ASIIN Seal & EUR-ACE Seal

Accreditation Report

Bachelor's Degree Programme

Power Engineering, Automation and Renewable Energy Sources
Power Systems
Power Engineering and Management

Provided by
Ss. Cyril and Methodius University in Skopje – Faculty of Electrical Engineering and Information Technologies

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A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Електроенергетика, автоматизација и обновливи извори на енергија	Power Engineering, Automation and Renewable Energy Sources	ASIIN, EUR-ACE®	/	TC 02
Електроенергетски системи	Power Systems	ASIIN, EUR-ACE®	/	TC 02
Електроенергетика, управување и менаџмент	Power Engineering and Management	ASIIN, EUR-ACE®	/	TC 02
Date of the contract: 09.04.2021 **Submission of the final version of the self-assessment report:** 22.04.2021 **Date of the onsite visit:** 12-14. July 2021 **at:** Faculty of Electrical Engineering and Information Technologies (FEEIT)				
Peer panel: Prof. Dr. Ralph Kennel, Technical University of Munich Prof. Dr. Mario Pacas, University of Siegen Prof. Dr. Alfons Kloenne, Karlsruhe University of Applied Sciences Dr. Risto Janevski, OKTA AD SKOPJE Goran Veljanovski, St. Clement of Ohrid University of Bitola				

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes
[2] Technical Committee 02 - Electrical Engineering/Information Technology.

Representative of the ASIIN headquarter: Dr. Iring Wasser, Managing Director	
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 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of December 9, 2011	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Undergraduate Degree Programme Power Engineering, Automation and Renewable Energy Sources (PEARES)	Bachelor of Science in Electrical Engineering and Information Technologies, in Power Engineering, Automation and Renewable Energy, B.Sc.	- **Power engineering:** design and development of power devices and processes, electro-mechanical, electro-thermical and electro-traction systems; efficiency and reliable industry/haushold energy; - **Automation:** design and process automatisation; automated control of electric drives, power converters and their control; - **Renewable Energy Sources:** utilization of different types of renewable energy sources; design of autonomous and grid-connected renewable power systems.	Level 6	Full time	No	8 Semesters	240 ECTS	Fall Semester each academic year, 15.09.2012
Undergraduate Degree Programme Power Systems (PS)	Bachelor of Science in Electrical Engineering and Information Technologies, in Power Systems, B.Sc.	- **Power Systems:** Development, analysis, control and management of power systems; electricity transmission, distribution and supply; design of overhead transmission lines and cables, electrical installations and lighting; smart grids and integrating renewable energy sources; high voltage engineering; solving problems related to power quality; basic concepts of economics and investment analyzes, as well as electricity market management and power regulation.	Level 6	Full time	No	8 Semesters	240 ECTS	Fall Semester each academic year, 15.09.2012
Undergraduate Degree Programme Power Engineering and Management (PEM)	Bachelor of Science in Electrical Engineering and Information Technologies, in Power Engineering and Management, B.Sc.	- **Power Engineering:** Proficiency in the techniques of planning, design, protection, automation and control of electric power facilities; energy efficiency, new technologies, environment and renewable sources. - **Management:** Acquisition of managerial skills and techniques of project management in power engineering.	Level 6	Full time	No	8 Semesters	240 ECTS	Fall Semester each academic year, 15.09.2012

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

The Faculty of Electrical Engineering and Information Technologies at SS. Cyril and Methodius University in Skopje in its Self-Assessment Report presents a brief history of the Faculty and the Power Engineering cluster under review. The programmes accordingly can look back on a long tradition dating back to the establishment of the Technical Faculty and the Department of Electro-Mechanical Engineering in 1959. This founding of the Faculty was a response to the countries need for engineers and especially power engineers, as power plants and the electric power systems had to be constructed. In 1973, the Faculty became an independent unit of the University in Skopje and in the following decades, the original study programme was further developed into four different degree programmes in Power Engineering, Industrial Power Engineering and Automation, Computer Technology and Automation and Electronics and Telecommunications in line with technological developments. In 2006, the Faculty changed its name into Faculty of Electrical Engineering and Information Technologies (FEEIT). The last significant updating and restructuring of the study programmes and degree programmes took place in 2012, in the framework of which the present three Bachelor degree programmes **PEARES** – Power Engineering, Automation and Renewable Energy Sources, **PS** – Power Systems and **PEM** – Power Engineering and Management emerged.

Regarding the profile of these three Bachelor programmes, the Self-Assessment Report provided by the Faculty to the ASIIN panel gives the following background information:

The ***Bachelor programme in Power Engineering, Automation and Renewable Energy Sources (PEARES)*** (https://feit.ukim.edu.mk/en/power-engineering-automation-and-renewable-energy-sources/) has accordingly been designed in the tradition of studying power engineering at the Faculty of Electrical Engineering and Information Technologies taking into account the new trends in renewable energy sources and power efficiency. The main fields that are covered in this degree programme are power engineering, automation

in power engineering processes of energy conversion, electric drives, electric transport, electrical and thermal processes and implementation of renewable energy sources. The degree programme is preparing its future graduates for the emerging scientific and technological processes in the utilisation of electricity with increased efficiency, reduction of losses in the overall system and savings of electricity fostering sustainable energy development in the society. The programme emphasizes the application of new technologies in the design, design and construction of power devices, electrical machines and electric drives. The PEARES degree programme trains its graduates to be highly qualified engineers with competencies and ability to design, model, technical maintenance and analysis of power devices (generators and motors for alternating current and direct current, transformers, small and special electrical machines, energy converters, low voltage devices and appliances). Graduate engineers will be competent for research, development, design, application, installation and operation of electromechanical and electro-thermal conversion plants.

The ***Bachleor degree programme in Power Systems (PS)*** (https://feit.ukim.edu.mk/en/power-systems/) empowers it graduates to be knowleadgable in power networks and systems their exploitation, management, control and planning, as well as the electricity market, high voltage engineering, power quality, low voltage electrical installations and lighting, smart grids and other related topics. Furthermore graduates will be acquainted with overhead lines and cables, computer methods for analyses of power systems, power plants and substations, groundings and grounding systems in power networks, power systems control and dispatching, reliability of power systems, fundamentals of renewable energy sources and power systems planning. This degree programme according to the SAR is preparing its graduates for the emerging scientific and technological processes

in companies that are responsible for transmission, distribution, trade and supply of electrical energy, as well as in production companies, companies that deal with design and realisation of power facilities and plants.

The ***Bachelor degree programme of Power Engineering and Management (PEM)*** (https://feit.ukim.edu.mk/en/power-engineering-and-management/) is described as a continuation of traditional power engineering following the technologies' innovations in electric power industry and business. The programme has been established as a response to the growing need of the power industry for such a profile of engineers, integration of new information and communication technologies in the knowledge and awareness of skills needed for project management and creating a successful business in the complex project environment that the engineer faces today. It is the objective of the Power Engineering and Management degree programme to produce a new and modern electrical engineer with solid theoretical knowledge in the basic areas of power engineering (electricity generation, power plants and substations) as well as good practical perspectives and skills in mastering engineering tasks. With the acquired competencies, the program enables graduates to face the energy challenges in the new technological and economic environment. In addition to the conventional and fundamental part of energy sector, this degree programme also covers modern aspects of power engineering such as respect for environmental aspects, energy efficiency measures, quality and competitive advantage in a market economy, requires study and energy technology solutions, sophisticated computer-based management and relevant analysis.

C Peer report for the ASIIN-Seal[4]

1. The degree programme: concept, content & implementation

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

Evidence:

- **UDS-1** – University Senate Decision 02-122/22 for PEARES (In the accreditation documents of the degree programme)
- **UDS-2** – University Senate Decision 02-122/17 for PS (In the accreditation documents of the degree programme)
- **UDS-3** – University Senate Decision 02-122/16 for PEM (In the accreditation documents of the degree programme)
- **AEB-DS-1** – Accreditation and Evaluation Board Decision 17-51/2 for PEARES (https://feit.ukim.edu.mk/wp-content/uploads/2019/12/reshenie-za-akreditacija-na-sp-prv-ciklus-elektroenergetika-avtomatizacija-i-obnovlivi-izvori-na-energija.pdf)
- **AEB-DS-2** – Accreditation and Evaluation Board Decision 17-51/3 for PS (https://feit.ukim.edu.mk/wp-content/uploads/2019/12/reshenie-za-akreditacija-na-sp-prv-ciklus-elektroenergetski-sistemi.pdf)
- **AEB-DS-3** – Accreditation and Evaluation Board Decision 17-51/4 for PEM (https://feit.ukim.edu.mk/wp-content/uploads/2019/12/reshenie-za-akreditacija-na-sp-prv-ciklus-elektroenergetika-upravuvanje-i-menadzhment.pdf)

Preliminary assessment and analysis of the peers:

The curricula and their connotated learning outcomes and competence profiles for the **Power Engineering, Automation and Renewable Energy Sources** (PEARES), **the Power Systems** (PS) as well as the Power **Engineering and Management** (PEM) degree programmes have been developed and decided in 2016-2017 at the beginning of the new 5-year programme cycle. They are valid until 2022, when the new accreditation cycle with a five year validity starts.

The process of defining the curricula and their corresponding learning outcomes for the three Bachelor programmes have been following a routine procedure. They have been elaborated and proposed by members of the responsible Institutes of the FEEIT and subsequently discussed and decided upon in meetings of the Faculties Teaching-Scientific Council Members in which all professors working at the Faculty of Electrical Engineering and Information Technologies in Skopje as well as five student members are represented. On the 21.12.2016 the corresponding initiation decisions (No. 02-2525/35, 02-2525/36, 02-2525/37) were taken for the three programmes under review. Afterwards the Commission for Cooperation and Public Trust at FEEIT, in which companies operating in the power engineering field are assembled, endorsed their initiation, followed by a positive vote of the University Senate on 31.01.2017 (Decision No. 02-122/16, 02-122/17, 02-122/22) and finally by the approval of the Ministry of Education. Regarding the participation of students in this process, the Faculty representative emphasize that graduate students and students from the fourth year were consulted in the preparatory phase.

In a collaborative effort, the FEEIT has thus defined common General Learning Outcomes for all three programs under review while extensively correlating them with the Subject Specific Supplemantory Criteria (SSC) for Electrical Engineering and Information Technology (EEIT) of ASIIN. In its own SWOT analysis, the Faculty has identified some differences especially in terms of economic and social requirements of the SSC and note that all three degree programmes may lack further mandatory modules that cover the social, entrepreneurship, project and business management aspects as there are currently few modules at the Faculty that focus particularly on these aspects. The are altogether seven on offer, namely Economic Assessment of Investments, Communication Skills, Entrepreneurship, Principles of Quality Management, Project Management and Ethics in Engineering, Regulation in Electricity Sector and Technological Innovations, of which students are mandated to take two modules during their studies.

In its own critical self-reflection the Faculty further notes, that the General and Specific Learning Outcomes of the three degree programmes can be further improved, avoiding repetitions between General and Specific Learning Outcomes, and defining more targeted Specific Learning Outcomes. It announces to address these issues in the upcoming national re-accreditation cycle starting in the second half of 2021, taking the findings of the ASIIN panel into account in this process.

According to the Faculty's own account, the learning outcomes for all three Bachelor programmes under review have been verified through positive feedback on the part of graduates and employers regarding the skill and knowledge level acquired as well as the graduates ability to adopt in the new working environment.

The intended competence profiles have been aligned to the specific areas of the profession. All three degree programmes provide general competences in Electrical and Power Engineering. In addition, specific competence profiles in the respective specialization areas of Power engineering, Automation and Renewable energy sources, Power Systems and Power Engineering and Management have been anchored in the curricula. The competences profiles are published in the respective Faculty booklets and Student guides. They are also published on the web site of the Faculty.

In terms of acceptance of the three Bachelor programs under review, the Faculty argues that they are well recognised on the labour market. The most important power companies and main stakeholders, e.g. the ESM-Power plants of North Macedonia, MEPSO-Macedonian power transmission system operator, and EVN-company for distribution of electricity, show their appreciation of the programmes by providing stipends to the best students studying in the three power engineering degree programmes. A considerable number of companies in power electric industry services and business show their esteem by providing internship through the Faculty Career Centre. Some companies are reported to specifically ask for graduated engineers from the Faculty of Electrical Engineering and Information Technologies in Skopje when recruiting new personnel.

The ASIIN panel finds that the objectives and learning outcomes of the three Bachelor programmes under review have been adequately described and developed by a consultative effort involving the most important stakeholders including students. They are published in official documents of the Faulty as well as on the website and are thus easily accessible to all interested parties.

The panel notes that there are currently no systematic tracer studies in place (see criterion 6), but the discussions of the panel with industry representatives and former alumni has provided conclusive evidence, that graduates of the three programmes under review are sought after by the North Macedonian labour market. In some instances, students are recruited even before they are graduating.

As the current programmes are finishing their 5 year “life cycle” and are up for national accreditation, the Faculty is devoted to taking the findings of the prior ASIIN international review into account. The panel agrees with the specified learning outcomes and confirms that they reflect the Bachelor level (level 6 of the European Qualification Framework). The panel however argues that these learning outcomes must be underpinned by corresponding curricula which in its view have to be modernized and adapted in a number of ways further described under different sections/criteria of this report. This applies especially to the Bachelor programme in Power Engineering, Automation and Renewable Energy, in which the defined learning outcomes particularly in the areas of automoation and to a

lesser degree in renewable energies are not sufficiently backed up by curricular content. The same finding applies to the Bachelor programme in Power Engineering and Management where the defined learning outcomes of the "management part" need to be further substantiated by providing additional modules in that area.

Criterion 1.2 Name of the degree programme

Evidence

- **AD-1** – Accreditation documents for PEARES,
- **AD-2** – Accreditation documents for PS,
- **AD-3** – Accreditation documents for PEM.
- **LHE** – Law on Higher Education (https://feit.ukim.edu.mk/wp-content/uploads/2021/02/zakon-za-visokoto-obrazovanie.pdf).

Preliminary assessment and analysis of the peers:
The name of all three Bachelor degree programme and the curricula of all modules have been discussed and passed at a meeting of the Faculty Teaching-Scientific Council and approved at the beginning of the last accreditation cycle starting in 2017.

The Faculty representatives argue that the name "Power Engineering, Automation and Renewable Energy Sources" (PEARES) has been selected to reflect the main fields covered by the curricula in this particular degree programme. These are power engineering, automation in power engineering processes of energy conversion, electric drives, electric transport, electrical and thermal processes and implementation of renewable energy sources.

Similarly, the name Power Systems (PS) builds on the long tradition of studying power engineering in the field of power systems. The programme seeks to convey expertise in the area of power networks and systems their exploitation, management, control and planning, as well as the electricity market, high voltage engineering, power quality, low voltage electrical installations and lighting, smart grids and other related topics.

Finally, the name Power Engineering and Management (PEM) has been identified to signal the integration of new information and communication technologies and awareness of skills needed for project management and creating a successful business in the complex project environment that the power engineer faces today.

The Faculty claims that so far there are no known cases where students or employers misunderstood the name of the cluster or the name of the degree programme.

The official language for all degree programmes is Macedonian, as it is stated in the Law on Higher Education (Record of **LHE**) and in the accreditation documentation (Record of **AD-1**, **AD-2** and **AD-3**). Also in the module description, it is stated that the working language is Macedonian. If foreign students are attending classes, teacher theoretically are entitled to deliver the lectures in English, but this case thus far has not materialized.

In considering this criterion, the panel takes as a starting point, that according to the ASIIN standards there has to be a clear alignment between the name of the programs and its content.

Regarding the **BA program in power engineering**, the ASIIN panel agrees with the title and confirms that this study program qualifies as a typical, well-substantiated power engineering programme.

In the case of the **BA program in power engineering and management** the panel is of the opinon that the management part of the curriculum is not substantial enough to justify the name of the programme. It observes that students might graduate from this programme without having taken any or only very few courses in the area of management. In the discussions, the questions comes up, whether this is a problem of translation in the sense that management is meant in the very narrow sense of project management or the running of power plants. The ASIIN panel points to the possibilities of upgrading and modernizing the profile, by including topics such as economics of energy, tariff policies, controlling and many other topics. With the current programme structure, the title in their view is not justified.

Concerning the **BA program in power engineering, automation and renewable energies**, a similar verdict is reached. Looking at the curriculum and after discussions with the programme representatives, the panel concludes that especially the “automation part” needs to be further substantiated to justify the title of the program and in order not to generate false expectations on the part of stakeholders (students, employers). The same applies to a lesser degree also for the renewable engineering part. The number of modules in renewable energy and their content are not sufficient to make a selection of subjects that justifies the title.

Criterion 1.3 Curriculum

Evidence:

- Module descriptions for alle three study programs containing the content and learning outcomes of each modules.

- Objective-module-matrices for the PEARES, PS and PEM degree programmes respectively.

Preliminary assessment and analysis of the peers:
The Faculty presents comprehensive module handbooks, which contain most of the essential information as required by the ASIIN general critieria (see criterion 5.1 in this report for more information).

All curricula of the Power engineering cluser and their constituting modules build on the tradition of previously accredited power engineering programmes at FEEIT, present tendencies in similar power engineering programmes in Europe, as well as on the experience of the teaching staff. They share a core of joint modules in mathematics, natural sciences and engineering. In particular, the joint core contains the following two groups of modules: **Fundamental mathematics and physics modules**, providing broad and sound knowledge in mathematics and physics, spread across the first four semesters. **Fundamental core electrical engineering modules** enabling broad electrical engineering and information technologies knowledge, spread across the first five semesters, including modules from power engineering, electronics, telecommunications, computer engineering, automation and control systems.

Each module has defined competences that contribute to the competences of the degree programmes. The core modules for each degree programme contain the general competences that are defined for the degree programme, on the other hand the elective modules present the additional competences in the study area in general, as well as some specific competences in the sub-area of the degree programmes. The learning outcomes and the curriculums of all three programmes from the Power Engineering cluster have been aligned ASIIN's to ASIIN Subject Specific Criteria 02. Corresponding tables in the SAR show the correlation between ASIIN´s SSC-02 learning outcomes and the programmes specific learning outcomes.

The panel learns that during the last accreditation process in 2017 the following adjustments and improvements were put in place: Core electrical engineering modules were defined with the intention to unify the basic engineering knowledge for all the degree profiles at the Faculty. The perceived need for a larger mathematical foundation as a prerequisite for all studies at FEEIT and abroad resulted in adding a number of additional mathematical modules. Further modules were added with the aim to provide future graduates with transferable skills in the economic assessment of investments, communication skills, entrepreneurship, principles of quality management; project management and ethics, regulation in the electricity sector and technological innovations. The impact of these changes are expected to materialize when the first generation of students finish their four years of study under the improved degree programmes that were accredited in 2017.

Criterion 1.4 Admission requirements

Evidence

- R1. Rulebook on requirements, criteria, rules, and procedures for enrolment and studying at the first cycle of studies (undergraduate studies) and the second cycle of studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje
- QP 7.5.1-1 Admission of students
- QP 7.5.1-6 Procedure for work of the student service

Preliminary assessment and analysis of the peers:
The admission rules of the three Bachelor programmes of the Power engineering cluster are clearly stated in the above mentioned documents. In a first step the size of the student intake is identified. The Dean of the Faculty, based on the resources for the teaching process available to the Faculty, suggests a corresponding number of students for enrollment first to the Scientific Council of the Faculty, which the final decision then vested with the Senate of the University for Approval.

The University subsequently publishes a call for enrollment in all faculties within the University in a public newsletter and on the Faculty website: https://feit.ukim.edu.mk/upisi/ with all necessary information (enrollment requirements, application dates, necessary documents for application etc.).

Eligible applicants have to be citizens of the Republic of North Macedonia or foreign citizens who have completed secondary education in the country or abroad and who have passed the state or international exam.

The state exam consists of two external subjects, two internal subjects and a project assignment. The candidate who is not satisfied with the result obtained with the selection of the candidates, according to the call conditions, has the right to object to the Faculty commission which is obliged to decide on the candidate's objection within 24 hours.

During the discussions with the Faculty representatives, the ASIIN panel learns that the admission process is challenging especially for candidates with an insufficient high school knowledge level in basic scineces. To accommodate for these starting difficulties, the Faculty of Electrical Engineering and Information Technology conducts additional classes in mathematics, which facilitates the students' knowledge of the material assisting them to pass the state exam and meeting the criteria for enrolment. In spite of all the assistance, there is a considerable drop-out rate in all three programs under review.

The ASIIN panel members consider the admission requirements to be fair and transparent. They commend the Faculty for offering bridge courses to the incoming group of freshmen

It is laudeable that staff members are offering preparatory modules in fundamentals such as mathematics, physics or programming before the beginning of the academic year as a much needed instrument fill potential knowledge gaps from their high school education and be ready to start. This is all the more needed as the quality of the student intake reportedly has diminished in recent years. The representatives of University of Skopje explain, that this is related to demographical factors, the decrease in the number of high school students forces Macedonian universities to lower their standards.

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

In case of the Bachelor programme Power Engineering, Automation and Renewable Energy Sources, the HEI provides a new curricular structure and list of contents which have been adapted to the title of the programme. The peers are now convinced that the title is now consistent with the contents, the structure and the possible outcomes.

With regard to the Bachelor programme Power Engineering and Management, the HEI reports that the title has been changed to Power Engineering and Project Management. The peers agree that the new title gives a clear connection of the study program, the essence and the idea of the program itself with the offered modules. Overall, the learning outcomes have been harmonized with the contents of the degree programs.

In conclusion, the peers agree that the criterion is completely fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Objective-Module-Matrix
- Detailed degree programme curriculum, study plan, structure, modules and modules' descriptions are published on Faculty's web page, that is:
- PEARES: https://feit.ukim.edu.mk/en/power-engineering-automation-and-renewable-energy-sources/
- PS: https://feit.ukim.edu.mk/en/power-systems/
- PEM: https://feit.ukim.edu.mk/en/power-engineering-and-management/

- R1. Rulebook on requirements, criteria, rules, and procedures for enrolment and studying at the first cycle of studies (undergraduate studies) and the second cycle of studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje
- R2. Rulebook of studies for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje - Faculty of Electrical Engineering and Information Technologies – Skopje
- S1. Student Success Statistics – Annual Report 2018 – 2019
- QP 7.5.1-4 Study success analysis
- QP 7.5.1-19 Realization of student internship
- C2. Engagement of teaching staff
- LHE – Law on Higher Education (https://feit.ukim.edu.mk/wp-content/uploads/2021/02/zakon-za-visokoto-obrazovanie.pdf).

Preliminary assessment and analysis of the peers:

Criterion 2.1 Structure and modules

The undergraduate studies at the Faculty of Electrical Engineering and Information Technologies (FEEIT) last four years, i.e., eight semesters with 240 ECTS credits. The programmes are organized in modules, which are presented in corresponding modules handbooks.

It is important to note that the three programmes under review are based on a vast common core. About 80% of the modules in the first four semesters are identical for all degree programmes. These are mainly fundamental mathematics and physics modules as wells as fundamental core electrical engineering modules. In the first couple of semesters there are unfortunately few chances for students to register for modules, which give them an insight how power engineers apply their knowledge in the real world. By the same token, students in the discussions with the panel voice a wish to understand, how the theoretical knowledge they acquire in the first couple of semesters in fundamental physics and maths courses are related to their later study and work experience.

Regarding the relation between compulsory courses and electives, legal changes in the Macedonian Law on Higher Education from 2018 have obliged the Faculty to increase the number of compulsory modules (minimum of 70% and maximum of 90%) within all degree programmes (before 2018 the ratio was 60%:40% between compulsory modules and elec-

tives). According to the Law of Higher Education, all students have moreover the opportunity to choose no more than 4 modules (or 10%) from different degree programs on the University list, without any restrictions on which module to be selected. Because the other Faculties are situated in different locations in Skopje, students usually select those 4 modules offered by the Faculty of Electrical Engineering and Information Technologies on the University list. Students can also gain an extra 6 ECTS credits from attending extracurricular activities such as, summer schools, conferences, student competitions, modules and seminars, organized by the Faculty, or other higher education institution.

The Faculty explains that it has limited possibilities to change the structure of the programme within the respective national accreditation period lasting 5 years each and to reconsider the position of a single module in the general concept of the degree programme. Each professor has a possibility to change no more than 30% ofhis/her module's syllabus to accommodate for new scientific, technical or educational advances.

The curricula of the study programmes in the Power Engineering Cluster according to the SAR are specifically designed to profile the graduates as electrical engineers, with an additional subspecialty in the area of each of the three degree programms under review. This is achieved through the blend of joint mathematics and natural sciences modules, joint modules focusing on the fundamental electrical engineering and information technologies, as well as core and elective modules from the narrower sub specialisation.

Regarding the possibilities for specialization as a diffentiating feature in the three programmes under review, the students of the ***Power Engineering, Automation and Renewable Energy Sources programme*** can select among a number of elective modules. These include courses on Low Voltage Apparatuses, Microcontroller Application, Power Quality, Grid Integration of Renewable Energy Sources, Low Voltage Electrical Installations and Lighting, Mechatronics Fundamentals, LabVIEW Programming, Application of Power Converters in Renewable Energy Sources, Wind Generators and Wind Generator Systems, Dynamics and Modelling of Electrical Machines, Electric Components of Automatic Control, Small and Special Electrical Machines, Design of Electric Machines and Transformers, Design of Systems Based on Renewable Energy Sources, Diagnosis, Testing and Protection of Electrical Machines, Digital Control of Electrical Machines, Electric Vehicle, Power System Protection, Measurement Systems and Data Acquisition, Control of Electric Drives as well as Photovoltaic Systems.

The students of the **Power Systems degree programme** can sharpen their competence profile by choosing among courses such as Electric Lighting, Overhead Lines and Cables, Computer Applications in Power Systems, Groundings and Grounding Systems in Power Networks, Power Quality, Power Systems Measurements, High Voltage Engineering 2, FACTS

Devices in Power Systems, Reliability of Power Systems, Smart Grids, Fundamentals of Renewable Energy Sources, Lab VIEW Programmin and Power System Protection.

As to the students of the ***Power Engineering and Management programme*** the following electives are on offer: Power Plant and System Operation, Electrical Measurements of Non-electrical Quantities, Grounding, Professional Risk and Safety in Power Plants, Small Hydro Power Plants, Nuclear Power Plants, Operational and Financial Management, Photovoltaic Systems, Business and Entrepreneurship in Engineering, Wind Power Plants, Energy Efficiency and Environmental Management, Identification and Risk Management in Engineering Projects, Electric Power Plants Planning and Operation, Design and Integration of Renewable Energy Sources in Power Systems, Quality Management Systems and Standardization in Engineering as well as Systems of Artificial intelligence in Power System.

The student internship (working practice) is a compulsory element of the curriculum. With the assistance of the so-called Career Centre, students can apply for practicals among a list of companies with whom the Faculty has signed an agreement. Students are either selected through a selection procedure realized by each company separately. Alternatively, students obtain their internship in direct contact with a certain company or through the IAESTE exchange platform. For students who are unable to find an internship, the Institutes within the Faculty are offering a one-month in-house internship as third alternative.

Students can obtain a total of 3 credits for a one-month internship per year during the last three years of their studies. The internships are usually realized during the summer break. For each degree programme, there is a responsible professor assigned for the internship, on the completion of which the students has to present a written report and receives a certificate on the part of the partnering company in line with the universiteis regulations. The internship reportedly serves the purpose that students apply their knowledge and to improve their practical skills for problem solving for research tasks and the design of systems and procedures, to understand the importance of technical working tasks in a team (soft skills) and to be aware of the non-technical effects of engineering activities. It furthermore is connected to the preparation of seminar papers, as well as in the preparation of the final diploma thesis and potentially realizing first employments after graduation.

In the interviews with the panel, practically all students voice dissatisfaction with the way the internships are organized and conducted. Many consider this experience as “a waste of time” without clear workings assignments and corresponding quality assurance measures. They also critizice the timing of the internships (“too early, too short”) and would prefer a longer internship of no less than 3 months in later stages of their studies.

Student mobility within the programmes under review is rather low. As regards outgoing mobility, comparatively few students study abroad in the framework of student mobility

programs (such as Erasmus+, Ceepus). Only 20 students have used this opportunity in the past four years. Concerning incoming mobility, it is mainly the children of Macedonians living abroad who are coming back to their country of origin to study. As there are currently no study programmes on offer, which are taught in English language, there are - with very few exceptions - hardly any foreign students present in the programmes. The faculty representatives in the discussion announce that they currently consider the introduction of English degree programmes. Also, there is a need for further investing in an International Office giving more guidance to students with an interest in studying abroad, as the ASIIN panel learns in the discussions on site.

There are rules in place that define the FEEIT´s principles regarding the acceptance of credits acquired externally by the students. The procedure is laid down in Article 21 of the Rulebook on requirements, criteria, rules, and procedures for enrolment and studying at the first cycle of studies (undergraduate studies) and the second cycle of studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje.

Concerning the achievement of the intended learning outcomes, the Faculty every year conducts its study success analysis by modules and study programs and takes measures to overcome the perceived problems. According to the analysis done in the last 5 years, about 25% of the enrolled students drop out of study in the first two years due to a lack of knowledge conveyed by their high school education. The success analysis by individual modules shows a passing rate of 50-75% in the first two years and over 80% in the third and fourth year. The analysis of the success of studying by degree programmes shows that about 45% of the current study cohort finishes in 4.4 years and 75% of the current students finish within 5 years. Among the factors responsible for exceeding the standard period of study are economic reasons - students are working aside from there studies, some even are offered a job before they graduate. The participation in the international working practice Work and Travel program which is usually realized from June to October is also cited as a factor, as students miss two exam sessions (in June and September). The fact that students can progress into the next semester without passing prerequisite courses also has an impact on prolonged study times, as is further elaborated under criterion 3.

The ASIIN panel in analysing the feedback for this criterion comes to the following conclusions:

First and foremost, there is a definite and urgent need for restructuring the internship experience, as all interviewed parties unanimously agree on. There is a broad consensus that the internship should be done in later stages/final phase of the reviewed programmes for a more extended period (at least three months). The Faculty and its Institutes should consult with companies offering internships **on a regular basis**, jointly discussing how this part

of the study programmes can be a meaningful experience for students and companies alike. The ASIIN panel points to the fact that in their discussion with industry representatives there have been clear signals for this to materialize.

As regards the structure of the three programme under review, the panel is mostly pleased with the power systems bachelor programme, which has a long tradition and a history of producing graduates, whose profile is welcome in the job market. The ASIIN panel is however not convinced by the structure of the other two programmes under review. Concerning the Power Engineering and Management Bachelor, the experts observe that the "Management part" of the title is not substantiated by available course content. The number of electives in the area of Management and Energy Economics are limited and it is even theoretically possible to graduate from the Power Engineering and Management programme without taking a single module in the area of management. The same applies to the specialization area of "automation" and to a lesser degree to the "renewable energies" in the third Bachelor programme on offer. As has been mentioned in prior parts of this report, the faculty needs to take advantage of the fact that the programmes can be restructured after the end of the five year programme cyle by increasing the number of course offers and adapting their contents in these areas. Otherwise, the intended learning outcomes of the Power Engineering and Management as well as the Power Engineering, Automation and Renewable Engergy Bachelor will not be achieved.

The panel furthermore recommends to illustrate more clearly to graduates, in which way the fundamental courses in mathematics and physics are lying the basis for their future work as power engineers and to familiarize students in earlier stages of their studies with practical applications of their specializations.

Finally, the panel recommends strengthening outgoing as well as incoming mobility of student and to establish an International Office, which should inform students more proactively about the various opportunities for studying abroad/the corresponding windows of mobility.

Criterion 2.2 Work load and credits

Evidence:

- PEARES: https://feit.ukim.edu.mk/en/power-engineering-automation-and-renewable-energy-sources/
- PS: https://feit.ukim.edu.mk/en/power-systems/
- PEM: https://feit.ukim.edu.mk/en/power-engineering-and-management/

- Rulebook of studies for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje - Faculty of Electrical Engineering and Information Technologies – Skopje
- Rulebook on the unique grounds for the credit system, transfer from one to another study program and the transfer from one to another higher education institution within Ss. Cyril and Methodius University in Skopje
- Student Success Statistics – Annual Report 2018 – 2019
- FEEIT 2016-2020 Self-Evaluation Report, (Appendix 3. Student Survey)

Preliminary assessment and analysis of the peers:
The higher education system of Northern Macedonia has adopted the the European Credit Transfer System (ECTS.

Within the University of Skopje, the "Rulebook on the unique grounds for the credit system, the transfer from one study program to another and the transfer from one higher education institution within the Ss. Cyril and Methodius University" defines the rules for calculating and transferring credits points. The Self Assessment Reports provides detailed information to that regard. Each academic year consists of 44 weeks, of which 30 weeks are covered by attendance based (though currently virtual) lectures, seminars and lab work, while the remaining 14 weeks are reserved for self-study and preparation for the exam sessions. During the entire studies, the student earn a total of 240 ECTS credits, which are evenly distributed in eight semesters of an average of 30 ECTS credits, or 60 credits in one academic year. During one semester, the student can enrol in compulsory and elective modules with a minimum of 21 and a maximum of 35 credits (regulated in Article 9 of the Study rules). Particularly successful students (with an average grade of at least 8.5) get permissiom to enrol for up to 40 ECTS credits (30 ECTS from current semester, and then a maximum of 10 credits from the next semester). The detailed information of all compulsory and elective modules with the information about the student's workload, and the number of ECTS credits, are available on the Faculty website under https://feit.ukim.edu.mk/en/undergraduate-studies/.

The workload of undergraduate studies is calculated taking all required activities of the student into account, which includes the time required for teaching, internships, time spent on extracurricular activities and time spent on self-study. In line with the ECTS system, student workload averages 30 hours per credit. All compulsory elements of the three study programmes under review are credited. In addition to the credits for compulsory and elective modules, students can get a certain number of ECTS for their internships (3 credits)

participation in a conference, realization of a student internship, modules and seminars, workshops organized by the Faculty or other higher education institutions, etc. The maximum number of points that the student can get outside of the provided modules is 6 ECTS

In order to monitor the success of the students' studies and their workload, the Faculty performs a student progression statistics every academic year and publishes a Student Success Statistics. In spite of the fact, the FEEIT has an extensive Internal QA system in place (see criterion 6 for more details), there is currently no systematic feedback instruments of students themselves, how they rate the workload calculations of individual modules, as the ASIIN panel observes.

Criterion 2.3 Teaching methodology

Evidence:

- Modules' descriptions are published on Faculty's web page
- PEARES: https://feit.ukim.edu.mk/en/power-engineering-automation-and-renewable-energy-sources/
- PS: https://feit.ukim.edu.mk/en/power-systems/
- PEM: https://feit.ukim.edu.mk/en/power-engineering-and-management/
- R2. Rulebook of studies for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje - Faculty of Electrical Engineering and Information Technologies – Skopje
- S1. Student Success Statistics – Annual Report 2018–2019
- S2. Self-Evaluation Report FEEIT 2016–2020
- S.3. Student survey model
- QP 7.5.1-2 Procedure for realization of teaching process
- QP 7.5.1-19 Procedure for realization of an internship

Preliminary assessment and analysis of the peers:
The teaching methods and instruments are regulated and presented in Part V of the Study rules, as well as in the "Procedure for realization of teaching process" from the Faculty's ISO 9001 quality control manual, which includes the planning and conducting of the teaching process, supervision and control of its implementation.

The learning methods for each module as well as the forms of teaching are presented in the module handbooks for all three programmes under review are are accessible on the Faculty's website through the following link: https://feit.ukim.edu.mk/en/undergraduate-

studies/. The curriculum of each module indicates how the total number of the planned module hours for teaching and learning is distributed among the following activities: lectures, exercises, projects, seminar papers, individual tasks, homework and self-learning.

The way of conducting the lectures is determined by each professor individually, "ex cathedra" being the dominant teaching style according to the Faculties own account. Some professors reportedly rely on more interactive or other forms of teaching. Most of the modules have laboratory exercises, through which the students apply theoretical knowledge in solving practical problems and acquire practical knowledge and skills for working in laboratory (demonstration, programming, design, measurements, tests, etc.). In addition to the laboratory exercises, the students acquire practical knowledge and skills during the mandatory student internship (see above). Professional excursions and field teaching are included in some modules.

As is further elatorated under criterion 4, FEEIT and its 10 institutes use the experience of senior staff members in coaching newly hired staff to perform better in their teaching. The Faculty moreover uses its own e-learning platform that provides the teaching staff with tools for communication with students and technical support. Through this platform, students have access to all announcements and information about modules, exam results, module literature and materials in electronic form, homework, presentations, videos, etc. For more efficient usage of the e-learning platform, the teaching staff receives constant technical assistance and support from the Faculty Computer Centre (FLAOP).

The module descriptions enlist a variety of methods for self-learning and research, such as homework assignments, projects, seminar papers, presentations and other forms of group and individual learning. In the framework of these assignments, students analyze and solve practical problems individually or collectively, do an independent research and learn how to use a professional and scientific literature. The final thesis (diploma thesis) is a compulsory module in the final semester wherein the student proves that he/she is able to perform an assigned research task independently, supervised by a professor-mentor.

Students are furthermore encouraged to participate in student conferences, workshops, seminars, competitions and other events organized or supported by the Faculty producing thereby opportunities for independent and team scientific research work, usually under the mentorship of professors and assistants.

In its own SWOT analysis, the Faculty acknowledges that the transition from the traditional teacher centred to a student centred teaching philosophy and methodology is an ongoing challenge. The introduction of more interactive forms of student centred learning remains an issue. In the eyers of the ASIIN panel, a concice concept should be further developed

and presented illustrating what the faculty plans in that regard and how a continuous process of improvement of didactics can be established. The panel however is reassured by the results of student surveys and by their discussions with students onsite, in which a general high appreciation of the quality of teaching staff is expressed.

Criterion 2.4 Support and assistance

Evidence:

- Student Success Statistics – Annual Report 2018–2019
- Self-Evaluation Report FEEIT 2016–2020

Preliminary assessment and analysis of the peers:
The Faculty of Power Engineering has established a comprehensive set of support measures to provide assistance and advice to its students throughout the student life cycle.

Prior to the commencement of studies, the faculty assists incoming freshmen in mastering their transition from secondary to higher education and getting them prepared for their studies. Faculty Staff members are offering preparatory bridge courses in fundamentals such as mathematics, physics or programming prior to the beginning of the academic year accommodating for potential knowledge gaps from their high school education. The faculty representatives consider thes preparatory courser all the more vital as the quality of the student intake has reportedly diminished in recent years (see 1.4 Admission requirements).

In addition, the Career Centre of FEEIT is informing students about the study portfolio of the Faculty, providing guidance regarding the choice of the degree programme in the process and assisting them in the admission process.

One of the most important elements of the comprehensive support system is the assignment of a personal mentor looking after incoming students. After enrolment, each freshman is assigned a professor (the staff member will routinely look after approximately 3-5 students) who will give advice and guidance while supervising student's progress during the course of their studies. Other sources of student support are the Dean's Office and the Student Affairs Service.

Next to assistance on the professorial level, the Faculty invests in so-called "student demonstrators", who are hired so support students in courses with many participants. Typically, these student demonstrators are student peers in more advanced semesters providing individual or group consultations and helping students to understand the course material.

As regards the transition between studies and the employment sector, it is again the Career Centre at the FEEIT providing the important link between students/graduates and their business environment. The Career Centre advises students on career choices and in finding appropriate employment in accordance with their skills, knowledge and personal affinities. In this context, it is important to mention that FEEIT organizes the Employment and Internship Fair "Contact" in close cooperation with the Faculty's Student Assembly. This Fair give companies a stage to present themselves and to recruit personnel. The Faculty furthermore supports the Job and Career Fair "JobFair" organized by the organization BEST. At the fairs, students attend presentations of companies, listen to personal experiences of former students who have become entrepreneurs, and touch base with company representatives. These events help students in becoming familiar with employment opportunities after graduation.

The Faculty also supports student conferences and events where students can acquire new knowledge and skills. It furthermore supports student organizations such as the Faculty's Student Assembly, IAESTE, BEST, EESTEC, the student branch of the Macedonian section of IEEE and others.

Students are made aware of their rights and obligations and the documents regulating them. At the beginning of the academic year, the Faculty together with the Student Assembly organizes the "orientation days" for freshman students. During this period, incoming students are acquainted with their study environment. Upon enrolment in the Faculty, each student subsequently signs a study agreement containing the rights and duties of the student and the Faculty as laid down in the "Rulebook on requirements, criteria, rules, and procedures for enrolment and studying at the first cycle of studies" (article 13). Freshmen students furthermore receive the so-called "**Student Information Booklet**" with information about the Faculty, teaching staff, degree programme, modules handbook. "

Finally, in order to protect the rights of the students at the University and its units, the students elect a Student Ombudsman (Article 51-57 of the University Statute and Article 51 of the Faculty Statute) who acts on their behalf.

The ASIIN panel commends the Faculty for its broad range of support services. The faculty members during the visit point to a heightened demand for guidance during the Covid pandemic, during which teaching took place almost exclusively electronically (apart from the laboratories) and difficult adjustments in the learning environment had to be made. During their discussions with various stakeholder, most prominently representatives of the student body, the panel notes a generally high satisfaction rate with the support and assistance offered by the Faculty. What is still missing, however, is a functioning international student's office assisting in- and outgoing students for their studies abroad and giving more

detailed information about opportunities for study exchange and about the modalities of recognition of study achievements in the foreign university.

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

The HEI proves that a complete restructuring of the student internship procedure has been done. The steps for the realization of the internship and the roles of all of the participants in the process are defined in detail. Restrictions to determine which students can enroll in a student internship are introduced. The process of monitoring the quality of the internship is also improved.

The peers consider criterion 2 to be completely fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Study rules for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje - Faculty of Electrical Engineering and Information Technologies – Skopje
- Student Success Statistics - Annual Report 2018 – 2019
- FEEIT 2016-2020 Self-Evaluation Report, (Appendix 3. Student Survey)
- Faculty Academic Calendar
- Examples of exam schedules

Preliminary assessment and analysis of the peers:

In the Self-Assessment Report and during the interviews, the Faculty representatives refer to the so-called “Study Rules”, which contain all information regarding the examination system. Many of the legal stipulations regarding the examination system are regulated on the national level by the ministry of education for all North-Macedonian Higher Education Institutions. The examination of students accordingly can take one of the following forms: students have the choice to either take the first of two exams. Students, who will not pass this first partial exam, cannot go to take the second partial exam. They however have the opportunity at the end of the semester to take the exam in full.

Testing of students' knowledge during the teaching period is done through preparation of independent projects, tests, seminar papers, laboratory exercises as well as the preparation of homework which allows for the continuous monitoring of a student's performance level. The assessment is performed by grading each form of activity and testing during the semester, as well as at the final exam at the end of the semester. Regarding the final exam(or two partial exams), the student can achieve a maximum of up to 100 points. The corresponding grades are expressed in Arabic numerals from 6 (six) to 10 (ten), or a negative grade of 5 (five) which means that the student failed the class.

The ASIIN panel is moreover informed about further specificities of the national exam system. It is surprised to learn, that a student who does not pass the final exam of a module can nevertheless advance to the next semester even if the failed module is the prerequisite for a succeeding course according to national regulations.

A student, who has attained at least 200 credits in the course of his studies (passed exams, completed student internship, completed seminars, courses, workshops, etc.), can register for the final thesis, supervised by a mentor selected from the faculty staff. Upon public defence of the thesis, students obtain their final degree.

The module handbooks provided for the three programmes under review list the exams to be taken in each course. The tasks provided for the individual work of the student seem to be evenly distributed during the semester, the panel does not hear anything to the contrary when consulting the students.

As regards special rules for handicapped or disadvantaged students, the panel is made aware of Article 73 of the “Study Rules” (Article 73) which contains exam regulations for students at all levels of higher education, who either have no parents or are mothers with children up to six years of age, who are blind, deaf or otherwise disabled. They as well as students, who are hospitalized, are entitled and benefit from adjusted exam deadlines.

Following the passing of the University Calendar, the Faculty formally adopts the Student Calendar, which is published at the beginning of the academic year on the Faculty's website. This calendar marks the period and the duration of the exams. The panel positively notes that student representatives participate in the preparation of the calendar. In case, that during the exam sessions certain exam dates overlap, additional daily sessions are organized for students.

The criteria for evaluating the exams and other teaching activities are publicly available and published on the Faculty website. Each students furthermore has a username and password that connets to the portal for learning and courses on this website with all necessary

information regarding the examination requirements. In addition, each professor elaborates the examination criteria in the introductory classes of the module. After completion of the exam, the professor in charge will announces the results to the students. A student who is not satisfied with the assessment or claims that the exam is not conducted in accordance with regulations can submit a complaint to the Dean of FEEIT. If the Dean determines that the complaint is well founded, the professor will review the grade from the final exam. If the professor does not reconsider the grade, the student takes the exam in front of a three-member commission composed of professor from the same or related teaching-scientific area, in the next 24 hours, the next working day. In addition, at the request of the student, he is allowed to retake the final exam for a higher final grade per certain module in a period of up to four months from the initial exam.

Each academic year, the Faculty conducts a student survey in which students assess the objectivity of the exam assessment for each module. The surveys conducted in the last five years show that students grade the objectivity of the exam assessment with an average grade higher than 9 (on a scale 1 to 10). The Faculty furthermore has a detailed system in place (see Criterion 6 for more details) to monitor the performance of each students individually and comparatively for his/her student cohort.

The ASIIN panel is generally satisfied with the implementation of the presented exam system. It nevertheless considers certain legal framework conditions problematic. The fact that a student does not have to pass a prerequisite course in order to register for the subsequent course might perpetuate failure in the end, especially since the faculty does not have the capacity to offer the courses every semester every year.

The panel is reassured of its assessment in as much as during the interviews students in general seems to be generally satisfied with the examination system (apart from individual complaints regarding the grading time exceeding the foreseen five working days, but this does not seem to be systematic). They panel asks for an English Translations of the exam regulations which are said to be part of the “Study Rules”. The type of exams/assessment methods should be made transparent in all courses of the moodule handbook. Furthermore, the 4th category of activities (industrial excursion) should be further specified.

The panel during the onsite visit reviews a sample of final thesis work as well as exams and concludes that the level of achievement is in line with the qualification level of the three Bachelor degree programmes under review and their associated programme and module learning outcomes.

Exam regulations (kind of exams, procedures, workload) must be placed in an official document that is accessible to all stakeholders.

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

The peers consider criterion 3 to be completely fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Student-Staff Ratio
- Statrt handbook with CVs of teaching staff
- C2. Engagement of teaching staff
- LHE Law on Higher Education
- Student Success Statistics – Annual Report 2018 – 2019
- S2. Self-Evaluation Report FEEIT 2016-2020
- Rulebook on the selection criteria for teaching-scientific titles (in Macedonian)
- CVs of the employees
- Research results under https://feit.ukim.edu.mk/en/science/

Preliminary assessment and analysis of the peers:

As attachment to FEEIT´s Self Assessment Report, the ASIIN panel has access to a staff handbook containing staff CVs with respective teaching and research qualification descriptions. At the time of this accreditation visit, the teaching body at FEEIT consists of over 100 employees with the following qualification level: 69 are holder of a PhDs, among them 40 full professors, 14 associate professors, and 15 assistant professors. In addition, the Faculty employs 17 Masters of Science as teaching assistants. The recruitment of professors is secured through a public competition in accordance with the Macedonian Law on Higher Education and the Rulebook on the selection criteria for teaching-scientific titles**.** A review committee consisting of 3 professors from the respective field reviews received applications, the election of the selected candidate is confirmed by voting of all members of the Teaching-Scientific Council as well as the Senate of UKIM. The appointment of full professors is for lifetime, while that of assistant professors and associate professors covers a period of 5 years; teaching assistants are

selected for a period of 3 years. In case of all employment needs, a request has to be submitted by the university to the Ministry of Education, which is charge of confirming the appointments.

The teaching staff at FEEIT is distributed within its altogether 10 institutes according to their disciplines and areas of teaching and research. At the beginning of each semester, the head of each institute proposes to the vice dean for education a planning/schedule of workload for professors and teaching assistants from institutes that matches their expertise and the corresponding modules taking into account the number of students who have enrolled on the modules covered by the corresponding institute. This distribution of teaching responsibilities is subsequently endorsed by the teaching-scientific council of the faculty. The average teaching load of a professor amounts to approximately 6-7 teaching hours weekly. Each professor is responsible for 2 to 3 modules per semester. The overall student-staff ratio at FEEIT is reported to be around 15:1. Next to the teaching staff involved in lectures and exercises, FEEIT employs a number of additional technical and administrative staff who are working in different parts of the administration and in the laboratories, organization of teaching/exercises, planning of exams, as well as other forms of support, assistance and counseling to students.

In its SWOT analysis, the Faculty has identified a need for new staff, mainly technicians in the laboratories. This need according to FEEIT has materialized due to the restrictions on new employments set by the government in the last couple of years. The Faculty has submitted a request to the Ministry of Education for employment of 10 new technicians within all laboratories, hoping for a positive decision by the end of 2021.

The quality of teaching is monitored by means of student surveys. The panel notes a high appreciation on the part of students which consider the commitment and quality of their teacher as fully satisfactory in all areas related to teaching (average mark is over 9 out of 10). The head of the Institute assumes the main responsibility in supervising the quality of teaching of all modules. In case of problems he, together with the vice-dean for education and the Teaching-Scientific council, reportedly takes appropriate counter-measures.

Regarding the issue of visiting lecturers, the ASIIN panel learns, that these teaching and research visits from outside are rarely realized, only occasionally during visits of experts or researchers in frame of joint projects and scientific collaborations between the institute and the corresponding domestic or international partners.

As concerns the quantity and quality of research activities by the Faculty members, FEEIT claims that in terms of numbers of projects, published papers, participation in conferences etc., it is among the leading faculties of UKIM and the country. In the period 2016-2020, the teaching staff of FEEIT according to the SAR participated in 17 international projects in various programme lines such as Horizon 2020, FP7, NATO SPS, Erasmus+ etc., Additional bilateral joint projects with Montenegro, Austria and China are equally reported. Under https://feit.

ukim.edu.mk/en/science/, the faculty presents a comprehensive list of publications in international journals as well as papers presented at national and international conferences, as well as 21 publications in monographs or book chapters.

The ASIIN panel commends the commitment of the Faculty staff, which has to cope with at times difficult framework conditions of limited resources and equipment (see below). They acknowledge that fact that students highly appreciate their teachers and that student´s satisfaction with Staff quality is an asset for the programmes under review. The level of research by the staff is considered to be of sufficient quality to enrich the programs and secure the achievement of the intended learning outcomes of the three programmes under review. Nevetheless, the majority of scientific publications are in the field of power engineering, and now that the focus is being extended to management and automation, the research activities should also be oriented in these directions.

The panel at the same time notes the "inhouse recruitment system" of the university/faculty with its specific strengths but also weaknesses. As practically all teaching staff are going through the same qualification circle, adhering to the university/faculty early one, usually until the end of their academic careers, academic and professional bonds are tied early one, resulting in a "corps spirit" which is useful in jointly overcoming challenges. From a scientific point of view, there remains however a challenge to further stimulating scientific exchange (beyond the participation in conference and the engagement of international projects)a nd for implementing new directions of research. This is even more warranted, as there are practically no possibilities to invite visiting lectures from outside the institution.

Criterion 4.2 Staff development

Evidence:

- LHE Law on Higher Education
- R4. Rulebook for scientific and professional development (in Macedonian)
- R5. Rulebook on the selection criteria for teaching-scientific titles (in Macedonian)
- S2. Self-evaluation report FEEIT 2016-2020

Preliminary assessment and analysis of the peers:

The panel learns that personal development of FEEIT employees in terms of professional and teaching skills is done to a good degree by way of an "internal training mechanisms", in the framework of which senior professors are "coaching" their younger colleagues. This "in-house"-tradition in transfering teaching knowledge is reported to have been in place ever since the Faculty was established more than 60 years ago.

In terms of formal regulations, the Faculty representatives point to the “rulebook for scientific and professional development” and the “rulebook on the selection criteria for teaching-scientific titles” in which the rights (and obligation) for scientific and professional development are fixed. FEEIT with very limited financial means at its disposal accordingly supports colleagues in their scientific and professional development in order to upgrade their teaching and research capacities. The university/faculty thus finances its own promising Master and Ph.D. students interested in pursuing an academic career by sending them to other educational institution at home and abroad. The Faculty takes over a maximum of 50% for the costs for its future employees who have enrolled in doctoral studies at FEEIT, and up to the same amount for the associates who have enrolled in doctoral studies at another university.

Limited funds are also available to support staff with an interest and need to participate in scientific meetings, professional seminars and trainings both nationally and internationally. Regarding the promotion of research activities, FEEIT will fund two research projects of Faculty members this year. This special initiative has been implemented to overcome the lack of international collaboration in the last year due to the pandemic.

Further trainings are organized in-house. The faculty staff has been trained to cope with the introduction of new technologies in teaching (Moodle platform, Zoom platform etc.). The trainings are executed by colleagues of the Faculty Computer Centre performing various forms of training and assistance in order to cope with these technological changes in order to support such development with the Corona crisis serving as an accelerator of these necessary adaptations. Limited funds are also available to support faculty staff in publishing their research findings in scientific journals.

According to Macedonian Law on Higher Education, members of the teaching staff every five years can take advantage of paid sabbatical leave with a duration of up to one year or unpaid leave for up to three years for professional development in the relevant scientific field or for a stay at a higher education or scientific institution. During the discussion, the ASIIN panel however learns that this is rather a theoretical opportunity as the staff capacity in the Faculty is generally not sufficient to secure the necessary replacements.

The personal development and progress of the teaching staff is evaluated every 3 to 5 years. This review is linked to the Macedonian Higher Education promotion system, in the framework of which candidates applying for the next step on the career ladder must present progress in teaching and research work. Student satisfaction survey is taken into account as a variable in the evaluation scheme. It is thus necessary that the candidate achieves a sufficient ranking in order to be promoted into a higher title.

The student survey performed at the end of each semester (applied to all professors and all modules) provides a continuous direct feedback about student satisfaction of the teaching process. These surveys are usually discussed and analysed within the institutes and allows the Head of the institute to undertake appropriate measures to correct or improve agreed teaching objectives for the next semester/year,

The panel learns that within the faculty of university, there are no further monetary or non-monetary incentive system is in place to honour outstanding achievements in teaching and research.

[…]

Criterion 4.3 Funds and equipment

Preliminary assessment and analysis of the peers:
The budget of FEEIT is provided by the following sources: state funds emenating from the budget of the Ministry of Education, covering mainly employees' salaries and overhead costs. Other sources of income originate from student tuition fees, research contracts and services to industry secured by the faculty itself. These self-earned funds are needed to cover the costs for the teaching, scientific-research and other activities and support measures of the Faculty. Currently, ministerial and own funding cover both approximately 50% of the faculties' total budget.

As to the institutes, which constitute FEEIT, they use their own funds acquired through research and contracts with industry and combine them with the faculty funds in order to buy/replace depreciated equipment and provide technical support for the running of laboratories and laboratory exercises. The Dean and the Vice Dean for finances are in charge of managing the finances of FEEIT, while the Heads of the Institutes are responsible for the financial operations of the institutes. Important decisions regarding the annual financial operations of FEEIT are approved by the Dean's Office.

Regarding the state of equipment, FEEIT reports that during the past 5 years, mainly through donations, contracts and services provided to industry as well as own investments, the faculty has managed to buy 3 photovoltaic power plants with a total capacity of 32 kW. Moreover, a PLC laboratory as well as laboratories for robotics and renewable energy sources have been equipped. Further investments went into the refurbishing of new computer classrooms and associated server equipment. Most of the equipment used in scientific and research work has been procured through international projects (about 2M EUR in the last 6-7 years) according to the Faculties representatives.

Further investments were provided to the library to purchase scientific literature, books and magazines, and to provide access to electronic databases for students and teaching staff, to cover membership fees for the teaching staff (such as IEEE). In addition, professors are financially supported in publishing books and articles in scientific papers.

With respect to its physical infrastructure preconditions, FEEIT disposes of facilities of around 10,000m2 including two amphitheatres with a total of 480 seats and 12 classrooms with 780 seats. Most of the classrooms are equipped to meet computer network linkages, electronic whiteboards and audio-visual projection equipment. The laboratory exercises are performed in altogether 18 laboratories with a total area of 1,745m2 with 349 seats, and 4 computer classrooms with 83 computer workstations. According to its own SWOT analysis, there is a shortage of space that has been persisted and aggravated in the past couple of years. The Faculty has taken countermeasures by teaching students in shifts. The situation is aggravated by the fact that some of the facilities are also used by other university units: this is the case of the Faculty of Information Sciences and Computer Engineering which even after its separation from FEEIT ten years ago is still using some of FEEIT's classrooms for teaching.

An important development step in upgrading its physical infrastructure has been the establishment of the Centre for Technology Transfer and Innovations – INNOFEIT as a part of FEEIT´s efforts to close the gap between academic education and practical expertise. INNOFEIT strives to prepare its students for their future professional careers and to jumpstart connections and transfer of technology that will foster economic development. It is important to note that INNOFEIT has become a selected candidate by European Investment Bank (EIB) for developing into a Centre-of-Excellence. INNOFEIT is reported to be the first fully operational digital innovation hub in the country. In the past 2 years, INNOFEIT has been successful in signing a number of research contracts with national and foreign companies. These contracts engage FEEIT employees to work on the development and commercialization of new products. Additionally, INNOFEIT has been awarded several "innovation vouchers" by the Fund for Innovation and Technological Development (FITR) in 2020. In addition, INNOFEIT is involved as initiator and organizer of the student program INNO-SAE, which supports interdisciplinary student projects from different faculties of UKIM, stimulating students' innovation and encouraging and supporting them to work on development of their own products that can further be commercialized.

The Faculty has a number of laboratories, which have been accredited to provide commercial services to industry generating additional income in the process. It thus serves as an accredited "Inspection body for electrical devices, installations and equipment" in accordance with the quality standard ISO / IEC 17020. Services of its accredited Laboratory for Electrical Measurements (LEM) include the calibration of instruments and generators for

direct and alternating voltages and currents, resistance, capacitance, frequency and phase angle. LEM is reported to be the only national reference laboratory for calibration of reference standards for electrical energy and power, especially important providing measurement traceability and unity of measurements in this segment of legal metrology in the country.

The Laboratory for detection of irradiated food operates in the field of testing and characterization of irradiated materials. The Laboratory performs the detection of irradiated food as part of the Monitoring program for food safety given by the Food and Veterinary Agency. The Laboratory is equipped for testing and characterization of irradiated materials by optically stimulated luminescence and thermoluminescence methods.

The ASIIN panel during the onsite visit has a chance to visit the various laboratories and testing centres getting a first-hand impression on the state of its equipment and its investment needs. They find that the equipment in a number of labs has come of age and that further investments are clearly needed to secure modern education and to lay the ground for successful research. Efforts should be made to equip the laboratories for teaching with up-to-date measuring equipment (e.g. Dos, difital sorage oscilloscopes the the like). This finding is also confirmed by students expressing a demand for modern equipment and software. The panel at the same time recognizes that the faculty leadership and staff do their best to cope with limited financial resources.

While state contributions clearly are not sufficient, the panel encourages the faculty to pursue the acquisition of alternative sources of income. This e.g. could be generated by reinforcing student recruitment nationally but also internationally. A step in the right direction would be the establishment of new Bachelor programs for international students offered in English. Additional funding also could be increased by strategically investing in the acquisition of third party funds and a closer cooperation with industry. The panel recommends considering the further professionalizing of the underlying “support services” in that regard; the employment of a professional faculty manager could thus be an option. The panel commends the faculty on the accreditation of various laboratories for testing purposes, not only but also for the financial impact of such as step.

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

The peers consider criterion 4 to be completely fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:
Module descriptions

- https://feit.ukim.edu.mk/en/power-engineering-automation-and-renewable-energy-sources/
- https://feit.ukim.edu.mk/en/power-systems/
- https://feit.ukim.edu.mk/en/power-engineering-and-management

Preliminary assessment and analysis of the peers:
The module descriptions are published on the Faculty's website in both Macedonian and English language through the following links: https://feit.ukim.edu.mk/i-ciklus/, https://feit.ukim.edu.mk/en/undergraduate-studies/.

In order to ensure that the modules are consistent within themselves, a special software platform (studii.feit.ukim.edu.mk) has been developed where all modules are entered and are available for the entire teaching staff. The module descriptions contain the module title and code, the semester in which they are offered, the lecturer in charge, the workload in ECTS credits as well as the total number of module hours. Furthermore, prerequisites for signing up, the content and learning methods, the distribution of hours for lectures, exercises and other module activities (projects, seminar papers, individual tasks, homework and self-learning) form an integral part of the module description.

The panel takes note of the provided module handbook and course descriptions. They observe that a lot of information is already available and especially commend the faculty members on breaking down the learning content on a weekly basis so that students have a very good overview of what to expect and the sequence of the material during a semester course.

The panel nevertheless sees considerable room for improvement in terms of consistency and completeness in the description of the various modules as they differ considerably in quality depending on the lecturer/professor who provided the input to each individual module. Particular attention should be paid with regard to formulating concise learning outcomes for each module instead of merely listing the course input. An example among others is the module "measurement in electrical engineering". In some of the modules, it is not always clear who is responsible for the modules/courses; sometimes there is a lack of information with regard to the type of exams and the assessment conditions (duration, help).

A method should be developed to assure that all module descriptions are of comparable quality, which is a trademark of a functioning internal quality assurance system (see below under criterion 6).

Criterion 5.2 Diploma and Diploma Supplement

Evidence

- D1. Sample graduation certificate for each degree programme
- D2. Sample Diploma Supplement for each degree programme
- D3. Sample transcript of records for each degree programme
- R2 Study rules for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies) at SS. Cyril and Methodius University in Skopje - Faculty of Electrical Engineering and Information Technologies – Skopje

Preliminary assessment and analysis of the peers:
The faculty issues a graduation certificate (**Diploma)** to all students who complete the requirements for the respective degree programme. The Diploma Supplement forms part of this Diploma providing information about the acquired qualifications (academic title, level and type of qualification), the respective degree programme (scientific area and field, program contents, learning objectives, duration of the degree programme: years and ECTS credits) as well as the conditions for enrolment and information about the grading system.

As regards the latter, in addition to the national grading system, an ECTS grading scale (A, B, C, D, E) is included for mapping the module grades to the European grading system. The DS contains information about the individual student´s performance and his/her average grade as well as the title of the diploma thesis. Finally, information about student internships, awards and recognitions outside of the teaching activities can be found, memberships in student organizations as well as participation in scientific research and application projects are listed. In addition, a Transcript of Records is attached to the Diploma Supplement and consists of a list of passed modules, grades as well as ECTS credits.

The panel confirms that a diploma certificate is issued together with a Diploma Supplement, which is also delivered in an English version. The presented documents provide the necessary information for interested stakeholders regarding a student´s qualification profile and the acquired learning outcomes. The individual modules and the grading procedure on which the final mark is based are clearly explained to third parties. In addition to the final mark, statistical data as set forth in the ECTS User's Guide is included to allow categorization of the individual result/degree

Criterion 5.3 Relevant rules

Evidence:

- A1. Student Information Booklet
- R1. Rulebook on requirements, criteria, rules, and procedures for enrolment and studying at the first cycle of studies (undergraduate studies) and the second cycle of studies (postgraduate studies) at Ss. Cyril and Methodius University in Skopje
- R2. Study rules for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies) at Ss. Cyril and Methodius University in Skopje - Faculty of Electrical Engineering and Information Technologies – Skopje https://feit.ukim.edu.mk/en/undergraduate-studies/. https://feit.ukim.edu.mk/za-fakultetot/pravni-akti-i-dokumenti/.

Preliminary assessment and analysis of the peers:

The Bachelor Programmes under review in the Faculty of Electrical Engineering and Information Technologies dispose of a number of documents, which regulate the rights and duties of both the higher educational institution/faculty and students. The most important of these documents are on the one hand the so-called "Rulebook on requirements, criteria, rules, and procedures for enrolment and studying at the first cycle of studies and on the other hand the "Study rules for first cycle studies (undergraduate studies) at Ss. Cyril and Methodius University. Thirdly, Parts XII and XIII of the "Study Rules" contain provisions regarding the protection of the student rights as well as disciplinary responsibilities. All legal acts and documents for study-relevant issues are available on the Faculty's website under https://feit.ukim.edu.mk/za-fakultetot/pravni-akti-i-dokumenti/.

The procedures and information for the admission, teaching, exams and completion of the degree programme are also available on the Faculty's website in Macedonian under https://feit.ukim.edu.mk/i-ciklus/. Information for the modules is available on the Faculty's website in Macedonian and English through the link: https://feit.ukim.edu.mk/en/undergraduate-studies/ and https://feit.ukim.edu.mk/i-ciklus/, respectively. Students also have access to additional information about modules, exams, module literature and materials through the Faculty's e-learning platform: https://e-kursevi.feit.ukim.edu.mk/.

The relevant information for the procedures for issuing different types of administrative documents is regulated by the University and is available on its website through the following link: http://uslugi.ukim.mk/index.php/category/feit/, or through the Faculty's website, https://feit.ukim.edu.mk/i-ciklus/proceduri-i-formulari/. Specifically, the relevant information includes: Formulary for the request letter submitted by the student, competent authority for issuing the document, Evidence / documentation that student attaches to

his/her request letter, Deadline for decision, Legal remedy and authority in charge of the legal remedy.

Overall, the panel considers that the rights and duties are clearly defined and binding. All relevant course-related information is available in the language of respective degree programme and accessible for interested stakeholders.

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

The HEI provides new module descriptions, which indicate that all modules have been updated accordingly and detailed information of individual forms of assessment has been added to each module.

The peers consider criterion 5 to be completely fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- LHE Law on Higher Education
- S2. Self-Evaluation Report FEEIT 2016-2020)
- Quality Manual (in Macedonian)
- QP. ISO 9001 Procedures
- S1. Student Success Statistics – Annual Report 2018 - 2019
- S2. Self-Evaluation Report FEEIT 2016-2020
- S3. Model of Student Survey

Preliminary assessment and analysis of the peers:

A considerable number of quality assurance responsibilities are regulated in the Law on Higher Education of the Republic of Macedonia. The law stipulates that the evaluation of higher education institutions in North Macedonia is performed both through external evaluation and self-evaluation. The external evaluation is performed by the Higher Education Evaluation Board of the Republic of Macedonia and is regulated in the Article 51 of the Law on Higher Education of the Republic of Macedonia. The self-evaluation of the University

and its units is regulated in the Article 55 of the Law on Higher Education of the Republic of Macedonia, as well as in the Articles 347 – 358 of the University Statute.

The self-evaluation of the Faculty for Electrical Engineering is an integral part of the self-evaluation scheme of the University. The faculty on regular intervals needs to present information regarding the effectiveness of its teaching and learning efforts, its spatial capabilities and the state of and investment needs for its equipment, its scientific-research output, the learning progress of its students, as well as the organizational set-up and functioning of the Faculty.

The Faculty furthermore is requested to provide a SWOT analysis of its educational and scientific work, suggesting corrective measures to overcome perceived weaknesses. In terms of process, the Faculty self-evaluation is performed by a Self-Evaluation Commission of FEEIT at intervals of up to three years, for which it prepares a Self-Evaluation Report and submits it to the Teaching - Scientific Council of the Faculty and to the University Self-Evaluation Commission.

In addition to the regular implementation of the mechanisms and activities determined by the law and the acts of the bodies that assess the quality of higher education, FEEIT since 2015 is operating according to the established standard ISO 9001, which forms the base for its extensive internal Quality Management System (QMS). It covers all higher education and research activities as well as the transfer of knowledge and technologies in the field of electrical engineering and information technologies. Regarding the teaching process, there are several procedures for assuring the quality of the processes, including the procedure for realization of teaching process, testing the student's knowledge, the study success analysis (see below), final thesis, the procedure for realization of an internship, as well as the realization of laboratory work.

As regards the study experience of students, the Faculty relies on the following instruments of Internal Quality Assurance figure the following:

First, an evaluation of the teaching staff and student satisfaction, which is conducted for each module at the end of each semester through student surveys. The results of the surveys are available to the Vice Dean for Education, the Heads of the Institutes, and the professors, who use the information to improve the teaching process in their own modules. They are also included in the self-evaluation reports.

In the SWOT analysis, the faculty itself sees a need for reform in this area in spite of the fact that student feedback is on first sight very positive. In order to understand this discrepancy, the panel interviews the students who put on record that their feedback is rather an appreciation of the commitment of their individual teachers rather than an expression of an overall satisfaction with the programmes under review.

In the past, there was moreover considerable doubt concerning the confidentiality, reliability and meaningfulness of these surveys, which were frequently considered as a bureaucratic nuisance instead of a tool for continuous improvement. In addition, students rarely were given a substantiated feedback on the impact of their responses. Before this background, the students themselves have established a working group and will present to the faculty a revised questionnaire with more focused questions. Suitable software programs have been identified, which will improve the impartiality of student feedback. This move is supported by the other members of the faculty.

The ASIIN panel notes, that the faculty conducts various analyses of study progress analysis each academic year under the guidance of the Vice Dean for Education. The results are documented in annual **Student Success Statistics Reports.** They contain information regarding the number of enrolled students per degree programme, an analysis of student performance per degree programme, module as well as per exam session, the average grade per module and finally the number of graduates per degree programme. Part of the overall Student Success Statistics Report is a more detailed Study Success Analysis (SSA) containing more detailed information on the manner of testing the students, the frequency of taking individual exams, and the achieved success (grades). What is missing however is a consistent evaluation of the student´s workloads in the individual modules.

Concerning the **monitoring of graduates success in the labour market**, the Faculty relies on maintaining partnerships with collaborating companies and collaboration with its graduates through the FEEIT Career Centre and the FEEIT Alumni Association. In the discussions with representative of collaborating companies, the panel gathers feedback which overall signal a high overall satisfaction regarding fundamental skills and the preparedness of graduates to learn. Formal comprehensive tracer studies for more detailed information about the graduates career paths, salary levels etc. thus far however have not been conducted.

The annual self-evaluation reports, as well as the student success reports are obligatorily reviewed by the Dean's Board as well as by the Teaching-Scientific Council of the Faculty with the purpose to inform all the structures of the Faculty regarding the results of the analysis, and providing an expert opinion on the required measures to be taken. The student success report and the self-evaluation report are transformed into proposed system of corrective and preventive measures, which are said to be implemented in the form of an action plan for the following year. During the audit, manifold examples to that regard are provided (such as the procurement of new equipment for laboratory exercises, employment of additional assistants, reduction of the number of students in the first year classes for more efficient teaching, introduction of student-demonstrators for modules with more than 100 students, application of new didactic methods etc).

Regarding **the involvement of stakeholders**, **students** only recently for the past 1-2 years have been involved in all bodies of the Faculty management, such as the Teaching Scientific Council and the Dean's Board. Today, students through the FEEIT Student Assembly undertake a series of activities in order to influence the improvement of teaching process as well as the development of degree programmes. An example in case has been student´s response to the Covid 19 pandemic, in the framework of which the Student Assembly conducted surveys for the perceived quality of the online teaching process and provided suggestions for improving the online teaching process. In December 2020, the students conducted an extensive research on the concept of the degree programmes and the impact of the individual modules. Their analysis is ongoing and is expected to significantly contribute to the improvement of the degree programmes that are up for reaccreditation next year.

The teaching staff is continuously involved in the improvement of the degree programmes through the annual self-evaluation reports and the review of student success reports by the Teaching Scientific Council of the Faculty.

Regarding the involvement of the employer representatives there are a considerable number of contacts on various levels. The cooperation of the Faculty with the industry and business partners is performed by various means such as consulting and expertise services, collaboration in development, innovation and research, realization of student practice/internship, sponsoring the promotion of graduates, sponsoring events at the Faculty, etc. FEEIT has signed over 200 memoranda of cooperation with various companies in support of these activities. In spite of these manifold contact, in many instances these contacts are done on a case by case level but not in the structured way such as an Industry Advisory board or a comparable, institutionally anchored structure.

In looking at the overall state of development of a functioning Internal Quality Assurance System, the ASIIN see that there is a comprehensive formal quality assurance system in place in line with Macedonian law. The panel acknowledges that most stakeholders are committed to fill it with life and to further developing a real quality assurance culture, elements of which have been witnesses throughout the site visit and the discussions. The ASIIN panel commends the faculty for presenting a comprehensive SWOT analysis clearly marking areas for improvement and further consideration. The fact that the Faculty on a voluntary basis is undergoing the challenge of an international accreditation needs to be recognized, the high quality of the Self-Assessment-Report also speaks for itself. The fact that a formal student representation in the quality assurance of the teaching process has been established is commendable though long overdue. In fact, the entire accreditation experience, the discussion during the virtual onsite visit attest to the fact that all members of the faculty including the students are committed to making the programmes under review better.

Having said this, the panel nevertheless sees considerable room for improvement in various areas:

There is clearly a need for reorganizing student feedback, a process which already has started by the student´s own initiative and to consistently close the quality circles giving a structured feedback to students concerning their suggestions on a regular basis.

A consistent monitoring of students workload and its impact on progression/failure rates in different courses thus far is absent and should be added to the portfolio of evaluation instruments of the faculty.

The panel moreover sees value in implementing formal tracer studies to know more precisely about the success of the Faculties graduates on the labour market beyond the laudable contacts with the Alumni Organizations and individual employer's representatives.

Most significantly, the panel suggests to (re)establishing and reinforcing communication channels with major stakeholder groups for the benefit of improving quality of the Faculties educational offerings. This relates on the one hand to the employment sector/industry, where contacts thus far have been organized rather "scattered" by individual professors or the respective dean. During the discussions with representatives of the employment sector the panel learn that there is a considerable interest by a considerable number of interviewees to interact (though not by all) n a more regular and formal framework to identify areas of common interest and actively create win-win situations. An example in case is the need to discuss jointly how the internship experience of students can be transformed into a valuable educational experience, which currently is not the case. The time to do so is ideal giving the fact the in the next couple of months the study programs need to be modernized for the next student cohorts.

The panel also is also missing a concrete Strategic Development Plan containing the action plan for the further development of the programmes under review on a yearly basis. This Strategic Plan usually mirrors the SWOT analysis and contains inter alia information on staff replacement policies, investment plans for the labs, as well as plans for the further development of teaching and research. The panel is reassured that such as document exists, it has however thus far not been provided.

As regards the organisation of student´s exchange, there is a need to further formalizing the recognition of credit transfer especially before the background of the Faculties plan to further internationalize its activities.

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

The peers consider criterion 6 to be completely fulfilled.

D Additional Documents

No additional documents needed.

E Comment of the Higher Education Institution (06.09.2021)

The following quotes the comment of the institution:

“The Faculty of Electrical Engineering and Information Technologies (FEEIT) expresses its sincere gratitude to the ASIIN Peer Panel for the Accreditation Report on Cluster A (Power Engineering Cluster) provided on 25.8.2021. Our impression is that the audit process was performed highly professionally covering all general and specific parts, which provide a clear picture of the way our institution operates. We acknowledge that the facts presented in the report fully reflect our current situation. We appreciate the fact that the peers have a positive impression of the work in our institution. We strongly believe that we will incorporate most of the provided recommendations and guidelines towards the overall improvement of the potential of the Faculty. Therefore, our statement contains only information on the actions that will be taken in order to implement the recommendations of the panel.

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

The learning outcomes will be harmonized with the contents of the study programs, which will be corrected and modernized in accordance with the recommendations of the panel, as explained in criterion 1.2.

Criterion 1.2 Name of the degree programme

We appreciate the comment on the lack of curricular content in automation and renewable energy sources (RES) that will support the title of the Bachelor programme Power Engineering, Automation and Renewable Energy Sources. This suggestion will be considered during the next national accreditation (currently in progress) by adding new modules related to automation and renewable energy sources. Also, current curricula will be improved and updated within existing modules devoted to the mentioned areas by including additional chapters, where appropriate, on novel trends and technologies in the areas of automation and RES in order to justify the name of the programme. In the meantime immediate action by improving the curricula will be realized in the previously mentioned modules until the ongoing national accreditation is approved and put into service.

We also appreciate the comment on the lack of curricular content in Management that will support the title of the Bachelor programme Power Engineering and Management. There-

fore, we decided to change the existing name of the Bachelor programme to Power Engineering and Project Management - PEPM. This decision will be implemented in the next national accreditation (currently in progress) by restructuring the existing modules towards Project Management especially in the area of running and managing energy projects. As a result, the Bachelor programme on Power Engineering and Project Management will provide knowledge in power engineering (electricity generation, renewable technologies, substations and switchyards, and energy efficiency) and project management where the emphasis will be focused on managing large infrastructure energy projects.

Criterion 2.1 Structure and modules

According to the former Law of Higher Education when the present programmes were accredited the student internships are performed annually for 1 month (in total 3 internships during the studies). The new Law from 2018 does not impose this restriction anymore so the Faculty, in cooperation with the partners from industry, will surely restructure the student internship and significantly improve the quality of the internship program.

Criterion 1.2 explains in more details the implementation of the improvements to be made in the structure of the Power Engineering, Automation and Renewable Energy Sources and Power Engineering and Management with the next national accreditation.

We strongly believe that the foreign ASIIN accreditation, as well as the improvement of all three power engineering degree programmes, will increase the interest of foreign students to study at our Faculty.

Criterion 2.2 Work load and credits

One of the forms of interactions with the students currently is a survey performed at the end of each semester. This student survey has only one question related to the workload matter, i.e. question 10 in the Student survey, which is not correctly translated and should be stated as ‘Requirements that are prescribed in the module’ (the full workload of a module – exam, homework, laboratory exercises, etc.). Based on the peers’ recommendations, additional questions will be added to cover the workload matter as well as other aspects that have been noted by the Faculty in the past period. The Faculty will prepare a platform for realization of this student survey that will be fully organized and realized by the students.

Criterion 2.3 Teaching methodology

The teaching process as is a very dynamic and changing. The Faculty conducts teaching in accordance with the Study rules and the ISO 9001 procedures. All members of the teaching

stuff are fully devoted to following and implementation of novel techniques and methodologies in order to have better interaction with the students. This is performed on a daily bases.

Criterion 2.4 Support and assistance

Regarding international mobility, all courses can be held in English if there is at least one foreign student according to our current accreditation. Unfortunately, we have not experienced this situation yet, but the Faculty remains prepared when this situation will appear. Additionally, in order to improve student incoming/outgoing mobility, FEEIT will establish an international office. At the moment, the Faculty has one Erasmus+ officer who is responsible for giving information and help in the preparation of the documents and the realization of the outgoing exchange student programme in the framework of Erasmus+. However, Erasmus+ is currently a responsibility of the University.

Criterion 3 Exams: System, concept and organisation

Regarding the 4th category of activities (industrial excursions), they are organized for all power engineering students within a number of modules in coordination with certain power plants. These excursions allow the students to practically witness the production process (hydro, thermal, solar and wind). Also, students' visits are organized in different companies.

The information about the exam regulations (kind of exams, procedures, and workload) will be placed in the Student Information Booklet and also placed on the Faculty web page.

Criterion 5.1 Module descriptions

Appropriate actions will be taken within the current accreditation in order to improve and level the consistency and completeness in the description of the various modules of all study programmes. An effort will be made through the Career center to improve the database of the FEEIT graduates in order to be able to trace the graduate's career paths and their professional engagement.

Criterion 6 Quality management: quality assessment and development

FEEIT established the Center for Technology Transfer and Innovations (INNOFEIT) in 2018 to boost cooperation with the industry on a more sustainable level. INNOFEIT is a separate legal entity and its statute introduces an Industrial Advisory Board (IAB) that advices INNOFEIT and helps shape the research and cooperation direction. As INNOFEIT is owned by FEEIT, we will introduce IAB findings and recommendations to the entire FEEIT's staff so that there is an even closer cooperation with the industry.

Currently, the Faculty's strategic plan for different areas is the Dean's Working Program that he/she prepares when applying for the position for 3 years. The realization of this plan is monitored through yearly reports about the Faculty's performance with actions to be taken for the following year submitted by the Dean. The work program of the current dean is attached to this report. Many of the panel's recommendations are also noted in the program."

Final assessment of the peers after the comment of the Higher Education Institution:

The peers welcome the actions the faculty is planning to take in order to fulfill the requirements and implement the recommendations. Since the measures explained in the statement are only plans for the (near) future, the peers suggest to maintain the initial requirements and recommendations until they have been fulfilled and implemented in practice.

In the context of a qualiy improvement procedure, the HEI has provided all necessary information and documents to prove that all requirements are fulfilled.

F Summary: Peer recommendations (10.09.2021)

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Power Engineering, Automation and Renewable Energy Sources	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026
Ba Power Systems	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026
Ba Power Engineering and Management	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026

Requirements

For the Bachelor's degree program Power Engineering and Management

A 1. (ASIIN 1.1, 1.2, 1.3) Make sure and provide evidence that the name of the degree programme, its intended learning outcomes and its content correspond with each other.

For all degree programs

A 2. (ASIIN 2.1) The internship experience for students must be restricted and improved in terms of the positioning, duration as well as associated quality assurance measures.

A 3. (ASIIN 5.1) The module descriptions must provide sufficient information on the forms of assessment.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1.) It is recommended to illustrate more clearly to graduates in which way the fundamental courses in mathematics and physics are laying the basis for their future work as power engineers and to familiarize students in earlier stages of their studies with practical applications of their specializations.

E 2. (ASIIN 2.1.) It is recommended to strengthen outgoing as well as incoming mobility of students and to establish an International Office, which should inform students

more proactively about the various opportunities for studying abroad/the corresponding windows of mobility.

E 3. (ASIIN 2.2.) The Faculty should consistently monitor student workload and its impact on progression/failure rates in different courses.

E 4. (ASIIN 2.3). A concept should be developed how the faculty plans to introduce more interactive forms of student centred learning.

E 5. (ASIIN 4.1) Given the "inhouse recruitment system", further steps should be taken to stimulate scientific exchange (beyond the participation in conference and the engagement of international projects).

E 6. (ASIIN 4.2) It is recommended to introduce (monetary or non-monetary) incentive systems to honour outstanding achievements in teaching and research by staff members.

E 7. (ASIIN 4.3) It is recommended to further modernize the equipment and to invest in modern lab equipment computers/software.

E 8. (ASIIN 5.1.) A reliable system should be further developed to assure that all module descriptions are of comparable quality (particular attention should be paid formulating concise learning outcomes for each module).

E 9. (ASIIN 6) It is recommended to reorganize student feedback, a process which already has started by the students' own initiative and to consistently close the quality circles giving a structured feedback to students concerning their suggestions on a regular basis.

E 10. (ASIIN 6) It is recommended to implement formal tracer studies to know more precisely about the success of the faculty's graduates on the labour market beyond the laudable contacts with the Alumni Organizations and individual employer representatives.

E 11. (ASIIN 6) It is recommended to (re)establish and reinforce communication channels with major stakeholder groups for the benefit of improving quality of the faculty's educational offerings. The creation of an Industry Advisory Board is an example in case.

G Comment of the Technical Committee 02 – Electrical Engineering/Information Technology (03.09.2021)

Assessment and analysis for the award of the ASIIN seal:

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

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

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

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Ba Power Engineering, Automation and Renewable Energy Sources	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026
Ba Power Systems	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026
Ba Power Engineering and Management	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026

Requirements

For the Bachelor's degree program Power Engineering and Management

A 1. (ASIIN 1.1, 1.2, 1.3) Make sure and provide evidence that the name of the degree programme, its intended learning outcomes and its content correspond with each other.

For all degree programs

A 2. (ASIIN 2.1) The internship experience for students must be restricted and improved in terms of the positioning, duration as well as associated quality assurance measures.

A 3. (ASIIN 5.1) The module descriptions must provide sufficient information on the forms of assessment.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1.) It is recommended to illustrate more clearly to graduates in which way the fundamental courses in mathematics and physics are laying the basis for their future work as power engineers and to familiarize students in earlier stages of their studies with practical applications of their specializations.

E 2. (ASIIN 2.1.) It is recommended to strengthen outgoing as well as incoming mobility of students and to establish an International Office, which should inform students more proactively about the various opportunities for studying abroad/the corresponding windows of mobility.

E 3. (ASIIN 2.2.) The Faculty should consistently monitor student workload and its impact on progression/failure rates in different courses.

E 4. (ASIIN 2.3). A concept should be developed how the faculty plans to introduce more interactive forms of student centred learning.

E 5. (ASIIN 4.1) Given the “inhouse recruitment system”, further steps should be taken to stimulate scientific exchange (beyond the participation in conference and the engagement of international projects).

E 6. (ASIIN 4.2) It is recommended to introduce (monetary or non-monetary) incentive systems to honour outstanding achievements in teaching and research by staff members.

E 7. (ASIIN 4.3) It is recommended to further modernize the equipment and to invest in modern lab equipment computers/software.

E 8. (ASIIN 5.1.) A reliable system should be further developed to assure that all module descriptions are of comparable quality (particular attention should be paid formulating concise learning outcomes for each module).

E 9. (ASIIN 6) It is recommended to reorganize student feedback, a process which already has started by the students’ own initiative and to consistently close the quality circles giving a structured feedback to students concerning their suggestions on a regular basis.

E 10. (ASIIN 6) It is recommended to implement formal tracer studies to know more precisely about the success of the faculty's graduates on the labour market beyond the laudable contacts with the Alumni Organizations and individual employer representatives.

E 11. (ASIIN 6) It is recommended to (re)establish and reinforce communication channels with major stakeholder groups for the benefit of improving quality of the faculty's educational offerings. The creation of an Industry Advisory Board is an example in case.

H Decision of the Accreditation Commission (17.09.2021)

Assessment and analysis for the award of the ASIIN seal:

The Accreditation Commission discusses the procedure and in particular the recommendation regarding an incentive system for the teaching staff. The Commission is of the opinion that such incentives or such a recommendation could also be perceived as criticism and could thus have a demotivating effect. It therefore deletes the originally suggested recommendation on this issue.

Assessment and analysis for the award of the EUR-ACE® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Ba Power Engineering, Automation and Renewable Energy Sources	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026
Ba Power Systems	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026
Ba Power Engineering and Management	With requirements for one year	30.09.2026	EUR-ACE®	30.09.2026

Requirements

For the Bachelor's degree programs Power Engineering, Automation and Renewable Energy Sources and Power Engineering and Management

A 1. (ASIIN 1.1, 1.2, 1.3) Make sure and provide evidence that the name of the degree programme, its intended learning outcomes and its content correspond with each other.

For all degree programs

A 2. (ASIIN 2.1) The internship experience for students must be restructured and improved in terms of the positioning, duration as well as associated quality assurance measures.

A 3. (ASIIN 5.1) The module descriptions must provide sufficient information on the forms of assessment.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1.) It is recommended to illustrate more clearly to graduates in which way the fundamental courses in mathematics and physics are laying the basis for their future work as power engineers and to familiarize students in earlier stages of their studies with practical applications of their specializations.

E 2. (ASIIN 2.1.) It is recommended to strengthen outgoing as well as incoming mobility of students and to establish an International Office, which should inform students more proactively about the various opportunities for studying abroad/the corresponding windows of mobility.

E 3. (ASIIN 2.2.) The Faculty should consistently monitor student workload and its impact on progression/failure rates in different courses.

E 4. (ASIIN 2.3). A concept should be developed how the faculty plans to introduce more interactive forms of student centred learning.

E 5. (ASIIN 4.1) Given the “inhouse recruitment system”, further steps should be taken to stimulate scientific exchange (beyond the participation in conference and the engagement of international projects).

E 6. (ASIIN 4.3) It is recommended to further modernize the equipment and to invest in modern lab equipment computers/software.

E 7. (ASIIN 5.1.) A reliable system should be further developed to assure that all module descriptions are of comparable quality (particular attention should be paid formulating concise learning outcomes for each module).

E 8. (ASIIN 6) It is recommended to reorganize student feedback, a process which already has started by the students’ own initiative and to consistently close the quality circles giving a structured feedback to students concerning their suggestions on a regular basis.

E 9. (ASIIN 6) It is recommended to implement formal tracer studies to know more precisely about the success of the faculty's graduates on the labour market beyond the laudable contacts with the Alumni Organizations and individual employer representatives.

E 10. (ASIIN 6) It is recommended to (re)establish and reinforce communication channels with major stakeholder groups for the benefit of improving quality of the faculty's educational offerings. The creation of an Industry Advisory Board is an example in case.

I Fulfilment of Requirements (23.09.2022)

Analysis of the peers and the Technical Committees (02.09.2022)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Power Engineering, Automation and Renewable Energy Sources	All requirements fulfilled	EUR-ACE®	30.09.2026
Ba Power Systems	All requirements fulfilled	EUR-ACE®	30.09.2026
Power Engineering and Project Management	All requirements fulfilled	EUR-ACE®	30.09.2026

Decision of the Accreditation Commission (23.09.2022)

Assessment and analysis for the award of the ASIIN seal:

The Accreditation Commission discusses the procedure and follows the opinion of the peers without any changes.

Assessment and analysis for the award of the EUR-ACE® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Power Engineering, Automation and Renewable Energy Sources	All requirements fulfilled	EUR-ACE®	30.09.2026
Ba Power Systems	All requirements fulfilled	EUR-ACE®	30.09.2026

Degree programme	**ASIIN-label**	**Subject-specific label**	**Accreditation until max.**
Power Engineering and Project Management	All requirements fulfilled	EUR-ACE®	30.09.2026

Appendix: Program Learning Outcomes and Curricula

The program learning outcomes, the curricula and an overview of the individual semesters can be found on the programs' websites:

Power Engineering, Automation and Renewable Energy Sources:

https://feit.ukim.edu.mk/en/power-engineering-automation-and-renewable-energy-sources/

Power Systems:

https://feit.ukim.edu.mk/en/power-systems/

Power Engineering and Management:

https://feit.ukim.edu.mk/en/power-engineering-and-management/