



**ASIIN Seal**

# **Accreditation Report**

**Bachelor's Degree Programme**  
***Mathematics Education***

Provided by  
**Universitas Jember**

Version: 17<sup>th</sup> of April 2024

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## A About the Accreditation Process

| Name of the degree program (in original language)  | (Official) English translation of the name | Labels applied for <sup>1</sup> | Previous accreditation                  | Involved Technical Committees (TC) <sup>2</sup> |
|--|--|---------------------------------|---|---|
| Pendidikan Matematika  | Mathematics Education                      | ASIIN                           | BAN-BT<br>30.12.2020<br>–<br>30.12.2025 | 12  |
| <p><b>Date of the contract:</b> 14.02.2023</p> <p><b>Submission of the final version of the self-assessment report:</b> 01.09.2022</p> <p><b>Date of the onsite visit:</b> 23.-24.02.2023</p> <p><b>Campus:</b> University of Jember on Jember campus</p>  |  |                                 |   |   |
| <p><b>Peer panel:</b></p> <p>Prof. Dr. Hans-Georg Weigand, University of Würzburg</p> <p>Hilda Assiyatun, M.Si., Ph.D., Institut Teknologi Bandung</p> <p>Alexandra Dreiseidler, Emil-Fischer Gymnasium in Euskirchen</p> <p>Ariqah Mumtazah, Universitas Hassanudin, student representative</p> |  |                                 |   |   |
| <p><b>Representative of the ASIIN headquarter:</b> Dr. Andrea kern</p>   |  |                                 |   |   |
| <p><b>Responsible decision-making committee:</b> Accreditation Commission for Degree Programmes</p>  |  |                                 |   |   |
| <p><b>Criteria used:</b></p> <p>European Standards and Guidelines as of May 15, 2015</p> <p>ASIIN General Criteria, as of December 10, 2015</p>  |  |                                 |   |   |

<sup>1</sup> ASIIN Seal for degree programmes

<sup>2</sup> TC: Technical Committee for the following subject areas: TC 12 - Mathematics.

|  |  |
|--|--|
| Subject-Specific Criteria of Technical Committee 12 – Mathematics as of December 9, 2016 |  |
|--|--|

## B Characteristics of the Degree Programme

| a) Name               | Final degree (original/English translation)      | b) Areas of Specialization | c) Corresponding level of the EQF <sup>3</sup> | d) Mode of Study | e) Double/Joint Degree | f) Duration | g) Credit points/unit     | h) Intake rhythm & First time of offer |
|-----------------------|--|----------------------------|--|------------------|------------------------|-------------|---------------------------|--|
| Mathematics Education | Bachelor of Education/ Sarjana Pendidikan (S.Pd) | -                          | 6  | Full time        | --                     | 8 Semester  | 144 credits (217.44 ECTS) | Annually in August/ July 1984          |

The Universitas Jember (UNEJ) was founded in 1964 by merging the Universitas Tawang Alun, the Tawang Alun Foundation and the Universitas Negeri Djember. Located in East Java in Indonesia, the university represents today one of the most important institutes in the area. The university incorporates four different campuses in Jember, Bondowoso, Lumabyang and Pasuruan offering 108 study programs within 16 faculties. These programs include bachelor, master and PhD study programs as well as vocational and professional programs. In the year 2019/2020, the university has accepted 10,710 students, whereas the current total number of students at the university is 34,409. In the last years, the number of students has increased and is currently at 41,167 students on all four campuses. The majority of students studies to receive a bachelor degree (83.4%) of whom a larger percentage of female students (67.1%).

The university motto is: "To excel in the development of science, technology and arts that sound on environmental, business, and industrial agriculture". The university currently aims to transform its own status from a semi-autonomous university to an autonomous university. This would guarantee that the university could develop a greater freedom in the organization. The aim is currently to receive a higher international recognition; therefore, the university is searching for international accreditation of at least 20% of their study programs.

The study program in this accreditation process is the bachelor's degree program "Mathematics Education" situated at the Faculty of Teacher Training and Education. UNEJ has presented the following vision and mission on the webpage of the study program:

"The vision of Bachelor in Mathematics Education is in 2027 the Bachelor in Mathematics Education (Ba ME) excels in producing mathematics education graduates who meet and/or

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<sup>3</sup> EQF = The European Qualifications Framework for lifelong learning

exceed SN DIKTI by integrating TPACK and elaborating STEAM in the field of environmentally friendly mathematics education

The Mission of Bachelor in Mathematics Education derived from the vision is:

- Organizing mathematics education and learning using effective learning approaches and models and utilizing technology.
- Conducting research on mathematics education that is beneficial for the development of science and the welfare of society.
- Organizing community service through the application of mathematics education that is oriented towards community empowerment.
- Developing a network of cooperation with domestic and foreign institutions/institutions in the field of tridharma perguruan tinggi [three pillars of higher education in Indonesia]
- Developing a sense of responsibility, self-confidence, emotional maturity, ethics, and personality as a lifelong learner.”

## C Peer Report for the ASIIN Seal

### 1. The Degree Programme: Concept, content & implementation

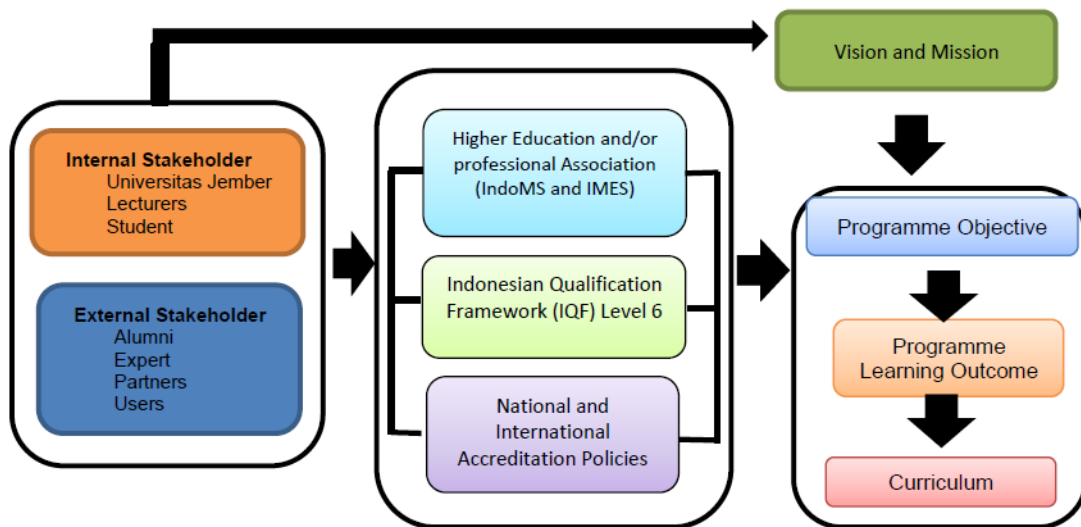
**Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)**

**Evidence:**

- Self-assessment report
- Webpage University <https://unej.ac.id/>
- Webpage of the study program <https://matematika.fkip.unej.ac.id/>
- Examples of diploma and diploma supplements
- Discussion during the audit

**Preliminary assessment and analysis of the peers:**

The program objectives from the bachelor study program Mathematics Education (ME) combine the standards of higher education in Indonesia defined by the SN SIKTI and the Indonesian National Qualification Framework (IQF or KKNI), guidelines of the mathematic education professional organizations (IndoMS and IMES) and the needs and demands of internal and external stakeholders. The consideration of all these influences results in the program objectives, program learning outcome and the curriculum of the study program Mathematics Education.



**Figure 1-1. Mechanism of Programme Objective and Programme Learning Outcome**

The program objectives of the bachelor program ME are defined in the self-assessment report as following:

- 1) "Teaching mathematics in primary, secondary education and other institutions;
- 2) Continuing studies in the field of professional education in mathematics, mathematics education, and other related fields;
- 3) Developing in the fields of education, learning media, and mathematics learning that sharpen TPACK (Technological Pedagogical and Content Knowledge) through environmentally sound research;
- 4) Elaborating mathematics on problems contained in Science, Technology, Engineering, the Arts and Mathematics (STEAM) to solve real problems; and
- 5) Developing a sense of responsibility, confidence, emotional maturity, ethics, and personality as lifelong learners."

These objectives are aligned with the mission and vision of the university and the faculty. Furthermore, the UNEJ defined program learning outcomes (PLOs), which summarize the skills and knowledge achieved at graduation. Comparable to the program objectives, the PLOs incorporate stakeholders' opinion through conduction surveys among alumni, schools and other institutions. The PLOs cover technical skills, as well as leadership skills, skills in using technology, foreign languages and non-educational mathematics content.



|       |  |
|-------|--|
| PLO1  | Showing characters that actuate the teachings in Pancasila.  |
| PLO2  | Respecting others' original opinions or findings, as well as cultural diversity to improve quality of life.  |
| PLO3  | Demonstrating an attitude of nationalism, cooperation, and social sensitivity towards society and the environment.   |
| PLO4  | Demonstrating the responsibility for the works in his/her field of expertise independently by internalizing academic values, norms, and ethics.  |
| PLO5  | Internalizing the spirit of independence, struggle, and entrepreneurship, by obeying the law and norms in social and state life.   |
| PLO6  | Applying logical, critical, systematic, and innovative thinking by demonstrating independent, quality, and measurable performance in developing or implementing science and technology.                  |
| PLO7  | Implementing and publishing the results of science and technology studies to solve mathematics problems and learning.  |
| PLO8  | Contributing the results of group work with full responsibility.   |
| PLO9  | Developing an entrepreneurial spirit based on science and technology that is environmentally sound through the development of a cooperation network.   |
| PLO10 | Designing mathematics learning using information and communication technology that is oriented towards life skills (thinking skills, social skills, academic skills, and vocational skills).             |
| PLO11 | Analyzing mathematical objects as the basis for mathematical thinking.   |
| PLO12 | Formulating the results of mathematical problem solving and learning.  |
| PLO13 | Analyzing mathematical concepts, learning theories, teaching theories, student characteristics, and assessments to carry out mathematics learning and research in the field of mathematics and learning. |

The PLOs are developed and updated on the basis of the stakeholders' needs. Therefore, UNEJ conducts annual tracer studies among recent alumni (tracer studies) and invites stakeholders for workshops or group discussions. Most recent surveys of stakeholders from institutions and schools revealed a need to emphasize the importance of leaderships skills, skills in using technology, foreign languages and non-educational mathematics in the study

program. This leads to the most recent update in the PLOs in the year 2021 to its current version, which have been integrated into the curriculum of the bachelor program ME.

The study program ME aims to educate graduations as mathematics educators, who are able to transfer knowledge and skills through education, experience and other activities.

The university describes the following job profiles for the graduates of the study program ME:

**Table 1-1. Job Profile Description of Ba ME**

| Job Profile  | Description   |
|--|---|
| Mathematics Educator   | As someone who carries out activities in providing knowledge, skills, education, experience, and so on in the field of mathematics.   |
| Assistant Mathematics Researchers in Mathematics Education and | As assistant research for Mathematics Education and Mathematics in government and private institutions  |
| Edupreneur in mathematics                                      | As entrepreneurs in the field of education or organizing business in the field of education; to create, develop, and market programs, products, services, or technology to increase the quantity and quality of learning. |

The majority of graduates from the recent years (2019-2022) found employment as mathematics educators in primary and secondary schools in government, private or tutoring institutions (56%). Other occupations include entrepreneurs in the education sector (24%), research assistants (10%) or within the banking sector and other areas (11%).

In the discussion with the representatives of the rector's office, they explain to the experts that the overall goal for the university, including the study program ME, is to reach higher international recognition and include modern topics such as environmental aspects into the curriculum. Thus, next to expanding the focus on science and technology, environmentally friendly methods will be included into study program's learning goals. Their strategy to develop the bachelor program ME comprises the increase of the research activity of the faculty and expands the internationalization of the program including the international mobility of students and staff. Yet, the representatives of the rector's office want the experts to be aware, that in their opinion, the excellence of a study program goes beyond the research and includes teaching and community service. The experts support this plan for the future of the bachelor program ME.

Considering the qualification of the graduations, the experts are interested in the type of occupation the graduates of the ME program are commonly employed. The representatives

of the rector's office state that 56% of all graduates work as teachers, whereas 24% work as entrepreneurs. They specify that activities in entrepreneurship are normally within education, but include also jobs to create online tutorials, creative content, creating books for students and others. They add that about 12% of the graduates continue with their university education by longing for a master degree. Before starting to work as a teacher or continuing their studies, the graduates need to complete a professional teacher training based on government regulations. The students also verify to the experts that they are enrolled in this program in order to become teachers at schools whereas only a smaller number of students want to become an entrepreneur in the education field. Several of the students additionally mention that they want to continue doing research and are consider the master program in mathematics education at UNEJ.

The expert panel raises the issue on how the PLOs of the bachelor program ME are achieved, as some of the PLOs appear very demanding in the experts' opinion. The program coordinators explain that the achievement of the PLOs is verified in different manner. In general, the PLO are implemented into several courses and their realization are therefore assessed within the examinations of the module. This can include also final projects or designing a draft article to prove the students' skills. This includes competences like reading and writing a scientific article in English, but also creating a poster accompanied by a poster presentation. Since the assessment shows that the PLOs are reached, the experts support this strategy. The students further verify to the experts that they know the PLOs of the study program and cite the webpage as their main source of information. Overall, the students consider the PLOs as clearly stated and accessible for everyone who is interested in the program. In the opinion of the alumni, the PLOs were reached and they prepared them well for their job as a teacher in school. They especially considered the amount of practical work as important to be successful in their jobs. Moreover, the representatives of the industry confirm, that cooperation between their school and the university exists and that they are regularly invited to give feedback on the PLOs. They mention to be actively involved in the development of the bachelor study program and consider the qualification level of the students as excellent, especially in their skills in teaching, technology and entrepreneurial skills.

The expert panel therefore concludes that the objectives and learning outcomes of the degree program are described briefly and concisely. They are transparently anchored and published on the programs' webpages and thus are available to students, lecturers and interested third parties. In the opinion of the experts, the objectives and learning outcomes reflect the targeted academic qualification level, are feasible and equivalent to the relevant exemplary learning outcomes specified in the applicable SSC (academic classification). The intended competence profile further represents the level of qualification according to the

European Qualifications Framework. The experts further remark that the relevance of the objectives and learning outcomes are reviewed on a regular basis involving relevant stakeholders and considering the demand on the labor market and the society. They further state that the qualifications are clearly presented in the diploma and diploma supplements.

### **Criterion 1.2 Name of the degree programme**

#### **Evidence:**

- Self-assessment report
- Examples of diploma and diploma supplement
- Webpage of the study program <https://matematika.fkip.unej.ac.id/>
- Discussion during the audit

#### **Preliminary assessment and analysis of the peers:**

The name of the bachelor program is originally “Pendidikan Matematika”, which translates to “Mathematics Education”. The name is based on the content of the curriculum and matches the regulations of the Ministry of Higher Education. Graduates from bachelor program in Mathematics Education awards the Sarjana Pendidikan (S.Pd) or Bachelor of Education.

The experts consider that the name of the degree program clearly reflects the intended aims and learning outcomes, as well as, fundamentally, the main course language. Moreover, the name is consistently used in all documents and the webpages.

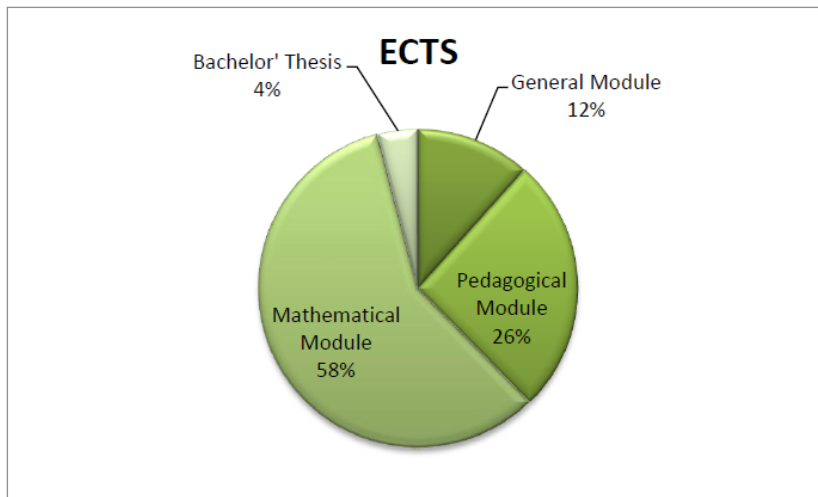
### **Criterion 1.3 Curriculum**

#### **Evidence:**

- Self-assessment reports
- Curricular overview of the study program
- Curricular document on the study program
- Module handbooks of the study program
- Objectives-Module-matrix
- Webpage of the study program <https://matematika.fkip.unej.ac.id/>
- Discussion during the audit

**Preliminary assessment and analysis of the peers:**

The curriculum summarizes courses in the fields of mathematics (58% of the entire curriculum) and the fields of education (26%). The courses on mathematics combine content on the different disciplines of mathematics taught at school as well as applied mathematics and technology. The field of education contains practical courses to gain pedagogical experience. The curriculum is complemented by general modules (12%) and by the bachelor thesis (4%).



**Figure 1-2. Course Composition based on ECTS**

The courses are arranged to ensure the learning of the students is appropriate to ensure efficient learning. The curriculum structure aims to enable students to achieve the PLOs described in criterion 1.1. The curriculum of the bachelor study program is organized in the Indonesian credit point system (SKS), which can be transferred to ECTS points – described in criterion 1.5. The entire curriculum contains modules with the amount of 146 credits or 220.46 ECTS points. Furthermore, the modules of the curriculum grouped into module groups, which are labeled as “general”, “learning”, “mathematics” or “uncategorized” as shown below.

| No           | Module Group                                  | Topic  | categories | Credits    | ECTS          |
|--------------|---|--|------------|------------|---------------|
| 1            | University Courses                            | Basic Attitudes and General Qualifications, namely: General Course (MKU)   | G          | 10         | 15,1          |
| 2            | Faculty Courses                               | Basic Education Management   | L          | 8          | 12,08         |
|              |   | Pedagogy Science (Field Practice)  | L          | 7          | 10,57         |
|              |   | General Qualifications (PLH and KWU)   | G          | 4          | 6,04          |
| 3            | Department Course                             | Science Insight  | G          | 3          | 4,53          |
| 4            | Learning Ba.Me                                | The Core of Pedagogy   | L          | 11         | 16,61         |
| 5            | Math Skills                                   | Core of Science in the Field of Study (Analysis (25 credits), Geometry (8 credits), Algebra (13 credits), Discrete Mathematics (11 credits)) | M          | 57         | 86,07         |
|              |   | Applied Mathematics and Optimization   | M          | 15         | 22,65         |
| 6            | Technology expertise                          | Learning Media Technology  | L          | 5          | 7,55          |
| 7            | Compulsory Courses According to RG and Thesis | Core Science based on RG (10 credits) and bachelor Thesis (6 credits)  | M          | 3          | 4,53          |
|              |   |  | L          | 7          | 10,57         |
|              |   |  | Un         | 6          | 9,06          |
| 8            | Elective Courses (minimum 10 credits)         | Elective course based on RG Insight Development  | M          | 10         | 15,1          |
| <b>Total</b> |   |  |            | <b>146</b> | <b>220,46</b> |

Note : G = General, L = Learning; M = Math; Un=uncategorized(Bachelor's thesis)

The majority of modules of the curriculum of the bachelor program ME teaches mathematics (58%). These subjects address all types of mathematics taught at school next to content on how mathematics and technology are applied to solve problems in companies and society. These courses are accompanied by modules, which focus on learning and education (26%). These are designed to show teacher students how to teach mathematics at school including the application of various kinds of educational methods while considering the character and psychology of pupils at school. In addition, the students gain practical experience in teaching as well as how to organize and plan classes. Each course is flexible and adaptable to accommodate new developments in technology and information. Furthermore, UNEJ encourages its teaching staff to include new research activities into their lectures.

The study program aims their students to be competent in teaching mathematics, to be competitive and skilled in the area of Technology, Pedagogical and Content knowledge (TPACK). The integration of TPACK in the curriculum helps students to face the challenges and opportunities during their daily work as a teacher or in other fields of occupation.

In general, in the first five semesters, the curriculum gains mainly general courses with five additional study materials: (1) basic attitude and general qualifications, (2) core scientific fields of study, (3) core pedagogical science, (4) instructional media technology and (5)

global education insight. Starting from semester six, students are free to integrate MBKM (government program Kurikulum Merdeka; Independent Learning – Independent Campus) in their curriculum, which allows them to study outside of the campus. In the bachelor program ME, most common examples of applying MBKM are teaching assistance, research, internships, independent studies and student exchange programs. Students can collect up to 20 credits within UNEJ and additionally a maximum of 40 credits outside the university.

The knowledge and experience collected on the campus is complimented by two compulsory internships the students spend usually on schools. One module “Internship introduction to the school field” with an extent of two credits is planned in the sixth semester and followed by the module “Student Community Service and Teaching Practice/ Internship” with an extent of three credits in the eighth semester.

The students of the bachelor program ME write a bachelor thesis at the end of their studies awarding six SKS credits. This undergraduate thesis is based on a research project and is accompanied by a seminar. In conducting research and community service in Indonesia, lecturers involve students to work on their final assignments/thesis, therefore they learn to face and overcome problems (research-based learning), write research proposals, collect data, analyze data, and report results (seminars and articles for publications, theses, etc.). The curriculum is under regular evaluation to improve the effectiveness of the overall PLOs of the program. Major review takes place every four years and considers the structure, content and curriculum. Minor evaluations focus on the topics taught in each module, the teaching and learning techniques and the assessment methods. A curriculum implementation control takes place every semester focusing on the main indicators to achieve the PLOs of the study program. One of the last major adaptations of the curriculum was an addition of study materials to the program, fostering the development of insights into the student’s studies.

The experts have several questions on the content of the curriculum. They first inquire which types of geometry are addressed in the module “Geometry” since this is unclear in the module handbook. The program coordinators explain that in the first semester, the students learn basics in geometry, which include Euclidian geometry and axiom geometry. The students learn what axioms are for, how to prove a theorem and how to define mathematical concepts. Topics like non-Euclidian geometry are only available as an elective course in the sixth semester. They add that there is also a research group working on geometry, analysis and technology if students are interested in this subject.

Another module, which is unclear to the experts, is “Mathematics teaching and learning strategy.” The program coordinators mention that this course is on how to teach mathematics. Therefore, the mathematical topics are not fixed and students can choose a field of

their interest in order to prepare these topics for working in class. In this course, the students gain the first practical experience by giving their first classes in front of their fellow students. In the discussion with the students, the expert panel's further request was to get to know how students learn to assess pupils at schools. The students confirm that this subject is covered in the modules on teaching techniques. They mention that they learn how to analyze pupils and their abilities. For practice, senior students and alumni often organize training courses and give pre-tests to a group of students followed by a discussion on the assessment methods. The students further add that they also were made aware of how to teach students with disabilities including mentally disturbed kids and ones with low intelligence. The expert panel therefore considers the curriculum as well created concerning its content.

In the discussion with the teaching staff, the expert panel asks how they include English into their lectures. They answer that they usually use presentation materials and references in English, so the students can get familiar with the English terminology and freely use books in English to support their learning. In addition, they mention some elective courses are already offered in English. Nevertheless, the students address to the expert panel their wish for a more international curriculum. Especially students with teaching experience abroad state they prefer to include more English in the theoretical and practical courses. This concerns particularly the learning of technical terms as well as the fluidity in written and spoken English. The students specify, the English level is appropriate for their work in public school in Indonesia; however, their skills should be improved if they are interested in teaching activity abroad and if they are interested to publish scientific articles in international journals. Furthermore, this would also increase their opportunities to spend time abroad, which is important to increase their experience and positively influence their job perspectives. In addition, the representatives from partner organizations identify the English skills as one of the greatest weaknesses of the students.

The importance of TPACK for the BA-conception was additionally discussed with the program coordinators. They describe to the experts that the students learn how to apply information technology as well as – in the sense of TPACK – Technological Pedagogical Content Knowledge. In this context students learn how to apply several types of software, especially GeoGebra. In the microteaching laboratory, they further practice the application of technology in their teaching. The main aim for the students is to learn, how to integrate technology into their problem-solving processes. Students will use technology on their smartphones as well as on notebooks.

Furthermore, the experts are especially interested in the module "Student Community Service and Teaching Practice/ Internship" in the eight's semester of the curriculum. The program coordinators outline that the internship is mainly organized at a school, where the



students learn how to write lesson plans, teach in class and how to integrate teaching media into the classroom. The program coordinators note that the students normally spend two months at a school, usually from September until November or March until May. This module is compulsory and the students are full time at the school during this period. Although the expert panel considers this program as essential in the education of teacher students, they raise the issue of the large workload during the internship, yet only three SKS are awarded. The students confirm that the internship is very important in their studies and do not consider the workload as excessive. They also tell the expert panel that they receive support in finding internships. They are further encouraged to join volunteering programs for teacher training, which almost every student in the discussion round has done. Several students also mention to have completed their teachers' training abroad, mainly Thailand and Philippines. The international teaching experience was all performed in English, which the experts strongly approved.

In this context, the experts asked the students, who have participated in the independent learning – independent campus program (MBKM) – and how they organize this exchange. The students tell they consider this program as very positive. Instead of simply learning theory they can experience it in practice. In their experience, the organization of the MBKM work offside the campus was simple. They mainly compare the content of the modules with the activity they are interested outside the university. They always can discuss the situation with their academic advisor. The recognition in this program was documented with a report, which then serves as a basis for getting the equal amount of credits for their work.

In the self-assessment report, the experts further stumbled upon the fact that students are supposed to integrate “environmentally sound research” in their bachelor thesis. The program coordinators add that the policy for the ministry requires students to spend at least six credits in research for a bachelor thesis. Therefore, the lecturers invite the students to do research already in an early stage by integrating them in research projects or community services. They describe as an example, that students are invited to create a mathematical game for the topic of “statistics.” This combines their knowledge in statistics together with their competences on how to teach and create educational games. However, such research project are in addition to the studies of the bachelor program.

Moreover, the experts discuss with the students if the level of education was adequate in their studies and if they felt prepared once they entered university. All students state, that they did not feel a great surprise or challenge once they started their studies at UNEJ. In the opinion of some, the system in the bachelor program is similar to their school in Indonesia. In addition, the lecturers are very friendly and supportive despite the challenging content in certain lectures on mathematics. They note that mathematics at the university is not the same as mathematics in school. However, the students consider the courses build

on each other, where they gain more knowledge in the field of mathematics and they have the chance to stepwise start and understand how mathematics should be taught to pupils and students at school.

Moreover, the experts address the topic of curriculum updates with the teaching staff. They describe the courses are updated each semester after they receive the results of the evaluation. They identify the main points the students had difficulties with and try to solve these issues for the next year(s). In addition, a research chair advises the lecturers to integrate the most recent research into their lectures. This includes results and ongoing projects by research group at UNEJ. The teaching staff states that the COVID-19 pandemic was also motivating them to updates the content and learning material of their lectures. Furthermore, it showed their need to improve their personal teaching skills online and in hybrid mode. The teaching staff mentions, their main goal in updating their module content is the achievement of the learning outcomes of the modules. Their main source for improvement is the survey of internal and external stakeholders. They also consider the current suggestions of the Indonesian Mathematics Society and the Indonesian Mathematics Education Society. Informal communication with their partners in school further directly addresses problems in the curriculum, which they try to solve together with their partners. The topic of curricular revisions was further addressed by the expert panel in the discussion with the representatives from partner organizations. The report to have been invited to give feedback on the curriculum and consider their suggestions were implemented in the past. In 2022, the university organized a joint workshop and invited different stakeholders to discuss the didactics as well as internships. Consequently, the amount of mathematical exercises were increased and the amount of practical examples in the mathematical examinations was expanded. Another issues discussed in the workshop, which is not yet implemented, is an extension of the internship to six months. They express their opinion that the additional time the students could spend at school to gain experience would strongly be of benefit for the students.

Overall, the expert panel is convinced, the curricula of the bachelor study program ME enables the students to achieve the intended learning outcomes. The learning outcomes are clearly defined for each module in the module handbook, which contribute to the achievement of the program objectives. The experts have a positive impression on the practical lectures of the curricula in order to provide the students with substantial experience for their future job and welcome the already initiated strategies for improvement. The experts consider each module represents a well-matched unit of teaching and learning. The module handbooks state the knowledge, skills and competences the students acquire in the course. In the opinion of the experts, the order of the modules is adequate and ensures that the learning outcomes can be achieved and that the programme can be completed within the

standard period of study. Nevertheless, the expert panel support the opinion to increase the amount of English in the learning material. This will allow the students to improve their written English as well as their English proficiency in conversation and teaching, which would benefit the internalization strategy of the university and the graduates' job opportunities. The experts further recommend considering expanding the internship up to six months if feasible. Furthermore, the experts are still uncertain about the amount of scientific research the students need to perform in the context of their bachelor thesis. Thus, they suggest defining the term "research" in a clear manner in the regard to the bachelor thesis in order to ensure it does not exceed the level and workload of a bachelor thesis. Finally, the expert panel recommends updating the reading list/source materials in the module handbook.

#### **Criterion 1.4 Admission requirements**

##### **Evidence:**

- Self-assessment report
- Academic guidelines for diploma and bachelor programs Universitas Jember
- University webpage <https://unej.ac.id/>
- Discussions during the audit

##### **Preliminary assessment and analysis of the peers:**

UNEJ states that they ensure the admission process is fair, transparent and offers equal opportunities to all applicants. The university posts their admission regulations on their webpage in Bahasa and on the webpage of the International office in English. Additionally, the information is also shared on social media including Instagram, Facebook and Twitter. Leaflets are also available in high schools in East Java and in the surrounding cities.

Annually, the university reviews the capacity of each program to accept new students. Based on this, the study programs received application based on four different application methods:

- 1) National Selection for State University Entrance for undergraduate level (Seleksi Nasional Masuk Perguruan Tinggi Negeri, SNMPTN)
- 2) Joint Selection for State University Entrance (Seleksi Bersama Masuk Perguruan Tinggi Negeri ; SBMPTN)
- 3) Joint Selection for Besuki Raya Higher Education for undergraduate level (Seleksi Bersama Masuk Perguruan Tinggi Besuki Raya, SBMPTBR)
- 4) Admission for International Students (Penerimaan Mahasiswa Asing, PMA)

Applicants require a senior high school degree and transcript and be under 25 years old. Applications are submitted online on a specific webpage and the results are send back via email.

Although the facts on the admission system are described in the self-assessment report, the expert panel has additional questions. The program coordinators therefore describe that the three ways of admission are differently used, but divided by an approximate percentage rate. Usually, the first option students can choose is the national selection, which is based on the students' achievements in their high school exams. In this option, the applicants need to provide the school study report for the first and second high school year as well as the first half of the third year. Normally, the application rate in this case is around 20% and is predominately used by students who excel at school. The second, and most common, option is based on a test, which is done by the government. In this test, they examine logical mathematical skills, language as well as English language. The application acceptance rate among these students is around 50%. The third option is also based on an exam, but this exam is conducted by the university itself. The acceptance rate in this case is around 30% and the main target group for this type of applications is in schools surrounding in proximity to university. The program coordinators add that only one applicant out of ten to twelve applications can be accepted at the moment. Currently, the application is still open and they have already received 157 application even though the capacity of the study program is limited to 55.

The expert panel request to know, how the university ensures that all applicants are treated equally. The representatives of the rector's office clarify that there is only one type of criteria for the application, which applies to everyone. These criteria are announced before the admission is open and communicated via webpage and media. Considering the admission by tests, the criteria are easy since the rank from high to low.

In summary, the experts verify that the terms of admission, the requirements and procedures presented are binding, transparent and the same for all applicants. The admission requirements are structured in a way that supports the students in achieving the learning outcomes. The experts note that the university has defined clear rules as to how individual admission requirements that have not been fulfilled can be compensated.

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

Add criterion 1.3.

The university submitted a statement on the content of several modules, in particularly on the modules on geometry and the module “Mathematics teaching and learning strategy.” However, the main topics of the recommendations were not addressed in details. Therefore the recommendation E1 on the English proficiency and E2 on the definition of research in the bachelor thesis remain.

Concerning the duration of the internship, the expert panel agrees with the statement of the university. It is possibly to conduct a longer internship outside the campus with a duration of up to six months (inside the MBKM program). The experts specify that the university should make this clear to their students and also clearly communicate with their students, which are suitable modules, which can be supplemented by the work done outside the campus.

## 2. The degree programme: structures, methods and implementation

### Criterion 2.1 Structure and modules

#### Evidence:

- Self-assessment report
- Objective-modul matrix
- Curriculum document of the study program
- module handbook

#### Preliminary assessment and analysis of the peers:

The curriculum of the bachelor program ME is divided into 86 modules, which allow the students to finish their studies within eight semesters or four academic years. According to the self-assessment report, the average study time of the program currently is three years and ten months to complete the courses plus eleven months to complete the bachelor thesis (total average of approximately four years and nine months).

The curriculum is divided into compulsory and elective modules. While the theoretical background in mathematics and teaching is predominately organized as compulsory courses, the students can gain experience in research and community activities done by research groups (KeRis\_DiMas) in the form of electives modules. The students are able to choose between topics: geometry, algebra, combinatorics and computer. These provide a pool of optional modules, of which each student needs to collect ten credits.

The experts raise additionally a question on the amount of elective courses, which focus on the students' research activity. The program coordinators clarify that the students have to join one research group, where they have to take courses in the amount of ten Indonesian credits during the sixth and seventh semester. Most of the courses have two credits; therefore, usually the students choose five different modules to collect the required amount of credits. All the work done in this research groups is connected to the bachelor thesis of the students. Thus, they already start to work for their bachelor thesis in the sixth semester. When the experts ask what happens if someone want to change the research group, the program coordinators cannot provide a clear answer, as they have never encountered such a situation.

The expert panel confirms that the bachelor degree program ME is consistently divided into modules, where each module is a sum of teaching and learning. The content of all module is concerted. The structure of each module as well as the curriculum ensures that the learning outcomes can be reached and allows students to define an individual focus and course of study (student mobility, internship etc.). In its current form, the curriculum is structured in a way that allows students to complete the degree without exceeding the regular course duration.

In the opinion of the expert panel, the modules have been adapted to the requirements of the degree programme. They ensure that each module's objectives help to reach both the qualification level and the overall intended learning outcomes. The two integrated internships are well-integrated into the curriculum. Furthermore, activities outside the university are recognized by the university. UNEJ has defined rules for recognizing achievements and competences acquired outside the higher education institution.

### *Student mobility*

UNEJ supports their students to participate in exchange programs. International students, who seek to obtain a degree at UNEJ, come from Thailand, East Timor and Madagascar. Three students received international scholarships to spend one semester in Spain, Poland and the Czech Republic. According to the regulations of UNEJ, students can collect up to 20 Indonesian credits during one semester abroad.

In 2019, students from the bachelor program ME conducted research at the State University of Malang for six months. In 2021, students collaborated with the University of Education Ganesha and the Universiti Teknologi Malaysia to join a research program. In each case, external funding was acquired by the Islamic Development Bank or by the innovation

talent program of the ministry. Students further participate in teaching assistance programs at various schools across East Java in order to gain practical experience. In addition, internships in collaboration with partners are possible. Within the MBKM programs, students of the ME program further participated in courses at the Semarang State University, (2) Malang State University, Lambung Mangkurat University, Medan State University, Surabaya State University, and the Ganesha Education University.

In the discussion with the students, several additionally mention getting teaching experience in Thailand and the Philippines. The experts summarize that they consider the student mobility as positive; however, they support the university in their plan to increase student mobility.

### **Criterion 2.2 Workload and credits**

#### **Evidence:**

- Self-assessment report
- Module handbook
- Curriculum document of the study program
- Academic guidelines for diploma and bachelor programs Universitas Jember
- Results of the student satisfaction survey
- Discussion during the audit

#### **Preliminary assessment and analysis of the peers:**

At UNEJ, the study system was created using the Indonesian credit point system (sistem kredit semester or SKS). UNEJ defines, that one credit is a measurement of appreciation for the knowledge acquired over the course of one semester through planned activities. These consider guided and independent learning, face-to-face activities, laboratory activities/practicum, projects, and field studies. One credit of lecture and practicum is equal to 170 minutes, which includes 60 minutes for structured assignments and another 60 minutes for independent study. The weight of each semester is determined by the weight of each sub-study material. The entire curriculum was structured to avoid a high workload in particular semesters. The modules handbooks of the study program ME clearly lists the awarded amount of credits as well as the workload in contact hours and self-study hours. Furthermore, this information is available online on the webpage of the study program.

The students are required to earn 146 credits to complete the studies. This results in 19 to 21 credits in the first to sixth semester, 15 credits in the seventh semester and nine credits in the eighth semester. Talented students with a grade point average (GPA) of 3.0 and

higher can take more credits (up to 24 credits). Students with a low GPA are advised to take less courses per semesters as shown below

**Table 2-1. Relationship Between Maximum Workload and the Grade Point Average (GPA)**

| GPA                       | Maximum Workload (Credits) |
|---------------------------|----------------------------|
| $0 \leq GPA \leq 1.50$    | 12                         |
| $1.5 < GPA < 2.00$        | 15                         |
| $2.00 \leq GPA < 2.50$    | 18                         |
| $2.50 \leq GPA < 3.00$    | 21                         |
| $3.00 \leq GPA \leq 4.00$ | 24                         |

Although normally the academic year at UNEJ is organized in two semesters, students of the bachelor program ME can enroll in a midst semester. This short learning period is only available for students who have failed courses or missed exams during the semester.

In the study program ME, each credit consists of theory (face-to-face teaching, structured assignments and independent assignments) or practical training (laboratory work, field activities or bachelor thesis). According to the self-assessment report, the total workload in the bachelor study program ME contains of 26% face-to-face time, 31% structured task, 31% self-study, 5% laboratory work, 4% bachelor's thesis, and 3% field activities (outside the campus at school or the community). The work for the bachelor's thesis can done either at a laboratory, school, community or campus.

One practical or theoretical credits in SKS is equivalent to 1.51 ECTS credit points. Therefore, the total workload of students is 220.46 ECTS credits.

A survey on the student satisfaction in the most recent years revealed that 84.51% of the students consider the workload of the program ME as adequate while 2.29% consider it as not enough and 11.43% as too heavy. UNEJ has since started to develop strategies to review the suitability of the workload in meetings of the teaching team and the coordinator of the modules and study program.

Concerning the workload, the experts are interested in, how the university ensures, that the workload of the students participating in the independent learning – independent campus (MBKM) is equal to the workload of the students how take courses at UNEJ. The program coordinators note that one of the main work done outside of the campus is the research for the bachelor thesis. Since research is mandatory for the bachelor thesis, non-MBKM students have to take courses on research at the campus, which is equal to conducting research outside the campus. The motivation of the students is often mainly to gain experience “in the field.” The supervisor of the bachelor thesis further closely monitors the research activity of the students. For all MBKM activities, the students have to keep a journal (“log book”) to document the work they conducted and hold regular meetings with their



supervisors. This is later consider in reference to the content of the curriculum and individual courses and the learning tools involved. In total, students can earn 20 credits outside the campus, which is used by 30% of the students at the moment in the bachelor program ME.

In general, the expert panel considers the workload of the students as very high. A recalculation of the workload in each week reveals up to 60 hours in one single week. The program coordinators acknowledge that the workload of the students is indeed high; however, the student satisfaction survey reveals that 84% of the students consider the workload as adequate. They add that the workload for each student and in each module varies due to the amount of theoretical and practical content in each course. Therefore, the topic of the workload was also extensively discussed with the students. The students confirm that the workload is indeed high. In comparison to high school, where they have to spend only half of the day of learning, at university, they are spending the entire day with learning. Despite several students consider it normal to work for ten hours of more in one day, other report difficulties to manage the workload. As one example, the student mention problems with learning for other modules while also preparing a final assignment in others. In addition, students who work on part-time jobs experience problems with the high workload even after reducing their courses per semester.

The experts summarize, that the university as defined the workload of each module. A credit point system gives information on the amount of work required from students in each module, which clearly dives information on both attendance-based learning and self-study time. Although the practice shows, that students can complete the degree without exceeding the regular course duration, the expert panel is very concerned about the high workload for certain modules and notices indicators that the listed workload might not reflect the real workload of the students (e.g. internships). Therefore, the experts are not certain how the workload was initially determined and how it is monitored. The experts suggests, that the university needs to develop a mechanism to assess the total workload of each module and the total workload of students per semesters. The credits of each module has to match the awarded workload for each module. This should also provide a support for the students to reduce the average time to complete the bachelor program.

### **Criterion 2.3 Teaching methodology**

#### **Evidence:**

- Self-assessment report
- Module handbook

- Discussions during the audit

### Preliminary assessment and analysis of the peers:

The university states that it applies various teaching methods in the bachelor program ME in order to achieve the program learning outcomes. The module handbook of the study program information on the teaching methods applied in each course. In addition, all lecturers of the study program ME have developed skills concerning the TPACK concept. The applied teaching methods of each module shall guarantee that the intended learning outcomes of each module can be achieved.

This overview is included in their self-assessment report:

| PLO     | Teaching and Learning Methods  | Example Course   |
|---------|--|--|
| 1 (S1)  | Team Based Learning, Self Directed Learning, Cooperative Learning, Project Based Learning                          | Religion   |
| 2 (S2)  | Team Based Learning, Self Directed Learning, Cooperative Learning, Project Based Learning, Case Method             | Trigonometry, Learning Media   |
| 3 (S3)  | Team Based Learning, Self Directed Learning, Cooperative Learning, Project Based Learning, Research Based Learning | Mathematics Education Research Methodology, Economic and Financial Mathematics                       |
| 4 (S4)  | Team Based Learning, Self Directed Learning, Cooperative Learning, Project Based Learning                          | Number Theory, Real Analysis   |
| 5 (S5)  | Team Based Learning, Self Directed Learning, Cooperative Learning, Project Based Learning, Problem Based Learning  | Inferential Statistics, Real Analysis  |
| 6 (KU1) | Project Based Learning, Problem Based Learning, Cooperative Learning   | Entrepreneurship and Business  |
| 7 (KU2) | Project Based Learning, Problem Based Learning, Cooperative Learning   | English for Writing and Teaching Mathematical Analysis   |
| 8 (KU3) | Project Based Learning, Problem Based Learning, Simulation/ Demonstration  | Learning Media, Linear Programming   |
| 9 (KU4) | Team Based Learning, Cooperative Learning, Project Based Learning, Research Based Learning, case method            | Review of High school Mathematics, Internship introduction to the school field (PLP)                 |
| 10 (KK) | Team Based Learning, Cooperative Learning, Project Based Learning, case method                                     | Mathematics Learning and Instructional, Mathematics Learning Evaluation, Mathematics Lesson Planning |
| 11 (P1) | Self Directed Learning, Cooperative Learning, Project Based Learning   | Labeling and Coloring Graph, Abstract Algebra  |
| 12 (P2) | Self Directed Learning, Cooperative Learning, Research Based Learning  | Combinatorics, Graph application,  |
| 13 (P3) | Self Directed Learning, Problem Based Learning, Project Based Learning   | Student Community Service and Teaching Practice (KK-PLP)   |

The majority of modules in the bachelor study program ME apply student-centered learning in their teaching, which includes interactive courses, discussions, demonstrations, project-based learning, problem-based learning, tutorials, practicum, bachelor's thesis proposal writing, and field studies.

The experts are convinced of the diverse teaching methods applied in the study program. They are interested, however, how the students mathematical competences are assessed on a regular basis. In particular, the experts are interested if weekly assignments are integrated, so the students can practice their skills. The teaching staff assert that they do not use weekly assignment as home works. Nevertheless, the students often work on team projects. These projects are also needed to pass the class and can be part of the assessment of the students in the module next to the final exam. Other assignments include the work on a presentation to summarize a chapter on one topic. Furthermore, problems from outside the classroom need to be solved and presented in front of the class. The teaching staff reports, they emphasize on group works and discussions in order to improve the soft skills of the students. The discussion continues on how the students learn how to design and develop learning tools. The teaching staff explains to the experts, that the students have to design learning material in their courses. This is part of the modules where students have to design classes. The development of learning tools and materials is further included into the research activity of the students, which follow the principle of "design, develop and refine." The experts additionally discuss with the representatives from partner organizations the graduates' skills with technology. The representatives from partners (mainly from school and tutorial schools) issue the students and graduates very good skills with technology. In particular, they consider their skills in IT-technology to create teaching learning media as exceptional. This includes their skills on how to use software to prepare examinations and solve problems in mathematics. In the opinion of the partners, the familiarity with technology and IT-based teaching tools is essential for successful teaching in the future.

The experts gain a very positive impression on the teaching methods and instruments used support the students in achieving the learning outcomes. The degree programme is designed to be well-balanced between attendance-based learning and self-study. The students are able to gain competences in independent academic research and writing and trains various soft skills. The experts comment very positive especially on the teacher training practice laboratory and the involvement with teaching materials. Still, the expert panel recommends increasing the number of mathematical exercises in the lectures in order to train and assess the mathematical skills of the students. The experts panel suggests to consider weekly mathematical exercises, which might be given as homework and which could be corrected by the students assistant or tutors.

|   |
|---|
| <b>Criterion 2.4 Support and assistance</b> |
|---|

**Evidence:**

- Self-assessment report
- Student handbook
- Webpage UNEJ Career Center <https://sites.google.com/unej.ac.id/puskar/home>
- Discussion during the audit

**Preliminary assessment and analysis of the peers:**

Students of the bachelor program ME receive support at department, faculty and university level. At the department level, an academic advisor is assigned to each student, who will accompany them during their entire studies. They are monitoring the student progress during the semesters and will advise them on taking courses in accordance with their GPA. For the internship, the students further receive a peer tutor for their assistance. Students can always contact their academic advisors for consultation on student learning problems. The Guidance Commission is responsible to support the students with questions on their thesis. In addition, two lecturers supervise the student's thesis, who are assigned to assist the student in completing their thesis. Certain lecturers and study coordinators also provide non-academic counseling services.

At the faculty level, student support is organized in public facility services. Additional advice can be obtained from the academic staff of the faculty, who mainly focus on questions on the organization of the personal studies.

At the university level, support and assistance is provided by several university centers. On one side, students can submit their complaints at the centralized UC3 Services regarding topics such as academic issues, student affairs, faculty and infrastructure, networks and applications. Student support is further available at the Counseling and Disabilities Guidance Service Center. Students with disabilities and learning problems receive support at this center, which also employ students for direct support. The UNEJ Career Center provides guidance for the future job opportunities including assistance to enhance student's entrepreneurial activities.

Satisfaction surveys among students generally report a satisfaction rate between 2.9 to 3.5 points out of four points. Low satisfaction rates is caused by the resources of the university and problems in online learning, whereas student support did not appear as a point of criticism in the student survey.

In the discussion with the students, the experts also asked them about the support they receive during their studies. The students describe that they feel very well supported since they can contact their academic advisors easily. According to the students, this person not only gives them advice, but also motivates them in their studies. The students also verify the experts that they received an introduction to the universities in the first semester, which included their study plan and information on how to study at UNEJ (online system, registration to courses, etc.).

The students further describe a good support system among the students of the course. Additionally, senior students are employed as tutors, who can easily be contacted and who are very helpful in answering general and technical questions. The students additionally confirm that student organizations exist in the form of a “mathematics education club” which organizes events and gives support, information to students as well as training (e.g. on MATLAB). The students mention they learned within this club of larger organizations in Indonesia such as the “Association of mathematics and mathematics education.” Further, they learned of the Mathematics Olympiad. The organization of a mathematics Olympiad in elementary schools and junior high schools is voluntarily supported by a group of students from UNEJ. The students report very positively on these extracurricular activities, as they strengthen their soft skills on organization, communication and leadership. Other extracurricular clubs focus on learning English or scientific writing. The students mention positively, that the university offers funding to organize events and competitions after the submission of proposals by each club/organization.

The expert panel therefore concludes that the university has allocated resources to provide individual assistance, advice and support for all students. The advice and guidance (both technical and general) are available to all students. This assists the students in achieving the learning outcomes and in completing the course within the scheduled time.

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

Add criterion 2.2.

The expert panel is aware that each student has different capabilities to take credit points in one semester in accordance with their GPA. Nevertheless, the student workload is exceptionally high in the experts’ opinion, which was substantiated further by the students. Although the university appears to have a well-developed system for the students to adjust their workload in general, the experts continue to advise the university develop a mechanism to evaluate the actual workload of the students in each modules. The experts are

concerned with the workload on some modules is higher than the indicated by the awarded credit points. Therefore, the requirement A1 remains in place.

Add criterion 2.3.

The experts reviewed the comments of the university concerning the students' practical skills in mathematics. They acknowledge the integrated methods of problem solving and follow-up presentations and discussions in the classroom. The experts consider this a very important teaching methodology. Nevertheless, they continue to issue the recommendation E3. The experts add in this regard, that solving mathematical exercises individually and in groups is an important ability for all students in the field of mathematics. The experts specify the university should consider these as structured assignments outside classroom to facilitate the students' skills in independent learning and practicing their mathematical skills.

### 3. Exams: System, concept and organization

#### Criterion 3 Exams: System, concept and organisation

##### Evidence:

- Self-assessment report
- Module handbook
- Academic calendar
- Discussion during the audit

##### Preliminary assessment and analysis of the peers:

UNEJ has a centralized agreement on the assessment rules, techniques and instruments, mechanism and procedures, assessment implementation, reporting, and student graduation. The university states, exam implementation is managed systematically and is based on objectivity, relevance, transparency, and accountability principles. The UNEJ standard for examinations is supposed to use clear criteria, which are accessible to all students and relevant to the learning outcomes of the module.

The examinations are generally organized with a mid-term examination and a final examination. The dates are determined before the start of the semester and communicated to the students via the webpage, online student system and at the beginning of each module. Students have to attend at least 75% of all classes in order to attend the final examination.

Students, who are absent from their mid-term exams, are allowed to take a make-up examination after providing evidence for missing the first exam date. In general, these make-up exams are organized one week after the final exam.

The graduation of the examinations follows these assessment criteria:

**Table 3-1. Student Assessment Qualification**

| Grade in Number        | Grade | Conversion | Category   |
|------------------------|-------|------------|------------|
| Score $\geq$ 80        | A     | 4.00       | Excellent  |
| $75 \leq$ Score $<$ 80 | AB    | 3.50       | Very good  |
| $70 \leq$ Score $<$ 75 | B     | 3.00       | Good       |
| $65 \leq$ Score $<$ 70 | BC    | 2.50       | Fair       |
| $60 \leq$ Score $<$ 65 | C     | 2.00       | Sufficient |
| $55 \leq$ Score $<$ 60 | CD    | 1.50       | Poor       |
| $50 \leq$ Score $<$ 55 | D     | 1.00       |            |
| $45 \leq$ Score $<$ 50 | DE    | 0.50       | Very Poor  |
| Score $<$ 45           | E     | 0.00       |            |

The results of any examinations are uploaded in the learning management media of UNEJ, where the students can access them with their own accounts.

Examinations forms vary depending on the module. Possible assessment types include mainly project, written exams, oral presentation, or the writing of a (research) report.

The curriculum of the bachelor program ME also requires their students to complete the module “Student community service and teaching practice” in the 8<sup>th</sup> semester. In this module, the students have to do practical work at a school to primary learn teaching techniques, school management and academic competences in the fields of education and studies. The assessment method is by observation, performance test, teaching practice and an evaluation of the report of the student. Similarly, examinations are also carried out for all studies within the MBKM program activities in order to award the credits points equal to their workload. The assessment method is communicated between the student and the lecturer during the organization of the MBKM activity.

The students of the bachelor study program ME are further obliged to write a bachelor thesis. To assess the bachelor thesis, the evaluation is based on the proposal as well as the final work. The students have to first prepare a research proposal, which is assessed in a seminar, which is attended by at least ten students, two supervisors, and two examiners. After the seminar, the students has two month to revise and finalize their final thesis before the thesis as to be defended. A second examination of the final thesis is possible.

Examinations can be adapted for students who have not met the minimum achievement criteria. This also includes adaption for students with disabilities or/and chronic illnesses.

The lecturers will provide alternative examination methods allowing either a second trial of exams or additional assignments.

The expert panel question how the assessment methods are determined in each module. The program coordinators describe that most modules apply several methods of assessment. As one example, they name the module “Micro teaching” where they assessment method involves student assignments, which is distributed into three group works. Another example with a complex assessment method is the module “Student Community Service and Teaching Practice/ Internship” in which the assessment is based on ten different factors. In addition, the experts are interested in how “attitude” is assessed in the courses. Here, the program coordinators mention as the main technique observation in the classroom. This includes how the students participate in the face-to-face classroom activities as well as group work. The experts are satisfied with the descriptions of the university.

Concerning the module handbook, the experts notice the term “essay” is commonly used as an examination form, which is not a clear terminology in the field of mathematics. The program coordinators specify that “essay” refers to all written examinations. In the bachelor program ME, this includes explanation such as stepwise explanation on how to solve a problem as well as solving calculations. The experts can follow this explanation, but still suggest using a more common term such as “written exam/test” instead of “essay.”

In addition, the expert panel asks the program coordinators about the organization of the examinations, particularly if unscheduled exams occur. They describe to the experts that the final exams at the end of the semester are scheduled by the faculty whereas the date of the mid-term examinations are determined by the lecturer. This is faculty policy according to the program coordinators. However, the dates are always announced to the students at the beginning of each course. The program coordinators add that unscheduled exams can occur during the semester. These are previously announced to the students in the learning management system, where they will receive a notification and an email to make them aware of the exam date. The students confirm to the expert panel that they are aware of the assessment forms and time in each course at the beginning of the semester. Although they normally have all final exams in one week, the students mention the possibility to reschedule exams on demand. In addition, the teaching staff explains to the experts that special regulations are available for students with disabilities and chronic illnesses. They mention one case of one visually impaired student, who received special tasks for their assessment. In cases of illness, special opportunities can be created after providing a letter from the doctors.

In conclusion, the expert panel considers the exams are well organized in the bachelor program ME. The number and distribution of exams ensure an adequate workload as well as



sufficient time for preparation. The experts especially have a positive impression on the organization of the exams ensuring an unbiased and anonymous graduation of the written exams. The criteria for the examinations are clearly presented online and in the module handbook. At the beginning of each lecture, the lecturer informs the students on the grading system of this module, which is also clearly listed in the module handbook. The experts note, students have an opportunity to consult their lecturers about the results of their exams and arrange a re-assessment of the exam if they consider it necessary.

## 4. Resources

### Criterion 4.1 Staff

#### Evidence:

- Self-assessment report
- Staff handbook
- Discussion during the audit

#### Preliminary assessment and analysis of the peers:

The staff of the study program ME is divided into the teaching staff and support staff. The teaching staff varies due to their qualifications, which determines the amount of teaching per semester. The current staff of the ME programs has the following qualifications:

**Table 4-1 The Number And Qualification of Academic Staff And Its Ratio to Students**

| Study Program            | Lecturer Qualifications       | Number | Total Number | Number of Students | The Ratio of the number of lecturers to students | The Ratio of the number of female and male staff |
|--------------------------|-------------------------------|--------|--------------|--------------------|--|--|
| Ba Mathematics Education | Professor                     | 3      | 29           | 414                | 1:14   | 1:1  |
|                          | Doctoral                      | 9      |              |                    |  |  |
|                          | Master                        | 16     |              |                    |  |  |
|                          | Currently in Doctoral Studies | 1      |              |                    |  |  |

These numbers show that 10% of the staff has reached the level of professor whereas 31% of the teaching staff have earned a doctoral degree and 55% a master degree. Employees holding a PhD degree are encouraged to continue their career in the professor acceleration program. The number of lecturers in the degree program is regularly evaluated by the study

program coordination to ensure high quality of teaching and support. Currently, the lecturer to student ratio is about 1:14, which is considered in good proportion by UNEJ.

Guest lecturers are invited to provide additional courses in the bachelor program ME. The list includes among others, researchers from the University of Essex (UK), the Ahmad Dahkan University (ID) and the University of Canberra (AUS).

Each lecturer at UNEJ has to participate in teaching, research and community services. Research and community service activities are supported by a research group called KeRis Dimas, who helps the lecturers to receive grants from organizations and the government. The university is currently trying to improve the research productivity by encouraging senior researchers to mentor others in proposal writing for research grants.

The performance of the teaching staff is monitored by the student evaluations at the end of each lecture. Based on this evaluation, the lecturer has to include improvements in his/her courses after discussing the results with the program coordinator. Additionally, the lecturer's performance is further evaluated by assessors, who directly report to the evaluation team. Negative evaluations result in a warning as well as guidance for improvement by the dean of the faculty. Employees are further evaluated by their direct supervisor in an online process.

The experts consider the number and qualifications of the teaching staff in the bachelor program ME as positive. The lecturers conduct research with funding from third parties and publish in national and international research journals. The program coordinators specify that the research is strongly dominated by project on mathematics education and that the study program even received an award from the university in this regard. This is further recognized by external grants as a "center of excellence for independent learning" and in a "competition program for independent learning." International collaborations exist with universities from India, Turkey and other countries. The experts consider the high number of guest visitors to the department as very positive. The project coordinators mention that recently new collaborations were established with universities in Malaysia and Korea, which will hopefully result in new joint research projects and exchanges. Incoming and outgoing visiting lectures can be supported by grants at UNEJ, which supports the lecturers to improve their skills abroad. Concerning their international experience, the teaching staff states to have received their degrees abroad and continue to have good relations with these institutions. They often invite guest lecturers to support the training of students, especially in new topics and topics, which are currently not covered in the curriculum.

The experts continue on this subject and ask about their strategies to improve the research productivity. According to the program coordinators, the teaching staff can always see the rank of the university and the program in their online systems. Therefore, they are aware

of their own research productivity. In addition, research groups involving students receive additional funding from the university. Incentives are further issues for publications in international journals as well as participation in international conferences. In the discussion of the experts and the teaching staff, they address the issue of research cooperation with the faculty of mathematics. Although collaborations and joint projects occur, the majority of projects of the teaching staff conducts is on mathematics educations. In addition, little cooperation exists in both departments on teaching whereas students are free to join courses of both. During the COVID-19 pandemic, several courses were joint with the faculty of mathematics, however, this was an exception and does not take place at the moment anymore. Cooperation among the teaching staff of both groups happens in meeting twice a year, where they exchange scientific and pedagogical new ideas.

The experts further address the topic of teaching load and how the lecturers balance their time of teaching, research, and community service. The teaching staff explains that they apply team teaching in the teaching of each module, which gives them a flexibility to spend time on their activities outside the classroom. The actual amount of teaching per person varies with each lecturer and in each semester. The present lecturers report to teach up to 20 hours per week in up to three courses. The teaching in class is about 50 min at UNEJ without considering the time of preparation, grading and consulting students. The teaching staff agrees that they have enough time to perform research due to their teach teaching. In addition, the lecturers also receive laboratory assistants or module assistants (“tutors”). These are senior students, who are employed at the university and receive money for their job. The main tasks of the module assistant is to support the teachers during exercises while laboratory assistance support the students to solve technical issues (e.g. how to use a 3D printer). The experts further inquire if students are integrated into the research and if this has previously resulted in joint publications. The program coordinators state that many students are interested in research and are therefore involved in the research activity of the teaching staff. This has already resulted in publications as well.

Overall, the experts receive a very positive impression on the teaching staff involved at the bachelor program ME. The composition, scientific orientation and qualification of the teaching staff team are suitable for sustaining the degree. The expert panel confirms that there are sufficient staff resources available for providing assistance and advice to students and administrative tasks. The research and development activities carried out by the teaching staff are in line with and support the level of academic qualification aimed at.

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| <b>Criterion 4.2 Staff development</b> |
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**Evidence:**

- Self-assessment report
- Discussions during the audit

**Preliminary assessment and analysis of the peers:**

UNEJ supports the continuation of the education of their lecturers, as it is considered as a crucial point improving the quality of the learning process. The university ensures, that every new lecturer is guaranteed to have teaching skills in accordance with the standards of the university. New lecturers receive training within the “Training of basic skills improvement program for teaching techniques.” Additional training is available to everyone of the teaching staff within the “Applied Approaches” program organized by UNEJ. This program aims at improving the lecturer’s skills in teaching with courses such as higher education learning models and strategies to develop learning plans and practices. Other courses focus on training in research-based learning with peer teaching techniques. Both programs are crucial for improving the pedagogical competences at UNEJ in learning strategies, scientific writing and teaching materials.

Furthermore, UNEJ supports its teaching staff in perusing a PhD degree and continue their enrollment in the professor acceleration program. As some consider the English proficiency as one main obstacle, the university provides also English training. Generally, support for the career development of the teaching staff is provided by the university.

Upon the question of the expert panel, the program coordinators describe that staff searching for a PhD can also study at the same university. Overall, the university is supportive to their staff to continue with their higher education and the application to reach the level of professor. Lecturers have to earn a PhD in order to become a professor in Indonesia. The PhD program in mathematics education at UNEJ was only established in 2022, in which they currently have nine students in total. The PhD students normally perform research together with their supervisor. A PhD can also be perused at other research institutions. UNEJ is suggesting to lecturers under 40 years of age to earn a PhD abroad if they are able to receive external funding. If the lecturer instead searches to receive a PhD degree in Indonesia, the university supports them by paying their tuition fees. The university support to continue their education is further confirmed by the teaching staff to the expert panel. They know about the possibilities to apply for grants from the ministry and the possibility of the university to cover their tuition fees. Currently, three lecturers are studying for their PhD, yet more are interested. In order to complete their PhD degrees abroad, several lecturers are currently trying to improve their English competences with a special training offered by the university. The teaching staff explain to the experts, that they are further allowed to spend time outside their university. They mention to have spent three to six

months for research visits at other universities in Indonesia, Malaysia, Japan or Australia. The experts request to know, which international conferences on mathematics education the staff members join on a regular basis. The staff members reply they mainly attend national conferences on mathematics education and education in general. The expert panel further questions the teaching staff on the university support for the professor acceleration program. This program is organized on a university level and is available for those, who have already achieved the level of an associate professor. The university supports those lecturers as they aim to increase the number of full professors at UNEJ. In order to do so, the lecturers need to prove that they have applied for grants, they do research and they have published at least two scientific publications.

The expert panel inquires how additional training for the staff is organized at UNEJ. In the opinion of the teaching staff, the university encourages them to continue their training and join workshops. As one example of a completed course, the teaching staff describes a three-day training on new software and how to integrate this into their classroom teaching. Other exchange takes place among the different research teams, who organize several joint activities in order to discuss new tools in pedagogy. New staff members further receive a special training for one year, where they are supported a fellow lecturer as a mentor. The university promotes several projects on how to improve the competences in pedagogy and non-pedagogy skills. This also includes programs for new staff members as well as a refreshing training for those who have already worked as lecturers at the university for several years.

The experts conclude that there are offers and support mechanisms available for teaching staff who wish to further develop their professional and teaching skills. However, the expert panel suggest that the teaching staff should strengthen their involvement with the international community in mathematics education. They therefore recommend the lecturers to increase the participation at international conferences, e.g., the International Congress on Mathematics Education (the next one is in Australia, 2024), the Conference on Psychology in Mathematics Education (PME) or the ICMI-East Asia Regional Conference on Mathematics Education (EARCOME).

#### **Criterion 4.3 Funds and equipment**

##### **Evidence:**

- Self-assessment report
- Staff handbook
- Library webpage <https://perpustakaan.unej.ac.id/>

- Digital repository of the library <https://repository.unej.ac.id/>
- List of institutions with MoUs and MoAs
- List of research grants of the teaching staff of the study program
- Discussions during the audit
- Kooperationsverträge und Regeln für interne/externe Kooperationen legen die hochschulinterne Zusammenarbeit sowie Kooperationen mit externen Institutionen fest.
- Dokumente aus dem täglichen Gebrauch der Hochschule, in denen die Ausstattung dargestellt wird, z.B. Laborhandbücher, Inventarlisten, Finanzpläne

#### **Preliminary assessment and analysis of the peers:**

The financing of UNEJ is based on funding from the government, student tuition fees and additional grants for research and services. Government funds are received annually and are utilized for salaries and general expenses. Additional costs for the teaching and learning activities are covered by the student tuition fees. The staff of UNEJ is further applying for grants from government and non-government organizations. Most grants are used to finance research and teaching projects, student exchange programs and equipment. Grants are also necessary to complete larger infrastructure projects including building construction. The university applies two online systems to manage their finances; a Budget Management Information System and a Financial Information System. Both systems are used to distribute the strategic plan of the university and show regulations and limitations as well as document the distribution of finances and manage future needs. The university further practices cooperations with national and international research institutions and universities. These cover academic and non-academic collaborations and mainly manage student exchange programs, student internships and teaching assistance. International cooperations exist with the University of Technology Malaysia whereas national collaborations exist among others with the Surabaya University, Malang University and the Ganesa University of Education.

UNEJ has a central library, offering their services and catalogue online. The library allows students and staff to borrow book while also providing room for reading and learning. Furthermore, the university managed their digital services on an online repository.

The facilities used in teaching of the bachelor program ME include classrooms, seminar rooms, libraries, study program laboratories, and virtual laboratories. Classrooms can accommodate up to 40 students, which are suitable for the number of students admitted each year. Laboratory equipment is continuously improved to meet up-to-date standards.

A survey among students on their satisfaction of the infrastructure reveals a high percentage of students are either “highly satisfied” or “satisfied” with a smaller exception concerning the number and quality of sports facilities. The teaching staff of the bachelor program ME is successful at acquiring research grants supporting their scientific activities and education.

In the discussion of the experts and the university representatives, the university summarizes that their budget for research is still low but increasing. The collaborations of the university is 91% domestic and nine percent overseas. The staff and students have access to apply for international grants including German grants from the DAAD and European grants from Erasmus+.

The experts are further curious which software is applied in the lectures and how the university manages these. As examples, the program coordinators list the software GeoGebra, which is applied in several courses on geometry and free of charge. Further free programs are also create learning videos, which other students can later watch and rate. In addition, software like MATLAB is provided by the university.

In the discussion between the expert panel and the representatives of the rector’s office, the issue on funding is addressed. The university acknowledges that the study program receives support from the university, student’s tuition fees and due to collaborations (equipment) and grants. The experts consider the high amount of research projects of the teaching staff as very positive; however, they are interested if there are larger projects within the study program, in which several lecturers are involved. The teaching staff explain to the expert panel, that they often apply for research funding as each of them is currently having several projects. These include collaboration projects with national and international partners. The university does offer small grants to support their research activity; larger projects can be applied at national or international funding agencies. The teaching staff adds that they also conduct collaborations with partners without formal projects (e.g. in Bangladesh, India and Australia).

The experts further have a question on the library and the online access to journals and books on mathematics education. In the opinion of the teaching staff, the university offers them an excellent library with the most important books in their field. The online access is also available for students to download publication and books. Furthermore, students can borrow books and use other resources of the library. In addition, the departments and faculties have their own libraries. At the beginning of each year, each staff member can made requests for material to the library. However, the focus for the students’ need is to expand the online access, as students prefer to download their learning materials.

The experts summarize, that the available funds and equipment form a sound and solid basis for the degree programme including guaranteed funds, sufficient and high-quality infrastructure and solid, binding rules for all internal and external cooperations. Nevertheless, the experts recommend expanding and updating the library in mathematics education. In addition, the expert consider the projects of the staff as positive; however, in their opinion, it would be important for them to work together in larger projects. These would convey the key research activities of the teaching staff and additionally provide opportunities for the involvement of PhD students in larger research group.

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

Add criterion 4.2.

The expert panel greatly appreciates the participate to the staff at international conferences to connect with the international community. The university has already shown their determination to increase their attendance at international meetings, which the experts consider as very positive. They continue to highlight, that especially the participation at important International Conferences like PME, ICME, EARCOME, CERME would be very beneficial for the teaching staff of the Universitas Jember.

Add criterion 4.3.

The university has submitted a list of journals available at the Universitas Jember as well as their e-resources. This list confirms to the experts that students and staff have access to the high ranked journals on an international level. In the experts' opinion, the university fulfills their desired standards in journals and therefore, the experts desists to issue any recommendations or requirements in this regard.

The university did not comment on the situation of large projects to combine the research of various staff members and students. Therefore, the experts continue to issue the recommendation E5.

## 5. Transparency and documentation

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| <b>Criterion 5.1 Module descriptions</b> |
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**Evidence:**

- Self-assessment report



- Module handbook
- Webpage of the study program <https://matematika.fkip.unej.ac.id/>
- Discussion during the audit

**Preliminary assessment and analysis of the peers:**

UNEJ publishes the module handbook of the bachelor program ME on the webpage of the program in Bahasa and English. The module handbook is therefore accessible for all students, stakeholders and people interested in the study program. Additionally, the module handbook is uploaded to the online management system for the students.

The experts observe that they contain information about the persons responsible for each module, the teaching methods and workload, the credit points awarded, the intended learning outcomes, the examination requirements, the forms of assessment and details explaining how the final grade is calculated. Further, literature is recommended to the students.

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| <b>Criterion 5.2 Diploma and Diploma Supplement</b> |
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**Evidence:**

- Self-assessment report
- Example of the diploma certificate
- Example of the diploma supplement
- Example of the transcript of records

**Preliminary assessment and analysis of the peers:**

UNEJ issues a degree certificate to all students who have successfully passed all courses. The diploma contains detailed information starting from the full name to the degree, as well as the origin of the department and study program. The transcript of records additionally lists all courses the student has passed along with the obtained grades. Further information on the degree program and the participation of the students in supporting academic activities and organizations. These activities are especially important for students searching to continue to work in entrepreneurial activities.

The ASIIN experts are provided with samples of these documents. They experts confirm that the students of both programs under review are awarded a Diploma Certificate as well as a Transcript of Records. The Transcript of Records lists all courses that the graduate has completed, the achieved credit points, grades, and cumulative GPA. The experts verify that the students receive these documents shortly after graduation. These documents provide

information on the student's qualifications profile and individual performance as well as the classification of the degree programme with regard to its applicable education system. Furthermore, the individual modules and the grading procedure on which the final mark is based are explained in a way, which is clear for third parties. In addition to the final mark, statistical data as set forth in the ECTS User's Guide is included to allow readers to categorize the individual result/degree.

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| <b>Criterion 5.3 Relevant rules</b> |
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**Evidence:**

- Self-assessment report
- Academic guidelines for diploma and bachelor programs Universitas Jember
- Academic calendar
- Webpage of the study program <https://matematika.fkip.unej.ac.id/>
- Webpage of the university <https://unej.ac.id/>
- Webpage International office <https://international.unej.ac.id/>
- Discussions during the audit

**Preliminary assessment and analysis of the peers:**

UNEJ rules and regulations are comprehensively documented in the “Academic Guidelines for Diploma, Bachelor and post-graduate programs”, which has been published by the university. These study regulations are presented online for all students in Bahasa on the official webpage of UNEJ. The webpage of the international office of UNEJ offers additional information in English focusing mainly on admission regulations. All information can additionally be accessed within the student management online system.

The university states, domestic and international students have the same rights and obligations at UNEJ. All students receive the academic guidebook at the beginnings of their studies during the orientation events. The orientation program covers the regulation of provisions for general affairs, students, curriculum structure, lectures, completion of the study, and study leave, academic facilities, evaluation of learning achievement, academic norms, transfer of study programs, graduation criteria, higher education transfer, the continuation of study, and academic administration and sanctions.

The experts consider the rights of both the higher education institution and students are clearly defined and binding. All relevant course-related information is available in the language of the degree programme and accessible for anyone involved. The experts add, that

based on the students comment, the webpage and their online learning management system is often afflicted by problems. Therefore, the experts recommend improving the stability of the webpage and further increase the amount of English information in order to reach a wider international audience.

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

Add criterion 5.3.

The university acknowledges the motivation of the experts' recommendation to expand the content of their webpage in English. The experts continue to recommend E6.

## **6. Quality management: quality assessment and development**

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| <b>Criterion 6 Quality management: quality assessment and development</b> |
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**Evidence:**

- Self-assessment report
- Quality Assurance Policy of UNEJ
- Questionnaire and the results of the Student Feedback Survey
- Results of Staff Satisfaction
- Discussion during the audit

**Preliminary assessment and analysis of the peers:**

The quality assurance system at UNEJ is organized by an internal and external control. The internal quality assurance system is centrally managed by the Quality Assurance Center at the faculty level and by the Quality Assurance Unit at the study program level. External quality control is mainly achieved by national and international accreditations. Within the national accreditation by BAN-PT, the bachelor program of ME was awarded an A with the period of 2020 to 2025.

Internal quality assurance is carried out to maintain the quality of study programs, curriculum, lecturers, and lessons. The monitoring of the curriculum considers the opinion of various parties, including internal stakeholders (leaders, students) and external stakeholders

(partners, graduate users, government regulations). Surveys are done with questionnaires, which are then analyzed by the different quality management systems.

UNEJ further considers the achievement of main performance indicator targets in each study program. Currently, the bachelor study program achieves great results for the indicator “graduates get decent jobs.” Improvements in the study program are, however, necessary for the performance indicators of “practitioners teach on campus”, “Lecturer's work is used by the community or gets international recognition”, “Study program in collaboration with world class partners” and “International standard program.” Since then, the study program started to increase their collaboration with the University of Malaya (Malaysia).

UNEJ further conducts quality assessment on the student program level. The curriculum of the study program is revised every four years. The last major changes were the integration of the Independent Learning – Independent Campus (MBKM) program in 2021. A continuous curriculum development is carried out by involving various parties, including internal stakeholders (leaders, students) and external stakeholders (partners, graduate users) by filling out the questionnaire. Each module is periodically reviewed by the internal quality assurance system toward the use of appropriate learning tools in order to achieve the learning outcomes of each lecture. During the semester, the internal quality assurance system monitors the learning process twice with meetings at the 4<sup>th</sup> and 8<sup>th</sup> semester. Internal evaluations of teaching and learning activities of the teaching staff is carried out through the learning management platform of UNEJ. The results of these monitoring processes is shared with the study coordinators and the team of course lecturers in order to make improvements of the program.

The evaluation of the lecturer is based on the opinion of the students. The university initiates regular survey online in the student management system. Students have to fill out the questionnaire at the end of the lecture, which includes questions on the teaching materials, teaching methods and the overall opinion of the students. A decline in the satisfaction of the students was registered during the COVID-19 pandemic, when the main teaching was conducted online. The results of these evaluation are submitted to the study program coordinator at regular meetings at the end of the school year, in order to improve the learning process of the lecturers in the next semester. In addition, the results of evaluations of lecturers by students were also discussed together with students during open-talk activities held by the mathematics student club, which were held before entering the beginning of the lecture in the next school year. In addition to open talk activities, lecturers of Ba ME

conduct evaluations by involving students to provide suggestions and criticisms for improvement in their learning process, which are discussed during the last class of the semester.

At the end of each academic year, the internal quality management of the faculty discussed the results of all evaluations surveys. They mainly consider, if and how the PLOs of the program are achieved. Although a negative effect of the COVID-19 pandemic is visible in the student surveys, the study program overall maintained a high quality based on tracer studies conducted among recent alumni. Next to a high satisfaction rate of the students, over 90% of the graduates find a job within less than 6 months. This proves the good competitiveness of the graduates from UNEJ.

In the discussion with the representatives from the rector's office, the experts ask on the student number and dropout rates. The university representatives provided evidence showing that the current number of students at the program is in total 549, whereas the dropout rate of the program is low and ranges around 3%. They admit that during the COVID-19 pandemic, several students could not continue with their studies, which increased the number of dropout students.

The experts ask the representatives of the rector's office what the consequences of the different forms of evaluation are. The university explains that each lecturer receives the scores of the student evaluation. The score range from one to seven, of which the teaching staff of the bachelor program ME usually get results above six (average 6.29). If one member of the teaching staff would receive low scores in their teaching, they would receive additional training consequently. The experts are further interested in which context the students receive feedback on the results of their evaluations. The program coordinators specify that all evaluation results are accessible in the online information system. In this system, the students can further see the score of each lecturer, and they are therefore aware of lecturers who have previously receive bad reviews. In addition, the study programs organizes an open talk once a year. In this event, the student are encouraged to openly address their issues and complaints, which will then be discussed together with the program coordinators, the teaching staff and university representatives. While this event is public and allows direct communication, the online surveys of the courses are conducted anonymously. The program coordinators verify that the teaching staff holds regular meetings twice a semester. Additionally, one internal meeting is organized prior to the start of each semester to discuss the changes in the content of the lectures as well as the applied teaching methods and involved technologies. The teaching staff further confirms that they also receive visitors from other universities, who review their used learning material in their modules. The students state that evaluations are done every semester in their online learn-

ing management system. The questionnaire is presented to them at the end of each lecture. In addition, they also mention to participate in the “open talk” once a year to openly voice and discuss their problems with the lecturers and program coordinators. In the opinion of the students, they experienced changes in the modules after they pointed out an issue in certain modules. As one example, they name one module, where the learning materials were not carefully listed in their study materials. This situation has nowadays strongly improved. Another example is the more elaborate personal feedback the students receive now from the lecturers during the modules and afterwards. Further, they state to have requested a better explanation of certain details in some modules, which was also implemented since.

The expert panel summarizes that the bachelor program ME is subject to regular internal quality assessment procedures aiming at continuous improvement. All responsibilities and mechanisms defined for the purposes of continued development are binding. Students and other stakeholders confirm to the experts to take part in the quality assurance process. The outcomes and all measures derived are made known to anyone involved. All methods employed and data analyzed are suitable for the purpose and used to continue improving the degree programme, especially with a view to identifying and resolving weaknesses. This includes evaluation if the intended learning outcomes have been achieved at graduation, the academic feasibility of the degree programme; student mobility, how the qualifications profile is accepted on the labor market or the effect of measures in use to avoid unequal treatment at the higher education institution.

## **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:

- D 1. A full list of journals members of the university have access to in mathematics education (international and national)

## **E Comment of the Higher Education Institution (25.05.2023)**

The institution provided a detailed statement as well as the following additional comments to the report:

### **“1. The Degree Program: Concept, content & implementation Criterion**

#### **Criterion 1.1 Objectives and learning outcomes of a degree program (intended qualifications profile)**

It's sufficient.

#### **Criterion 1.2 Name of the degree program**

It's sufficient.

#### **Criterion 1.3 Curriculum**

a) Page 15, 4<sup>th</sup> paragraph, line 26-29

##### **ASIIN:**

They first inquire which types of geometry are addressed in the module “Geometry” since this is unclear in the module handbook.

##### **Comment/response:**

In the first year, students learn the basic concepts of geometry. Students learn about defined term and undefined term objects (points, lines, line segments, plane, and space geometric objects), axioms, types of proof both inductively and deductively, and proving theorems. Student as a preservice teacher must know everything before conveying it to their students in class.

b) Page 15, last paragraph.

##### **ASIIN:**

Another module, which is unclear to the experts, is “Mathematics teaching and learning strategy.”

##### **Comment/response:**

In the “mathematics teaching and learning strategy” course module, it is explained that students will become familiar with various models, methods, strategies and approaches and their characteristics for teaching mathematics topics at the high school level. Students are then invited to design activities to apply models, methods, strategies, and approaches through designing learning activities on topics of student choice that are considered appropriate to the characteristics of the models, methods, strategies and approaches. In designing activities, students are also taught about how to use triggering questions/problems or evaluation questions that are in accordance with the character models, methods, approaches, strategies, and student characters. So that in this course, the focus is on how students can teach mathematics content that is in accordance with the character of students, the cognitive level of students by using methods, models, strategies, and approaches in designing learning activities.

c) Page 19, first paragraph, Line 5

##### **ASIIN:**

The experts further recommend considering expanding the internship up to six months if feasible.

**Comment/response:**

The Internship for 6 months or 1 semester has been accommodated by MBKM activities, such as teaching assistance at schools, internships and independent studies in institutions partner, thematic courses in Universitas Jember assisted villages, with a credit score of 20 SKS (30,52 ECTSs). All these activities had been explained in the bachelor's in mathematics education curriculum guidance.

**Criterion 1.4 Admission requirement**

It's sufficient.

**2. The degree programme: structures, methods and implementation**

**Criterion 2.1 Structure and modules**

It's sufficient.

**Criterion 2.2 Work load and credits**

Page 24, last paragraph

**ASIIN:**

A re-calculation of the workload in each week reveals up to 60 hours in one single week.... Therefore, the topic of the workload was also extensively discussed with the students. The students confirm that the workload is indeed high

**Comment/response:**

In the Ba Me study program, one credit is defined as 50 minutes of face-to-face, 60 minutes of independent study, and 60 minutes of structured study. This rule was adopted from the Regulation of the Minister of Education and Culture No. 3 of 2020 Article 19 Paragraph (4), which then adopted as a university regulation. In practice, 50 minutes of face-to-face learning are carried out in class. In comparison, 120 minutes for independent and structured learning are used outside of class and unscheduled (can be done on the sidelines of empty face-to-face learning activities or at any free time) to fulfill assignments and practice together with friends, tutors, or lecturer guidance. Mathematics education students generally take 18-21 credits (standard credit) to 24 credits (for students with a GPA of more than 3) each semester and assume five active days a week.

- a. The total time per week for students taking 18 credits is  $18 \times 50 \text{ minutes} = 900 \text{ minutes} = 15 \text{ hours}$  or 3 hours/day face to face,  $18 \times 120 \text{ minutes} = 2160 \text{ minutes} = 36 \text{ hours}$  per week or 7.2 hours per day.
- b. The total time per week for students taking 20 credits is  $20 \times 50 \text{ minutes} = 1000 \text{ minutes} = 16.67 \text{ hours}$  or 3.33 hours/day for face-to-face meetings,  $20 \times 120 \text{ minutes} = 2400 \text{ minutes} = 40 \text{ hours}$  per week or 8 hours per day.
- c. The total time per week is  $24 \times 50 \text{ minutes} = 1200 \text{ minutes} = 20 \text{ hours}$  or 4 hours/day face to face,  $24 \times 120 \text{ minutes} = 2880 \text{ minutes} = 48 \text{ hours}$  per week or 9.6 hours per day

| Table. Recapitulation of total study time per day, either scheduled or unscheduled Credits taken | Face-to-face study time (in class and scheduled)/day | Independent and structured study time (outside class and unscheduled)/day |
|--|--|---|
|--|--|---|



|            |      |     |
|------------|------|-----|
| 18 credits | 3    | 7,2 |
| 20 credits | 3,33 | 8   |
| 21 credits | 3,5  | 8,4 |
| 24 credits | 4    | 9,6 |

**Criterion 2.3 Teaching Methodology**

Page 27, last paragraph.

**ASIIN:**

The expert panel recommends increasing the number of mathematical exercises in the lectures in order to train and assess the mathematical skills of the students. The experts panel suggests to consider weekly mathematical exercises, which might be given as homework, and which could be corrected by the students assistant or tutors.

**Comment/response:**

Students practice their mathematical abilities during lectures. This is due to existing problems, which arose during the discussion. To ensure that was discussed and resolved was correct, the lecturer acted as a facilitator in the class at that time. To practice math problem solving skills, students are given problems and solved in groups so that the solutions given are the result of group discussions. After getting a solution, the group began to present it in front of the class. During the presentation, other students may respond or provide input on the results of the group discussion. This is done continuously for each chapter in the course.

**Criterion 2.3 Support and assistance**

It's Sufficient.

**3. Exams: System, concept and organization****Criterion 3 Exams: System, concept and organization**

Page 32, 2<sup>nd</sup> paragraph.

**ASIIN:**

The experts can follow this explanation, but still suggest using a more common term such as "written exam/test" instead of "essay."

**Comment/response:**

We consider accepting the expert's suggestion using a more common term such as "written test" instead of "essay."

**4. Resources****Criterion 4.1. Staff**

It's Sufficient.

**Criterion 4.2. Staff Development**

Page 37, last paragraph.

**ASIIN:**

However, the expert panel suggests that the teaching staff should strengthen their involvement with the international community in mathematics education. They therefore recommend the lecturers to increase participation at international conferences.

**Comment/Respond:**

Teaching Staff in mathematics education develop their professionalism to do university tri darma, are teaching, publication, community in services. In developing professionalism their

teaching and publication, mathematics education teaching staff follow any international conferences. Teaching Staff in mathematics education follow the international conference on research implementation and education of mathematics and science 2024, Mathematics and mathematics education international conference, etc. Ba ME has organized the International Conference of Mathematics Education, Learning and Application (ICOMELA), in 2021. International conferences that have been attended by Ba ME lecturers, such as a) International Conference on Multidisciplinary Contemporary Research, Genting Highlands, Malaysia, b) The South East Asia International Science-Technology, Engineering, and Mathematics (SEA-STEM), c) The 9th International Conference on Mathematics, Science, and Education at Universitas Semarang; d) The 2<sup>nd</sup> International conference on The 2<sup>nd</sup> International Conference on Mathematics : Education, Theory and Application (ICMETA) at Universitas sebelas Maret, Indonesia, e) 2nd International Seminar on Applied Mathematics and Mathematics Education (ISAMME) 2020 IKIP Siliwangi; f) he 2nd International Conference on Mathematics and Learning Research (ICOMER) held by Mathematics Education Department – Universitas Muhammadiyah Surakarta, g) International Conference on Mathematics and Mathematics Education (ICMMEd) at universitas Pattimura, d) International Conference of Mathematical Analysis, it's Application and Learning (ICoMAAL) at Universitas Sanata Dharma, Yogyakarta, Indonesia. We will increase the participation at international community.

#### **Criterion 4.3 Fund and equipment**

a) Page 39, last paragraph.

##### **ASIIN:**

However, the focus for the students' need is to expand the online access, as students prefer to download their learning materials.

##### **Comment/Respond:**

We accept it, the student of mathematics education can study with read the books by visit the study program library, faculty library or university library. Beside reading the books in the available library, the students can read articles open access that available in universitas jember. The link is 1. E-book Springer by <https://link.springer.com>, 2. E-Book Taylor & Francis by <https://taylorfrancis.com>, 3. Open Educational Resources by <https://oer.library.unej.ac.id>, 4. UNEJ Open e-Resources Portal by <https://oailib.unej.ac.id>, 5. UNEJDIGILib can be downloaded in play store and AppStore

b) Page 40, first paragraph.

##### **ASIIN:**

These would convey the key research activities of the teaching staff and additionally provide opportunities for the involvement of PhD students in larger research group.

##### **Comment/Respond:**

Jember University's FKIP Mathematics Education Doctoral Program starts in 2022 and research groups are being developed for Ph.D. students, but currently PhD students are not directly involved in research groups.

## **5. Transparency and documentation**

#### **Criterion 5.1 Module Description**

It's Sufficient.

**Criterion 5.2 Diploma and Diploma Supplement**

It's Sufficient.

**Criterion 5.3 Relevant Rules**

Page 42, last paragraph.

**ASIIN:**

Therefore, the experts recommend improving the stability of the webpage and further increase the amount of English information in order to reach a wider international audience.

**Comment/response:**

We consider accepting it.

**6. Quality Management: quality assessment and development**

**Criterion 6 Quality management: quality assessment and development**

**a) Page 44, 3<sup>rd</sup> paragraph.**

**ASIIN:**

In the discussion with the representatives from the rector's office, the experts ask on the student

number and dropout rates. The university representatives provided evidence showing that the current number of students at the program is in total 549, whereas the dropout rate of the program is low and ranges around 3%. They admit that during the COVID-19 pandemic, several students could not continue with their studies, which increased the number of dropout students.

**Comment/response:**

The university's efforts to reduce the increase in the number of dropout students is to improve services for students. Student Support Services: Institutions establish comprehensive student support services to identify and address the underlying factors contributing to students' inability to continue their studies. This can include financial aid programs, counseling services, academic advising, and mentorship programs. By providing necessary support, institutions can help students overcome challenges and stay engaged in their education. In addition to increasing the role and function of academic supervisors.

**b) Page 44, 4<sup>th</sup> paragraph.**

**ASIIN:**

The experts ask the representatives of the rector's office what the consequences of the different forms of evaluation are. The university explains that each lecturer receives the scores of the student evaluation. The score range from one to seven, of which the teaching staff of the bachelor program ME usually get results above six (average 6.29). If one member of the teaching staff would receive low scores in their teaching, they would receive additional training consequently.

**Comment/response:**

The university's response to providing additional training to teaching staff who receive low scores in their teaching is commendable. By offering supplementary training, the university demonstrates their commitment to helping teaching staff improve their teaching quality. Providing additional training to teaching staff who receive low scores in evaluations offers an opportunity to identify areas for improvement and provide relevant solutions. This helps teaching staff address their weaknesses in teaching and enhance their skills.

Moreover, this approach also signifies that the university values feedback from students and utilizes it as a tool for improving teaching. By offering opportunities for additional training, the university shows their willingness to invest in the professional development of teaching staff and enhance the student learning experience.

This approach also encourages teaching staff to continue learning and adapt to the needs and expectations of students, creating an environment conducive to high-quality teaching.

Overall, the university's action of providing additional training to teaching staff who receive low scores in evaluations demonstrates their commitment to continuous improvement in teaching quality. It can enhance the student learning experience and ensure that teaching staff continue to develop their teaching skills. some of the training that has been attended by lecturers, among others:

1. **Associate Data Scientist.** This training was attended by 7 lecturers to strengthen the competence of lecturers in statistics.
2. **Microsoft Certified Education.** This training was attended by 8 lecturers to strengthen and enhance skills in the field of education technology.
3. **Internet of Thing Training.** This training was attended by 7 lecturers to enhance teaching strategies, connect mathematics to the real world, promote problem-solving skills, facilitate collaborative learning, and prepare students for future technological advancements.
4. **Digital Marketing.** This training was attended by 6 lecturers to strengthen the competence of lecturers in entrepreneurship.

5. **Adobe Certified Professional.** This training was attended by 6 lecturers to strengthen the competence of lecturers in learning media.”

## F Summary: Expert recommendations (31.05.2023)

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

| <b>Degree Programme</b>  | <b>ASIIN Seal</b>              | <b>Maximum duration of accreditation</b> | <b>Subject-specific label</b> | <b>Maximum duration of accreditation</b> |
|--------------------------|--------------------------------|--|-------------------------------|--|
| Ba Mathematics Education | With requirements for one year | 30.09.2028                               | -                             | -  |

### Requirements

- A 1. (ASIIN 2.2) Develop a mechanism to assess the total workload of each module and the total workload of students per semesters. The credits of each module has to match the awarded workload.

### Recommendations

- E 1. (ASIIN 1.3) It is recommended to increase the amount of English in the content of the modules to increase the English proficiency.
- E 2. (ASIIN 1.3) It is recommended to define the term “research” in regard to the bachelor thesis.
- E 3. (ASIIN 2.3) It is recommended to include more exercise in order to practice the mathematical skills of the students. This might include written (weekly) exercises as homework, which should be corrected by student tutors (assistants).
- E 4. (ASIIN 4.2) it is recommended to increase the participation of the teaching staff and students at international conferences.
- E 5. (ASIIN 4.3) it is recommended to increase the number of projects of the staff of the study degree program to support larger scientific goals and increase the possibilities in the education of PhD students.

- E 6. (ASIIN 5.3) To achieve a wider international representation, it is recommended to expand the amount of English on the webpage of the university and its faculties.

## G Comment of the Technical Committee 12- Mathematics (09.06.2023)

### *Assessment and analysis for the award of the ASIIN seal:*

The Technical Committee discusses the accrediting procedure, especially the requirement A1 to evaluate the total workload of the students as well as the recommendation E3 to increase the number of written assignments. Since the expert panel considers the workload of the students in the study program under review as presumably high, the Technical Committee changes the wording of the recommendation E3 in order to clarify that this suggestion would not lead to an increase of the workload of the students.

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 Education | With requirements for one year | 30.09.2028                        | –                      | -                                 |

### Requirements

#### For all degree programmes

- A 1. (ASIIN 2.2) Develop a mechanism to assess the total workload of each module and the total workload of students per semesters. The credits of each module has to match the awarded workload.

### Recommendations

#### For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to increase the amount of English in the content of the modules to increase the English proficiency.
- E 2. (ASIIN 1.3) It is recommended to define the term “research” in regard to the bachelor thesis.

- E 3. (ASIIN 2.3) It is recommended to substitute selected oral assessments with exercises in order to practice the mathematical skills of the students. This might include written (weekly) exercises as homework, which should be corrected by student tutors (assistants).
- E 4. (ASIIN 4.2) it is recommended to increase the participation of the teaching staff and students at international conferences.
- E 5. (ASIIN 4.3) it is recommended to increase the number of projects of the staff of the study degree program to support larger scientific goals and increase the possibilities in the education of PhD students.
- E 6. (ASIIN 5.3) To achieve a wider international representation, it is recommended to expand the amount of English on the webpage of the university and its faculties.

## H Decision of the Accreditation Commission (23.06.2023)

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

The accreditation commission discusses this procedure and makes several changes. First, the accreditation commission decides to delete the former recommendation A3 on weekly exercises to practice the mathematical skills of the students; in the opinion of the accreditation commission, the university is responsible to choose the teaching methods of the desired outcomes are achieved. Second, the accreditation commission changes the recommendation E3 (former E4) in order to include also national conferences. Third, the accreditation commission deletes the part on PhD students in the recommendation E4 (former E5) as this accreditation procedure is only concerned with the bachelor program Mathematics Education.

The Accreditation Commission decides to award the following seals:

| <b>Degree Programme</b>  | <b>ASIIN Seal</b>              | <b>Maximum duration of accreditation</b> | <b>Subject-specific label</b> | <b>Maximum duration of accreditation</b> |
|--------------------------|--------------------------------|--|-------------------------------|--|
| Ba Mathematics Education | With requirements for one year | 30.09.2028                               | –                             | -  |



## **Requirements**

### **For all degree programmes**

- A 1. (ASIIN 2.2) Develop a mechanism to assess the total workload of each module and the total workload of students per semesters. The credits of each module has to match the awarded workload.

## **Recommendations**

### **For all degree programmes**

- E 1. (ASIIN 1.3) It is recommended to increase the amount of English in the content of the modules to increase the English proficiency.
- E 2. (ASIIN 1.3) It is recommended to define the term “research” in regard to the bachelor thesis.
- E 3. (ASIIN 4.2) it is recommended to increase the participation of the teaching staff and students at national and international conferences.
- E 4. (ASIIN 4.3) it is recommended to increase the number of projects of the staff of the study degree program to support larger scientific goals.
- E 5. (ASIIN 5.3) To achieve a wider international representation, it is recommended to expand the amount of English on the webpage of the university and its faculties.

# I Fulfilment of Requirements (22.03.2024)

## Analysis of the experts and the Technical Committee (06.03.2024)

### Requirements

#### For the degree programme

- A 1. (ASIIN 2.2) Develop a mechanism to assess the total workload of each module and the total workload of students per semesters. The credits of each module has to match the awarded workload.

| Initial Treatment |   |
|-------------------|---|
| Experts           | Fulfilled.<br>Justification: The experts acknowledge that Univeristas Jember as developed an elaborated standard operating procedure to evaluate the real workload of the students. In addition, the university has already presented the first results of its analysis. The experts continue to point out that the documentation does not show evidence how the results of this survey had influence the number of credits in the modules. However, the experts are convinced that the university will consider the collected data after collecting more data in their next revisions. |
| TC 12             | Fulfilled.<br>Vote: unanimous.<br>Justification: The TC follows the decision of the experts.  |
| AC                | Fulfilled.<br>Vote: unanimous<br>Justification: The AC follows the decision of the experts and the TC.  |

## Decision of the Accreditation Commission (22.03.2024)

| Degree programme         | ASIIN-label                  | Subject-specific label | Accreditation until max. |
|--------------------------|------------------------------|------------------------|--------------------------|
| Ba Mathematics Education | All requirements fulfilled-d |                        | 30.09.2028               |

## Appendix: Programme Learning Outcomes and Curricula

According to the self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved in the bachelor program “Mathematics Education”

### Objectives

1. Teaching mathematics in primary, secondary education and other institutions
2. continuing studies in the field of professional education in mathematics, mathematics education, and other related fields
3. developing in the fields of education, learning media, and mathematics learning that sharpen TPACK (Technological Pedagogical and Content Knowledge) through environmentally sound research
4. elaborating mathematics on problems contained in Science, Technology, Engineering, the Arts and Mathematics (STEAM) to solve real problems
5. Developing a sense of responsibility, self-confidence, emotional maturity, ethics, and personality as a lifelong learner

### Program learning outcomes (PLOs)

| No | Code | PLOs  | SSC-TC12 | Aspect              |
|----|------|---|----------|---------------------|
| 1  | S1   | Showing characters that actuate the teachings in Pancasila  | 14       | Attitude and Social |
| 2  | S2   | Respecting others' original opinions or findings, as well as cultural diversity to improve quality of life        | 14       |                     |
| 3  | S3   | Demonstrating an attitude of nationalism, cooperation, and social sensitivity towards society and the environment | 14       |                     |

|    |      |   |            |                |
|----|------|---|------------|----------------|
| 4  | S4   | Demonstrating the responsibility for the works in his/her field of expertise independently by internalizing academic values, norms, and ethics  | 14         | General Skill  |
| 5  | S5   | Internalizing the spirit of independence, struggle, and entrepreneurship, by obeying the law and norms in social and state life   | 14         |                |
| 6  | KU1  | Applying logical, critical, systematic, and innovative thinking by demonstrating independent, quality, and measurable performance in developing or implementing science and technology                  | 10         |                |
| 7  | KU 2 | Implementing and publishing the results of science and technology studies to solve mathematics problems and learning.   | 9,11       |                |
| 8  | KU 3 | Contributing the results of group work with full responsibility.  | 12         |                |
| 9  | KU 4 | Developing an entrepreneurial spirit based on science and technology that is environmentally sound through the development of a cooperation network   | 12,13      |                |
| 10 | KK   | Designing mathematics learning using information and communication technology that is oriented towards life skills (thinking skills, social skills, academic skills, and vocational skills)             | 2,4,8,9,10 | Specific Skill |
| 11 | P1   | Analyzing mathematical objects as the basis for mathematical thinking   | 1          | Knowledge      |
| 12 | P2   | Formulating the results of mathematical problem solving and learning.   | 3,5,6,7    |                |
| 13 | P3   | Analyzing mathematical concepts, learning theories, teaching theories, student characteristics, and assessments to carry out mathematics learning and research in the field of mathematics and learning | 3,5,6,7,10 |                |

The following **curriculum** is presented:

### Curriculum Structure of Bachelor in Mathematics Education

**Table 22. University-Level Courses (10 credits)**

| No                   | Course Code | Course                          | Semester | Credits         |              |           |
|----------------------|-------------|---------------------------------|----------|-----------------|--------------|-----------|
|                      |             |                                 |          | General Courses | Institutions | Total     |
| 1                    | MPK 9001    | Islamic Education*              | 2        | 2               |              | 2         |
| 2                    | MPK 9002    | Protestant Christian Education* | 2        | 2               |              | 2         |
| 3                    | MPK 9003    | Catholic Christian Education*   | 2        | 2               |              | 2         |
| 4                    | MPK 9004    | Hindu Education*                | 2        | 2               |              | 2         |
| 5                    | MPK 9005    | Buddhist Education*             | 2        | 2               |              | 2         |
| 6                    | MPK 9006    | Civic Education                 | 7        | 2               |              | 2         |
| 7                    | MPK 9007    | Indonesian                      | 1        | 2               |              | 2         |
| 8                    | UNU 9001    | Pancasila Education             | 5        | 2               |              | 2         |
| <b>Total Credits</b> |             |                                 |          | <b>8</b>        | <b>0</b>     | <b>8</b>  |
| 9                    | UNU 9002    | English                         | 5        |                 | 2            | 2         |
| <b>Total Credits</b> |             |                                 |          | <b>0</b>        | <b>2</b>     | <b>2</b>  |
| <b>Total Credits</b> |             |                                 |          | <b>8</b>        | <b>2</b>     | <b>10</b> |

**Table 23. Courses at Faculty and Study Program Level (22 Credits)**

| No                   | Course Code | Course  | Semester | Credits  |              |          | Course Level |
|----------------------|-------------|---|----------|----------|--------------|----------|--------------|
|                      |             |   |          | Core     | Institutions | Total    |              |
| 1                    | KPU 1101    | Introduction to Education                           | 1        |          | 2            | 2        | Faculty      |
| 2                    | KPU 1204    | Learners' Development                               | 2        |          | 2            | 2        | Faculty      |
| 3                    | KPU 1102    | Learning Theory                                     | 1        |          | 2            | 2        | Faculty      |
| 4                    | KPU 1203    | Educational Profession                              | 2        |          | 2            | 2        | Faculty      |
| <b>Total credits</b> |             |   |          | <b>0</b> | <b>8</b>     | <b>8</b> |              |
| 5                    | KPU 1506    | Entrepreneurship and Business                       | 5        |          | 2            | 2        | Faculty      |
| 6                    | KPU 1106    | Environmental Education                             | 5        |          | 2            | 2        | Faculty      |
| <b>Total credits</b> |             |   |          | <b>0</b> | <b>4</b>     | <b>4</b> |              |
| 7                    | KPU 1108    | Internship Introduction to School Environment (PLP) | 4        |          | 2            | 2        | Faculty      |

| No                   | Course Code | Course   | Semester | Credits  |              |          | Course Level |
|----------------------|-------------|--|----------|----------|--------------|----------|--------------|
|                      |             |  |          | Core     | Institutions | Total    |              |
| 8                    | KPU 1721    | KK-PLP (Fieldwork and Introduction to School Environment/ Student Community Service and Teaching Practice) | 7        |          | 3            | 3        | Faculty      |
| <b>Total credits</b> |             |  |          | <b>0</b> | <b>5</b>     | <b>5</b> |              |
| 10                   | KPM 1103    | Science Insights   | 1        |          | 3            | 3        | Major        |
| 11                   | KPM 1002    | Micro Teaching   | 5        |          | 2            | 2        | Faculty      |
| <b>Total credits</b> |             |  |          | <b>0</b> | <b>5</b>     | <b>5</b> |              |

**Table 24. Learning Courses of Study Program (11 credits)**

| No                   | Course Code | Course   | Credits   |              | Credits Distribution |          |           |
|----------------------|-------------|--|-----------|--------------|----------------------|----------|-----------|
|                      |             |  | Core      | Institutions | Theory               | Pract    | Total     |
| 1                    | KPM 1467    | Mathematics Lesson Planning                      | 2         |              | 2                    |          | 2         |
| 2                    | KPM 1316    | Evaluation of Mathematics Learning Outcomes      | 2         |              | 2                    |          | 2         |
| 3                    | KPM 1531    | The Development and Review of School Curriculum  | 2         |              | 2                    |          | 2         |
| 4                    | KPM 1210    | Learning Media                                   | 2         |              | 1                    | 1        | 2         |
| 5                    | KPM 1315    | Instructional Strategies in Teaching Mathematics | 3         |              | 3                    |          | 3         |
| <b>Total credits</b> |             |  | <b>11</b> |              | <b>10</b>            | <b>1</b> | <b>11</b> |

**Table 25. Expertise-based Courses of Study Program (62 credits)**

| No | Course Code | Course                      | Credit |              | Credit Distribution |       |       |
|----|-------------|-----------------------------|--------|--------------|---------------------|-------|-------|
|    |             |                             | Core   | Institutions | Theory              | Pract | Total |
| 1  | KPM 1101    | Differential Calculus       | 4      |              | 4                   |       | 4     |
| 2  | KPM 1209    | Integral Calculus           | 3      |              | 3                   |       | 3     |
| 3  | KPM 1311    | Multivariable Calculus      | 3      |              | 3                   |       | 3     |
| 4  | KPM 1312    | Vector Analysis             | 3      |              | 3                   |       | 3     |
| 5  | KPM 1526    | Real Analysis               | 4      |              | 4                   |       | 4     |
| 6  | KPM 1527    | Complex Variable Analysis   | 3      |              | 3                   |       | 3     |
| 7  | KPM 1102    | Trigonometry                | 2      |              | 2                   |       | 2     |
| 8  | KPM 1104    | Geometry                    | 3      |              | 3                   |       | 3     |
| 9  | KPM 1207    | Analytical Geometry         | 3      |              | 3                   |       | 3     |
| 10 | KPM 1366    | Transformational Geometry   | 2      |              | 2                   |       | 2     |
| 10 | KPM 1208    | Linear Algebra              | 3      |              | 3                   |       | 3     |
| 11 | KPM 1418    | Abstract Algebra            | 4      |              | 4                   |       | 4     |
| 12 | KPM 1105    | Logic and Mathematical Sets | 3      |              | 3                   |       | 3     |

| No                   | Course Code | Course                          | Credit    |              | Credit Distribution |          |           |
|----------------------|-------------|---------------------------------|-----------|--------------|---------------------|----------|-----------|
|                      |             |                                 | Core      | Institutions | Theory              | Pract    | Total     |
| 13                   | KPM 1265    | Number Theory                   | 3         |              | 3                   |          | 3         |
| 14                   | KPM 1313    | Combinatorics                   | 2         |              | 2                   |          | 2         |
| 15                   | KPM 1421    | Mathematical Statistics         | 3         |              | 3                   |          | 3         |
| 16                   | KPM 1422    | Discrete Mathematics            | 3         |              | 3                   |          | 3         |
| 17                   | KPM 1314    | Ordinary Differential Equations | 3         |              | 2                   | 1        | 3         |
| 18                   | KPM 1420    | Capita Selecta in Mathematics   | 3         |              | 3                   |          | 3         |
| 19                   | KPM 1206    | Algorithms and Programming      | 3         |              | 2                   | 1        | 3         |
| 20                   | KPM 1425    | Technology-Assisted Learning    | 2         |              | 1                   | 1        | 2         |
| <b>TOTAL credits</b> |             |                                 | <b>62</b> |              | <b>59</b>           | <b>3</b> | <b>62</b> |

**Table 26. Expertise-based Courses of Study Program in Applied Mathematics and Optimization (15 credits)**

| No           | Course Code | Course                               | Credits   |              | Credits Distribution |           |           |
|--------------|-------------|--------------------------------------|-----------|--------------|----------------------|-----------|-----------|
|              |             |                                      | Core      | Institutions | Theory               | Practicum | Core      |
| 1            | KPM 1528    | Inferential Statistics               | 3         |              | 2                    | 1         | 3         |
| 2            | KPM 1529    | Operational Research                 | 3         |              | 3                    |           | 3         |
| 3            | KPM 1423    | Partial Differential Equations       | 3         |              | 3                    |           | 3         |
| 4            | KPM 1530    | Numerical Methods                    | 3         |              | 2                    | 1         | 3         |
| 5            | KPM 1532    | Mathematics for International School | 3         |              | 3                    |           | 3         |
| <b>TOTAL</b> |             |                                      | <b>15</b> |              | <b>13</b>            | <b>2</b>  | <b>15</b> |

**Table 27. Core Courses based on TPACK and Research Group (16 credits)**

| No                             | Course Code | Course   | Credits |              | Credits Distribution |           |       |
|--------------------------------|-------------|--|---------|--------------|----------------------|-----------|-------|
|                                |             |  | Core    | Institutions | Theory               | Practicum | Total |
| <b>Geomobel Research Group</b> |             |  |         |              |                      |           |       |
| 1                              | KPM 1633    | Geometry Modeling                              | 3       |              | 3                    |           | 3     |
| 2                              | KPM 1634    | Geometry Research Methodology and its learning | 3       |              | 3                    |           | 3     |
| 3                              | KPM 1635    | English for Writing and Teaching Geometry      | 2       |              | 2                    |           | 2     |
| 4                              | KPM 1636    | Geometry Learning Design                       | 2       |              | 2                    |           | 2     |
| Total                          |             |  | 10      |              | 10                   |           | 10    |
| <b>Manabel Research Group</b>  |             |  |         |              |                      |           |       |



| No                                | Course Code | Course   | Credits   |              | Credits Distribution |           |           |
|-----------------------------------|-------------|--|-----------|--------------|----------------------|-----------|-----------|
|                                   |             |  | Core      | Institutions | Theory               | Practicum | Total     |
| 1                                 | KPM 1637    | Analytical Mathematics Modeling                              | 3         |              | 3                    |           | 3         |
| 2                                 | KPM 1638    | Analytical Mathematics Research Methodology and Its Learning | 3         |              | 3                    |           | 3         |
| 3                                 | KPM 1639    | English for Writing and Teaching Analytical Mathematics      | 2         |              | 2                    |           | 2         |
| 4                                 | KPM 1640    | Learning Design for Analytical Mathematics                   | 2         |              | 2                    |           | 2         |
|                                   |             | <b>Total</b>   | <b>10</b> |              | <b>10</b>            |           | <b>10</b> |
| <b>Kompustabel Research Group</b> |             |  |           |              |                      |           |           |
| 1                                 | KPM 1640    | Mathematics Modeling   | 3         |              | 3                    |           | 3         |
| 2                                 | KPM 1641    | Research Methodology for Mathematics Education               | 3         |              | 3                    |           | 3         |
| 3                                 | KPM 1642    | English for Writing and Teaching                             | 2         |              | 2                    |           | 2         |
| 4                                 | KPM 1643    | Learning Design  | 2         |              | 2                    |           | 2         |
|                                   |             | <b>Total</b>   | <b>10</b> |              | <b>10</b>            |           | <b>10</b> |
| 1                                 | KPM 1804    | <b>Undergraduate Thesis</b>                                  | 6         |              |                      | 6         | 6         |

**Table 28. Elective Science Courses (10 credits)**

| No                             | Course Code | Course   | Credits |              | Credits Distribution |           |      |
|--------------------------------|-------------|--|---------|--------------|----------------------|-----------|------|
|                                |             |  | Core    | Institutions | Theory               | Practicum | Core |
| <b>Geomobel Research Group</b> |             |  |         |              |                      |           |      |
| 1                              | KPM 1633    | Geometry Modeling                              | 3       |              | 3                    |           | 3    |
| 2                              | KPM 1634    | Geometry Research Methodology and its learning | 3       |              | 3                    |           | 3    |
| 3                              | KPM 1635    | English for Writing and Teaching Geometry      | 2       |              | 2                    |           | 2    |
| 4                              | KPM 1636    | Design Geometry Learning                       | 2       |              | 2                    |           | 2    |

0 Appendix: Programme Learning Outcomes and Curricula

| No                                | Course Code | Course   | Credits   |              | Credits Distribution |           |           |
|-----------------------------------|-------------|--|-----------|--------------|----------------------|-----------|-----------|
|                                   |             |  | Core      | Institutions | Theory               | Practicum | Core      |
|                                   |             | <b>Total</b>   | <b>10</b> |              | <b>10</b>            |           | <b>10</b> |
| <b>Manabel Research Group</b>     |             |  |           |              |                      |           |           |
| 1                                 | KPM 1637    | Analytical Mathematics Modeling                              | 3         |              | 3                    |           | 3         |
| 2                                 | KPM 1638    | Analytical Mathematics Research Methodology and Its Learning | 3         |              | 3                    |           | 3         |
| 3                                 | KPM 1639    | English for Writing and Teaching Analytical Mathematics      | 2         |              | 2                    |           | 2         |
| 4                                 | KPM 1640    | Mathematics Learning Design Analysis                         | 2         |              | 2                    |           | 2         |
|                                   |             | <b>Total</b>   | <b>10</b> |              | <b>10</b>            |           | <b>10</b> |
| <b>Kompustabel Research Group</b> |             |  |           |              |                      |           |           |
| 1                                 | KPM 1640    | Mathematics Modeling   | 3         |              | 3                    |           | 3         |
| 2                                 | KPM 1641    | Mathematics Education Research Methodology                   | 3         |              | 3                    |           | 3         |
| 3                                 | KPM 1642    | English for Writing and Teaching                             | 2         |              | 2                    |           | 2         |
| 4                                 | KPM 1643    | Learning Design  | 2         |              | 2                    |           | 2         |
|                                   |             | <b>Total</b>   | <b>10</b> |              | <b>10</b>            |           | <b>10</b> |
| 1                                 | KPM 1804    | <b>Bachelor's Thesis</b>                                     | 6         |              |                      | 6         | 6         |

\*\* ) New Elective Courses