



**ASIIN Seal**

## **Accreditation Report**

**Bachelor's Degree Programmes**

***Mathematics***

***Mathematics Education***

***Natural Science Education***

**Master's Degree Programme**

***Mathematics Education***

Provided by

**Universitas Negeri Yogyakarta, Indonesia**

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## A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for <sup>1</sup>	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) <sup>2</sup>
Program Studi S1 Matematika	Bachelor of Science in Mathematics	ASIIN	/	12
Program Studi S1 Pendidikan Matematika	Bachelor of Education in Mathematics	ASIIN	/	12
Program Studi S1 Pendidikan IPA	Bachelor of Education in Natural Science	ASIIN	/	12, 13
Program Studi S2 Pendidikan Matematika	Master of Education in Mathematics	ASIIN	/	12
<p><b>Date of the contract:</b> 16.04.2019</p> <p><b>Submission of the final version of the self-assessment report:</b> 18.10.2019</p> <p><b>Date of the onsite visit:</b> 19.-21.11.2019</p> <p><b>at:</b> Universitas Negeri Yogyakarta, Yogyakarta, Indonesia</p>				
<p><b>Peer panel:</b></p> <p>Prof. Dr. Martin Buhmann, University Gießen</p> <p>Prof. Dr. Angela Fösel, University Erlangen</p> <p>Alexandra Dreiseidler, former Emil-Fischer Secondary School Euskirchen (paper-based)</p> <p>Luthfia Hastifa Sam, Hasanuddin University (Student Representative)</p>				
<p><b>Representative of the ASIIN headquarter:</b> Christin Habermann</p>				
<p><b>Responsible decision-making committee:</b> Accreditation Commission for Degree Programmes</p>				
<p><b>Criteria used:</b></p>				

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

<sup>2</sup> TC: Technical Committee for the following subject areas: TC 12 - Mathematics; TC 13 - Physics.

## **A About the Accreditation Process**

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European Standards and Guidelines as of 15.05.2015	
ASIIN General Criteria, as of 28.03.2014	
Subject-Specific Criteria of Technical Committee 12 – Mathematics as of 09.12.2016	
Subject-Specific Criteria of Technical Committee 13 – Physics as of 09.12.2019	

## B Characteristics of the Degree Programmes

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
Ba Mathematics	Sarjana Sains Matematika (S.Si) / Bachelor of Science in Mathematics (B.Sc.)		6	Full time	n/a	8 Semester	237 ECTS (144 sks)	WS / 1997
Ba Mathematics Education	Sarjana Pendidikan (S.Pd.) / Bachelor of Education (B.Ed.)		6	Full time	n/a	8 Semester	237 ECTS (144 sks)	WS / 1964
Ba Natural Science Education	Sarjana Pendidikan (S.Pd.) / Bachelor of Education (B.Ed.)		6	Full time	n/a	8 Semester	237 ECTS (144 sks)	WS / 2007
Ma Mathematics Education	Magister Pendidikan (M.Pd.) / Master of Education (M.Ed.)		7	Full time	n/a	4 Semester	69 ECTS (42 sks)	WS / 2005

For the Bachelor's degree programme Mathematics the institution has presented the following profile in their curriculum:

### Vision

By 2025 to become a leading study program at the national level in the mastery, application, and development of Mathematics and produce graduates who are pious, independent and intelligent

### Missions

1. To implement mathematics education and teaching program in synergy to provide graduates who can compete in the global level and are ready to continue to the higher level.
2. To conduct research to develop the field of mathematics and its useful application for the development of science and technology.

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

3. To conduct community service through the dissemination and application of mathematics to increase the public's appreciation on mathematics.
4. To implement a good and clean study program management and build mutually beneficial collaborations with other parties, whether in or outside the country, to increase community service and the education and research quality in the field of mathematics.

### **Graduate Profile**

The graduate profiles of Mathematics Study Program include academicians, research assistants, consultants, practitioners (for industry, service, government, and bank), software developer and data analyst.”

For the Bachelor's degree programme Mathematics Education the institution has presented the following profile in their curriculum:

### **“Vision of the Study Program**

Become an international standardized mathematics education study program capable of producing pious, independent and intellectual graduates.

### **Missions of Study Programs**

5. Organize a quality learning process to prepare pious, independent and intellectual graduates
6. Intensify research and publication of leading scientific works in the field of mathematics education to support the learning process and development of mathematics education
7. Carry out community service in the field of mathematics education to support the teacher professional development and increase community appreciation of mathematics and mathematics education
8. Organize good and clean governance of the study program and foster collaboration with institutions at national and international levels to support the process of learning, research, and publication of scientific works, and community service.

### **Graduate Profile**

Mathematics Education Study Program of the Faculty of Mathematics and Natural Sciences, Yogyakarta State University produces excellent, creative, and innovative graduates based on piety, autonomy, and intellectuality, who can undergo the profession as mathematics teachers, developers of mathematics learning resources and media, and managers in the field of education. The following is a description of each graduate profile.”

No	Graduate Profile	Description
1	Mathematics teachers	The graduates of mathematics study program can be professional teachers in the field of mathematics in both formal and non-formal institutions.
2	Developers of mathematics learning resources and media	The graduates of mathematics study program can be developers of print and digital learning resources as well as conventional and digital learning media
3	Managers in the field of education	The graduates of mathematics study program can be managers of formal and non-formal educational institutions.

For the Bachelor's degree programme Natural Science Education the institution has presented the following profile in their curriculum:

### **“Vision of the Study Program.**

In 2025, Natural Science Study Program would be the Pioneer and Eminent Study Program in national, regional, and international level; which produces the professional, devoted, intelligent and independent Natural Science Education Scholars.

### **Mission of the Study Program**

1. To prepare the excellent, outstanding, creative, superior, professional, and having global competitiveness prospective educators and Natural Science educators.
2. To improve the research on the innovative and current Natural Science as the base of educational process and dedication to the society;
3. To hold the social service in the society which is based on the result of Natural Science research;
4. To hold the internationalization of Natural Science education by strengthening the network and partnership in national, regional, and international level.
5. To empower the whole available resources by using the information, communication, and technology engineering.

### **The Scholars' Profile**

The scholars' profile of Natural Science education S1 Study Program of the Mathematics and Natural Science Faculty is being the Natural and Science educators or teachers in SMP/MTs, researcher's assistants on Natural Science and its education, and innovation developer on Natural Science learning.”

For the Master's degree programme Mathematics Education the institution has presented the following profile i profile in their curriculum:

### **Vision**

The study program vision is to become a Mathematics Education Master's Study that is leading in mathematics education and learning research in Southeast Asia founded on the values of piety, independence, and intelligence by 2025.

### **Missions**

1. To implement high quality education and teaching at the mathematics education Master's study program that is founded on piety, independence, and intelligence;
2. To conduct research, studies, and scientific development of mathematics education in which results can be published at the regional level of Southeast Asia at minimum;
3. To develop community service in the field of Mathematics Education and other relevant fields through intellectual behaviour development based on quality research findings that serves the Indonesian people, Southeast Asia regions, or at the global level; and
4. To develop collaborative network that is in synergy with various partner agencies and institutions, whether at the local, national, regional, or the global level.

### **Graduate Profile**

<b>Graduate Profile</b>	<b>Description</b>
Professional educator of mathematics education	Lecturer of mathematics education or mathematics teacher in formal or non-formal institutions
Researcher of mathematics education	Designer, researcher, and writer of scientific paper in the field of mathematics education
Consultant of mathematics education	Providing clues, considerations or advices in the field of mathematics education, designing and developing activities in the field of mathematics education
Media and learning material developer of mathematics education	Designer and developer of conventional or IT-based learning media in the field of mathematics education, designer and developer of learning materials in the field of mathematics education



## C Peer Report for the ASIIN Seal

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

#### Evidence:

- Objective-Module Matrices for all four degree programmes, provided in the Self-Assessment Report, showcase how each module serves to reach the qualification goals of the study programmes
- Diploma Supplements for all four degree programmes inform about the aim and content of the study programme
- The module descriptions, available for all four study programmes, inform about the aims and content of each single module
- Discussions with representatives of UNY management, programme coordinators, lecturers, business representatives and students
- The Self-Assessment Report entails details about the objectives of each study programme

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

For all four degree programmes, UNY has described and published programme objectives and programme learning outcomes. While the programme objectives focus on the vision and mission of the respective degree programme and are rather short and concise, the programme learning outcomes cover a number of specific competencies the students attain in each degree programmes. These are clustered around the following four competencies: Attitudes, General Skills, Particular Skills, and Knowledge Mastery. The programme objectives can be found on the university's website as well as the "Approval Sheet", an institutional summary of each degree programme provided and signed by the Dean of Academic Affairs.

According to these concise descriptions of the programme objectives, the mission of the Bachelor's degree programme Mathematics is "facilitating graduates with the ability to compete in the global era and with qualification to continue their studies to a higher level, conducting research to develop mathematical science and its application significant for the development of science and technology, conducting community service for disseminating and applying mathematical science" as well as to "support the quality of education and

research in mathematics.”

The mission of the Bachelor’s degree programme Mathematics Education is “conducting professional education, academic education, and vocational education in the field of teacher training with the support of non-educational fields to facilitate the development of students in becoming graduates who uphold piety, autonomy, and intellectuality” as well as “conducting research to unearth and disseminate knowledge, to invent and disseminate technology ... for the purpose of improving individual and social welfare.” The Master’s degree programme of Mathematics Education furthers these qualification objectives by “conducting high quality education and teaching”, “conducting research and development in mathematics education that is publishable at least in Southeast Asia” as well as “conducting community service activities based on research in mathematics education.”

Finally, the Bachelor’s degree programme Natural Science Education follows the mission to prepare prospective Natural Science educators, to “improve the research on the innovative and current Natural Science as the base of education process and dedication to society”, “to hold the internationalization of Natural Science education by strengthening the network and partnership in national, regional, and international level” as well as “to empower the whole available resources by using information, communication, and technology engineering.”

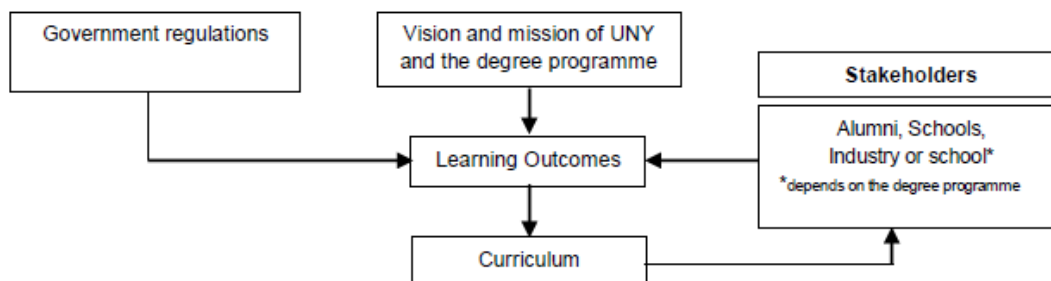
The programme learning outcomes are more detailed and are anchored in the Diploma Supplement in Bahasa Indonesia and English. They are divided into different fields of objectives and cover the following competencies of the graduate: Attitudes, General Skills, Particular Skills, Knowledge Mastery. While the “Attitudes” focus on the students’ moral, lawful, just and responsible behaviour within the university but also within society, those competencies remain similar in all four degree programmes. However, “General Skills”, “Particular Skills” and “Knowledge Mastery” focus distinctly on the competencies to be achieved in each degree programme. While the first two categories focus on the subject-specific skills and knowledge of the students, the peers laude that the latter category focuses on the students’ process of life-long learning. Given that three of the four degree programmes have a focus on education, these pedagogical and didactical competencies are absolutely necessary for the graduates; yet the peers appreciate that also graduates of the Bachelor Mathematics are given the ability to life-long learning. Additionally, UNY has also delivered objective-module matrices for all degree programmes that showcase which competencies students acquire in each module, thus making it easy for the peers to assess whether each individual module supports obtaining the overall qualification objectives of the degree programmes.

The peers discuss the learning outcomes of each degree programme, which can be found

in their entirety in the Annex to this accreditation report, with regard to the following criteria: the level of academic qualifications aimed at; the respective ASIIN SSC; whether the intended qualification profiles allow the students to take up an occupation corresponding to their education; which stakeholders are involved in the continuous assessment and further development of the objectives. The peers refer to the Subject-Specific Criteria (SSC) of the Technical Committee Mathematics and the SSC of the Technical Committee Physics as a basis for judging whether the objectives and intended learning outcomes of the four degree programmes, as defined by Universitas Negeri Yogyakarta (UNY), correspond with the competencies outlined by the SSC. While the SSC of the Technical Committee Mathematics are relevant for all four study programmes, the SSC of the Technical Committee Physics have been consulted only with regard to the Bachelor’s degree programme Natural Sciences. The peers thus judge the transparency of the qualification objectives but especially their accordance with the respective SSC and come to the following conclusion: The objectives and intended learning outcomes of all four degree programmes under accreditation are consistent with the EQF levels aimed at and adhere to the relevant ASIIN SSC. The objectives and learning outcomes are clearly defined and published in the Diploma Supplement as well as the university’s website.

The peers discuss with the programme coordinators of UNY how the programme objectives and programme learning outcomes were designed. They learn that they were developed based on the vision of the University and government regulations but especially through the input of relevant stakeholders, such as partners from the industry, alumni, teachers and students. These stakeholders are also involved in the revision of the learning outcomes, the programme objectives as well as the curriculum (cf. criterion 1.3). As such, the study programme undergoes minor adaptations every year, while big changes, such as the inclusion of new learning outcomes or modules, are undertaken every five years.

UNY provides the following graphic, to clarify the process of creating and assessing the learning objectives and the curriculum, respectively:



The peers are very satisfied knowing that the objectives and learning outcomes are continuously updated and believe that especially the input of the external stakeholders ensures

that students are best qualified for a successful career after graduation. The peers inquire the different employment options for a Bachelor of Education and a Master of Education. They learn that Bachelor graduates are able to teach Mathematics in formal or non-formal institutions, such as schools and learning centres and that they may also manage said educational institutions. In addition to that, graduates of a Master of Education are also capable of researching and developing the education of Mathematics itself and may work for the Ministry of Education or similar governmental agencies. In the discussion with the students as well as the partners from the industry, the peers learn that most students of the educational programmes find employments as teachers in schools or in educational centres. Master students of the educational programmes may also work as lecturers at universities or as educational consultants for the Ministry of Education. The graduates of the Bachelor of Mathematics find work as research assistants, data analysts or software developers. Less than 2% of students will continue with the Master's degree, due to the employment opportunities that are already available after finishing the Bachelor's degree.

The peers ask which subject a graduate of the Bachelor's degree Natural Science Education can teach. The programme coordinators explain that at Indonesian high schools, students take the class "Natural Science", which serves as an introduction to the different fields of natural sciences they may take during the following year. As such, the curriculum of this Bachelor's degree programs cover the fundamentals of Physics, Biology and Chemistry.

In summary, the peers are very satisfied with the qualification objectives and learning outcomes of each degree programmes as they match EQF and ASIIN SSC criteria, are continuously evaluated and developed by all relevant stakeholders and are published transparently.

<b>Criterion 1.2 Name of the degree programme</b>
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**Evidence:**

- The "Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Concerning Nomenclature of Study Programs in Higher Education" informs about the regulations for naming any study programme in Indonesia
- Curricula of all four study programmes reflect if the contents taught match the title of the programmes
- The Self-Assessment Report gives details about the chosen titles for the study programmes

- Discussions with representatives of UNY management, programme coordinators, lecturers, business representatives and students

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

In Indonesia, titles for degree programmes are based on a decree by the Ministry of Education and as such follow rules and cannot be awarded at random. The titles for undergraduate programmes are indicated by the acronym “S1”, while graduate degree programmes are labelled with “S2”. Another regulation refers to the categorization of degree programmes in UNY, especially the distinction between “educational degree programmes” and “non-educational degree programmes”. The former are indicated by the term “pendidikan”, meaning “education”, prior to the label of the subject discipline, whereas the title for non-educational degree programmes only contains the name of the discipline. The peers consider the names for all four study programmes to adequately reflect the programmes’ intended aims and learning outcomes as well as their main course language.

<b>Criterion 1.3 Curriculum</b>
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**Evidence:**

- A curriculum for each study programmes allows an overview of the taught contents and how the intended learning outcomes of the programmes are supposed to be achieved
- Objective-Module Matrices for all four degree programmes, provided in the Self-Assessment Report, showcase how each module serves to reach the qualification goals of the study programmes
- The “Academic Regulation Yogyakarta State University Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Concerning the National Standards of Higher Education” informs about the regulation for creating and developing a curriculum
- The module descriptions, available for all four study programmes, inform about the aims and content of each single module
- Discussions with representatives of UNY management, programme coordinators, lecturers, business representatives and students
- Self-Assessment Report explains in great detail how the curriculum was created and is constantly developed

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

The curricula of the degree programmes are designed to comply with the programme objectives and programme outcomes and are subjected to constant revision processes (cf.

graphic under criterion 1.1). As such, the curricula are recurrently reviewed and commented on by students and teachers as well as by external stakeholders such as alumni or partners from the industry and regular changes are made to ensure that the curricula are up to modern standards.

There exist three rules with regard to the development and structure of the curriculum. The first refers to the review-process of the curricula already discussed prior. The second sets the minimum number of credit points and the third the construction of the curriculum with regard to certain contents. As such, the curriculum of undergraduate programme in Indonesia must at least contain 144 Indonesian credits (sks) or 237 ECTS, whereas the curriculum of graduate programmes must at least contain 42 sks (69 ECTS), so that in total at least 300 ECTS are reached when completing both a Bachelor's and a Master's degree. With regard to the general rule covering the construction of the curriculum, Bachelor's degree programmes in Indonesia must entail 22 sks of university and faculty common courses, 2 sks community service and 8 sks of common basic educational courses. For the Master's degree curriculum students solely have to take 2 sks of common courses.

Generally, the curriculum of the Bachelor's degree programmes consist of 8 semesters, each with a duration of 16 weeks. The first six semesters contain so-called common courses, basic educational courses as well as specific courses dependant on the chosen degree programme. The seventh semester entails the community service of the students as well as an internship. The eighth semester is dedicated to the undergraduate thesis. The common courses are set by the university and are mainly designed to achieve learning outcomes within the attitudes domain as well as generic skills of the students such as English speaking competencies. Basic education courses and mathematics education/natural science education courses cover basic concepts of educational science, psychology, didactical approaches for mathematics and natural sciences education. It is within the specific courses that each programme is distinctly designed. (For an overview of the specific courses taught in each programme, please refer to the curricula in the annex of this report).

The peers learn that the elective courses of the Bachelor's degree programmes make up less than 10% of the entire curriculum and inquire why so few elective courses are offered to the students. The programme coordinators explain that there are so few elective courses – e.g. only 4 sks of mathematics education courses and 6 sks of mathematics courses for the Bachelor's degree programme Mathematics Education – so it can be guaranteed that students learn all the necessary subject-specific skills they need to be successful in their career. The peers agree with this assessment.

The curriculum of the Master's degree programme consists of 4 semesters. It consists of

three common courses (Philosophy of Science, Educational Research Methodology, Statistics), compulsory courses and a list of elective courses. The compulsory courses, next to scientific and pedagogical mathematical topics, also focus on academic writing and scientific research. The elective modules cover nine course groups, each containing two modules, among them Mathematical Statistics, Topology or Coding Theory. Students are able to select two course groups and thus define the individual focus of their study.

During the discussion with the programme coordinators, the peers learn that the curricula of all degree programmes undergo major revision every five years, while minor revisions are undertaken every year; the newest curriculum was adapted for the 2019/2020 study year. The peers ask about the changes that have been made to the curricula and learn that for the Bachelor of Mathematics Education, for example, digital learning has been included in the curricula in the form of three modules, based on a wish of partners from the industry. For the Bachelor of Natural Science Education, the module “Disaster Mitigation” has been introduced as well as a module on academic writing in English for the science classroom. For the Master of Mathematics Education, a qualitative research course was introduced to increase the research competencies of graduate students. The peers are very impressed by the input of all relevant external stakeholders on the curricula and believe all changes made to be very beneficial to the students’ future career.

The peers also discuss the practical experience of the students. They learn that all Bachelor students have to undertake a community service that is mandatory in Indonesian HEIs and that is aimed to provide experiences to apply their knowledge while at the same time supporting Indonesian society. As such, during the Community Service students live and work mostly in rural or sub-urban areas for four to five weeks and support the local societal needs.

Unlike the Community Service, the educational internship of the Bachelor’s degree programme Mathematics Education and the Bachelor’s degree programme Natural Science Education is conducted at partner schools for the duration of three months and allows students to gain knowledge about designing lesson plans, teaching in a real classroom environment and performing classroom assessments. Each of the internships is supervised by one representative from UNY to ensure that students gain the necessary skills. While the students would like to have more practical experience the peers see that the curriculum itself is designed to allow for much pedagogical practice, whether in the form of certain modules or the internship. The Bachelor of Mathematics includes a 1-month long internship that students have to undertake at a company either in Indonesia or abroad.

The peers are very satisfied with the structure and content of the curriculum as all necessary skills and competencies are covered.

In their Self-Assessment Reports, UNY states that students still lack certain English-speaking competencies. In order to counter this and to help the students gain sufficient English language skills, every student now has to take an English test at the beginning of his or her enrolment. This way, UNY can assess the English-speaking abilities of each student and offers additional language courses if needed. The curriculum of the Bachelor's degree programmes also includes three English courses, Basic English, English for Mathematics Learning, and English for Mathematics Writing (respectively for the Natural Science programme). As one of only two faculties of UNY, the Faculty of Mathematics and Natural Science also offers a bilingual programme. Here, some modules are held simultaneously in Bahasa and English. While the peers notice during the discussion with the students, that they generally hold sufficient English-speaking skills, they nonetheless believe it to be beneficial if entire modules were held solely in English.

In summary, the peers gained the impression that the overall objectives and learning outcomes of the degree programmes are systematically substantiated and updated in the individual modules. It is clear, which knowledge, skills and competencies students will acquire. Thus, the graduates of all four degree programmes under review are well prepared for entering the labour market and can find adequate employment in Indonesia.

### **Criterion 1.4 Admission requirements**

#### **Evidence:**

- The „Academic Regulation Yogyakarta State University”, the “Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Concerning the National Standards of Higher Education” and the “Government Rule – National Student Admission” inform about the admission requirements and procedures at UNY and especially for the four study programmes
- A Student Admission Brochure details the process of admission for interested students
- Discussions with representatives of UNY management, programme coordinators, lecturers, business representatives and students
- Self-Assessment Report explains in great detail the admission process and its requirements

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

Student admission for all degree programmes at UNY is managed through the admission



office. Regarding the admission process itself, different systems are applied for undergraduate programmes and graduate programmes. For the undergraduate programmes, there exist three pathways for student admission:

1. SNMPTN (National Entry Selection of Public Universities), based on academic performance during high school (40%)
2. SBMPTN (Joint Entry Selection of Public Universities), based on a nationwide selection test that is held every year for university candidates (40%)
3. Mandiri Selection (Local admission), these students are selected under special consideration of their education, local origin, social background, achievements in sports or science, and financial means

Unlike the undergraduate programmes, the admission for the Master's degree programme does not entail an entrance test at the national level. Instead, student admissions are independently held at UNY. Here, students must hold a Bachelor's degree with a minimum GPA of 2.75. Students with a Bachelor of Mathematics may apply, yet they must catch up on some pedagogical courses.

Especially for the Bachelor's degree programmes these different ways of application are necessary as the number of applicants is significantly higher than the available places. For the Bachelor's degree programmes, UNY receives more than 2000 applications per year, while only 80 students may enrol in each degree programme. For the Master's degree programme, 60-70 slots are available, while over 300 students apply.

All information regarding admission, including its requirements and its procedures, are available on UNY's website and are anchored in the "Academic Regulations of UNY" and the "Government Rules – National Student Admission", among others.

The peers notice that these regulations state that students suffering from colour-blindness are not allowed to study at UNY. While this disability may be a hindrance for some degree programmes, it is no disadvantage for the study of Mathematics, Mathematics Education or Natural Science Education. The programme coordinators explain that this regulation does not adhere for students of the above mentioned degree programmes. Yet, this regulation is mentioned in UNY's admission regulations. The peers thus ask the programme coordinators to change this setting so as to not discriminate against colour-blind students.

The peers also inquire about the tuition fee for the four study programmes and learn that the fee is based upon the students' parent's income, so that also students from lower-income families can attend university. Additionally, scholarships are available, especially in emergency situations, where parents suddenly cannot finance their children's studies anymore. The peers approve of this financial scheme.

In summary, the auditors find the terms of admission to be binding and transparent. They confirm that the admission requirements support the students in achieving the intended learning outcomes and ask UNY to ensure that colour-blind students may also apply for the study programmes.

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

*1.4 – Admission Requirements*

The University clarifies in their statement, that only a few programmes do not accept students suffering from colour-blindness, such as the Bachelor of Education in Science. The Bachelor of Science in Mathematics, the Bachelor of Education in Mathematics and the Master of Education in Mathematics, accept students with colour-blindness. Respective information can be found on the university's website.

The peers thank UNY for their clarification. Nonetheless, they highly recommend to also allow colour-blind students to study the programme Bachelor of Education in Science or to at least discuss admission on a person-to-person basis as colour-blindness exists on a spectrum and thus varies in severity.

As such, they regard criterion 1 as mostly fulfilled.

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

<b>Criterion 2.1 Structure and modules</b>
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**Evidence:**

- Objective-Module Matrices for all four degree programmes, provided in the Self-Assessment Report, showcase how each module serves to reach the qualification goals of the study programmes
- The module descriptions, available for all four study programmes, inform about the structure of the modules
- The curriculum of each study programmes showcases its structure
- The “Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Concerning the National Standards of Higher Education” inform about the structure of each study programme.
- The “Academic Regulation Yogyakarta State University” as well as the “Regulations

regarding student mobility” inform about student mobility and credit transfer.

- The Self-Assessment Report delivers information about the structure of the programmes as well as student mobility
- Discussions with representatives of UNY management, programme coordinators, lecturers, business representatives and students

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

After analysing the module descriptions and the study plans the peers confirm that all degree programmes under review are divided into modules and that each module is a sum of coherent teaching and learning units. All working practice intervals (Community Service and internships) are well integrated into the curriculum and the supervision by the faculties allows for their respective quality in terms of relevance, content, and structure. In addition, the peers gain the impression that the choice of modules and the structure of the curriculum ensure that the intended learning outcomes of the respective degree programme can be achieved.

To allow students to complete the degree without exceeding the regular study duration, the courses are distributed proportionally over eight semester by considering prerequisites for higher-level courses. In addition to prerequisites, a balance between the different types of courses (e.g. common courses, educational courses, subject-specific courses) is also considered.

After analysing the curricula, the peers notice that each module consists of one course and that therefore there exist many small modules. UNY states that they are in the process of creating a more compact curriculum based on the example of the European model, yet this may take some time. The peers worry about the number of exams the students thus have to take and inquire, whether there have been any complaints by the students. The programme coordinators deny this (cf. criterion 3). To minimize the workload, however, it is guaranteed that no more than two exams are held per day. The peers generally regard the module structure as sufficient yet they urge UNY to create more compact modules to reduce the number of exams.

*International Mobility*

According to the peers, international mobility, although actively promoted by the programme coordinators, is still very limited. UNY tries to promote international mobility by offering scholarships and creating partnership agreements with other universities. So far, there exist over 60 partnership agreements with national and international universities, although all of them are within Asia. The peers are glad that UNY offers support to the students with regard to studying abroad, yet the numbers remain low in comparison to the

number of students enrolling each year. The respective faculties have recognized that there is a serious need for increasing the academic mobility of their own students and for attracting more international students. The peers support the first steps undertaken (scholarships and implemented partnership agreements), but are convinced that even more measures must be taken in order to support the internationalization of UNY, especially since UNY aims at becoming an internationally recognized university. For example, there should be more classes taught solely in English and more partnerships agreements could be undertaken, especially with non-Asian countries.

The peers inquiry whether offering more courses taught in English would help to attract more international students. UNY agrees with that assessment and states that it is in the process of creating more courses in English but that they also offer courses for international students to learn Bahasa Indonesia. The peers appreciate that a variety of courses are already taught bilingually and that during their appointment procedure, lecturers have to prove their English-speaking capabilities.

The peers appreciate the effort to foster international mobility and support the faculties in further pursuing this path.

### **Criterion 2.2 Work load and credits**

#### **Evidence:**

- The module descriptions for each study programme inform about the work load and credits of each module
- The “Academic Regulation Yogyakarta State University” informs about the regulations and restrictions for work load and credits in Indonesia
- Curricula for all four study programmes detail the amount of credits gained in each semester
- A document regarding the transcription of Indonesian Credits (sks) to ECTS allows for an understanding of the workload and credits
- Discussions with representatives of UNY management, programme coordinators, lecturers, business representatives and students

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

According to Indonesian regulation, each undergraduate degree holds 144 sks over the span of eight semesters while each graduate degree covers 42 sks in four years. According to the Academic Regulations of UNY, 1 sks is equivalent with 170 minutes of student activity per week within one semester. As there are 16 weeks of academic activity per semester, 1 sks amounts to 47.72 hours of student activity per semester. When converting to ECTS 1

ECTS equals 26 hours of student activity per semester, which the peers deem sufficient. The peers further confirm that the workload in hours is indicated in the module descriptions and the distinction between classroom work and self-studies is made transparent and is in line with the credits awarded.

With regard to the distribution of the workload over the span of the semesters, the peers learn that for the Bachelor's degree programmes, the first six semesters hold approximately 20-21 sks while in the seventh semester, there are 14 sks of courses, including 6 sks for the internships, and in the eighth semester, students only take 6 sks for their undergraduate thesis. The programme coordinators state that fewer credit points in the last two semesters allow students to finish their studies on time. In addition to distributing the credits proportionally across the semesters, there are regulations in place that avoid students having a workload that exceeds their ability. Here, the GPA of each student defines the maximum credits they may take in the upcoming semester. For example a student with a GPA of less than 2,00 may take 18 sks while a student with a GPA of more than 3,00 may take 24 credits. This way, it is also possible that extremely good students will finish their studies ahead of time. While an unusual approach, the peers see that this is a standard at most Indonesian universities and they agree that this way students are encouraged to finish the studies on their own time instead of having to drop out due to an unbearable workload. To ensure that even the students only allowed to take 18 sks per semester may finish their studies on time, remedial programmes are offered. The peers appreciate this effort.

The peers learn, however, that systematic monitoring and evaluation of the actual workload is not yet conducted so that there exist limited information on the conformity between the theoretical workload and the actual workload. The programme coordinators admit that they see a need to measure the actual workload. The peers thus urge UNY to implement a workload analysis quickly, e.g. as part of the already conducted course evaluations.

During the discussions with the students, the peers learn that they deem the workload as well as the number of exams to be adequate and that they still find time to develop their individual interests and skills outside of the university by working or taking extracurricular classes.

The peers believe the overall workload to be manageable, especially since nearly all students graduate on time. Yet, they urge UNY to conduct workload analyses to ensure that the actual workload matches the awarded credit points.

<b>Criterion 2.3 Teaching methodology</b>
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**Evidence:**

- The module descriptions inform about the teaching methodology applied in each module
- The Self-Assessment Report delivers details about the didactical methods applied in the four degree programmes
- Discussions during the audit, especially with lecturers and students, allow an insight into the teaching methodology actively applied

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

UNY has implemented various teaching and learning methods, which mainly focus on student-centered learning. As such, the use of teaching methodology and media is adjusted to the characteristics of each course and its learning objectives and learning outcomes. For example, mathematics courses with high complexity mainly use expository methods that are combined with problem-solving approaches, while educational courses mainly use problem-based learning combined with student presentations. Those courses dealing with computers and programming are mostly conducted in the laboratories of UNY. The educational programmes also offer excursions as part of their teaching methodology in courses such as Entrepreneurship, History of Mathematics or the internships. The peers are especially impressed with the Micro-Teaching Lab, which allows teachers to record students holding a simulation lecture so the students' performance can later on be assessed in detail.

To improve the flexibility of learning processes and the interaction between students and lecturers, UNY has also launched "Be-Smart", an online platform designed for e-learning activities. For the Bachelor's degree programme Mathematics Education, for example, UNY has developed online modules for 31 out of all 66 modules offered. As Be-Smart is a relatively new platform, all teachers are currently receiving training on how to utilize it. Those that have finished their training will then upload their modules' teachings and documents to the platform. The programme coordinators state that currently, Be-Smart is still a work in progress but they are confident that within the next year all modules will have been uploaded. They assert, however, that Be-Smart is only used in addition to traditional face-to-face lecturers.

The peers ask which computer languages and software are used in the degree programmes and learn that students are instructed in all relevant programmes such as Python, R or Matlab. The university currently holds 10 Matlab licenses, which are not always sufficient regarding the numbers of students per course. As such, the peers recommend increase the

amount of Matlab licenses to at least 20.

In summary, the peers are very impressed with the various teaching methodologies, both traditional and modern, that are utilized in the four degree programmes under review. They deem them suitable to support the students in achieving the intended learning outcomes.

<b>Criterion 2.4 Support and assistance</b>
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**Evidence:**

- The Self-Assessment Report provides an overview of the programmes implemented and the measures taken to support students
- Discussions during the audit, especially with the programme coordinators and the students, allow an insight into the assistance provided in the four study programmes

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

In order to support students in completing their studies on time with good achievements, the university and the faculty provide academic and personal support and assistance through various means: First, each student is appointed an academic supervisor during their first semester, which supports them with devising their study plan and monitors the student's academic progress. Additionally, each student is also appointed a thesis supervisor, who supports him or her in the process of writing their undergraduate thesis. Second, there exist special supervisors who help those students that are interested in extracurricular activities related to their studies, such as participating in mathematics or science Olympiads or national entrepreneurial competitions held by the Ministry of Research, Technology and Higher Education. The peers laude that each student has one personal supervisor that aids them throughout their entire studies and also that the university provides support for those extracurricular activities that can further the students' career.

In addition to the abovementioned academic support, UNY also provides student counselling services and medical center services for personal problems a student might face. Students' interests and talents are furthermore facilitated through several centers, such as the career development center or the scholarship information portal. In order to provide students with sufficient information about the available support and assistance, UNY distributes a Student Handbook that is regularly updated. All necessary information can also be found on UNYs websites.

The peers notice the good and trustful relationship between the students and the teaching staff; there are enough resources available to provide individual assistance, advice and sup-

port for all students. The support systems help the students to achieve the intended learning outcomes to complete their studies successfully and without delay.

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

*2.1 – Structure and Modules*

In their statement, UNY agrees that more classes shall be offered in English and consider this a valuable input. Regarding partnerships with non-Asian countries, they emphasize that UNY already holds relations with visiting scholars and guest lecturers from countries such as the United States of America, Australia, the Netherlands and Mexico. The peers thus believe that UNY should build on these already existing relationships to increase the international mobility of their own students and members of staff.

*2.2 – Work Load and Credits*

UNY agrees with the peers that a workload analysis is necessary and plans on preparing a respective survey as soon as possible.

*2.3 – Teaching Methodology*

With regard to the availability of MATLAB licenses, UNY agrees that the current 10 licenses might not be sufficient for the amount of students. They clarify, however, that alternative open source software, such as R, Maxima, Octave, Euler math Toolbox and Python are accessible by all students as it is more affordable, yet is also utilized widely within the industry. The peers agree with that assessment, although they still believe that MATLAB is an important tool the students must know how to utilize.

The peers regard criterion 2 as fulfilled.

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

**Evidence:**

- The module descriptions inform about the examination of each module
- The “Academic Regulation Yogyakarta State University” as well as the “Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Concerning the National Standards of Higher Education” determine the rules and regulations of examination in all four study programmes
- Exemplary examination schedule
- Final Task Guidebook and Final Task Assessment Book showcase the regulations and



requirements but also the guidelines and assistance with regard to the students' final task

- The Self-Assessment Report gives details about the forms of exams utilized in the four study programmes
- Examinations and final theses were provided during the on-site visit
- Discussions with representatives of UNY management, programme coordinators, lecturers, business representatives and students

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

At UNY, assessment is conducted according to the regulations defined in the Quality Assurance of Assessment as well as the Academic Regulations. Each course determines course objectives to support the achievement of the programme learning outcomes. Accordingly, each course must assess whether all defined learning outcomes stated in the module description have been achieved. If a student fails an exam, he or she may repeat it, either within the semester (in the case of failed mid-term exams), after the end of the semester (in the case of failed final exams) or during the next semester. There is no limitation on how often an exam can be re-taken.

The assessment system at UNY has two purposes: a formative and a summative purpose. The formative assessments are used by the lecturer to monitor the progress of achieving the course objectives and usually takes place in the middle of the semester. If the lecturer notices that students are not able to achieve the course objectives to the fullest, he or she will adapt the taught contents accordingly. The summative assessments are used to display whether the course objectives have been met at the end of each semester.

All final exams take place within a certain timeframe at the end of each semester. This timeframe (exam weeks) is communicated at the beginning of each academic year. Before the exam week there is a preparatory week offered for students to prepare intensively for their final exams. About two weeks prior to the exam weeks, a detailed schedule is published that informs about the exact time and date when each exam takes place.

During the first meeting of each course, the students are informed about the form, the date, the relevant regulation and the weight of the individual exam for the final grade. Assessment of the students' attitudes, which are part of the overall programme learning outcomes, are conducted through observation and documentation of the lecturers. Assessments of knowledge are conducted via quizzes at the end of each unit as well as mid-term and final exams. Assessments are carried out in various forms such as written tests, oral presentations or projects.

The students confirm that a variety of assessment methods is used, including traditional methods such as written or oral exams, but also presentations or projects are utilized. Next to the mid-term and the final exam, students also have some quizzes and projects throughout the semester that all count towards the final module grade. The peers calculate, that students have on average 36 examinations per semester. While the students do not complain about this immense workload, the peers nonetheless believe it to be beneficial to reduce the number of exams and quizzes and to allow students more time to focus on each examination.

With regard to the final thesis, the peers learn that Master students may also write their final thesis abroad, with an external supervisor or in English. For the Bachelors of Education, the final theses are less research-based and more empirically, which the peers deem satisfactory given the pedagogical focus of the degree programmes.

During the on-site visit the peers inspect a sample of examination papers and final theses. They are very satisfied with the general quality of the samples and confirm the high standards of the final theses.

The peers conclude that the criteria regarding the examination system, concept, and organization are fulfilled and that the examinations are suitable to verify whether the intended learning outcomes are achieved or not. They recommend, however, to reduce the number of quizzes so students have more time to prepare for the mid-term and final examinations.

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

With regard to the number of exams taken by the students per semester, UNY clarifies that students do not have to partake in 36 examinations per semester but in 18, as the maximum number of courses to be taken by a student per semesters is nine and each course contains a mid-term as well as a final exam. In addition to these two exams, however, several courses also administer quizzes. UNY states, however, that the work load for these quizzes is significantly lower than that of exams as the quizzes are intended as a formative assessment. Similarly, the students' project, according to UNY, does not add to the overall workload as it can be conducted as a substitution of the final thesis.

The peers thank UNY for the clarifications. As even quizzes, despite their lesser workload, are still exams, the peers still believe the workload to be too high and continue recommending reducing the number of quizzes and exams per semester.

In general, the peers regard criterion 3 as generally fulfilled.

## 4. Resources

### Criterion 4.1 Staff

#### Evidence:

- A Staff Handbook for all four degree programmes informs about the composition of the staff as well as its capacity
- The “Government Rule – Teacher and Lecturer” details the regulations for teachers and lectures
- The Self-Assessment Report gives details about the members of staff and their tasks
- Discussions during the audit, especially with the members of staff as well as the students

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

At UNY, the staff members have different academic positions. There are professors and lecturers. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. For example, there are lecturers who hold a Master’s degree and lecturers who hold a PhD degree. The latter may become professors once they have earned a certain amount of credits with regard to their academic work. In addition, the responsibilities and tasks of a staff member with respect to teaching, research, and supervision depend on the academic position.

According to the Self-Assessment Reports, the staff of the Bachelor’s degree programme Mathematics is composed of 1 full-professor, 10 lecturers with a PhD and 27 lecturers with a Master’s degree. The Bachelor’s degree programme Mathematics Education has 1 full-professor, 15 lecturers with a PhD and 18 lecturers with a Master’s degree, while the Master’s degree programme Mathematics Education is taught by 1 full-professor and 16 lecturers with a PhD. The Bachelor’s degree programme Natural Science Education consists of 1 professor, 3 lecturer with a PhD and 14 lecturers with a Master’s degree. Albeit the Bachelor’s degree Mathematics does not have a professor, the peers understand that the 10 lecturers with a PhD are on their way to becoming full professors. In addition, the Bachelor Natural Science Education is supported by 5 to 7 laboratory assistants.

When reading the curriculum vitae of the members of staff prepared by UNY as part of their self-assessment report, the peers notice that different lecturers teach in the Bachelor Mathematics and the Bachelor of Mathematics Education. This is due to the fact that while both study programmes cover some common ground, the educational degree programme

always introduces pedagogical elements into each module, which necessitates a different expertise of the lecturer.

The peers inquire the teacher-student ratio and learn that for all degree programmes under review the ratio is 1:10 or 1:11 and is set by the Indonesian Ministry of Education. The number of enrolled students is based upon this ratio; if some teacher wants to conduct research abroad for a year, the number of enrolled students has to be decreased respectively. Vice versa, if the faculty wants to enrol more students, they first have to employ more staff. The peers are told that it is fairly easy to attract more members of staff if necessary as the university holds enough budgetary means and the number of applicants is quite high in Indonesia.

Each week, lecturers have to teach 12 sks, which equals around 12 hours per week, with 16 weeks per semester. The lecturers are satisfied with their workload and state that they have sufficient time to conduct their own research. Nonetheless, they state that since there are very few technicians taking care of the computer or IT-equipment, teachers have to deal with any shortcomings themselves. As a result, the internet connection sometimes is rather unstable which hinders the usage of electronic media. The peers agree with the members of the teaching staff that UNY should hire more computer technicians so that a smooth operation can be ensured at all times.

In summary, the peers confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes. The auditors are impressed by the excellent and open-minded atmosphere among the students and the staff members. It is supported by an extensive advisory system, which ensures that every student has an academic advisor. This atmosphere of understanding and support is one of the strong points of the degree programmes.

#### **Criterion 4.2 Staff development**

**Evidence:**

- A Staff Handbook for all four degree programmes informs about the composition of the staff as well as its capacity
- The “Government Rule – Teacher and Lecturer” details the regulations for teachers and lectures
- The Self-Assessment Report gives details about the members of staff and their tasks

- Discussions during the audit, especially with the members of staff as well as the students
- Example of Certificates of Internal Educational Programmes of staff members
- Examples of Certificates for Attending International Conferences of staff members

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

According to the self-assessment report, staff-development is carried out on a regular basis to improve the quality, competence and performance of the teaching staff. The staff-development activities include guest lectures, research and publication, monitoring and evaluation. For example, UNY regularly holds a so-called coaching clinic to assist lecturers in applying for a doctoral degree or offers English courses to improve these language skills. With regards to didactical training, there exist a variety of courses, for example the IOT-Programme (Internet of Things), which educates lecturers in utilizing new computer programmes, such as the online-platform Be-Smart.

With regard to research activities, all lectures have the opportunity to apply for grants, which they usually receive. Furthermore, the university holds coaching for lecturers aiming to participate in international conferences or increasing their academic writing skills. During the on-site visit, the peers saw some samples of the lecturer's research, in form of books or journal articles. They were very impressed that the teachers tend to include students into their research work, thus effectively merging their research and teaching responsibilities.

The peers ask, whether lecturers have the possibility of taking a sabbatical. They learn that a sabbatical has just recently been implemented by the Indonesian Ministry of Education so that from now on, lecturers may spend 4-6 months abroad or in the industry while receiving their full salary.

In summary, the peers confirm that UNY offers sufficient support mechanisms and opportunities for members of the teaching staff who wish to further develop their professional and didactical skills.

<b>Criterion 4.3 Funds and equipment</b>
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**Evidence:**

- The Self-Assessment Report informs about the funding and equipment of the four degree programmes
- On-site visit of laboratories, seminar rooms and library

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

As UNY is a public university, it is funded by the Indonesian government as described in the Activity and Budget Plan (RKA). The funds noted in the RKA consists of three components: funding for education and teaching as well as research and service; financing of human resources development, and development of scientific and student activities. In the Self-Assessment report, UNY provides information about the funding each degree programme has received within the last three years. The peers assess a stable financial stream for the degree programmes as well as an overall satisfactory amount. The programme coordinators, the teachers and the students state that no severe bottlenecks exist and that in case more finances are needed they can be applied for easily.

During the audit, the peer group also visited the laboratories and the classrooms in order to assess the quality of the infrastructure and the technical equipment. Here, the peers noticed that there generally are enough workspaces, enough laboratories and that all laboratories are equipped with modern and sophisticated instruments to accommodate the needs of the students in conducting the practical tasks of each course as well as their own individual research. For example, the peers are highly impressed with the Micro-Teachings Lab, that allows students to conduct a lecture while being filmed so that their performance may later be assessed in detail.

The peers furthermore understand that a variety of laboratories exists for the four degree programmes, e.g. the Bachelor's degree programme Natural Science Education makes use of the science laboratories of the degree programmes Biology, Chemistry and Physics, yet they also utilize a designated educational laboratory. The peers are very impressed by the latter, which not only contains various materials needed in an educational environment, but also shows the students' own work, such as charts of local insects, that can be utilized as further materials by other students. Similarly, in the educational laboratory of the Bachelor's degree programme Mathematics Education, students had built geometrical shapes. With regard to the scientific laboratories, however, the peers notice a lack of safety measures. For example, in the Chemistry laboratories, goggles and safety showers are missing and many chemicals are not stored in closed safety cabinets. This should be updated as soon as possible to ensure that students can practice within a safe environment.

The peers also visit the faculty's two libraries: the "old" library and the digital library, fully equipped with computer rooms for the students. While the peers are generally very satisfied with the libraries, both teachers and students wish for more international books as well as more access to international journals. The peers support this wish and ask UNY to conduct steps accordingly.

While the peers see that UNY has established many computer laboratories, they learn from

the teachers and the students that the internet connection is not always stable and that some sites, necessary for the students, have difficulties loading. The teachers believe that this is due to a lack in computer technicians employed by UNY who would be able to quickly solve such issues. The peers agree and recommend hiring more computer technicians (s. criterion 4.1).

In summary, the peers agree that the facilities of all four degree programmes are adequate to allow students to reach the intended learning outcomes and to gain the necessary skills and qualifications for a successful career after graduation. It is absolutely necessary, however, to make sure that all laboratories adhere to international safety standards.

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

*4.3 – Funds and Equipment*

UNY agrees with the peers that safety features must be added to the laboratories. In a first step, each laboratory as well as each floor of the buildings has been equipped with fire extinguishers and first-aid kits. In addition, a safety shower and an eye shower were constructed and are ready to be utilized. UNY has also set up a safety issue policy that covers the requirements of students to use self-protection equipment including lab coats, goggles, gloves, face masks and wearing closed shoes.

The peers are impressed by the quick changes made by UNY and assess that the university takes this issue rather seriously. The peers believe, however, that UNY's effort should continue, e.g. by making sure that each laboratory has safety showers. It is also vital that students are not able to get into contact with chemical substances. These should be stored in locked closets only accessible by the teachers.

The peers regard criterion 4 as mostly fulfilled.

## 5. Transparency and documentation

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

- Module Handbooks, containing module descriptions, for each of the four degree programmes
- Self-Assessment Report informs about recent changes made in respective module

handbooks

- Discussions during the audit, especially with the programme coordinators allow an understanding of the creation and updating of the module descriptions

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

The module descriptions are published on UNY's website in both Bahasa Indonesia and English so that students and stakeholders can access them at any time.

After studying the module descriptions, the peers confirm that they include all necessary information about the persons responsible for each module, the teaching methods and work load, the awarded credit points, the intended learning outcomes, the applicability, the admission and examination requirements, and the forms of assessment and details explaining how the final grade is calculated.

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

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

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

The peers confirm that there exist diploma supplements for all four degree programmes that entail the general information about the degree programme, the student's grade as well as detailed information about the qualification objectives and learning outcomes of the programme. The peers notice, however, that this diploma supplement does not adhere to the international standard as it, for example, does not include any information about the applicable educational system, the procedure on which the final grade is based or statistical data allowing the reader to categorize the individual result/degree with regard to the ECTS User's Guide.

During the discussion with the students, the peers are also informed that diploma supplements are not given automatically to the students upon their graduation but that students have to request the diploma supplement, which may take some time to be handed out. As the diploma supplement is indispensable for the students' international career, UNY must ensure that all necessary information are covered and that the diploma supplement is handed out to the students automatically immediately after graduation.



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

- Academic Regulation Yogyakarta State University
- Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Concerning Nomenclature of Study Programs in Higher Education
- Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Concerning the National Standards of Higher Education
- Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia on Diploma, Certificate of Competency, Certificate of Profession, Degree and how to write Academic Degree in Higher Education Institution
- Government Rule – National Student Admission
- Government Rule – Teacher and Lecturer
- Government Rule – Career Development
- Regulations regarding Student Mobility and Guidelines on Credit Transfer

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

The peers confirm that the rights and duties of both UNY and the students are clearly defined and binding. All rules and regulations are published on the university's website and hence are available to all relevant stakeholders.

In addition, students receive all relevant course materials in the language of the degree programme at the beginning of each semester.

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

*5.2 – Diploma Supplement*

To address the peers' request concerning the Diploma Supplement, UNY Rectors issued a statement that starting from January 2020, each UNY graduate must be given an SKPI together with the graduate certificate/diploma. The format of the SKPI will add a section where there is information on the conversion from the Indonesian SKS system to the ECTS included. This change is much appreciated by the peers who await an exemplary version of this revised document before they entirely discharge their request.

In conclusion, the peers consider this criterion to be mostly fulfilled.

## 6. Quality management: quality assessment and development

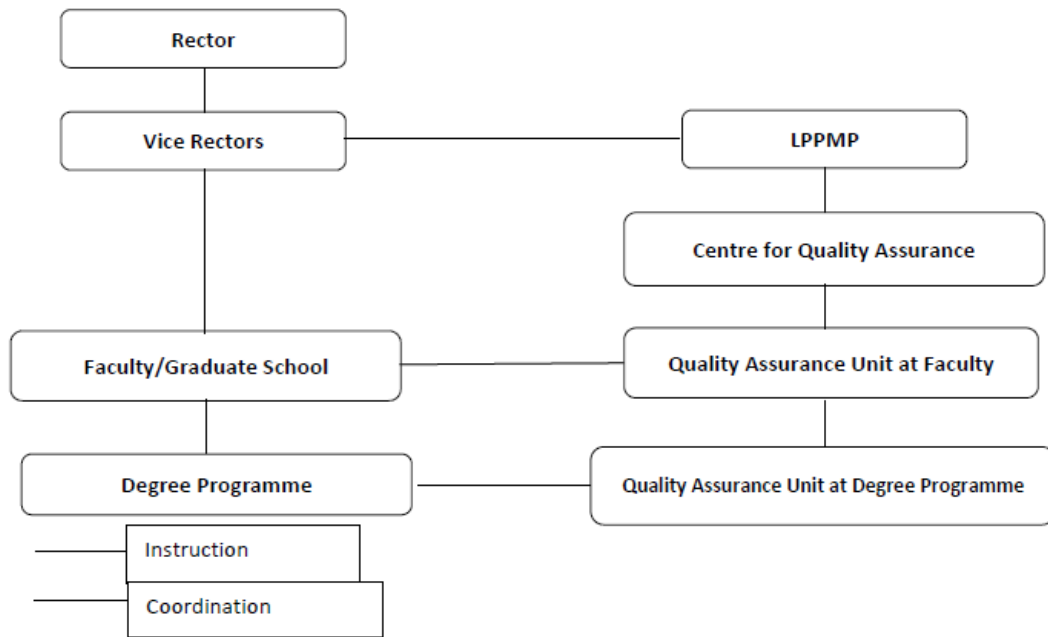
<b>Criterion 6 Quality management: quality assessment and development</b>
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### **Evidence:**

- The “Internal Quality Assurance System / Quality Procedures and Work Instructions” sets the structure and guidelines for the quality assurance system of UNY
- The “Quality Standards of Yogyakarta State University” details how UNY defines and controls the quality of its study programmes
- The “Curriculum Development Guidebook and Curriculum Handbook” informs about how the curricula of all four study programmes are created and continuously developed
- The “Annual Report of Yogyakarta State University” shows the current state of UNY, especially with regard to its quality assessment.
- The Self-Assessment Report details the methods UNY utilizes to control and improve the quality of its degree programmes

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

UNY follows a clear quality assurance system in accordance with Law No. 12 of 2012 about Higher Education. This system includes an internal as well as an external quality assurance system, both regulated by decrees from the Ministry of Research and Technology. Since 2015, UNY is committed to following this structured quality assurance and management process. Its implementation was coordinated by the Education Quality Assurance Development Agency through the Quality Assurance Centre. There are two units under the Center for Quality Assurance, namely one at the faculty and one at the degree programme level.



External quality assessment of the degree programmes is provided by the National Accreditation Agency for Higher Education (BAN-PT) every five years. This national standard of higher education was designed to encourage educational institutions to improve their performance in providing quality education services. Moreover, the objective of this standard is to support transparency and accountability in the implementation of the national education system.

Internal quality assessment of the degree programme is carried out through internal audits and evaluations. The internal audit is conducted every year by UNY’s internal auditors. In addition, monitoring and evaluating of all courses is carried out through a survey of university service satisfaction through the online platform, which involves students, lecturers, and academic staff. The students, for example, give their feedback on each course by filling out the questionnaire online. Giving feedback on the classes is compulsory for the students; otherwise they cannot access their grades for the course on the e-learning platform. The course evaluations are held during the final exam week and a compilation of the students’ feedback is sent to the respective lecturer.

In addition to these measures, students state that they can always voice criticism or concern directly to their lecturers, their head of faculty or the dean and feel that they are taken seriously.

The peers discuss with the representatives of UNY’s partners from public institutions or private companies that UNY regularly invites them to roundtables, where they discuss the needs and requirements of the employers as well as possible changes to the degree programmes. As the peers consider the input of the employers to be very important for the

further improvement of the degree programmes they appreciate the existing culture of quality assurance with the involvement of all stakeholders in the quality assurance process.

During the discussion with the programme coordinators, the peers also learn that alumni are regarded as one of UNY's highest capital as they mark a link between the university and the economic world, especially since the alumni are distributed all over Indonesia or even abroad. Hence, alumni are frequently invited to UNY to talk to the current students about their career or to give support to them during their final thesis.

In summary, the peer group confirms that the quality management system is suitable to identify weaknesses and to improve the degree programmes. All stakeholders are involved in the process.

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

The university gives no statement for this criterion.

The peers regard criterion 6 as fulfilled.

## **D Additional Documents**

No additional documents needed.

## **E Comment of the Higher Education Institution (24.01.2020)**

The institution provided a detailed statement as well as the following additional

## F Summary: Peer recommendations (07.02.2020)

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

Degree Programme	ASIIN seal	Subject-specific Label	Maximum duration of accreditation
Ba Mathematics	With requirements for one year	-	30.09.2025
Ba Mathematics Education	With requirements for one year	-	30.09.2025
Ba Natural Science Education	With requirements for one year	-	30.09.2025
Ma Mathematics Education	With requirements for one year	-	30.09.2025

### Requirements

#### For all degree programmes

- A 1. (ASIIN 2.2.) Implement a system to continuously measure the students' workload.
- A 2. (ASIIN 5.2) The Diploma Supplement must match international standards and should be provided to the students upon graduation by default.

#### For the Bachelor's degree programme Natural Science Education

- A 3. (ASIIN 4.3) The laboratories must adhere to international safety standards.

### Recommendations

#### For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to teach more classes in English so that students are prepared for an international career.
- E 2. (ASIIN 3) It is recommended to reduce the number of exams and quizzes students have to take during each semester.
- E 3. (ASIIN 4.1) It is recommended to have more technicians employed to take care of the equipment, especially in the computer laboratories

- E 4. (ASIIN 4.3) It is recommended to purchase more international books and international journal subscriptions
- E 5. (ASIIN 4.3) It is recommended to purchase more Matlab licenses.

**For the Bachelor's degree programme Natural Science Education**

- E 6. (ASIIN 1.4) It is highly recommended to revise the admission requirements so that applicants suffering from colour-blindness are not automatically rejected.

## **G Comment of the Technical Committees (09.03.2020)**

### **Technical Committee 12- Mathematics (04.03.2020)**

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

The Technical Committee 12-Mathematics discusses the degree programmes and follows the assessment of the peers.

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

<b>Degree Programme</b>	<b>ASIIN seal</b>	<b>Subject-specific labels</b>	<b>Maximum duration of accreditation</b>
Ba Mathematics	With requirements for one year	-	30.09.2025
Ba Mathematics Education	With requirements for one year	-	30.09.2025
Ma Mathematics Education	With requirements for one year	-	30.09.2025

### **Technical Committee 13- Physics (09.03.2020)**

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

The Technical Committee 13-Physics discusses the degree programmes and follows the assessment of the peers.

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

<b>Degree Programme</b>	<b>ASIIN seal</b>	<b>Subject-specific labels</b>	<b>Maximum duration of accreditation</b>
Ba Natural Science Education	With requirements for one year	-	30.09.2025



# H Decision of the Accreditation Commission (20.03.2020)

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

The Accreditation Commission discusses the accreditation procedure and follows the decision of the peers and the technical committees involved.

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

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Mathematics	With requirements for one year	-	30.09.2025
Ba Mathematics Education	With requirements for one year	-	30.09.2025
Ba Natural Science Education	With requirements for one year	-	30.09.2025
Ma Mathematics Education	With requirements for one year	-	30.09.2025

## Requirements

### For all degree programmes

- A 1. (ASIIN 2.2.) Implement a system to continuously measure the students' workload.
- A 2. (ASIIN 5.2) The Diploma Supplement must match international standards and should be provided to the students upon graduation by default.

### For the Bachelor's degree programme Natural Science Education

- A 3. (ASIIN 4.3) The laboratories must adhere to international safety standards.

## Recommendations

### For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to teach more classes in English so that students are prepared for an international career.
- E 2. (ASIIN 3) It is recommended to reduce the number of exams and quizzes students have to take during each semester.

- E 3. (ASIIN 4.1) It is recommended to have more technicians employed to take care of the equipment, especially in the computer laboratories
- E 4. (ASIIN 4.3) It is recommended to purchase more international books and international journal subscriptions
- E 5. (ASIIN 4.3) It is recommended to purchase more Matlab licenses.

**For the Bachelor's degree programme Natural Science Education**

- E 6. (ASIIN 1.4) It is highly recommended to revise the admission requirements so that applicants suffering from colour-blindness are not automatically rejected.

## I Fulfilment of Requirements (16.03.2021)

### Analysis of the peers and the Technical Committees (05.03.2021)

#### Requirements

##### For all degree programmes

A 1. (ASIIN 2.2.) Implement a system to continuously measure the students' workload.

Initial Treatment	
Peers	fulfilled Justification: UNY has integrated new items within their already established monitoring and evaluating system to measure students' actual workload. This evaluating system can also be accessed online.
TC 12	fulfilled Justification: The Technical Committee follows the assessment of the peers.
TC 13	fulfilled Justification: The Technical Committee follows the assessment of the peers.

A 2. (ASIIN 5.2) The Diploma Supplement must match international standards and should be provided to the students upon graduation by default.

Initial Treatment	
Peers	Fulfilled Justification: The Diploma Supplement has been renewed and now matches international standards. A letter from the rector to the UNY Deans and Directors of Graduate Schools shows the seriousness of UNY to make sure that all graduates are provided the Diploma Supplement by default.
TC 12	fulfilled Justification: The Technical Committee follows the assessment of the peers.
TC 13	fulfilled Justification: The Technical Committee follows the assessment of the peers.

**For the Bachelor's programme Natural Science Education**

A 3. (ASIIN 4.3) The laboratories must adhere to international safety standards.

<b>Initial Treatment</b>	
Peers	Fulfilled. Justification: The UNY Cluster Natural Sciences' Response/photos, showcases that they have implemented the necessary safety standards, including locked closets for chemicals, safety showers and fume hoods.
TC 13	fulfilled Justification: The Technical Committee follows the assessment of the peers.

**Decision of the Accreditation Commission (16.03.2021)**

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Mathematics	Without requirements	-	30.09.2025
Ba Mathematics Education	Without requirements	-	30.09.2025
Ba Natural Science Education	Without requirements	-	30.09.2025
Ma Mathematics Education	Without requirements	-	30.09.2025

## Appendix: Programme Learning Outcomes and Curricula

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

### *Attitudes*

1. Worshipping God and showing religiosity, honesty, and patience;
2. Upholding humanity in conducting duties based on religion, morality, and ethics;
3. Contributing to the improvement of the quality of social, national, and state life, and to the enhancement of civilization on the basis of Pancasila;
4. Acting as a citizen with patriotism, nationalism, and responsibility to the country and nation;
5. Valuing a wide diversity of cultures, perspectives, religions, and beliefs as well as other peoples original opinions and inventions;
6. Cooperating and possessing social sensitivity to and care of society and environment;
7. Conforming to the rule of law and being disciplined in social and state life;
8. Internalizing academic values, norms, and ethics
9. Being responsible for the duties in accordance with the expertise independently;
10. Internalizing the spirits of autonomy, resilience, and entrepreneurship

### *General Skills*

1. Solving problems in various fields by using a valid mathematical approach based on valid data to generate an appropriate problem-solving model,
2. Working in teams to utilize mathematical knowledge either independently or in a group,
3. Being responsible for the validity of the work requiring mathematical skills
4. Having a high entrepreneurial spirit based on honesty and intelligence,
5. Applying logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that refers to and applies the humanistic values appropriate with mathematics,
6. Demonstrating independent, quality, and measurable work performances,

7. Generating the implications of the development or the implementation of science and technology that refers to and applies the humanistic values based on rules, procedures, and scientific ethics in giving solutions, ideas, or designs,
8. Constructing a scientific description of analyses under the field of mathematics in the form of an undergraduate thesis and uploading it on the university webpage,
9. Making appropriate decisions in the context of mathematics problem solving based on information and data analysis,
10. Maintaining and developing a network with supervisors, colleagues, and peers both inside and outside institution,
11. Documenting, storing, securing, and recovering data to ensure the validity and prevent plagiarism.

#### *Particular Skills*

1. Designing and analysing algorithms using mathematical rules correctly and efficiently, and implementing it in various programming paradigms to establish a quality software system with regard to ethics, legality, and information securities,
2. Observing, identifying, formulating, and solving problems through the mathematical approach with or without computer software,
3. Reconstructing, modifying, and analysing mathematical problems structurally and interpreting them,
4. Utilizing a wide range of available alternative solutions to mathematical problems independently or in a group to make right decisions,
5. Mastering information and communication technology theoretically and updating its advancement
6. Generating scientific work in the field of mathematics and its application and presenting or publishing it through seminars or scientific journals, with regard to the values of honesty and responsibility.

#### *Knowledge Mastery*

1. Mastering mathematics concepts and reasoning
2. Mastering one of the mathematics fields comprehensively, namely: algebra, analysis, geometry, statistics, applied mathematics, or computer sciences
3. Developing mathematical thinking, starting from procedural to deep understanding, which covers exploration, logical reasoning, generalization, abstraction, and formal proofs.
4. Having a sufficient basic knowledge to continue his/her study to a higher level

## 0 Appendix: Programme Learning Outcomes and Curricula

The following **curriculum** is presented:

### Semester 1:

No	Code	Course	Credits			
			T	P	L	J
1	MKU6301	Islam Education	3			3
	MKU6302	Catholic Education				
	MKU6303	Christianity Education				
	MKU6304	Buddhism Education				
	MKU6305	Hinduism Education				
	MKU6306	Confucianism Education				
2	MKU6207	Civics	2			2
3	MKU6211	English	2			2
4	MKU6210	Statistics	2			2
5	MAT6301	Logics and Sets	3			3
6	MAT6302	Differential Calculus	3			3
7	MAT6203	Geometry of Shape	2			2
8	MAT6204	Information and Communication Technology	1	1		2
<b>Total</b>			<b>18</b>	<b>1</b>		<b>19</b>

### Semester 2:

No	Code	Course	Credits			
			T	P	L	J
1	MKU6208	Pancasila	2			2
2	MKU6214	Social Cultural Education	2			2
3	MAT6205	Numerical Theory	2			2
4	MAT6206	Geometry of Space	2			2
5	MAT6307	Integral Calculus	3			3
6	MAT6308	Linear Algebra	3			3
7	MAT6309	Advanced Statistics	2	1		3
8	MAT6310	Algorithm and Programming	2	1		3
<b>Total</b>			<b>18</b>	<b>2</b>		<b>20</b>

### Semester 3:

No	Code	Course	Credits			
			T	P	L	J
1	MAT6311	Abstract Algebra	3			3
2	MAT6312	Analytical Geometry	3			3
3	MAT6313	Advanced Calculus	3			3
4	MAT6314	Differential Equation	3			3
5	MAT6315	Probability Theory	3			3
6	MAT6316	Computer Application	2	1		3
7	MAT6317	Discrete Mathematics	3			3
<b>Total</b>			<b>20</b>	<b>1</b>		<b>21</b>

### Semester 4:

No	Code	Course	Credits			
			T	P	L	J
1	AMF6201	Discourse and Studies of Mathematics and Natural Sciences	2			2
2	MAT6318	Advanced Abstract Algebra	3			3
3	MAT6319	Linear Programming	3			3
4	MAT6320	Partial Differential Equation	3			3
5	MAT6321	Information System and Data Basis	2	1		3
6	MAT6322	Mathematics Modelling	3			3
7	MAT6323	Mathematical Statistics	2	1		3
<b>Total</b>			<b>18</b>	<b>2</b>		<b>20</b>

## 0 Appendix: Programme Learning Outcomes and Curricula

### Semester 5:

No	Code	Course	Credits			
			T	P	L	J
1	MKU6209	Indonesian Language	2			2
2	MAT6224	English for Mathematics	2			2
3	MAT6325	Real Analysis	3			3
4	MAT6326	Advanced Linear Algebra	3			3
5	MAT6327	Applied Regression Analysis	2	1		3
6	MAT6228	Transformation Geometry	2			2
7	MAT6329	Operation Research	3			3
8	MAT6330	Complex Analysis	3			3
<b>Total</b>			<b>20</b>	<b>1</b>		<b>21</b>

### Semester 6:

No	Code	Course	Credits			
			T	P	L	J
1	MKU6212	Entrepreneurship	1		1	2
2	MAT6231	History of Mathematics	2			2
3	MAT6332	Numerical Method	2	1		3
4	MAT6233	Advanced Real Analysis	2			2
5	MAT6234	Graph Theory	2			2
6	MAT6335	Mobile Device Programming	2	1		3
7		<i>Elective course 1</i>				3
8		<i>Elective course 2</i>				3
<b>Total</b>						<b>20</b>

### Semester 7

No	Code	Course	Credits			
			T	P	L	J
1	MKU6313	Community Service			3	3
2	PKL6302	Field Work Practice			3	3
3	MAT6336	Applied Multivariate Statistics	2	1		3
4	MAT6237	Mathematics Seminar	2			2
5		<i>Elective course 3</i>				3
6		<i>Elective course 4</i>				3
<b>Total</b>						<b>17</b>

### Semester 8

No	Code	Course	Credits			
			T	P	L	J
1	MAT6638	Thesis Final Assignment	6			6
<b>Total</b>						<b>6</b>



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

*Attitudes*

1. Worshipping God and showing religiosity, honesty, and patience;
2. Upholding humanity in conducting duties based on religion, morality, and ethics;
3. Contributing to the improvement of the quality of social, national, and state life, and to the enhancement of civilization on the basis of Pancasila;
4. Acting as a citizen with patriotism, nationalism, and responsibility to the country and nation;
5. Valuing a wide diversity of cultures, perspectives, religions, and beliefs as well as other peoples original opinions and inventions;
6. Cooperating and possessing social sensitivity to and care of society and environment;
7. Conforming to the rule of law and being disciplined in social and state life;
8. Internalizing academic values, norms, and ethics
9. Being responsible for the duties in accordance with the expertise independently;
10. Internalizing the spirits of autonomy, resilience, and entrepreneurship
11. Recognizing and caring for the local wisdom and adapting to the socio-cultural diversity nation-wide and globally

*General Skills*

1. Applying logical, critical, systematic and innovative thinking in the context of science and technology development that keeps and applies the value of humanity especially in the field of mathematics education
2. Demonstrating independent, qualified, and measurable performance
3. Finding out the implications of the development or implementation of science and technology that keep and apply the value of humanities based on rules, procedures, and scientific ethics in order to produce solutions or ideas especially in the field of mathematics education.
4. Developing a scientific description of the results of studies in the field of mathematics education in the form of thesis and uploading it to the university webpage.
5. Taking the right decision in the context of solving problems in the field of mathematics education based on the analysis result of relevant information and data.
6. Maintaining and developing network with mentors, colleagues, and associates both inside and outside the institution, especially in the field of mathematics education.

7. Being responsible for own work and for the achievement of work group or organization, especially in the field of mathematics education as well as giving supervision and evaluation of the completion of the job assigned to workers under its responsibility by paying attention to scientific rules and profession ethics.
8. Performing a self-evaluation process of the working groups under its responsibility and managing learning independently.
9. Documenting, storing, securing, and recovering data to ensure the validity and to prevent plagiarism.
10. Providing guidance in choosing various alternative solutions to the problems in the field of mathematics education

*Particular Skills*

1. Applying mathematical concepts and mindset as well as pedagogical-didactic concepts of mathematics and utilizing information and communication technologies to develop media/learning resources.
2. Planning, implementing, and evaluating innovative, life skill-oriented mathematics learning
3. Assessing and implementing a variety of learning methods innovatively available and proven.
4. Providing assistance and guidance as well as exemplary for learners especially in mathematics learning.
5. Conducting research and produce creative-innovative scientific thinking as an alternative solution in mathematics education and communicating it orally and in writing in an efficient, effective and aesthetic way.
6. Adapting to the current situation that develops mainly in the field of mathematics education particularly by utilizing information and communication technologies.

*Knowledge Mastery*

1. Acquiring the pedagogical-didactic concepts of mathematics to implement innovative mathematics learning in primary and secondary life-skill-oriented education.
2. Acquiring the mathematical concepts that include mathematical logic and sets, algebra, analysis, geometry, probability theory and statistics, discrete mathematics, principles of mathematical modeling, linear programming, differential equations, and numerical methods that support the learning of mathematics in primary and secondary education as well as for further studies.
3. Mastering the principles and techniques of planning, implementation, and evaluation of innovative mathematics learning which is life skills-oriented.
4. Mastering research methodology and scientific writing rules to design and conduct

research and also communicate the creative-innovative scientific thinking as an alternative to solve problems in the field of mathematics education.

5. Mastering technology, especially information and communication technology, which is relevant to support innovative mathematics learning and to adapt to the current situation that develops particularly in the field of mathematics education.

The following **curriculum** is presented:

### Semester 1

No	Code	Course Title	T	P	L	Total	Prerequisite
1	MKU6301	Islam Education	3			3	
	MKU6302	Catholic Education	3				
	MKU6303	Christianity Education	3				
	MKU6304	Hinduism Education	3				
	MKU6305	Buddhism Education	3				
	MKU6306	Confucianism Education	3				
2	MKU6210	Statistics	2			2	
3	MDK6201	Educational Sciences	2			2	
4	PMA6201	ICT and Mathematics Instructional Media	1	1		2	
5	MAA6303	Plane Geometry	3			3	
6	MAA6201	Algebra	2			2	
7	MAT6301	Logic and Set	3			3	
8	MAT6302	Differential Calculus	3			3	
		Total Credits				20	

### Semester 2

No	Code	Course Title	T	P	L	Total	Prerequisite
1	MKU6208	Pancasila Education	2			2	
2	MKU6211	English Language	2			2	
3	MDK6202	Educational Psychology	2			2	
4	MAA6202	Trigonometry	2			2	
5	MAT6205	Number Theory	2			2	MAT6301
6	MAT6206	Space Geometry	2			2	MAA6303
7	MAT6307	Integral Calculus	3			3	MAT6302
8	MAT6309	Advanced Statistics	2	1		3	MKU6210
9	MAT6310	Algorithm and Programming	2	1		3	PMA6201
		Total Credits				21	

**0 Appendix: Programme Learning Outcomes and Curricula**
**Semester 3**

No	Code	Course Title	T	P	L	Total	Prerequisite
1	MKU6207	Civic Education	2			2	
2	AMF6201	Insights Into and Studies of Mathematics and Natural Sciences	2			2	
3	PMA6202	Psychology of Mathematics Learning	2			2	
4	PMA6203	English for Mathematics Education 1	2			2	MKU6211
5	MAA6204	Plane Analytical Geometry	2			2	MAA6303
6	MAA6206	Computer Application	1	1		2	MAT6310
7	MAT6308	Linear Algebra	3			3	MAT6301
8	MAT6313	Advanced Calculus	3			3	MAT6307
9	MAT6315	Probability Theory	3			3	MAT6301
		Total Credits				21	

**Semester 4**

No	Code	Course Title	T	P	L	Total	Prerequisite
1	MKU6214	Socio-cultural Education	2			2	
2	MDK6203	Educational Management	2			2	
3	MDK6204	Educational Socio-anthropology	2			2	
4	PMA6204	Mathematics Curriculum and Instruction	2			2	
5	PMA6305	Mathematical Learning Strategies	2		1	3	
6	PMA6206	Development and Production of Mathematics Instructional Media	1	1		2	
7	MAA6205	Spherical Analytical Geometry	2			2	MAT6204
6	MAT6314	Differential Equation	3			3	MAT6307
8	MAT6319	Linear Programming	3			3	MAT6308
		Total Credits				21	

**Semester 5**

No	Code	Course Title	T	P	L	Total	Prerequisite
1	MKU6209	Indonesian Language	2			2	
2	PMA6207	Mathematics Learning Assessment	2			2	PMA6204
3	PMA6308	Review on High School Mathematics	3			3	

**0 Appendix: Programme Learning Outcomes and Curricula**

4	PMA6309	Planning Mathematics Instruction	3			3	PMA6204
5	PMA6210	Mathematics Instructional Multimedia	1	1		2	MAT6310
6	MAT6311	Abstract Algebra	3			3	MAT6205
7	MAT6317	Discrete Mathematics	3			3	MAT6301
8	MAT6325	Real Analysis	3			3	MAT6313
		Total Credits				21	

**Semester 6**

No	Code	Course Title	T	P	L	Total	Prerequisite
1	MKU6212	Entrepreneurship	2			2	
2	PMA6311	Mathematics Education Research Methodology	3			3	
3	PMA6212	Seminar on Mathematics Education	2			2	
4	PMA6213	Microteaching		1	1	2	PMA6309
5	MAT6228	Transformation Geometry	2			2	MAA6204
6	MAT6332	Numerical Methods	3			3	MAT6310
7		Elective Course 1	3			3	
8		Elective Course 2	3			3	
		Total Credits				20	

**Semester 7**

No	Code	Course Title	T	P	L	Total	Prerequisite
1	MKU6313	Field Community Service			3	3	
2	PMA6214	Ethnomathematics	1		1	2	PMA6305
3	PPL6301	Educational Internship			3	3	PMA6213
4	MAT6231	History of Mathematics	2			2	
5		Elective Course 3	2			2	
6		Elective Course 4	2			2	
		Total Credits				14	

**Semester 8**

No	Code	Course Title	T	P	L	Total	Prerequisite
1	PMA6616	Thesis Final Assignment				6	
		Total Credits				6	

According to the diploma supplement the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Natural Science Education:

*Attitudes*

1. Worshipping God and showing religiosity, honesty, and patience;
2. Upholding humanity in conducting duties based on religion, morality, and ethics;
3. Contributing to the improvement of the quality of social, national, and state life, and to the enhancement of civilization on the basis of Pancasila;
4. Acting as a citizen with patriotism, nationalism, and responsibility to the country and nation;
5. Valuing a wide diversity of cultures, perspectives, religions, and beliefs as well as other peoples original opinions and inventions;
6. Cooperating and possessing social sensitivity to and care of society and environment;
7. Conforming to the rule of law and being disciplined in social and state life;
8. Internalizing academic values, norms, and ethics
9. Being responsible for the duties in accordance with the expertise independently;
10. Internalizing the spirits of autonomy, resilience, and entrepreneurship

*General Skills*

1. Applying the logical, critical, systematic, and innovative thinking within the context of development or implementation of the science and technology while considering and applying the humanity values relevant to his/her expertise.
2. Showing an independent, quality, and measured performance;
3. Examining the implications for development or implementation of science and technology while accommodating and applying the humanity values that are appropriate to the expertise based on the rules, procedures, and scientific ethics to produce the solution, suggestion, design, or criticism
4. Making the scientific description of those research findings in the form of undergraduate thesis or final report and publishing it on the university's website.
5. Making a right decision within the context of problem solving in their expertise based on the results of information and data analysis;
6. Maintaining and improving network with the supervisor, colleague, and peer both inside and outside the institution
7. Taking the responsibility on the achievement of the working group and conducting supervision and evaluation on the working accomplishment under his/her authority.

8. Performing self-evaluation on the working group under his/her authority and managing learning independently
9. Documenting, storing, securing and retrieving data to guarantee validity and prevent plagiarism
10. Making a strategic decision based on information and data analysis on the field of Natural Science and Natural Science education, giving suggestion to peers, and informing it to the public
11. Conducting research which could be used as an alternative in solving the problems in Natural Science education.
12. Being responsible for his/her own work, for the organizational working achievement in the scope of Natural Science and Natural Science education, and for the report of the organizational working achievement.

*Particular Skills*

1. Planning, conducting, and evaluating the Natural Science learning process, which is oriented on the process standards.
2. Using the Natural Science learning references and media based on the advancement of science and technology to support the Natural Science learning process in the curricular, co-curricular, and extra-curricular activities.
3. Planning and managing the resources in conducting the activities in class, laboratory, school, and Education Institution under his/her authority and comprehensively evaluating those activities.

*Knowledge Mastery*

1. Mastering the facts, concepts, principles, laws, theories, and procedures in Natural Science
2. Mastering the theory of learning, the student's characteristics, strategy, planning and evaluation of integrated science learning
3. Mastering the theoretical concept of problem solving on Natural Science education in procedure through the scientific approach

The following **curriculum** is presented:

**SEMESTER I**

No	Code	Courses	Credits Detail			
			T	P	L	J
1	MKU6301	Islamic Religion Education*	3			3
	MKU6302	Catholic Religion Education*	3			
	MKU6303	Christian Religion Education*	3			
	MKU6304	Buddhism Religion Education*	3			
	MKU6305	Hinduism Religion Education*	3			
	MKU6306	Konghuchu Religion Education*	3			
2	IPA6301	Matematics for Natural Science	3	-	-	3
3	IPA6202	Basic Natural Science	2	-	-	2
4	IPA6103	Basic Natural Science Lab-work	-	1	-	1
5	IPA6204	General Biology I	2	-	-	2
6	IPA6105	General Biology I Lab-work	-	1	-	1
7	IPA6206	Basic Physics-I	2	-	-	2
8	IPA6107	Basic Physics I Lab-work	-	1	-	1
9	IPA6208	General Chemistry-I	2	-	-	2
10	IPA6109	General Chemistry I Lab-work	-	1	-	1
11	MDK6201	Educational Science	1	1	-	2
<b>Total</b>			<b>15</b>	<b>5</b>	<b>-</b>	<b>20</b>

**SEMESTER II**

No	Code	Courses	Credits detail			
			T	P	L	J
1	MKU6208	Pancasila	2	-	-	2
2	MKU6209	Bahasa (Indonesian Language)**	2	-	-	2
3	MKU6211	English**	2	-	-	2
4	MDK6203	Education Management	2	-	-	2
5	IPA6210	Genereal Biology-II	2	-	-	2
6	IPA6111	General Biology II Lab-work	-	1	-	1
7	IPA6212	Basic Physics-II	2	-	-	2
8	IPA6113	Basic Physics II Lab-work	-	1	-	1
9	IPA6214	General Chemistry –II	2	-	-	2
10	IPA6115	General Chemistry II Lab-work	-	1	-	1
11	BIO6216	Environmental Science	2	-	-	2
12	IPA6116	Information and Communication Technology	1	1	-	2
13	IPA6117	Information and Communication Technology Lab-work	-	1	-	1
<b>Total</b>			<b>17</b>	<b>5</b>	<b>-</b>	<b>22</b>

**NOTE:**

ENGLISH MEANT IN THIS COURSES IS *BASIC ENGLISH FOR SCIENCE*



## 0 Appendix: Programme Learning Outcomes and Curricula

### SEMESTER III

No	Code	Courses	Credits detail			
			T	P	L	J
1	MDK6202	Psychology of Education	2	-	-	2
2	MKU6207	Civic Education	2	-	-	2
3	AMF6201	The Insight and Study on Mathematics and Natural Science	2	-	-	2
4	PIA6201	Natural Science Laboratory Management and Technique	2	-	-	2
5	PIA6102	Natural Science Laboratory Management and Technique Lab-work	-	1	-	1
6	IPA6218	Natural Science 1	2	-	-	2
7	IPA6119	Natural Science 1 Lab-work	-	1	-	1
8	IPA6222	Geoscience	2	-	-	2
9	IPA6123	Geoscience Lab-work	-	1	-	1
10	IPA6220	Basic Biochemistry	2	-	-	2
12	IPA6121	Basic Biochemistry Lab-work	-	1	-	1
13	----	Elective (1 Course)	2	-	-	2
14	----	Elective (1 Course)	2	-	-	2
<b>Total</b>			<b>18</b>	<b>4</b>	<b>-</b>	<b>22</b>

### SEMESTER IV

No	Code	Course	Credits detail			
			T	P	L	J
1	MDK6204	Socio-Anthropology of Education	2	-	-	2
2	PIA6305	Strategy and Management in Teaching Natural Science	2	-	1	3
3	PIA6106	Strategy and Management in Teaching Natural Science Lab-work	-	1	-	1
4	PIA6203	Natural Science Learning Media Development I	2	-	-	2
5	PIA6104	Natural Science Learning Media Development I Lab-work	-	1	-	1
6	IPA6224	Natural Science 2	2	-	-	2
7	IPA6125	Natural Science 2 Lab-work	-	1	-	1
8	IPA6226	Human Biology and Nutrition	2	-	-	2
9	FIP6323	Astronomy	2	1	-	3
10	MKU6210	Statistics**	2	-	-	2
11	-----	Elective (1 Course)	2	-	-	2
12	-----	Elective (1 course)	2	-	-	2
<b>Total</b>			<b>18</b>	<b>4</b>	<b>1</b>	<b>23</b>

## 0 Appendix: Programme Learning Outcomes and Curricula

### SEMESTER VI

No	Code	Course	Credits detail			
			T	P	L	J
1	MKU6214	Socio-Cultural Education	2	-	-	2
2	PIA6215	Micro-teaching	1	-	1	2
3	PIA6311	Integrated Natural Science and Its Learning Process	3	-		3
4	PIA6112	Integrated Natural Science and Its Learning Process Practice		1		1
5	IPA6232	Biophysics	2	-	-	2
6	IPA6133	Biophysics Lab-work	-	1	-	1
7	IPA6234	The Philosophy of Natural Science	2	-	-	2
8	IPA6235	Applied Natural Science	2	-	-	2
9	IPA6136	Applied Natural Science Lab-work	-	1	-	1
10	PIA6213	Natural Science Education Research	2	-	-	2

		Methodology				
11	PIA6114	Natural Science Education Research Methodology Lab-work	-	1	-	1
12	BIM6223	Biotechnology	2	-	-	2
13	-----	Elective (1 Course)	2	-	-	2
<b>Total</b>			<b>18</b>	<b>4</b>	<b>1</b>	<b>23</b>

#### NOTE:

MICRO-TEACHING PROGRAM IS A PROGRAM TO FASILITATE THE STUDENTS AS PROSPECTIVE TEACHERS IN PRACTICING AND IMPROVING THEIR NATURAL SCIENCE TEACHING SKILLS IN A LIMITED FORMAT FOR SMP/MTS.

### SEMESTER VII

No	Code	Course	Credits detail			
			T	P	L	J
1	PPL6301	Educational Intership	-	-	3	3
2	MKU6313	Community Development Program (KKN)	-	-	3	3
<b>Total</b>			<b>-</b>	<b>-</b>	<b>6</b>	<b>6</b>

#### NOTE:

THE COMMUNITY DEVELOPMENT PROGRAM (KKN) CAN BE TAKEN IN THE PREVIOUS SHORT TERM.

THE TEACHING PRACTICE IS AIMED TO FASILITATE THE STUDENTS AS THE PROSPECTIVE TEACHERS IN IMPROVING THE BASIC SKILLS ON TEACHING NATURAL SCIENCE FOR SMP/MTS STUDENTS IN A REAL SETTING.

### SEMESTER VIII

No	Code	Course	Credits detail			
			T	P	L	J
1	PIA6616	Final Thesis (TAS)	-	-	6	6
<b>Total</b>			<b>-</b>	<b>-</b>	<b>6</b>	<b>6</b>

#### NOTE:

THE ADVISORY AND ADMISSION FOR THESIS TITLE CAN BE CONDUCTED IN THE PREVIOUS SEMESTER.

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

*Attitude*

1. Demonstrate religious values, academic ethics, and responsibility

*General Skills*

1. Demonstrate logical, critical, systematical, and creative thinking skills
2. Demonstrate adaptability, autonomy, leadership, and collaboration skills

*Particular Skills*

1. Able to conduct educational research and development in field of mathematics education which are useful for society, stakeholders, and the development of science and technology
2. Demonstrate communication skills to disseminate scientific works in national and international scientific forums and journals

*Knowledge of Mastery*

1. Master profound theoretical knowledge on pedagogy, didactic, curriculum, and assessment in the field of mathematics education.
2. Apply pedagogical and didactical concepts into practices in the field of mathematics education
3. Demonstrate problem solving skills in school mathematics and college mathematics
4. Able to critically analyse recent issues in mathematics education by using interdisciplinary and multidisciplinary approaches.

The following **curriculum** has been presented:

NO	CODE	COURSE	SEM & CREDITS				TOTAL CREDITS
			1	2	3	4	
<b>I. SCIENTIFIC FOUNDATION COURSES</b>							<b>6</b>
1	PAS8201	Philosophy of Science	2				
2	PAS8202	Education Research Methodology	2				
3	PAS8203	Statistics	2				
Total			<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>II. STUDY PROGRAM SPECIFIC COURSES</b>							<b>28</b>
1	PMA8201	Mathematics Learning Method		2			
2	PMA8202	Numerical Theory		2			
3	PMA8203	Study on Issues in Mathematics Education	2				
4	PMA8232	Mathematics Models		2			
5	PMA8228	Qualitative Research Methodology	2				
6	PMA8206	Mathematics Learning Psychology	2				
7	PMA8207	Mathematics Learning Practicum		2			
8	PMA8208	Geometry			2		
9	PMA8209	Mathematics Learning Practicum			2		
10	PMA8101	Thesis Proposal Writing Project		1			
11	PMA8236	Scientific Paper Writing			2		
12	PMA8102	Mathematics Learning Method			1		
13	PMA8601	Thesis				6	
Total			<b>6</b>	<b>9</b>	<b>7</b>	<b>6</b>	
<b>III. ELECTIVE/CONCENTRATION COURSES *)</b>							<b>4</b>
<b>A. Abstract Algebra</b>							
1	PMA8210	Abstract Algebra I		2			
2	PMA8211	Abstract Algebra II			2		
<b>B. Complex Analysis</b>							
							<b>4</b>

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1	PMA8212	Complex Analysis I		2			
2	PMA8213	Complex Analysis II			2		
<b>C. Numerical Analysis</b>							
1	PMA8214	Numerical Analysis I		2			<b>4</b>
2	PMA8215	Numerical Analysis II			2		
<b>D. Real Analysis</b>							
1	PMA8216	Real Analysis I		2			<b>4</b>
2	PMA8217	Real Analysis II			2		
<b>E. Dynamic System</b>							
1	PMA8218	Dynamic System I		2			<b>4</b>
2	PMA8219	Dynamic System II			2		
<b>F. Mathematical Statistics</b>							
1	PMA8233	Mathematical Statistics I		2			<b>4</b>
2	PMA8234	Mathematical Statistics II			2		
<b>G. Topology</b>							
1	PMA8222	Topology I		2			<b>4</b>
2	PMA8223	Topology II			2		
<b>H. Fuzzy Set Theory</b>							
1	PMA8224	Fuzzy Set Theory I		2			<b>4</b>
2	PMA8225	Fuzzy Set Theory II			2		
<b>I. Coding Theory</b>							
1	PMA8226	Coding Theory I		2			<b>4</b>
2	PMA8227	Coding Theory II			2		
<b>J. Special Elective Courses</b>							
1	PMA8235	Mathematical Power		2			<b>8</b>
2	PMA8229	Mathematics Workshop I		2			
3	PMA8230	Level A Mathematics			2		
4	PMA8231	Mathematics Workshop II			2		
<b>Total</b>			<b>0</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>8</b>

<b>TOTAL</b>			<b>12</b>	<b>13</b>	<b>11</b>	<b>6</b>	<b>42</b>
<b>IV. MATRICULATION COURSES **)</b>							<b>8</b>
1	PMA8255	School Mathematics Curriculum Analysis	2				
2	PMA8256	Mathematics Learning Strategy	2				
3	PMA8258	Mathematics Learning Planning		2			
4	PMA8259	Mathematics Learning Media		2			
Total			<b>4</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>8</b>

Note:

\*) Students must select two out of the nine offered course groups, or one course group containing 8 credits (J).

\*\*\*) Students who do not have mathematics education background must take these prerequisite courses.

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