ASIIN Seal

Accreditation Report

Bachelor's Degree Programs
Electrical Engineering
Electrical Engineering Education

Provided by
Universitas Negeri Malang

Version: 07 December 2021

Table of Content

A About the Accreditation Process

Name of the degree program (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
S1 Teknik Elektro	Bachelor of Electrical Engineering	ASIIN	1742/SK/BANPT/AKRED/S/VII/2019	02
S1 Pendidikan Teknik Elektro	Bachelor of Electrical Engineering Education	ASIIN	1749/SK/BANPT/AKRED/S/VII/2018	02
Date of the contract: 23.12.2020 **Submission of the final version of the self-assessment report:** 16.09.2021 **Date of the onsite visit:** 12.-14.10.2021 **Online**				
Peer panel: Prof. Dr. Madhukar Chandra, Chemnitz University of Technology Prof. Dr. Dirk Dahlhaus, University of Kassel Ernst Blank, Siemens AG				
Representatives of the ASIIN headquarter: Sophie Schulz, Daniel Seegers				
Responsible decision-making committee: Accreditation Commission				
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 10, 2015				

[1] ASIIN Seal for degree programprograms;
[2] TC: Technical Committee for the following subject areas: TC 02 - Electrical Engineering/Information Technology

Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of December 9, 2011	

B Characteristics of the Degree Programs

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corre-sponding level of the EQF[3]	d) Mode of Study	e) Dou-ble/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
S1 Teknik Elektro	Bachelor in Electrical Engineering	Power system, Control system	6	Full time, blended-learning	--	8 semesters	146 SKS (≈218.29 ECTS)	Yearly in July 2014
S1 Pendidikan Teknik Elektro	Bachelor in Electrical Engineering Edu-cation	Power System, Education	6	Full time, blended-learning	--	8 semesters	146 SKS (≈223.64 ECTS)	Yearly in July 2009

For the Bachelor's degree program Electrical Engineering, the institution has presented the following profile on their website:

"**Vision:**

Realizing the Electrical Engineering (EE) S1 Study Program as a superior study programprogram and becoming a national reference in the development of the field of science and technology, especially in the field of Electrical Engineering that is relevant to the needs of development, society and humanity.

Mission:

1. Organizing superior higher education and being a highly competitive reference in the field of electrical engineering.
2. Organizing research and development of science to produce superior academic work and become a highly competitive reference in the field of science and technology, especially in the field of electrical engineering.
3. Building science and technology in the field of electrical engineering that is superior and becomes a reference for the welfare of society and humanity.
4. Cooperating with domestic and foreign parties to improve the quality and performance of study programs.
5. Empowering alumni in order to increase the role and credibility of study programs.

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

6. Building a healthy study program organization based on the principles of autonomy, accountability and sustainability.

Aim:

1. Produce graduates with a bachelor level in electrical engineering that are superior and highly competitive.
2. Produce academic work through research and development of knowledge in the field of electrical engineering.
3. Realizing community welfare and increasing human values through the application of science and technology in the field of electrical engineering.
4. Improving the quality and performance of study programs through the expansion of cooperation with various parties both at home and abroad.
5. Increasing the role and credibility of study programs through empowering alumni.
6. Realizing a healthy study program organization based on the principles of autonomy, accountability, and sustainability."

For the Bachelor's degree program Electrical Engineering Education, the institution has presented the following profile in the on their website:

"**Vision:**

Realizing the Electrical Engineering Education S1 Study Program as a superior study program and becoming a national reference in the development of education and science, especially in the field of Electrical Engineering Education that is relevant to the needs of development, society and humanity.

Mission:

1. Organizing higher education to produce graduates who are superior and highly competitive in the field of Electrical Engineering Education.
2. Organizing research and development of science to produce academic works that are superior and highly competitive in the fields of education, science and technology, especially in the field of Electrical Engineering Education.
3. Building communities through the application of science and technology in the field of electrical engineering for welfare and humanity.
4. Establish cooperation with foreign and domestic parties to improve the quality and performance of study programs.
5. Empowering alumni in order to increase the role and image of study programs.

6. Building a healthy department and study program organization based on the principles of autonomy, accountability, accreditation and continuous self-evaluation.

Aim:

1. Producing superior and highly competitive PTE undergraduate graduates.
2. Produce scientific work through research and development of science in the PTE field.
3. Realizing community welfare through the implementation of science and technology in the PTE field.
4. Improving the quality and performance of study programs by collaborating with various parties.
5. Increasing the role and existence of study programs through empowering alumni.
6. Realizing healthy study program governance based on the principles of autonomy, accountability, accreditation, and continuous self-evaluation."

C Peer Report for the ASIIN Seal

1. The Degree Program: Concept, content & implementation

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

Evidence:

- Self-assessment report
- Study plans of the degree programs
- Module descriptions
- Website
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
The peers base their assessment on the learning outcomes as detailed in the self-assessment report (SAR) of the two Bachelor's degree programs under review. They refer to the Subject-Specific Criteria (SSC) of the Technical Committee 02 – Electrical Engineering/Information Technology as a basis for judging whether the intended learning outcomes of the degree programs as defined by the Universitas Negeri Malang correspond with the competences outlined by the SSC.

The university has described and published objectives, graduate profiles, learning outcomes and quality management measures for both programs. The peers approve that for each program a detailed presentation of learning outcomes and graduate's profiles is given in combination with learning outcome matrices matching the described learning outcomes with the respective modules of the programs. However, the links between the modules and the related learning outcomes remain rather opaque.

The learning outcomes of both programs focus on power systems and control systems as well as corresponding education in these fields. As the peers could learn during the online visit, this focus is implemented due to governmental demands to produce personnel which is able to meet Indonesia's obligation to invest in renewable energies. The study programs of Universitas Negeri Malang are designed to complement those of other universities in

Indonesia. In the peer's opinion, the learning outcomes and intended aims do not sufficiently depict the field of Electrical Engineering.

From the documents presented, and the discussions with the representatives of Universitas Malang, the peers understand that graduates of the Electrical Engineering program are supposed to be capable of conducting research and applying actual methods of modelling, calculating, and testing in their field of specialization. The graduates of the Electrical Engineering Education program should have mastered basic concepts of electrical engineering and be able to apply knowledge about didactics in creating teaching and learning materials as well as in designing and conducting teaching in electrical engineering at vocational schools. Furthermore, they should be able to engage in research on problems of electrical engineering.

Other than that, the learning outcomes contain general skills such as theoretical knowledge, scientific skills and more practical skills like problem assessment and problem solution proficiency as well as an ethical component which obliges the students to use their acquired skills in accordance with the Indonesian constitutional principles of Pancasila.

In the peers' opinion, the objectives and learning outcomes of both degree programs do not cover all aspects that can be expected from a program in the respective field, as they do not cover the whole spectrum of electrical engineering. For example, important aspects of communication engineering, digital communication or information theory are neither covered in the objectives nor in the curricula. To this end, the learning outcomes should be either extended (and supported with corresponding modules) or be brought in line with the actual content taught in the programs.

Students and alumni confirm during the audit that they have good job opportunities as teachers, researchers or employees in various positions in private companies and administration. The representatives of the industry and the vocational schools confirm that they are satisfied with the alumni and emphasize the new perspectives they bring along, as well as their adaptability to new fields and technologies. According to the representatives, a feedback loop is in place which facilitates a smooth transition from university to either school or industry. The peers acknowledge the close relationship of Universitas Negeri Malang with their surrounding vocational schools and companies as well as with their students and alumni. However, for the peers it is hard to imagine that graduates of the programs will be able to start an employment in a typical position for bachelor's graduates. In their opinion, the programs train students to be good professionals rather than university graduates who are qualified to take up higher positions in companies, e. g. in research and development departments.

In summary, even though Universitas Negeri Malang has defined qualification objectives for both degree programs and supplied evidence for a safe occupational future, the peers consider the learning outcomes and qualification objectives insufficient. They must be re-written as they currently do not match EQF Level 6 and lack certain aspects. In particular, theoretical basics, scientific skills and essential aspects of electrical engineering are inadequately addressed. As will be stated in the next criterion, the change of the name of the degree program might be one important aspect to solve this issue.

Criterion 1.2 Name of the degree program

Evidence:

- Module handbook per program
- Self-assessment report
- Discussion during the online audit

Preliminary assessment and analysis of the peers:
The expert panel considers the name of the Bachelor of Electrical Engineering program as well as the name of the Bachelor of Electrical Engineering Education program to be misleading. The online audit as well as the self-assessment report evidence important aspects of electrical engineering not being addressed/conveyed within the program (cf. criteria 1.1 and 1.2). This also leads to the problem that intended learning outcomes and aims are not reflected by the names of the programs.

Criterion 1.3 Curriculum

Evidence:

- Self-assessment report
- Module handbooks
- Website
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
The curricula of both programs are designed to comply with the program objectives and learning outcomes, and they are subject to continuous revision processes. As such, the curricula are reviewed regularly and commented on by students and lecturers as well as by external stakeholders such as alumni or partners from schools and the private sector. The

Quality Assurance Unit of the Electrical Engineering Department as well as the curriculum board are set in place to constantly ensure and improve the quality. Besides the objectives and learning outcomes defined by Universitas Negeri Malang itself, the curricula also consider the Indonesian standards of higher education and the Indonesian national qualifications framework as well as the recommendations from professional associations, lecturers of similar study programs in the field and expert groups.

The courses of all degree programs are divided into three different categories: (1) basic courses for character development, (2) courses on subject matter and expertise as well as (3) electives. Both programs distribute their credits in the same way. They award 12 Indonesian credits (SKS, see chapter 2.2 for more details) for basic courses for character development, 36 SKS for elective courses and 98 SKS for mandatory courses on subject matter and expertise. The latter subsume 4 SKS for a field work practice in both programs and 4 SKS for an additional teaching internship in the Electrical Engineering Education program, as well as 4SKS for a mandatory community service in both programs. The peers learn that the students classify the overall workload per semester as high, but manageable and that they value the time at the university as very positive regarding character formation and soft skills development.

In the Electrical Engineering program, the first four semesters are filled primarily with basic courses for character development and mandatory courses on subject matter and expertise. In the latter, the students are supposed to learn the basics in different areas of electrical engineering, for example calculus, electrical measurement, mechanical physics, digital electronics or electromagnetic fields. The fifth semester marks the dividing point for the two specializations “Power Systems” and “Control Systems”. Exclusively in the fifth and sixth semesters, the students are to shape their profile within the respective specialization. The subsequent seventh semester is again common to all students independently of the chosen specialization. The community service is to be done in the sixth semester and the internship in the seventh semester. The seventh and eighth semester also contain three elective courses. The students finish their studies with their undergraduate thesis at the end of the eighth semester.

The Electrical Engineering Education program is structured in a similar way. The major difference is that it contains a considerable number of courses dealing with pedagogical and didactic questions instead of the two specializations. Courses such as “Introduction of Teaching”, “Teaching and Learning” or “Evaluation of Learning” are designed to provide the students with necessary competences to become a vocational school teacher. From semester five through seven, students can expand their electrical engineering knowledge and teaching skills in elective courses such as “IT Assisted Teaching” or “Micro Teaching”. The seventh semester features two internships. One is to be done at a vocational school and

the other in industry. The students finish their studies in the eighth semester comprising the community service and their undergraduate thesis.

As already implied in criterion 1.1, the peers doubt that the study programs are at a level being appropriate for a bachelor's program (EQF 6). When reviewing the study plans as well as the module descriptions, they are missing indispensable aspects of electrical engineering and a valid order of subjects, as well as adequate teaching methods that meet the requirements of skills to be taught. Essential theoretical basics are either left out due to the overall orientation towards control or power systems, or they are scheduled to be taught in a later semester. This does not allow the students to fully understand modules due to missing prerequisites, let alone to conduct research or understand experiments to their full extent. Topics being an inherent part of any regular electrical engineering program and missing in both programs comprise e. g. Kirchhoff network theory (two-ports vs. four-poles, impedance/admittance/hybrid matrices), digital communications (e. g. optimum detection in additive white Gaussian noise channels) and linear algebra (e. g. finite-dimensional and infinite-dimensional vector and pre-Hilbert spaces). The same goes to linear systems being dealt with in the module NTROUM6022 'Linear System' in the third semester, while the required concepts of eigenfunctions (namely complex exponential functions) and eigenvalues (the transfer function of a linear system) requiring the Fourier transform are taught in the module NTROUM6030 'Signal Processing' in the fourth semester. It has to be mentioned that all courses are taught in Bahasa Indonesia. This, however, does not correspond to the international standard within electrical engineering. Due to the most significant literature being published in English, it is inevitable to provide more than one module to ensure adequate English language skills.

While the lack of certain basics might be explained with the overall profile of both programs, the order of the modules and the choice of teaching methods used to convey both knowledge and skills show the inconsistency of the overall curriculum. For instance, in the module NTROUM6002 'Electrical Physic' in the first semester, the electrical potential is treated, while the module TROUM6009 'Calculus 2' on integrals and derivatives being mandatory in the context of potentials is taught only in the second semester. Labs, for example, are not suited to teach the necessary theory as they should be used to solidify and deepen theoretical knowledge by running experiments. Here, the most central part of an electrical engineering curriculum, namely lumped element circuits, is taught in the module NTROUM6006 'Electrical Circuit 1' in the first semester, but exclusively for the direct current (DC) case. The general case, however, being described by RLMCn elements (and representing the special case of distributed electromagnetic systems described by field quantities in the framework of Maxwell theory) is treated in the one-credit module TROUM6026 'Basic Lab Works 5' in the third semester. As a consequence, the relation between achieving

the competences and what is done in the modules and the curriculum as a whole is hard to be identified. The module handbook shows that far too little skills are being taught in lectures and classes. The peers got the impression that this issue is strongly connected to the composition of the staff. They doubt that faculty members holding a master's degree are able to either understand the relations between theory and practice across different modules or to design own modules. This, though, is indeed the rule rather than the exeception as the peers did learn during the online visit (cf. Criterion 4.1). Concerning the teaching methods, the peers realize that presentation skills are not part of modules and oral exams are almost absent.

Even though Universitas Negeri Malang tries to align their studies with both the labor market and the national guidelines, it is not only the name of the study program that is misleading. The peers consider the curricula of both study programs in need to be redesigned in order to meet the requirements of a bachelor's program (EQF 6). This should be done in accordance with the revision of the qualification objectives, as all shortcomings identified there are also reflected in the curricula. The changes also need to be visible in the module handbook.

Finally, the peers recommend that the language skills of the students and teaching staff be further developed and promoted. As it turned out during the online audit, the share of participants being able to communicate in English is negligible. However, as students are expected to work in international teams after their studies, and in view of the majority of current technical literature being published in English, the peers highly recommend strengthening English language skills in the curricula and actively promoting the language proficiency of both teaching staff and students.

Criterion 1.4 Admission requirements

Evidence:

- Self-assessment report
- Website
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
There are four different paths of admission into the programs:

1. National selection of Higher Education or University (Seleksi Nasional Masuk Perguruan Tinggi Negeri (SNMPTN)), a national admission system, which is based on the final grades in secondary school.

2. Joint selection of Higher Education or university (Seleksi Bersama Masuk Perguruan Tinggi Negeri (SBMPTN)). This national selection test is held every year for university candidates. It is a nationwide written test (subjects: mathematics, Bahasa Indonesia, English, physics, chemistry, biology, economics, history, sociology, and geography).

3. Independent selection (Seleksi Penerimaan Mashasiwa Baru (SPMB)): Students are selected based on a written test (similar to SBMPTN) specifically held by Universitas Negeri Malang for prospective students that have not been accepted through SNMPTN or SBMPTN.

4. Level transfer program selection (Seleksi Program Alih Jenjang (SPAJ)): The associate degrees of level D-II or D-III allow non-high school graduates to continue to the S1 level. The associate degrees are obtained after a course of post-secondary study and reflect a qualification above a high school diploma and below a bachelor's degree. The degree corresponds to the duration it takes to complete the course, measured in years. This program is part of the overall efforts to enable foreign students to study at Universitas Negeri Malang. It is carried out in cooperation with the UM's Office of International Relations.

For each academic year, the university determines the ratio of students admitted through these four ways. Generally, the number of applications is considerable higher than the number of admitted students. For the academic year 2020/21, the ratio is between 1:15 for the EE program and 1:5 for the EEE program. Both programs have a capacity of 60 students.

The tuition fees for the programs are determined by the Ministry of Finance based on a proposal from Universitas Negeri Malang. In the Faculty of Electrical Engineering, there are seven levels for these fees, depending on the parents' income. For students from underprivileged families, there is no tuition fee. Difficulties with the payment of the tuition fees are additionally met by a number of measures to ensure the success of the students. Furthermore, there are various options for scholarships that cover the tuition fees. These numbers can be found on the website established for the registration process. The website, however, is only available in Indonesian.

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

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

After assessing the statement of Universitas Negeri Malang (attached in chapter E of this report) as well as the additional documents, the peers deem this criterion partially fulfilled.

2. The degree program: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-assessment report
- Study plans
- Module handbooks
- Objective-Module-Matrices
- Discussions during the online audit
- Annex Cluster B

Preliminary assessment and analysis of the peers:
The programs under review are designed for four years, and the students need to achieve 146 Credits (which equals about 218 ECTS for the Electrical Engineering program and 224 ECTS for the Electrical Engineering Education program). Each semester is equivalent to 16 weeks of learning activities, including one week for midterm exams and one week for final exams.

After analyzing the module descriptions and the study plans, the peers confirm that both programs under review are divided into modules that split the assigned credits into teaching, assignments and self-study. Despite the fact that no curricular overview or study plan exists, the given matrices reflecting the interrelation between the modules and the learning outcomes remain confusing and unsubstantiated. Even though the overall structure described in Criterion 1.3 does seem meaningful in the first place, the module descriptions are insufficient. The sequence of modules, for example, does not correspond to the sequence of contents required to be able to follow different topics (cf. Criterion 1.3). Furthermore, the description of modules is not always informative and reveals that far too little skills are being taught in lectures and classes (e.g., general Kirchhoff networks (not only DC) and linear systems), but are taught in labs with a very small credit budget. The peers therefore consider it necessary that UM redesigns the curricula for both study programs. Here,

it would also be possible to reorganize the modules so that they appear more coherent and consecutive.

The peers learn that the teaching internship and the industry internship, which is part of both programs, are well integrated into the curricula. The close relationship between Universitas Negeri Malang and their regional industry is presented as interdependent by the university's staff as well as the representatives during the online audit. However, this does not ensure that the activities during the internship correspond to the EQF Level 6 in electrical engineering.

International mobility

The SAR as well as the discussions make it very clear that international recognition is one of UM's primary goals for the next years. The peers point out that international mobility of both lecturers and students is a key factor in these efforts.

The peers learn that the university already provides some opportunities for students to conduct internships and study semesters abroad. There are cooperation agreements with a variety of organizations within Indonesia and also with other countries, mostly in Asia. The university has established its own scholarship for international mobility and, moreover, manages various external scholarships sponsored by the Indonesian government, the US Government or the European Union. Qualifications obtained at other universities in Indonesia or abroad are recognized if they fit the description of existing modules at Universitas Negeri Malang. Before a stay abroad, the university makes a learning agreement with the respective student to ensure that the courses taken are relevant to the study program and can thus be recognized. The annexes show that since 2016 only 14 students took the chance to participate in a student's exchange. During the online visit, the representatives present a much higher number, namely 80 students a year who at least participate in a national exchange. The peers recognize a very extensive national network of universities which allows students to take (online) courses from many different Indonesian universities. They are also pleased to learn that a comparatively large number of students actively uses this opportunity. They nevertheless note that the possibility of an exchange abroad could be more actively promoted and supported by the university, as the demand for international mobility is still rather low. The peers emphasize that spending some time abroad would also contribute to the improvement of the English language proficiency. As they detect no problems concerning the organization of student mobility and credit transfer, they think that a widening of the opportunities for students and a focused advertisement on international exchanges may be helpful.

Criterion 2.2 Workload and credits

Evidence:

- Self-assessment report
- Study plans
- Module Handbooks
- Discussion during the online audit

Preliminary assessment and analysis of the peers:
Based on the National Standards for Higher Education of Indonesia (SNPT), both programs under review use a credit point system called SKS. According to the legal requirements, an undergraduate program in Indonesia can have between 144 and 160 SKS, and the actual number of SKS in both programs under review is 146.

1 SKS of workload is equivalent to 170 minutes per semester week. For lectures, tutorial and similar classes, this means 50 minutes of face-to-face activity, 60 minutes of structured tasks and 60 minutes of independent learning per semester week, whereas for seminars and similar forms of learning, it is 100 minutes face-to-face activity and 70 minutes of independent learning. For laboratory work, internships, community service etc., 1 SKS equals 170 minutes of the respective activity per semester week. The details and the students' total workload are described in the respective module descriptions. The peers acknowledge that a credit point system based on the students' workload is in place. However, they note that the point of the European Credit Transfer and Accumulation System has been missed due to the non-consistent conversion from SKS to ECTS. While both courses award 146 SKS, they differ in their workload. The Electrical Engineering Education program comprises 66 courses and thus a workload of 6262 hours which is converted to exactly 223.64 ECTS (assuming an equivalence of 1 ECTS to 28 hours workload) , while the Electrical Engineering program comprises 63 courses with a total workload of 6112 hours and thus corresponding to exactly 218,29 ECTS. In the SAR, in turn, the university indicates a total workload of 215 ECTS for both programs.

As the university explains, the conversion of SKS into ECTS depends on the type of activity. For theory and practice courses, a ratio 1:1.59 is being used, whereas for internship and community service it is 1:1.82. The peers point out that, given that 1 SKS equals 170 minutes per semester week regardless of the activity, this cannot be true. The difference may be due to the fact that mid-term and final exams are not considered in the university courses. However, as mandatory parts of the modules, they should be included and as a result, there should be a single conversion rate between SKS and ECTS. The peers ask the university to apply this conversion rate uniformly in all module handbooks to correct the noted inconsistencies.

With the exception of the last two semesters, the workload is between 18 and 21 SKS according to the regular study plan. The workload of the last two semesters is markedly reduced to give the students enough time for their theses and their fieldwork. However, the effective number of SKS the students can take depends on their achievements in the previous semester. If their Grade Point Average (GPA) is less than 2.0, they can take up to 18 SKS, for GPA between 2.0 and 3.0 up to 22 SKS and for A GPA above 3.0 up to 24 SKS in one semester, respectively. This mechanism is supposed to ensure that students can really handle the workload. It also means that students can finish their studies in less than eight semesters. On average, the students seem to finish one to two semesters later. The drop-out rates are very low, and the average grade for both programs level off at about 3.4.

The peers conclude that the general workload is high but manageable, as the students confirm. They also report the workload to be transparently documented and, therefore, fair and predictable.

Criterion 2.3 Teaching methodology

Evidence:

- Self-assessment report
- Module Handbooks
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

The teaching and learning methods employed in each course are laid down in the module handbook. Through the Indonesian regulations on credit points (cf. Criterion 2.2), an adequate balance between face-to-face activities and independent learning is intended. In the programs under review, various student-centered learning methods are utilized. Besides the regular lectures, cooperative learning, project- and problem-based learning, inquiry and experiments are used to a considerable degree. The students confirm that these methods are actually used in the courses, and that they are highly satisfied with the variety of teaching methods. They emphasize their involvement into the research projects and the possibilities of being part of publications. The teaching and learning activities are supported by a broad range of media, both traditional (books, papers) and online (video, presentations etc.). The university's online learning management system supports teachers and students in communicating and disseminating learning material. In the course of the Covid-19 pandemic, the university has swiftly switched to online learning with videoconferences, recorded videos and other media.

Yet, the problems described under Criterion 1.3 still prevail. While different teaching methods are being implemented, it remains unclear why a specific method is chosen for a specific topic. As already mentioned under Criterion 2.1, a lab, for example, is not suited to convey basic theoretical knowledge. The peers therefore advise Universitas Negeri Malang to review the modules and examine the best suitable teaching methods for the different courses.

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Website
- Discussions during the audit

Preliminary assessment and analysis of the peers:

In order to support students in completing their studies on time with good achievements, the university and the faculty provide academic and personal support and assistance through various means. The main contact person for every student is their academic advisor, which is assigned to them in their first semester. An academic advisor shall help them develop an adequate schedule for their studies, choose electives according to their skills and interests and support them in case of academic and non-academic problems. Each student has the opportunity to meet with their academic advisor, who is also responsible for monitoring their study progress, at least four times per semester. Furthermore, there are supervisors for the thesis, the fieldwork practice or teaching internship, and the community service who give advice on specific issues related to these aspects. The university supports the students in finding a job in various ways. Both programs offer a course on entrepreneurship in which the students learn how to develop a business model and how to start a company. Moreover, for students of all programs, UM organizes regular job fairs and trainings for writing applications and CVs.

The website shows that there is also a system to support students with disabilities. The university has established a center for special needs education that supports these students in their learning process, and that helps the teaching staff to develop accessible learning media. The facilities for both programs are accessible for students with disabilities.

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

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

After assessing the statement of Universitas Negeri Malang (attached in chapter E of this report) as well as the additional documents, the peers deem this criterion partially fulfilled.

3. Exams: System, concept and organization

Criterion 3. Exams: System, concept and organization

Evidence:

- Self-assessment report
- Module handbooks
- Exam regulations
- Exemplary written exams and final theses
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
For the examination of the students' achievement, each course has to determine objectives, which support the achievement of the overall learning outcomes of the respective program. Accordingly, each course must assess whether all defined learning outcomes stated in the module description have been achieved. For this purpose, Universitas Negeri Malang utilizes various types of examination.

In each course, the students have to pass written mid-term and final examinations. These commonly feature short answers, essays, problem-solving or case-based questions as well as calculation problems. Additionally, according to the Self-assessment report, quizzes, tests, practical performances, assignments, small projects, portfolios, presentations and oral exams are employed to assess the students' achievement of the learning outcomes. At the first meeting of a course, the students are informed about what exactly is required in order to pass the module. It is common to hold small quizzes every two or three weeks, but there are generally no unscheduled tests. The final grade of each module is calculated based on the score of these individual assessments. The exact formula is given in the module handbook. Universitas Negeri Malang uses a grading system with the grades A, A-, B+, B, B-, C+, C, D and E, where a D (equivalent to a Grade Point of 1) is necessary to pass a module. It is also necessary for the students to attend 80% of the courses.

The discussions during the online audit reveal that oral exams are sometimes held by only one examiner. The peers consider advise UM to assign two lecturers for every oral exam in the future for a fair evaluation and the stability of the grades.

Shortly before the online visit, the peers were provided with a selection of exams and final projects to check. As a logical consequence of the fact that large parts of the curricula do not correspond to EQF level 6, the requirements and standards of most of the presented exams do not reach bachelor's level either. The peers confirm that the exams and the theses might match the issued module descriptions and learning outcomes, though, as already written in the previous criterions, these are flawed for a variety of reasons. The final theses, for example, are unacceptably short (there is, for instance, a Bachelor thesis with a length of 9 pages comprising 5 tables, 2 figures and 1.5 pages of references, and thus leaving about 4 pages of text for the treatment itself) compared to the general standard, and consist mostly of tables, abstracts or short descriptions and therefore do not reveal any analysis or scientific claim. Things like the state of the art, a problem formulation, the objectives and a proper discussion of potential methods to achieve the objectives are missing completely. The theses presented thus correspond more to an internship report. It remains unclear to what extent, for example, the methods/procedures used are predetermined or were selected by the students themselves after appropriate literature research.

The schedule for mid-term and final exams is prepared by the department and is communicated to the students at least two weeks before the start of the exam week. If a student cannot participate in the exam due to illness (with a doctor's certificate) or for another important reason, they can take the make-up exam that is scheduled no later than one week after the regular exam date. There is a defined objection process for students who feel that their grade does not adequately reflect their achievement of the learning outcomes. The peers reckon that there is no limit on how often students can repeat an exam except for a maximum study duration of 15 semesters. However, as the failing rates are very low the grades are formed by the sum of all assessments, re-examinations seem to be an exception at UM.

Next to the mid-term and the final exams, students also have some quizzes and projects throughout the semester that all count towards the final module grade. Although this means that the total number of tests during a semester is comparatively high, the students do not complain at all about this workload and instead confirm that taking several exams for one course allows for a continuous learning process and a very good preparation for the final exams. The students confirm that the module requirements and exam dates are indeed communicated to them at the beginning of each semester. The students also emphasize that the grading system is fair and transparent.

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

After assessing the statement of Universitas Negeri Malang (attached in chapter E of this report) as well as the additional documents, the peers deem this criterion partially fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

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

Preliminary assessment and analysis of the peers:
At Universitas Negeri Malang, the staff members have different academic positions. There are professors, associate professors, assistant professors and lecturers. The academic position of each staff member is based on research activities, publications, academic education, supervision of students and other supporting activities. This relies on regulations by the Indonesian Ministry of Education that determines certain minimum credit points of experience for reaching the next level. The SAR states that, on average, the entire workload of an active lecturer in odd semesters and in even semesters is 17.3 ECTS and 16.23 ECTS, respectively. However, the corresponding table is missing, and it is not clear how many hours correspond to these numbers. During the online audit, the peers learn that a lecturer has 18 hours of responsibilities in the field of teaching. Some are also involved in the management of the programs or in different tasks of the faculty or university bodies. In this case, they can ask for a reduction of their teaching duties. On top of that, every lecturer guides 20 to 30 students as an academic advisor.

The peers deem the workload to be rather high and in conflict with other aspects such as research, didactical training or further education in general. They also learn that none of the staff members being present during the online audit has used the chance to take a sabbatical during the last five years, although it is possible and desired by the university. Nevertheless, the research and publication volumes seem to be rather high on a national scale. The students and the staff confirm the overall research orientation of the faculty. The peers conclude that it would be desirable to expand the international research and publication share.

There are overall 27 lecturers for both programs. Only two of those are full professors, nine hold a PhD and 16 hold a Master's degree (some of which are still studying), resepectively. The SAR indicates a lecturer-student ratio of 1:30. If one was about to indicate the student-professor ratio, it would be 1:405 or 1:74 (involving the PhDs). The peers point out that this is not only a matter of numbers. They derive that this factor is one of the causes for the misconception of the curricula. As they learn during the online discussions, assistant professors – who hold only Master´s degrees – design and teach their own modules. Some modules are even defined by master's students who teach in the bachelor's programs. The peers doubt that these assistant professors or master's students are able to design modules with a coherent synergy of contents and teaching methods. As for the general lack of full professors, they advise the university to ensure that the staff is sufficiently qualified to offer an EQF Level 6 qualification in electrical engineering or electrical engineering education.

Another critical point the peers notice is the overall lack of English proficiency regarding the staff. The staff is obliged to reach at least 500 points in the TOEFL (Test of English as a Foreign Language), which is equivalent to the B2 level of the CEFR (Common European Framework of Reference for Languages). As only a small proportion of teachers was capable to communicate in English during the online audit, the peers recommend taking this matter much more seriously with regards to the overall international orientation of electrical engineering.

In summary, the peers confirm that the staff is providing assistance and advice to the student and appreciate the close relationship between students and teaching staff. However, they doubt that the overall qualification of the staff is suitable for an EQF Level 6 study program. At the same time, the number of qualified staff members is simply insufficient. They therefore ask the university to provide more teaching staff with advanced academic qualifications (above the Master's degree) and research records, which cover the whole spectrum of electrical engineering.

Criterion 4.2 Staff development

Evidence:

- Self-assessment report
- Staff Handbook
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

According to the Self-assessment report, Universitas Negeri Malang encourages the continuing professional development of its staff. For this purpose, various opportunities are provided. There is a mandatory didactic training for new academic staff that encompasses

curriculum design, teaching material, and innovative teaching and learning methods. Moreover, the staff members can consult the head of the Electrical Engineering Department and apply for training activities that improve their competencies. These trainings are conducted by external institutions and will only be approved if they are aligned with the staff's field of expertise or the direction of the institutional development. Additional to the department's support, some of the trainings are funded by the IsDB (Islamic Development Bank) and the Ministry of Education and Culture. Universitas Negeri Malang also encourages its staff to continue their education to the doctoral level. One instrument to foster this is the possibility of a sabbatical, which is promoted by the faculty.

All teaching staff are encouraged to study abroad or to participate in international research projects and conferences in order to enhance their knowledge, increase their English proficiency and build international networks. In particular, lecturers who started working in 2018 are obliged to pursue further education abroad. For this purpose, the university informs about possible scholarships either from Indonesia itself or from foreign governments to support academic mobility.

The peers consider the support mechanisms for the continuing professional development of the teaching staff adequate and sufficient. However, they could learn during the online discussion that measures such as sabbaticals or the international teaching exchange are only used to a limited extent.

Criterion 4.3 Funds and equipment

Evidence:

- Self-assessment report
- Videos and presentation of the facilities
- Discussions during the online audit

Preliminary assessment and analysis of the peers:

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

In preparation of the audit, the university provides a number of videos showing the laboratories of the programs. During the virtual on-site visit, the facilities of all programs were shown in more detail. The peers notice that the lecture rooms are in very good condition

and mostly well-equipped. They, however, learn that some of the instruments are shared with other faculties and are therefore not available at a desirable number. The peers also consider the available equipment in the labs to be of high standards and are convinced that the laboratories adhere to the international safety standards.

The university has licensed Microsoft Office and other standard software, but does only provide only two MATLAB licenses for the whole department, which is clearly insufficient for an electrical engineering program. Furthermore, the peers note that the scope of access to important databases remains unclear. For instance, no access is provided to the Institute of Electrical and Electronics Engineers (IEEE) data base IEEEXplore or other scientific data bases which are required for students to conduct independent research activities

In summary, the peer group judges the available funds and the infrastructure adequate for sustaining the degree programs, but identifies some improvement in terms of available software and access to scientific data bases.

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

After assessing the statement of Universitas Negeri Malang (attached in chapter E of this report) as well as the additional documents, the peers deem this criterion partially fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-assessment report
- Module Handbooks
- Website

Preliminary assessment and analysis of the peers:

The module descriptions for both programs have been published on the university's website and are thus accessible to students as well as to all stakeholders, though it would be desirable to publish the module handbooks in a combined file as it was provided to the peers and in Bahasa Indonesia as well as in English. The peers observe that the descriptions contain information about the staff members responsible for each module, the teaching methods and workload, the credit points awarded, the intended learning outcomes, the

applicability, the examination requirements and the forms of assessment with an associated formula of how the final grade is calculated.

However, as already mentioned, some information is missing or insufficient. The learning outcomes are not always skills-based, the types of examination and the prerequisites for individual modules are not always clear, the conversion to ECTS is not consistent (see Criterion 2.2), the applied teaching methods do not always suit the targeted type of proficiencies (see Criteria 1.3 and 2.3). Another problem worth mentioning is the incomprehensibility of the acronyms used on the website and the SAR. The acronyms are derived from the Indonesian terms and afterwards translated into English. This makes it hard to guess what is actually meant by the letters if one is confronted only with the acronym. Therefore, the peers ask the university to revise the module handbooks to address the mentioned issues.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

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

Preliminary assessment and analysis of the peers:
The peers confirm that the students of both degrees under review are awarded a diploma and a Diploma Supplement after graduation. The diploma consists of a diploma certificate and a transcript of records. The transcript of records lists all courses that the graduate has completed, the achieved credit points, grades and cumulative GPA. The diploma supplement contains all necessary information about the degree program. However, it does not include any statistical data to allow readers to categorize the individual result, which must be added in the future.

Criterion 5.3 Relevant rules

Evidence:

- Self-assessment report
- Website
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
The peers confirm that the rights and duties of both Universitas Negeri Malang and the students are clearly defined and binding. All rules and regulations are published on the

university's website in Indonesian as well as in English and hence available to all stakeholders. In addition, the students receive all relevant course material in the language of the degree program at the beginning of each semester. During the online audit, the students confirm that all information is documented properly and well aware of all binding rules.

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

The peers consider this criterion to be completely fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-assessment report
- Data based on surveys among students and graduates
- Discussions during the online audit

Preliminary assessment and analysis of the peers:
The peers learn that there is an institutional system of quality management aiming at continuously improving the degree programs. This system relies on a variety of Quality Assurance Units (UPMs), which are established on different organizational levels.

SPM focuses on both national and international accreditations. Every degree program and every Higher Education Institution in Indonesia has to be accredited by the national Accreditation Agency (BAN-PT). Universitas Negeri Malang as an institution as well as the Electrical Engineering Education program have received the highest accreditation status (A). The Electrical Engineering program has received the second highest accreditation status (B).

UPMs are units acting above the faculty level and are represented by a head lecturer and departmental representatives, who are appointed by the Dean. There are UPMs settled at every faculty and called GPMs. Finally, Universitas Negeri Malang installed an Internal Supervisory Unit (SPI), which acts on the university level, regarding matters connected to the non-academic field.

The basis for the internal quality assurance is defined by the faculty's vision and mission, strategic plan and work program. These documents contain current goals and targets that

are used to measure the faculty's success. The university employs various methods of internal quality assurance, for instance, a monitoring of the students' performance, regular surveys among students and alumni and a periodical internal audit.

Monitoring by the GPM is conducted in a standardized way three times a semester: at the beginning (lesson plan, teaching materials, use of web portal, learning approach), in the middle (implementation of midterm exam, learning outcome achievement) and at the end (analysis of final exam, achievement of course learning outcomes etc.). The internal quality audit is conducted once a year for each degree program and aims at regularly assessing the quality and sustainability of the programs. It follows a standardized procedure and results in a report to the program identifying potential improvement.

At the end of each semester, a student satisfaction survey is carried out for all courses including questions about the resources, teaching methods, competence of teaching staff etc. The university annually carries out an alumni tracer study to find out about their job opportunities, the relevance of the skills they acquired in the programs and other related issues.

Students and representatives from the vocational schools and the industry confirm that they are always integrated into a feedback loop. Either through the internships or the accessible surveys. This does help both sides, vice versa.

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

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

The peers consider this criterion to be completely fulfilled.

D Additional Documents

Not required.

E Comment of the Higher Education Institution (08.11.2021)

The following quotes the comment of the institution:

“In response to the ASIIN Peers’ Report for Cluster B (Bachelor of Electrical Engineering and Bachelor of Electrical Engineering Education) Universitas Negeri Malang, we would like to appreciate all responses. In this following statements or comment, we try our best to clarify your valuable suggestion as follows:

1. The Degree Program: Concept, content & implementation

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

The peer thinks that the links between the modules and the related learning outcomes remain rather opaque (p.8).

> Response: Each learning outcome has a study material assigned to each subject, then each subject has a module.

In the peer’s opinion, the learning outcomes and intended aims do not sufficiently depict the field of Electrical Engineering (p.9).

> Response: We agree that the Electrical Engineering field covers power, electronics, control system, signal processing, and telecommunication. However, we focused on our distinctiveness in power and control instead of all areas in defining LOs. Furthermore, all Electrical Engineering study materials were included in compulsory and elective subjects. In the future, we will review the subjects' curriculum and structure.

Graduates of the Electrical Engineering Education program should be able to engage in research on problems of electrical engineering (p.9).

> Response: The research was conducted based on electrical engineering knowledge and implemented in Electrical Engineering Education. For example, making and using Electrical Engineering software for education and virtual lab. There was also research on electrical engineering education kit for high school and higher education.

In the peers’ opinion, the objectives and learning outcomes of both degree programs do not cover all aspects that can be expected from a program in the respective field, as they do not cover the whole spectrum of electrical engineering. For example, important aspects of communication engineering, digital communication or information theory are neither covered in the objectives nor in the curricula (p.9).

> Response: Essential telecommunication in the Electrical Engineering program is accommodated in the compulsory subject "Introduction to Electrical Engineering (NTROUM6004)" in

semester 1. In contrast, the Electrical Engineering Education study program covers the basics of "Telecommunication (PTELUM6015)" compulsory subject in semester 3. Further study is available in elective subjects titled "Data Communication (NTROUM6081)" for the Electrical Engineering program and "Data Communication and Computer Network (PTELUM6042)" for the Electrical Engineering Education program.

The peers hard to imagine that graduates of the programs will be able to start an employment in a typical position for bachelor's graduates. In their opinion, the programs train students to be good professionals rather than university graduates who are qualified to take up higher positions in companies, e. g. in research and development departments (p.9).

Response: The study programs already accommodated the subjects that could be implemented into careers, including decision support systems, project management, innovation management, industry management, and professional ethics.

The peers consider the learning outcomes and qualification objectives insufficient. They must be re- written as they currently do not match EQF Level 6 and lack certain aspects (p.10).

Response: LOs have covered the Qualification of level 6 EQF, which comprises of mastering, optimizing, analyzing, and evaluating competencies in electrical engineering. The LOs from these two study programs already covered the advanced knowledge (critical understanding of theories and principles) and responsibility (manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work) of level 6 EQF;

Criterion 1.2 Name of the degree program

The expert panel considers the name of the Bachelor of Electrical Engineering program as well as the name of the Bachelor of Electrical Engineering Education program to be misleading. The online audit as well as the self-assessment report evidence important aspects of electrical engineering not being addressed/conveyed within the program (cf. criteria 1.1 and 1.2). This also leads to the problem that intended learning outcomes and aims are not reflected by the names of the programs (p.10).

Response: Following the Indonesia nomenclature, we use the BA term in equivalent with the B.Eng. We will evaluate changing the BA into B.Eng., including name of study programs. It's also proven by our alumni recognized by industries, vocation schools and abroad universities

Criterion 1.3 Curriculum

As already implied in criterion 1.1, the peers doubt that the study programs are at a level being appropriate for a bachelor's program (EQF 6) (p.12).

Response: The Kirchhoff Network Theory is taught in "AC Power Circuit subject", both in Electrical Engineering and Electrical Engineering Education. Digital Communications is

taught in the "Data Communication" subject. The Electrical Engineering study program teaches Linear Algebra (e.g., finite-dimensional and infinite-dimensional vector and pre-Hilbert spaces, etc.) in "Calculus (1 and 2)" and "Engineering Mathematics (1 and 2)" subjects. In comparison, Electrical Engineering Education teaches it in "Mathematics (1 and 2)" subjects. Eigen is taught in semester 2 through the "Numerical Method" (see curriculum).

It has to be mentioned that all courses are taught in Bahasa Indonesia. This, however, does not correspond to the international standard within electrical engineering. Due to the most significant literature being published in English, it is inevitable to provide more than one module to ensure adequate English language skills.

Response: Some lecturers teach in English in some subjects, although we explain the advanced theory in the Indonesian language. There is an English Student Council and students published papers in IEEE, AIP, IOP, etc., which states that they can speak English.

While the lack of certain basics might be explained with the overall profile of both programs, the order of the modules and the choice of teaching methods used to convey both knowledge and skills show the inconsistency of the overall curriculum. For instance, in the module NTROUM6002 'Electrical Physic' in the first semester, the electrical potential is treated, while the module TROUM6009 'Calculus 2' on integrals and derivatives being mandatory in the context of potentials is taught only in the second semester.

Response: The senior high school students in Indonesia are thought the basis of integral; therefore, the subject of Electrical Physics is presented in the early semester. Meanwhile, the Calculus 2 subject aims to equip students before taking the Electromagnetic Field subject in semester 3.

The module handbook shows that far too little skills are being taught in lectures and classes.

Response: Based on the curriculum, Lump is taught in semester 2 through the RL 2. This theory is practiced in Basic Practicum 2 in the same semester. "Basic Lab Works " does not cover the "Electrical Circuit 1"; it covers "Analogue Electronics 2" and "Linear System". "Electrical Circuit 1" is accommodated in "Basic Lab Works 1" in semester 1.

The peers got the impression that this issue is strongly connected to the composition of the staff. They doubt that faculty members holding a master's degree are able to either understand the relations between theory and practice across different modules or to design own modules. This, though, is indeed the rule rather than the exception as the peers did learn during the online visit (cf. Criterion 4.1).

Response: Lecturers in these two-study program designed and developed module handbooks/descriptions in their Research groups (called KBK), facilitated and monitored by the Curriculum Expert Team from LP3 UM.

Concerning the teaching methods, the peers realize that presentation skills are not part of modules and oral exams are almost absent (p.13).

Response: Most subjects applied project-based and problem-based teaching methods, which require students to present their assignments and answer some questions from peer participants/students and lecturers during the oral exams. Some subjects that use project-based learning implement 1-2 presentations on their project progress and final presentation at the end of the semester, as in practical module handbooks.

Even though Universitas Negeri Malang tries to align their studies with both the labor market and the national guidelines, it is not only the name of the study program that is misleading. The peers consider the curricula of both study programs in need to be redesigned in order to meet the requirements of a bachelor's program (EQF 6). This should be done in accordance with the revision of the qualification objectives, as all shortcomings identified there are also reflected in the curricula. The changes also need to be visible in the module handbook.

Response: Following the above description, The curriculum of both study programs has been assessed by the National Accreditation Board (BAN PT) and meets the level 6 EQF qualification. The curriculum will be reviewed and revised every four years.

Finally, the peers recommend that the language skills of the students and teaching staff be further developed and promoted. The peers highly recommend strengthening English language skills in the curricula and actively promoting the language proficiency of both teaching staff and students.

Response: Lecturers have used learning materials in English. Lecturers and students have attended international seminars and international forums as participants and keynotes. In addition, there are guest lectures from several foreign universities, for example UiTM (Malaysia), NCKU & STUST (Taiwan) and ITSA (Columbia).

Criterion 1.4 Admission requirements

The admission website, however, is only available in Indonesian.

Response: Possibly when accessing, the selection link (http://home.seleksi.um.ac.id/) was still on maintenance

2. The degree program: structures, methods and implementation

Criterion 2.1 Structure and modules

The programs under review are designed for four years, and the students need to achieve 146 Credits (which equals about 218 ECTS for the Electrical Engineering program and 224 ECTS for the Electrical Engineering Education program). Each semester is equivalent to 16 weeks of learning activities, including one week for midterm exams and one week for final exams.

Response: The correct calculation is 215 ECTS for both Electrical Engineering and Electrical Engineering Education. There was a desynchronization between the old and new calculations during the translation process. The conversion is as follow:

1 credit = 170 minutes lecture per week

1 semester = 14 times lecture

1 course = 2 exams @ 2 hours

1 credit course = (170 * 14/60) + 4

ECTS=total study hours/28.

The peers therefore consider it necessary that UM redesigns the curricula for both study programs. Here, it would also be possible to reorganize the modules so that they appear more coherent and consecutive (p.15).

Response: As explained in Criteria 1, we appreciate the suggestion for curriculum improvement and module organization. Our university schedules curriculum review and revision every four (4) years.

The peers learn that the teaching internship and the industry internship, which is part of both programs, are well integrated into the curricula. However, this does not ensure that the activities during the internship correspond to the EQF Level 6 in electrical engineering.

Response: The study programs ensure that the industry for internships suits the Electrical Engineering area meets the level 6 EQF. Students' assignment in the industry is done by an industry advisor (engineer in the industry). Records of Daily Activities in Industry are recorded in a logbook, final evaluation through exams where the assessment is by industry supervisor and lecturer. Teaching internship is conducted in vocational schools with the Electrical Engineering program and is mentored by professional teachers.

The annexes show that since 2016 only 14 students took the chance to participate in a student's exchange. During the online visit, the representatives present a much higher number, namely 80 students a year who at least participate in a national exchange (p.16).

Response: Fourteen students participated in the international exchange, whereas 80 students were in the national exchange (Annex B-BEE page 29 and Annex B-Bed page 27)

Criterion 2.2 Work load and credits

The peers acknowledge that a credit point system based on the students' workload is in place. However, they note that the point of the European Credit Transfer and Accumulation System has been missed due to the non-consistent conversion from SKS to ECTS. While both courses award 146 SKS, they differ in their workload. The Electrical Engineering Education program comprises 66 courses and thus a workload of 6262 hours which is converted to exactly 223.64 ECTS (assuming an equivalence of 1 ECTS to 28 hours workload), while the Electrical Engineering program comprises 63 courses with a total workload of 6112 hours and thus corresponding to exactly 218,29 ECTS. In the SAR, in turn, the university indicates a total workload of 215 ECTS for both programs.

Response: There were errors in the total number of subjects in the Electrical Engineering program where it should state 54 subjects and 56 subjects for the Electrical Engineering Education program. The correct ECTS could be found in the SAR Introduction, namely 215 for the Electrical Engineering program and 215 for the Electrical Engineering Education program. The total workload for the Electrical Engineering program was 6007.3 hours, whereas for the Electrical Engineering Education program was 6103.33 hours.

However, as mandatory parts of the modules, they should be included and as a result, there should be a single conversion rate between SKS and ECTS. The peers ask the university to apply this conversion rate uniformly in all module handbooks to correct the noted inconsistencies.

Response: There is a duration difference between learning in class or lab with an internship. Class learning is equivalent to 170 minutes/sks

Criterion 2.3 Teaching methodology

While different teaching methods are being implemented, it remains unclear why a specific method is chosen for a specific topic. As already mentioned under Criterion 2.1, a lab, for example, is not suited to convey basic theoretical knowledge. The peers therefore advise Universitas Negeri Malang to review the modules and examine the best suitable teaching methods for the different courses.

Explanation: The bachelor competency level is level 6 Indonesian National Qualification Framework (INQF) or equivalent to the level 6 EQF. Competence can be achieved through problem-based and project-based learnings that facilitate analysis capabilities (Level 6). Moreover, since the learning method is comprised in the curriculum review, we reviewed the correct method for each module.

3. Exams: System, concept and organization

Criterion 3. Exams: System, concept and organization

The discussions during the online audit reveal that oral exams are sometimes held by only one examiner. The peers consider advise UM to assign two lecturers for every oral exam in the future for a fair evaluation and the stability of the grades.

Response: There are two types of oral exams: subject oral exam at the end of the semester and bachelor thesis oral exam at the end of the study. The subject oral exam is related to a theory subject or practice-based subject and is performed by the related lecturer and assessed by classmates. The assessment criteria are presentation organizing (relevance, effective use of presentation time, material, presentation appearance, articulation of presentation), communication (presenter speaks clearly and fluently, attractive and motivating presentation, mastering of material presented, argument answers question), product (knowledge, method, observation, cooperation, analysis, result and discussion). A bachelor

thesis oral exam is conducted with three examiners from the program and an additional lecturer from industry/other universities with similar fields (optional).

Shortly before the online visit, the peers were provided with a selection of exams and final projects to check. As a logical consequence of the fact that large parts of the curricula do not correspond to EQF level 6, the requirements and standards of most of the presented exams do not reach bachelor's level either.

Response: As previously mentioned that "The LO from these two programs already covered the advanced knowledge (critical understanding of theories and principles) and responsibility (manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work) of level 6 EQF ; as established in LO 3 and LO 4 in Electrical Engineering program. Meanwhile, the Electrical Engineering Education program established it in LO 1, LO 2, LO 3, LO 4, LO 6, LO 7, and LO 8 through keywords such as mastering , optimizing, analyzing, and evaluating." All subjects are the breakdown from all of the appointed LOs; therefore, the final exams are structured based on the EQF level 6 indicator.

Both study programs have been nationally accredited by BAN PT, where used KKNI level 6 that is equivalent to level 6 EQF.

The peers confirm that the exams and the theses might match the issued module descriptions and learning outcomes, though, as already written in the previous criterions, these are flawed for a variety of reasons. The final theses, for example, are unacceptably short (there is, for instance, a Bachelor thesis with a length of 9 pages comprising 5 tables, 2 figures and 1.5 pages of references, and thus leaving about 4 pages of text for the treatment itself) compared to the general standard, and consist mostly of tables, abstracts or short descriptions and therefore do not reveal any analysis or scientific claim. Things like the state of the art, a problem formulation, the objectives and a proper discussion of potential methods to achieve the objectives are missing completely

Response: The 9-page thesis that was attached is the published articles on SCI indexes (IEEE, Springer, etc). Further study on students' thesis can be seen in https://ieeexplore.ieee.org/document/8825014 for the Electrical Engineering program, and https://ieeexplore.ieee.org/document/9230076 for the Electrical Engineering Education program. Students' theses typically have 50–75 pages and can be seen in http://mulok.library.um.ac.id/home.php?s_data=Skripsi&s_teks2=Teknik+Elektro&s_field=0&s_teks=listrik&submit=Search&mod=b&cat=1

4.Resources

Criterion 4.1 Staff

The SAR states that, on average, the entire workload of an active lecturer in odd semesters and in even semesters is 17.3 ECTS and 16.23 ECTS, respectively. However, the corresponding table is missing, and it is not clear how many hours correspond to these numbers. During the online audit,

the peers learn that a lecturer has 18 hours of responsibilities in the field of teaching. Some are also involved in the management of the programs or in different tasks of the faculty or university bodies. In this case, they can ask for a reduction of their teaching duties. On top of that, every lecturer guide 20 to 30 students as an academic advisor.

> Response: We would like to clarify that what we meant by 17.3 ECTS = 11.7 credits (SKS) in the odd semester is equivalent to 9.75 hours/week, while 16.23 ECTS = 11 credits (SKS) is equivalent to 9.1 hours/week in the even semester. Both follow the calculation of the ECTS conversion standard in the following section. Lecturers with additional tasks get SKS reduction as per the university's rule.

The peers deem the workload to be rather high and in conflict with other aspects such as research, didactical training or further education in general. They also learn that none of the staff members being present during the online audit has used the chance to take a sabbatical during the last five years, although it is possible and desired by the university. Nevertheless, the research and publication volumes seem to be rather high on a national scale. The students and the staff confirm the overall research orientation of the faculty. The peers conclude that it would be desirable to expand the international research and publication share.

> Response: We would like to clarify this statement. Following the performance load rules in Indonesian universities with a minimum 12 credits (SKS) of teaching, 1 credit (SKS) of research and service, the department manages the workload on each lecturer accordingly (https://bkdapp.um.ac.id/). Therefore, the lecturer could perform all roles and responsibilities in each semester. Particularly in 1 credit (SKS) of research and service, lecturers can submit national and international publications, as sampled from this link https://ieeexplore.ieee.org/search/searchresult.jsp?newsearch=true&queryText=siti%20sendari.

There are overall 27 lecturers for both programs. Only two of those are full professors, nine hold a PhD and 16 hold a Master's degree (some of which are still studying), respectively. The SAR indicates a lecturer-student ratio of 1:30. If one was about to indicate the student- professor ratio, it would be 1:405 or 1:74 (involving the PhDs).

> Response:
>
> We would like to clarify that the national standard for the university stated that the maximum lecturer(Professors, Ph.D., and Masters)-student ratio in the science program is 1:60 for a bachelor's degree. The guide can be accessed at BANPT website. Lecturer must have at least a master's degree to teach in a bachelor's degree program; thus, our program ratio meets the SAR ratio of 1:30. The increasing number of professors and PhDs are listed in the university's strategic plan.

Some modules are even defined by master's students who teach in the bachelor's programs. The peers doubt that these assistant professors or master's students are able to design modules with a coherent synergy of contents and teaching methods. As for the general lack of full professors, they

advise the university to ensure that the staff is sufficiently qualified to offer an EQF Level 6 qualification in electrical engineering or electrical engineering education.

> Response: Module development is developed by the related lecturers in their Research Group facilitated by the Curriculum Expert Team from LP3. This group consists of Prof and or PhD and master degree lecturers, including fellow from other universities and industries. The group coordinates the subject contents, and the Head of Study Program organizes the subject contents into the curriculum along with the Head of Curriculum-Based Competency and LP3 Curriculum Experts.

Another critical point the peers notice is the overall lack of English proficiency regarding the staff. As only a small proportion of teachers was capable to communicate in English during the online audit, the peers recommend taking this matter much more seriously with regards to the overall international orientation of electrical engineering.

> Response: Teaching activities will intensify the usage of the English language in the future. Furthermore, there is an ongoing international class in two study programs cooperating with UiTM (Universiti Teknologi Mara Malaysia), which is conducted all in English. There is international student in regular courses that make sure that the lecturer must use English for teaching. The standard certification from ministry of education also required the lecturer able to teach in English. In addition, the faculty has English Camp program for lecturer and English club for Student

Criterion 4.2 Staff development

The peers consider the support mechanisms for the continuing professional development of the teaching staff adequate and sufficient. However, they could learn during the online discussion that measures such as sabbaticals or the international teaching exchange are only used to a limited extent.

> Response: Lecturers can have sabbatical leaves, but the rules' implementation has yet to be appropriately accommodated. The Ministry presents several programs to accommodate sabbaticals, such as competitions, preventing all lecturers from taking their leaves.

Criterion 4.3 Funds and equipment

They, however, learn that some of the instruments are shared with other faculties and are therefore not available at a desirable number. The peers also consider the available equipment in the labs to be of high standards and are convinced that the laboratories adhere to the international safety standards.

> Response: The utilization of shared laboratory facilities is optimally scheduled for users can perform their activities following their needs, such as equipment availability and quality. Essential equipment and materials are completed in the program's laboratory and only used for in-program learning. Shared specific equipment can be accessed following the SOP in each laboratory .

The university has licensed Microsoft Office and other standard software, but does only provide only two MATLAB licenses for the whole department, which is clearly insufficient for an electrical engineering program.

> Response: The total licenses are based on the total laboratories that use MATLAB for research and publication purposes. Our programming learning uses Sci-Lab and Octave. We also, apart from MATLAB, own PSIM with a network license for laboratory learning with multiple computers (20–30 users).

Furthermore, the peers note that the scope of access to important databases remains unclear. For instance, no access is provided to the Institute of Electrical and Electronics Engineers (IEEE) database IEEEXplore or other scientific databases which are required for students to conduct independent research activities.

> Response: We have yet to have access to IEEEXplore. For the time being, we access it through FORTEI Association Forum. Nevertheless, we have access to other databases such as Springer, Wiley, Sciencedirect, Taylor & Francis, and Nature.

5. Transparency and documentation

Criterion 5.1 Module descriptions

However, as already mentioned, some information is missing or insufficient. The learning outcomes are not always skills-based, the types of examination and the prerequisites for individual modules are not always clear, the conversion to ECTS is not consistent (see Criterion 2.2), the applied teaching methods do not always suit the targeted type of proficiencies (see Criteria 1.3 and 2.3). Therefore, the peers ask the university to revise the module handbooks to address the mentioned issues.

> Response: Thank you for the suggestion. As mention before, our response for LO,s ECTS and oral exam were mention in Criteria 1, criteria 2 and criteria 3, respectively. In addition, the handbook content improvement result can be accessed on our website: http://elektro.um.ac.id/program-studi/s1-teknik-elektro/ and http://elektro.um.ac.id/program-studi/s1-pendidikan-teknik-elektro/

Criterion 5.2 Diploma and Diploma Supplement

The diploma supplement contains all necessary information about the degree program. However, it does not include any statistical data to allow readers to categorize the individual result, which must be added in the future.

> Response: Thank you for your suggestion, we will include statistical data on alumni diploma supplement in the future."

F Summary: Peer recommendations (16.11.2021)

Taking into account the additional information and the comments given by Universitas Negeri Malang, 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 accreditaiton
Ba Electrical Engineering	Suspension	/	Suspension for max. 18 months
Ba Electrical Engineering Education	Suspension	/	Suspension for max. 18 months

Prerequisites

For all degree programs

V 1. (ASIIN 1.3) Redesign the programs, especially their scientific focus, to ensure that they adhere to EQF level 6 and that the module concepts follow a clear structure and learning path. Consequently, completely revised module descriptions must be provided.

V 2. (ASIIN 1.3) Complement the existing modules by those being mandatory for addressing all topics in electrical engineering and education programs on EQF level 6.

V 3. (ASIIN 4.1) Provide more teaching staff with advanced academic qualifications (above Master degree) and research records.

V 4. (ASIIN 3) Exams and theses must be redesigned so that they evidence the achievement of learning outcomes corresponding to EQF level 6.

Requirements

For all degree programs

A 1. (ASIIN 1.2, 1.3) Make sure and evidence that the name of the degree program, its intended learning outcomes and its content correspond with each other.

A 2. (ASIIN 1.3, 2.1, 3, 5.2) Revise the module descriptions to ensure they clearly reflect the content taught and that they describe the learning outcomes in terms of competencies acquired.

A 3. (ASIIN 2.2) Ensure that the conversion from SKS to ECTS is correct for all modules and the overall workload.

A 4. (ASIIN 4.3) Ensure access to necessary software and literature resources.

A 5. (ASIIN 5.2) The Diploma Supplement must include statistical data as set forth in the ECTS User's Guide.

Recommendations

For all degree programs

E 1. (ASIIN 1.3; 2.1; 4.2) It is recommended to increase the use of English both within the curricula and among teaching staff.

E 2. (ASIIN 5.1) It is recommended to publish the module handbooks on the website in both Bahasa Indonesia and English.

G Comment of the Technical Committee 02 – Electrical Engineering/Information Technology (22.11.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the decision of the peer group without any changes.

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

Degree Programme	ASIIN Seal	Subject-specific label	Maximum duration of accreditation
Ba Electrical Engineering	Suspension	–	Suspension for max. 18 months
Ba Electrical Engineering Education	Suspension	–	Suspension for max. 18 months

Prerequisites

For all degree programs

V 1. (ASIIN 1.3) Redesign the programs, especially their scientific focus, to ensure that they adhere to EQF level 6 and that the module concepts follow a clear structure and learning path. Consequently, completely revised module descriptions must be provided.

V 2. (ASIIN 1.3) Complement the existing modules by those being mandatory for addressing all topics in electrical engineering and education programs on EQF level 6.

V 3. (ASIIN 4.1) Provide more teaching staff with advanced academic qualifications (above Master degree) and research records.

V 4. (ASIIN 3) Exams and theses must be redesigned so that they evidence the achievement of learning outcomes corresponding to EQF level 6.

Requirements

For all degree programs

A 1. (ASIIN 1.2, 1.3) Make sure and evidence that the name of the degree program, its intended learning outcomes and its content correspond with each other.

A 2. (ASIIN 1.3, 2.1, 3, 5.2) Revise the module descriptions to ensure they clearly reflect the content taught and that they describe the learning outcomes in terms of competencies acquired.

A 3. (ASIIN 2.2) Ensure that the conversion from SKS to ECTS is correct for all modules and the overall workload.

A 4. (ASIIN 4.3) Ensure access to necessary software and literature resources.

A 5. (ASIIN 5.2) The Diploma Supplement must include statistical data as set forth in the ECTS User's Guide.

Recommendations

For all degree programs

E 1. (ASIIN 1.3; 2.1; 4.2) It is recommended to increase the use of English both within the curricula and among teaching staff.

E 2. (ASIIN 5.1) It is recommended to publish the module handbooks on the website in both Bahasa Indonesia and English.

H Decision of the Accreditation Commission (07.12.2021)

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

The Accreditation Committee discusses the procedure and follows the decision of the peer group and the Technical Committee without any changes. The Accreditation Commission is convinced that the deficiencies are too serious in order to be remedy them within a year, which is the regular timeframe for the fulfilment of requirements. Thus, the Commission is convinced that suspending the procedure is helps the university to focus more intensively on the deficiencies and the redesigning of the two programs. By suspending the procedure, the university gets six more months to do so.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Subject-specific label	Maximum duration of accreditation
Ba Electrical Engineering	Suspension	–	Suspension for max. 18 months
Ba Electrical Engineering Education	Suspension	–	Suspension for max. 18 months

Prerequisites

For all degree programs

V 1. (ASIIN 1.3) Redesign the programs, especially their scientific focus, to ensure that they adhere to EQF level 6 and that the module concepts follow a clear structure and learning path. Consequently, completely revised module descriptions must be provided.

V 2. (ASIIN 1.3) Complement the existing modules by those being mandatory for addressing all topics in electrical engineering and education programs on EQF level 6.

V 3. (ASIIN 4.1) Provide more teaching staff with advanced academic qualifications (above Master degree) and research records.

V 4. (ASIIN 3) Exams and theses must be redesigned so that they evidence the achievement of learning outcomes corresponding to EQF level 6.

Requirements

For all degree programs

A 1. (ASIIN 1.2, 1.3) Make sure and evidence that the name of the degree program, its intended learning outcomes and its content correspond with each other.

A 2. (ASIIN 1.3, 2.1, 3, 5.2) Revise the module descriptions to ensure they clearly reflect the content taught and that they describe the learning outcomes in terms of competencies acquired.

A 3. (ASIIN 2.2) Ensure that the conversion from SKS to ECTS is correct for all modules and the overall workload.

A 4. (ASIIN 4.3) Ensure access to necessary software and literature resources.

A 5. (ASIIN 5.2) The Diploma Supplement must include statistical data as set forth in the ECTS User's Guide.

Recommendations

For all degree programs

E 1. (ASIIN 1.3; 2.1; 4.2) It is recommended to increase the use of English both within the curricula and among teaching staff.

E 2. (ASIIN 5.1) It is recommended to publish the module handbooks on the website in both Bahasa Indonesia and English.

Appendix: Program Learning Outcomes and Curricula

According to the self-assessment report the following **learning outcomes (intended qualifications profile)** shall be achieved by the Electrical Engineering program:

Code	Competences
LO1	Graduates are able to master the theoretical concepts, science, and principles of engineering to gain a thorough understanding of the **basic principles of power systems and control systems** through logical, critical, systematic, and innovative thinking by internalizing academic values, norms, and ethics.
LO2	Graduates are able to operate and analyze the **basic components and series in power systems or control systems** while **upholding human values** in carrying out tasks based on religion, morality, and ethics.
LO3	Graduates are able to design and develop processes and systems for the **optimization of power systems or control systems** so that they can contribute to the improvement of the quality of life in society, nation, and state, and to the advancement of civilization based on Pancasila.
LO4	Graduates are able to carry out **repair and maintenance of the equipment in power systems or control systems** while showing responsibility for work in their fields of expertise independently.
LO5	Graduates are able to demonstrate **technopreneurship** to solve problems related to power systems or control systems by internalizing the spirit of independence, struggle, and entrepreneurship.
LO6	Graduates have responsive **sosiotechno spirit and management** related to power systems or control systems and are able to work together and show social sensitivity to and concern for society and the environment
LO7	Graduates possess the knowledge and skills to exhibit behavior as religious citizens who appreciate the state, nation, and culture of Indonesia based on the spirit of Pancasila and to demonstrate independence at work in an innovative, adaptive, and critical manner according to global dynamics.

The following **curriculum** is presented:

Semester 1

No	Kode	*Course Name*	SKS	JS
1		*Religious Education*	3	3
	UNIVUM6001 UNIVUM6002 UNIVUM6003 UNIVUM6004 UNIVUM6005	*Islamic religious education* *Catholic religious education* *Christian religious education* *Hindu Religion Education* *Buddhist Religious Education*		
2	FTEKUM6001	*English for Professional Purposes*	2	2
3	NTROUM6001	*Calculus I*	3	3
4	NTROUM6002	*Electrical Physics*	3	3
5	NTROUM6003	*Electrical Chemistry*	2	2
6	NTROUM6004	*Electrical Engineering Introduction*	3	3
7	NTROUM6005	*Electrical Measurement*	2	2
8	NTROUM6006	*Electrical Circuit I*	2	2
9	NTROUM6007	*Basic Lab Works 1* *a) Electrical Measurement* *b) Electrical Circuit I*	1	2
		TOTAL	21	22

Semester 2

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6007	*Pancasila Education*	2	2
2	NTROUM6008	*Scientific Writing*	2	2
3	NTROUM6009	*Calculus II*	2	2
4	NTROUM6010	*Mechanical Physics*	2	2
5	NTROUM6011	*Analog Electronics I*	2	2
6	NTROUM6012	*Electrical Circuit II*	2	2
7	NTROUM6013	*Digital Electronics*	2	2
8	NTROUM6014	*Algorithm and Computer Programming*	3	3
9	NTROUM6015	*Probability and Statistics*	2	2
10	NTROUM6016	*Basic Lab Works 2* *a) Analog Electronics I* *b) Electrical Circuit II*	1	2
11	NTROUM6017	*Basic Lab Works 3* *a) Digital Electronics* *b) Computer Programming*	1	2
		TOTAL	21	23

Semester 3

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6009	*Indonesia Language Education*	2	2
2	FTEKUM6003	*Occupational Health and Safety*	2	2
3	NTROUM6018	*Engineering Mathematics I*	3	3
4	NTROUM6019	*Sensors and Trandusers*	2	2

5	NTROUM6020	*Microcontroller*	2	2
6	NTROUM6021	*Analog Electronics II*	2	2
7	NTROUM6022	*Linear System*	2	2
8	NTROUM6023	*Numerical Method*	2	2
9	NTROUM6024	*Stochastic and Random Variables*	2	2
10	NTROUM6025	*Basic Lab Works 4* *a) Sensors and Trandusers* *b) Microcontroller*	1	2
11	NTROUM6026	*Basic Lab Works 5* *a) Analog Electronics II* *b) Linear System*	1	2
		TOTAL	**21**	**23**

Semester 4

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6008	*Civic education*	2	2
2	NTROUM6027	*Engineering Mathematics II*	3	3
3	NTROUM6028	*Intelligent System*	3	3
4	NTROUM6029	*Electromagnetic Fields*	3	3
5	NTROUM6030	*Signal Processing*	2	2
6	NTROUM6031	*Electrical Energy Conversion*	3	3
7	NTROUM6032	*Continuous Control System*	3	3
8	NTROUM6033	*Basic Lab Works 6* *a) Electrical Energy Conversion* *b) Continuous Control System*	1	2
		TOTAL	**20**	**21**

Semester 5

a. Power System Specialization

No	Kode	*Course Name*	SKS	JS
1	FTEKUM6002	*Research Methodology*	2	2
2	FTEKUM6004	*Entrepreneurship*	2	2
3	NTROUM6041	*Electric Machines*	3	3
4	NTROUM6042	*Power Generation System*	2	2
5	NTROUM6043	*Power System Analysis*	3	3
6	NTROUM6044	*Transmission and Distribution*	3	3
7	NTROUM6045	*Power Electronics*	3	3
8	NTROUM6046	*Advanced Lab Works A1* *a) Electric Machines* *b) Power Generation System*	1	2
9	NTROUM6047	*Advanced Lab Works A2* *a) Power System Analysis* *b) Transmission and Distribution*	1	2
		Total Semester V: Power System Specialization	20	22

b. Control System Specialization

No	Kode	*Course Name*	SKS	JS
1	FTEKUM6002	*Research Methodology*	2	2
2	FTEKUM6004	*Entrepreneurship*	2	2
3	NTROUM6061	*Industrial Control Systems*	3	3
4	NTROUM6062	*Industrial Instrumentation*	3	3
5	NTROUM6063	*System Interfaces*	3	3
6	NTROUM6064	*Robotics I*	3	3
7	NTROUM6065	*Machine Learning*	2	2
8	NTROUM6066	*Advanced Lab Works B1*	1	2
		a) Industrial Control Systems		
		b) Industrial Instrumentation		
9	NTROUM6067	*Advanced Lab Works B2*	1	2
		a) Intelligent System		
		b) System Interfaces		
Total Semester V: Keahlian Sistem Kendali			20	22

Semester 6

a. Power System Specialization

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6010	*Innovation Management*	3	3
2	UKKNUM6090	*Community Service Program*	4	8
3	NTROUM6049	*High Voltage and Insulation*	3	3
4	NTROUM6048	*Grounding and Protection System*	2	2
5	NTROUM6050	*Operation and System Stability*	3	3
6	NTROUM6051	*Modern Power System*	2	2
7	NTROUM6052	*Advanced Lab Works A3*	1	2
		a) High Voltage and Insulation		
		b) Grounding and Protection		
Total Semester VI: Keahlian Sistem Tenaga Listrik			18	23

b. Control System Specialization

No	Kode	*Course Name*	SKS	JS
1	UNIV6010	*Innovation Management*	3	3
2	UKKN6090	*Community Service Program*	4	8
3	NTROUM6068	*Robotics II*	3	3
4	NTROUM6069	*Optimal Control Systems*	2	2
5	NTROUM6070	*Image Processing*	3	3
6	NTROUM6071	*Medical Electronics*	2	2
7	NTROUM6072	*Advanced Lab Works B3*	1	2
		a) Robotics		
		b) Optimal Control Systems		
Total Semester VI: Keahlian Sistem Kendali			18	23

Semester 7

No	Kode	*Course Name*	SKS	JS
1	NTROUM6034	*Industrial Management*	2	2
2	NTROUM6035	*Sociotechnology*	2	2
3	NTROUM6090	*Industrial Apprentice*	4	4
4		*Optional Subject I*	3	3
5		*Optional Subject II*	3	3
TOTAL			14	14

Semester 8

No	Kode	*Course Name*	SKS	JS
1	NTROUM6036	*Professional ethics*	2	2
2	NTROUM6100	*Undergraduate Thesis*	6	6
3		*Optional Subject III*	3	3
TOTAL			11	11

According to the self-assessment report the following **learning outcomes (intended qualifications profile)** shall be achieved by the Electrical Engineering Education program:

Code	Competences
LO1	Graduates are able to master the concept of Electric Power Generation to design, build, maintain, repair, and evaluate power generation systems honestly while internalizing academic norms and values and showing responsibility, hence able to contribute to the improvement of the quality of people's lives.
LO2	Graduates understand the concepts and principles of Electric Power Transmission and Distribution in order to be skilled at designing, installing, maintaining, repairing, and evaluating Electric Power Transmission and Distribution systems while upholding human values based on religion, morality, and ethics and respecting the diversity in opinions.
LO3	Graduates understand the concepts and principles of Electric Power Utilization in order to be skilled at designing, assembling, testing, maintaining, repairing, and evaluating Electric Power Utilization systems honestly, patiently, compliantly with disciplined laws, and cooperatively and with social sensitivity to and concern for society using logical, critical, systematic, and innovative thinking in the utilization of electric power.
LO4	Graduates understand the concepts and principles of Industrial Automation in order to be skilled at designing, assembling, testing, maintaining, repairing, and evaluating Industrial Automation systems honestly while upholding human values and showing responsibility for improving the quality of people's lives by developing or implementing science and technology.
LO5	Graduates understand pedagogic concepts and principles in order to be skilled at designing, implementing, and evaluating learning activities about (a) education and learning, (b) student development, (c) curriculum, (d) learning resources, (e) learning planning, (f) learning implementation, and (g) learning quality improvement through CAR by internalizing values, norms, and academic ethics, showing a high degree of nationalism, and respecting the diversity in cultures, views, religions, and beliefs.

LO6	Master the basic concepts and application of mathematics, basic electricity, electronics, and measurement to design, build, and evaluate electricity systems honestly by internalizing norms and academic values and showing responsibility, hence able to contribute to the improvement of the quality of people's lives.
LO7	Master the concept of industrial electronics to design, build, maintain, repair, and evaluate industrial electronic systems honestly by internalizing norms and academic values and showing responsibility, hence able to contribute to the improvement of the quality of people's lives.
LO8	Master the concept of mechatronics to design, build, maintain, repair, and evaluate mechatronic systems honestly by internalizing academic norms and values and showing responsibility, hence able to contribute to the improvement of the quality of people's lives.
LO9	Understand the concepts and principles of research and development in order to be skilled at designing, implementing, and evaluating research and development activities in the fields of (a) descriptive-quantitative research, (b) qualitative research, (c) development research, (d) evaluation research, and (e) classroom action research with honesty, humbleness, diligence, thoroughness, patience, and responsibility for work in their fields of expertise independently while respecting the diversity in views as well as in other people's original opinions or findings in making the right decisions in the context of problem-solving in the field of electrical engineering based on the results of information and data analysis.
LO10	Understand the basics of personality and entrepreneurial knowledge, so that they are skilled at designing, implementing, evaluating, and creating business activities in the form of technical & management assistance as well as products and services in the field of electrical engineering to serve the needs of society and schooling with religiousness, honesty, humbleness, and patience by internalizing academic values, norms, and ethics and by maintaining and developing networks with mentors, colleagues, and peers both inside and outside the institution.
LO11	Graduates possess the knowledge and skills to exhibit behavior as religious citizens who appreciate the state, nation, and culture of Indonesia based on the spirit of Pancasila and to demonstrate independence at work in an innovative, adaptive, and critical manner according to global dynamics.

The following **curriculum** is presented:

1st Semester

No	Kode	*Course Name*	SKS	JS
1		*Religious Education*	3	3
	UNIVUM6001 UNIVUM6002 UNIVUM6003 UNIVUM6004 UNIVUM6005	*Islamic religious education* *Catholic religious education* *Christian religious education* *Hindu Religion Education* *Buddhist Religious Education*		
2	UNIVUM6012	*Development of Student*	3	3
3	FTEKUM6001	*English for Professional Purposes*	2	2
4	PTELUM6001	*Electric Drawing*	2	2
5	PTELUM6002	*Electrical Physic*	2	2
6	PTELUM6003	*Mathematic I*	2	2
7	PTELUM6004	*Electrical Measurement*	3	4
8	PTELUM6005	*DC Electric Circuit*	3	4
		TOTAL	**20**	**22**

2nd Semester

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6007	*Pancasila Education*	2	2
2	UNIVUM6011	*Introduction of Teaching*	2	2
3	PTELUM6006	*Computer Programming*	3	4
4	PTELUM6007	*Analog Electronic*	3	4
5	PTELUM6008	*Mathematic II*	2	2
6	PTELUM6009	*Digital Electronic*	3	4
7	PTELUM6010	*AC Electric Circuit*	3	4
8	PTELUM6011	**Computation and Numeric System*	2	2
		TOTAL	**20**	**24**

3rd Semester

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6013	*Teaching and Learning*	3	3
2	UNIVUM6009	*Indonesian*	2	2
3	FTEKUM6003	*Occupational Health and Safety*	2	2
4	PTELUM6012	*Microprocessor*	3	4
5	PTELUM6013	*Sensor and Transducer*	3	4
6	PTELUM6014	*Electromagnetic*	2	2
7	PTELUM6015	**Telecommunication*	2	2
8	PTELUM6016	*Electrical Installation*	3	4
		TOTAL	**20**	**23**

4th Semester

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6008	*Civic*	2	2
2	PTELUM6017	*Electric Machinary*	3	4

3	PTELUM6018	**Signal Processing*	2	2
4	PTELUM6019	*Learning Resources*	2	2
5	PTELUM6020	*Evaluation of Learning*	3	3
6	PTELUM6021	*Power Electronic*	3	4
7	PTELUM6022	*Control System*	2	2
8	PTELUM6023	**Industrial Automation*	3	4
		TOTAL	**20**	**23**

5th Semester

No	Kode	*Course Name*	SKS	JS
1	PTELUM6024	*Instructional Design*	3	3
2	PTELUM6025	**Analysis of Electric Power System*	3	3
3	PTELUM6026	*Vocational Education*	3	3
4	PTELUM6027	*Electric Power Generation*	3	4
5	PTELUM6028	**Transmission and Distribution System*	3	4
6	FTEKUM6004	*Entrepreneurship*	2	2
7		*Elective Course Study Program / Transdisciplinary*	2	2
8		*Elective Course Study Program / Transdisciplinary*	2	2
		TOTAL	**21**	**23**

6th Semester

No	Kode	*Course Name*	SKS	JS
1	UNIVUM6010	*Management of Innovation*	3	3
2	PTELUM6030	**High Voltage and Isolation*	3	3
3	PTELUM6031	**Intelligent System*	2	2
4	PTELUM6032	*Micro Teaching*	3	3
5	FTEKUM6002	*Research Methodology*	2	2
6	PTELUM6033	*Statistic*	2	2
7		*Elective Course Study Program / Transdisciplinary*	2	2
8		*Elective Course Study Program / Transdisciplinary*	2	2
		TOTAL	**19**	**19**

7th Semester

No	Kode	*Course Name*	SKS	JS
1	PTELUM6090	*Industrial Practice*	4	12
2	UPLPUM6090	*School Teaching Practice*	4	12
3		*Elective Course Study Program / Transdisciplinary*	2	2
4		*Elective Course Study Program / Transdisciplinary*	2	2
5		*Elective Course Study Program / Transdisciplinary*	2	2

6		*Elective Course Study Program / Transdisciplinary*	2	2
		TOTAL	**16**	**32**

8th Semester

No	Kode	*Course Name*	SKS	JS
1	PTELUM6100	*Thesis*	6	12
2	UKKNUM6090	*Community Service Program*	4	16
		TOTAL	**10**	**28**