields

PLO-4: Able to conduct studies and compare the strengths and weaknesses of a statistical methodology (method or model) in solving a multidisciplinary system/problem in statistics and data science, both using mathematical proof and using computational techniques and modern computing tools.

PLO-5: Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams

PLO-6: Able to apply an attitude of responsibility, professional ethics, and uphold human values

PLO-7: Able to motivate oneself to think creatively and learn lifelong

The following **curriculum** is presented:

SEMESTER: I			
No.	Course Code	Course Name	Credit
1	KS185111	Probability Theory	3
2	KS185112	Sampling Methods	3
3	KS185113	Linear Model	3
4		Elective Course 1	3
Total credit			12

SEMESTER: II			
No.	Course Code	Course Name	Credit

0 Appendix: Programme Learning Outcomes and Curricula

1	KS185211	Statistika Inferensia / Inference Statistics	3
2	KS185212	Analisis Multivariat / <i>Multivariate Analysis</i>	3
3		Elective Course 2	3
4		Elective Course 3	3
Total credit			12

SEMESTER: III

No.	Course Code	Course Name	Credit
1	KS185311	<i>Analisa Data / Data Analysis</i>	3
		Thesis proposal*	
Total credit			3*

SEMESTER: IV

No.	Course Code	Course Name	Credit
1	KS185411	Thesis	9
Total credit			9

No	Course Code	Course Name	Credit
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Elective Courses

1	KS185131	Experimental Design	3
2	KS185132	Statistical Process Control	3

0 Appendix: Programme Learning Outcomes and Curricula

3	KS185133	Simulation Technique	3
4	KS185134	Survival Analysis	3
5	KS185135	Population Study	3
6	KS185136	Econometrics	3
7	KS185137	Stochastic Process	3
8	KS185138	Statistical Analysis	3
9	KS185139	Quality Design	3
10	KS185231	Bayesian Analysis	3
11	KS185232	Meta Analysis	3
12	KS185233	Market Research	3
13	KS185234	Official Statistics	3
14	KS185235	Qualitative Data Analysis	3
15	KS185236	Nonparametric Regression	3
16	KS185237	Time Series Analysis	3
17	KS185238	Statistical Machine Learning	3
18	KS185239	Enterprise Data Analytics	3
19	KS185240	Advance Data Organization	3
20	KS185331	Reliability Analysis	3
21	KS185332	Intensive Computational Statistics	3
22	KS185333	Spatial Statistics	3
23	KS185334	Financial Statistics	3
24	KS185335	Research Method and Colloquium	3
25	KS185336	Consulting Statistics	3

26 KS185337 Capita Selecta

3