ASIIN Seal & EUR-ACE® Label

Accreditation Report

Bachelor's Degree Programs
Computer System Engineering, Automation and Robotics
Computer Technologies and Engineering
Computer Hardware Engineering and Electronics
Telecommunication and Information Engineering

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 program (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Компјутерско системско инженерство, автоматика и роботика	Computer System Engineering, Automation and Robotics	ASIIN, EUR-ACE®	/	**02**, 04
Компјутерски технологии и инженерство	Computer Technologies and Engineering	ASIIN, EUR-ACE®	/	**02**, 04
Компјутерско хардверско инженерство и електроника	Computer Hardware Engineering and Electronics	ASIIN, EUR-ACE®	/	**02**, 04
Телекомуникации и информациско инженерство	Telecommunication and Information Engineering	ASIIN, EUR-ACE®	/	**02**, 04
Date of the contract: 09.04.2021 **Submission of the final version of the self-assessment report:** 22.04.2022 **Date of the onsite visit:** 14.-16.07.2021 **at:** Faculty of Electrical Engineering and Information Technologies (FEEIT)				
Peer panel: Prof. Dr. Reinhard Moeller, University of Wuppertal Prof. Dr. Dieter Baums, University of Applied Sciences of Central Hesse Prof. Dr. Petar Maric, University of Banja Luka Filip Anackovski, St. Clement of Ohrid University of Bitola				
Representative of the ASIIN headquarter: Sophie Schulz				
Responsible decision-making committee: Accreditation Commission				

[1] ASIIN Seal for degree programs; EUR-ACE® Label: European Label for Engineering Programs

[2] TC: Technical Committee for the following subject areas: TC 02 - Electrical Engineering/Information Technology; TC 04 - Informatics/Computer Science

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 Programs

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
Ba Computer System Engineering, Automation and Robotics (CSEAR)	Дипломиран инженер по електротехника и информациски технологии во областа Компјутерско системско инженерство автоматика и роботика / Bachelor of Science	- Automation and system engineering - Industrial automation - Robotics - Artificial intelligence and computing in control systems	6	Full time	/	8 semesters	240 ECTS	Each fall semester, since fall semester 2012
Ba Computer Technologies and Engineering (CTE)	Дипломиран инженер по електротехника и информациски технологии во областа Компјутерски технологии и инженерство / Bachelor of Science	- Computer Engineering - Computer Science	6	Full time	/	8 semesters	240 ECTS	Each fall semester, since fall semester 2012
Ba Computer Hardware Engineering and Electronics (CHEE)	Дипломиран инженер по електротехника и информациски технологии во областа Компјутерско хардверско инженерство и електроника / Bachelor of Science	- Computer hardware engineering - Electronics - Digital Signal Processing	6	Full time	/	8 semesters	240 ECTS	Each fall semester, since fall semester 2012
Ba Telecommunications and Information Engineering (TIE)	Дипломиран инженер по електротехника и информациски технологии во областа Телекомуникации и информациско инженерство / Bachelor of Science	- ICT systems and networks - ICT services and applications	6	Full time	/	8 semesters	240 ECTS	Each fall semester, since fall semester 2012

For the bachelor's degree program Computer System Engineering, Automation and Robotics the institution has presented the following profile on the website:

„The ever present increase in production efficiency, quality and optimization, demands a constant exploitation of integrated and advanced automation concepts in both technical and non-technical systems (eco-systems, economic systems, medical systems, etc.). Therefore, the programme strives to insure that engineers graduated through it find a wide variety of employment and advancement opportunities: they will be able to identify, analyze, understand and solve problems in different environments, from industrial plants to non-technical settings. They will be competent to work with modern industrial automation, with

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

supervision, remote control and data acquisition systems, as programmers and hardware or software engineers, in academic institutions and/or research centers, etc. “

For the bachelor’s degree program Computer Technologies and Engineering the institution has presented the following profile on the website:

„This study program provides acquisition of broad computer engineering knowledge and flexible employment opportunities for the prospective students. Computer Engineering professionals are needed in a wide variety of industries that design computer systems based on new technologies in many areas of application. A graduated computer engineer from this profile, can continue his/her career in many industry areas, as well as the public sector, where the following is being designed, developed and implemented: computer communication systems and services; complex digital systems; modern information systems; Internet and network systems; analysis and development of intelligent networks. The acquired knowledge of students is an excellent basis for continuing studies in institutions and/or research centers all around the world.“

For the bachelor’s degree program Computer Hardware Engineering and Electronics the institution has presented the following profile on the website:

„Engineers of this profile can build their career in companies that design complete solutions based on microprocessor systems (embedded systems for data acquisition, mobile devices, microcontrollers for control and automation in industry, communication equipment, etc.), and in every company that utilizes computers and other electronic equipment.“

For the bachelor’s degree program Telecommunications and Information Engineering the institution has presented the following profile on the website:

„Graduated engineers can be employed in the country and abroad in companies and institutions that develop and implement ICTs: telecommunication and mobile operators, software companies, companies that produce telecommunication equipment, research laboratories and top academic institutions. “

C Peer Report for the ASIIN Seal[4]

1. The Degree Program: Concept, content & implementation

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

Evidence:

- Website per program
- Objective-module-matrix per program
- Diploma Supplement per program
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:

The Faculty of Electrical Engineering and Information Technologies (FEEIT) has described and published program objectives and program learning outcomes for each of the four degree programs. The peers approve that for each program a detailed presentation of learning outcomes and graduates' profiles is given in combination with learning outcome matrices matching the described learning outcomes with the respective modules of the programs. The very informative websites contain brief but explicit descriptions of the programs objectives, clearly stating the professional fields and specializations of the offered degree programs as well as program particularities. The peers acknowledge that the definition of the program objectives involved a thorough analysis of study programs of many other European universities. They also welcome that the learning outcomes and corresponding curricula were developed jointly not only with FEEIT representatives but also with externals stakeholders, in particular industries and alumni, in order to adapt the profiles of the graduates according to the needs of the industry. Moreover, FEEIT has aligned the program objectives with the subject-specific criteria of ASIIN and the EUR-ACE® standards.

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

The overall objective of the Computer System Engineering, Automation and Robotics program is to impart extensive fundamental and practical knowledge from all disciplines in system engineering, control theory, automation and robotics. At the end of their studies, graduates shall be able to present, model and analyse the behavior of systems of different natures, employ relevant (research) methods, techniques and tools for mathematical systems analysis and apply the acquired problem solving skills. To do so, the student should gain a clear comprehension of the methods for information processing and data acquisition in the control and automation systems, and know how to analyse and synthesize automatic control systems, robotic systems, artificial intelligence and machine learning systems, and intelligent control systems, among others.

In the case of the Computer Technologies and Engineering program, the students are supposed to acquire fundamental knowledge from all disciplines in computer technologies and engineering, as well as practical skills for analysis, design, implementation, administration and usage of complete hardware-software computer systems for various specific purposes. In this regard, the graduates of this program shall be able to analyze, design and implement computer architectures, algorithms, data structures and databases, information systems, and cloud systems, among others. Moreover, the graduates should know how to administrate and use embedded and mobile devices as well as wired and wireless computer networks. The students shall also have an overview of the concepts and methods in data science, machine learning and artificial intelligence.

The Computer Hardware Engineering and Electronics program, aims at combining electronics and computer engineering. The combination of knowledge and skills from these two disciplines shall serve as a basis for producing graduates who will be high quality engineers, capable of coping with the challenge of complete hardware-software solution. The imparted knowledge in architectures, algorithms and concepts of computer systems, combined with knowledge from the field of electronics – in particular analog design, VLSI design, PLD and FPGA components, and microelectronics – shall enable the graduates to design products fast, efficient and accurate. Depending on the choice of electives, the students should acquire knowledge in digital signal processing, audio, image and video processing, multimedia systems, biomedical engineering, electromagnetics, electromagnetic waves, antennas, and radio engineering.

The overall objective of the Telecommunication and Information Engineering program is to profile a modern electrical engineer in the field of telecommunications and information engineering, who shall possess the most modern knowledge and skills for a successful professional career in the ICT sector. In this regard, the program focuses specifically on the needs of the national industry and economy, in order to boost the economic development

of the country. The program therefore aims at producing top professionals with an innovative approach and the required leadership skills. To this end, the students shall acquire a broad theoretical and practical knowledge of electrical and telecommunication engineering as well as communication and information technologies, and should be able to plan, design, construct and manage systems that send, process and store information. In this regard, it is necessary that the graduates will be able to conduct independent scientific research.

Next to the professional skills, the students of all four programs are supposed to acquire personal and social skills such as critical and creative thinking, problem solving, the capacity to work individually and in a team (also with colleagues from different disciplines), effective communication, decision making and lifelong learning.

The peers conclude that the objectives of all four programs adequately reflect level 6 of the European Qualification Framework (EQF). The program objectives and learning outcomes of all programs are consistent with the ASIIN Subject-Specific Criteria of the Technical Committee Electrical Engineering/Information Technology and therefore correspond with the EUR-ACE® standards. They aim at the acquisition of specific competences and are described in a brief and concise way. They are well-anchored, binding and easily accessible to all stakeholders.

Criterion 1.2 Name of the degree program

Evidence:

- Official decisions of the university and the ministry for science and education
- Website per program
- Law on Higher Education
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The expert panel considers the names of the study programs to be adequately reflecting the respective aims, learning outcomes, and curricula.

Criterion 1.3 Curriculum

Evidence:

- Website per program
- Curricular overview per program
- Objective-module-matrix per program

- Module descriptions per program
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The curricula of the degree programs are designed to match the program objectives and learning and to that end, they are continuously examined and revised. In the self-assessment report and the curriculum for each program, FEEIT describes in detail how the learning outcomes of each program are to be achieved in the individual modules and thus explains the significance of each module for the program as a whole. The curricula are reviewed by the panel in order to identify whether the described learning objectives can be achieved by the available modules. Course descriptions as well as matrices matching the general learning objectives and the module contents were provided for a detailed analysis. The discussions during the online visit reveal that the current curricula are in a constant revision process and that several modifications have already been made in recent years.

All four programs consist of eight semesters during which the students acquire 240 credits in total. They all share a core of joint modules in mathematics, natural sciences (in particular physics) and engineering that the students take during the first four to five semesters. In turn, each program covers two more groups of modules, which are program-specific core modules on the one hand, and program-specific electives as well as interdisciplinary electives from the broader engineering context on the other hand. The core of the joint modules integrated in all four programs leads to the fact that the first four semesters of all programs are very similar, as the majority of the basic modules are the same. During these four semesters, the students acquire the necessary basic knowledge in mathematics, engineering and computer science by completing core modules covering topics such as programming and algorithms, electric circuits, systems thinking or computer architecture. Once the foundations have been laid, each of the programs focuses on its respective speciality from the fifth semester onwards, although some program-specific modules can also be found during the first four semesters. Electives play a significant role in all four programs, as they make up a large part of the curricula and are supposed to allow the students to specialize within a certain field, thus developing an individual profile. A detailed curricular overview of each study program can be found in the appendix of this document.

The peers generally have a good impression of the curricula of all four programs. By thoroughly analyzing the module descriptions and following the discussions during the on-site visit, the peers state that the four programs are coherent, up to date and cover the essential topics in the respective field, enabling also an individual specialization through many

elective courses. The curricula allow the students to achieve the intended learning outcomes. The program objectives and intended learning outcomes are systematically substantiated and the individual modules build upon and complement each other in a meaningful, if well chosen. Nevertheless, the peers strongly recommend rethinking the current structure of the four programs, in particular regarding the proportion of mandatory and elective courses. The issue is illustrated in detail under criterion 2.1.

Criterion 1.4 Admission requirements

Evidence:

- 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)
- QP 7.5.1-1 Admission of students
- QP 7.5.1-6 Procedure for work of the student service
- Self-assessment report

Preliminary assessment and analysis of the peers:
Student admission for all degree programs at FEEIT is managed through the Student Affairs Service. The admission of students is realized in accordance with the procedure *QP 7.5.1-1 Admission of students* from the ISO 9001 quality control manual applied by the faculty. The enrolment criteria are defined in 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)*.

Admission to the four study programs under review is generally open for all candidates who have completed secondary education, i.e. the state matura or international matura. Those who have completed a four-year secondary education according to the regulations that were in force before the introduction of the state matura can enrol in the undergraduate cycle as well. The university determines which secondary education curricula are suitable for enrolment at certain studies. To be admitted to the four study programs under review, candidates must prove that they have taken their state matura in mathematics as well as in Macedonian, Albanian or Turkish language and literature. Taking an entrance exam is not required.

In summary, the auditors find the terms of admission to be binding and transparent. They confirm that the admission requirements support the students in achieving the intended learning outcomes.

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

The peers consider criterion 1 to be completely fulfilled.

2. The degree program: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Website per program, where the module descriptions are published
- Curricular overview per program
- Objective-module-matrix per program
- Realization of the internship
- 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)
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:

After analyzing the module descriptions and the curricula, the peers confirm that all degree programs under review are divided into modules and that each module is a sum of coherent teaching and learning units. All four programs consist of eight semesters. Each module has a duration of one semester. In all four programs, up to 60 % of the total number of modules represent compulsory modules, 30 % make up the elective modules that can be chosen from the electives list of each program and 10 % remain for the university-wide electives list. The electives have a high weight in the programs according to state requirements, and the students have to take elective courses in each semester. All four programs share a core of joint modules in mathematics, natural sciences (in particular physics) and engineering that the students take during the first four to five semesters. In turn, each program covers two more groups of modules, which are program-specific core modules on the one hand, and program-specific electives as well as interdisciplinary electives from the broader engineering context on the other hand. The core of the joint modules integrated in all four programs leads to the fact that the first four semesters of all programs are almost identical,

as the majority of the basic modules are the same. This means that 80 % of the contents taught in the first four semesters are common for all degree programs.

The peers discuss the structure of the program in much detail with all stakeholders, as they question the sense of having so many electives, in particular from the very beginning onwards. They also note that the process of choosing electives is not clear to every student, and that many of the electives offered in the programs are not necessarily program-specific. Rather, many electives are offered in all four programs, in particular in the first half of the curricula. The peers emphasize that the overall aim of a bachelor's degree should be to focus on a core curriculum that enables the students to acquire a broad basic knowledge within the respective field. While the peers undoubtedly support the integration of elective courses in a bachelor's program, they stress that the core of elective modules should only be integrated in the final phase (or at least second half) of a bachelor's program, once the foundations have been laid. This would allow the students to choose the electives in a reasonable manner and in line with their individual specialization. With the current structure, the peers are concerned that by choosing too many „insignificant" electives and taking few mandatory core modules, the students could go „the easy way" and, as a consequence, miss important core topics. The peers learn that the professors would also prefer to have more mandatory and less elective courses. However, the high number of electives within the curricula is based on governmental regulations. The students, in turn, welcome the large number of electives, as this forces them to deal with the different contents and possible specializations at an early stage, which means that they normally have to do some research in order to make the right decisions. They admit that choosing the most suitable electives can be very challenging, as they are sometimes lacking the necessary prior knowledge in order to fully understand the contents and requirements of the electives. The peers also discuss this with the industry representatives, who emphasize the importance of having a very good core knowledge, in particular in math, programming, and logic. The industry representatives worry that since not all of the core contents are covered in mandatory modules, it could happen – although rarely – that students miss the chance to acquire the necessary knowledge, without realizing it. Moreover, they stress that having a solid understanding of the theoretical core basics of engineering has become a prerequisite for pursuing a successful career in a fast-changing technological environment, since only those with a solid basic knowledge will be able to adapt to frequent changes. According to the industry representatives, it is not a problem to specialize in certain areas in later professional life. However, it *is* a problem if the young professionals have gaps in the basics, as these are usually much more difficult to catch up in practice. In order to avoid such gaps, the peers strongly recommend restructuring the curricula in terms of strengthening the

mandatory courses and ensuring that the core competences will be acquired in these mandatory courses. In this regard, the peers suggest including more mandatory courses in the first four semesters of each program, and in turn, integrating the elective courses primarily within the second half of the curricula. In addition, they would appreciate if the electives were more specifically adapted to each program. This way, the students could more easily be guided on how to develop their individual profile and how to choose the most suitable electives accordingly.

Internships

All four programs include a compulsory internship with a total length of three months, which enables the students to apply their knowledge and to improve their practical and soft skills. The internship is supposed to be divided into three one-month internships per year for the last three years of the studies and is usually carried out during the summer break. However, this procedure has changed during the pandemic. Instead of dividing the internship into three parts, the students completed it in one combined period. The students would prefer to maintain this procedure, as it was much easier for them to find a placement, despite the pandemic. Also in terms of organizational efforts, it was easier to complete the internship in one session.

The faculty's career center publishes placement opportunities on a regular basis. Moreover, many companies take the opportunity to introduce themselves during the job fair that the faculty organizes annually (see also criterion 2.4). However, the peers learn from the students that it is often difficult to find a suitable company who offers an internship. Although the internship is mandatory, the students have the impression that it is not enforced by the faculty. In case the students do not find a placement, the faculty offers to do a project or to realize the internship in one of the faculty's laboratories instead. During the discussion with the industry representatives, the peers try to identify the reasons why the students experience problems in finding an internship. According to the industry representatives, the problem is twofold: First, the companies have noted that students from earlier years are not yet ready to work in the company, as they are lacking some skills, and therefore are often assigned with undemanding tasks. Second, and more importantly, the companies consider the individual parts of the internship, i.e. one month, to be too short, and therefore do not see any benefit from employing a student for such a short stay.

Based on the experiences of the students and the industry representatives, the peers conclude that the reason for and the benefit of dividing the internship into three parts are rather unclear. There is a broad consensus that the internship should be done in a later stage and for a more extended period. Therefore, the peers recommend restructuring the internship, so that it takes place in the final phase of the studies in a consecutive period of

three months, by combining the three individual parts into one. This way, it will most likely be easier for the students to find a placement. At the same time, it can be guaranteed that the students have acquired all necessary competences and knowledge, allowing them to take on demanding and responsible tasks.

International Mobility

The peers also discuss in detail about international mobility and note that, although actively promoted by the program coordinators, it is still rather limited, even though the faculty has established partnerships with about 20 international universities. The peers learn that, in recent years, the faculty managed to increase the number of outgoing students, although it is still comparatively low. The main reason for the low demand in international exchange is the funding, which is too low if the students cannot rely on additional financial support from their parents. Another reason is the organizational effort. The demand is even lower with regards to incoming students, which is not surprising for the peer panel, as the majority of courses are held completely in Macedonian. Overall, the peers encourage the faculty to further enhance student mobility, and in particular promote it more actively. The peers are confident that this can be done with little effort, as the basics for successful student exchange without exceeding the regular period of study are already in place. First, the peers learn that the faculty has already identified a mobility window, which is the 7th or 8th semester. However, this needs to be clearly communicated to the students. Second, in order to increase the number of incoming students, the faculty should consider offering more courses completely in English, in particular since all professors and students at FEEIT show a high level of proficiency in English.

Criterion 2.2 Work load and credits

Evidence:

- 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
- Website per program
- Rulebook of studies for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies)
- Annual student success report 2018-19
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:

The university applies the European Credit Transfer System (ECTS) for the allocation of credit points per module. The calculation of the workload is regulated in the *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*. The academic year at FEEIT comprises 44 weeks, during which the students gain 60 ECTS (i.e. 30 ECTS per semester). Particularly successful students with an average grade of at least 8.5 can acquire up to 40 ECTS credits. In this case, they receive 30 ECTS from the current semester and add a maximum of 10 credits from the next semester. The workload of undergraduate studies is determined by the total required activities of the student in hours, including the time spent in class, on extracurricular activities, and on self-study. For each course, the professors prepare a detailed weekly schedule that clearly indicates the estimated workload per week. According to the rulebook, 1 ECTS equals 30 hours. The modules are constructed in a way that, with some exceptions among electives, all of them comprise 6 ECTS, which means that in most cases, the students spend 180 hours on a module per semester. By the time of the on-site visit, there are a few elective courses that still comprise only 3 ECTS. However, this will be adapted in the upcoming study year, so that all modules (except for the final thesis as well as practical training) show a consistent workload of 6 ECTS in order to make sure that the workload is equally distributed. The peers welcome that FEEIT is about to establish this uniform system, in particular since they learn from the students that the credits of some math electives that only comprise 3 ECTS do not adequately reflect the actual workload. Otherwise, they deem the workload as well as the number of exams to be adequate and confirm that the students have enough time to develop their individual interests and skills outside of the university by working or taking extracurricular classes. Moreover, the students are confident that this issue will easily be solved when adjusting the few remaining 3 ECTS modules to the faculty norm of 6 ECTS.

The peers confirm that the workload in hours is indicated in the module descriptions and the distinction between classroom work and self-studies is made transparent and is in line with the credits awarded. At the end of each semester, the students' workload for every course is monitored and evaluated. In addition, FEEIT implements a student progression statistic every academic year and publishes an annual report on student success statistics. The peers believe the overall workload to be adequate and manageable.

Criterion 2.3 Teaching methodology

Evidence:

- Module descriptions per program
- Self-assessment report

- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
FEEIT has implemented various teaching and learning methods that focus on problem-based learning and aim at supporting the students in achieving the learning outcomes. In general, teaching includes lectures, classroom exercises, laboratory exercises, group work, projects and internships. Some modules also include field teaching or excursions. The applied teaching and learning methods per module are clearly stated in the respective module descriptions. Although the classic lecture is still the most common form of teaching, all staff members are increasing the use of alternative teaching methods. In particular, they are now offering many workshops and flipped classroom exercises. The peers learn that the overall aim of the teaching staff is to establish the problem-based learning as the faculty's standard teaching methodology. The peers welcome that and at the same time, they are convinced that traditional lectures remain a useful tool for knowledge transfer, and understand well that they are deeply rooted at FEEIT. Most of the modules include laboratory exercises, independent of the applied teaching method. The laboratory work enables the students to apply theoretical knowledge in solving practical problems and acquire practical knowledge and skills. In case of very big classes, the teachers divide them into two groups in order to focus on the individual student in the best possible way.

In order to facilitate the teaching and learning process, FEEIT has established an e-learning platform that provides the teaching staff with tools for communication with students and technical support for the implementation of various teaching activities. The platform allows students and teachers an easy access to all information about modules, exams and results, literature, as well as electronic course material such as videos or presentations. Online teaching has been greatly extended during the COVID-19 pandemic. During the on-site visit, both teaching staff and students emphasize several times the advantages of online teaching and confirm that it works very well in practice. The students highlight that the online courses were particularly helpful during the internship and final study phases, as they were not expected to be on campus while at the same time working in a company or writing the thesis. The peers welcome the use of online teaching as well and would be pleased if this was maintained after the pandemic.

In summary, the peers appreciate the various teaching methodologies, both traditional and modern, that are utilized in the four study programs under review. They deem them suitable to support the students in achieving the intended learning outcomes.

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Student success statistics
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:

In order to support students in completing their studies on time with good achievements, the faculty provides academic and personal support and assistance through various means: First, students are appointed an academic supervisor ("professor-advisor") during their first semester, who supports them with devising their study plan (in particular with choosing electives) and monitors the student's academic progress. Each professor has about five students assigned to him or her. The peers regret to learn that not many students take this opportunity and instead stop consulting their personal advisor soon after the first meeting. However, the students emphasize that this is not due to poor advice by the professors. During the pandemic, when most of the teaching activities took place online, FEEIT noted that a considerably higher number of students made use of the professor-advisor system than in previous years. Both the program coordinators and the peer panel are confident that the online teaching could have a positive side effect in order to motivate more students to regularly see their advisor also beyond the pandemic.

FEEIT aims at facilitating the transition from secondary to higher education for first year students. In this regard, it organized preparatory math and programming courses before the beginning of each academic year. Moreover, the faculty has good experiences with using students from higher semesters to offer consultations and tutorials, in particular for courses with large numbers of participants. FEEIT has its own career center, which has two main responsibilities: assisting potential students with choosing the most suitable study program and supporting soon-to-be graduates in the employment process. In this context, it is important to mention that FEEIT organizes the annual employment and internship fair "Contact" in close cooperation with the faculty's student assembly. The faculty invites industry representatives from many different companies who take the opportunity to introduce themselves and their field of activity and to recruit qualified staff.

The peers have a very good impression of the wide-ranging support and assistance mechanisms offered at the faculty and notice a very friendly and trustful relationship between the students and the teaching staff. They conclude that there are enough resources avail-

able to provide individual assistance, advice, and support for all students. The support systems help the students to (better) achieve the intended learning outcomes in order to complete their studies successfully and without delay.

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

The peers consider criterion 2 to be completely fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Rulebook of studies for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies)
- University and student calendar
- Sample exam schedules
- Sample exams, project works and final theses
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
Assessment is conducted according to the regulations defined in the *rulebook of studies for first cycle studies (undergraduate studies) and the second cycle studies (postgraduate studies)*. FEEIT prepares an academic calendar, which is published at the beginning of each semester and is accessible through the faculty website. The academic calendar contains all information on the exams, such as dates, duration and information on the location (exam schedule). The exam schedule is prepared by the faculty but has to be officially approved by the student assembly. Students can take an exam three times; if they fail the third one, there is the possibility to do one last extra try, although extra fees apply in this case. The final exams always have to take place on different days as long as they are from the same semester.

The assessment system at FEEIT has two purposes: knowledge testing during the teaching period as well as final examination at the end of the semester. Knowledge testing during the semester is performed through partial exams, preparation of independent projects,

tests, seminar papers, laboratory exercises, or preparation of homework, amongst others. The aim of checking student knowledge during the teaching period is to continuously monitor the student's progress as well as the distribution of the workload. All professors are asked to distribute the assignments evenly during the semester. The overall quantity of these assignments is well integrated in the calculation of the overall workload.

The final examination is performed in a final exam. Those who have successfully completed all prescribed obligations within the appropriate module can register for and take the final exam. The knowledge 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. The final exams are performed through written or oral exams and projects.

The students confirm that a variety of assessment methods is used. The peers discuss in detail about the workload, which is adequate according to the students. Although they have to complete a comparatively high number of tasks during the semester, the students emphasize that taking several assignments for one course allows for a continuous learning process and serves as an important preparation for the final exam.

At the end of their studies, the students complete their bachelor’s thesis. They can register for the final thesis if they have acquired at least 200 credits on all grounds (passed exams, completed student internship, completed seminars, modules, workshops, etc.) until then.

During the on-site visit, the peers are provided with a selection of exams and final theses to check. They confirm that these represent an adequate level of knowledge as required by the EQF level 6. In conclusion, the peers note that all relevant examination regulations are in place and well communicated in a transparent way. The forms of exams are oriented toward the envisaged learning outcomes of the respective courses, and the workload is distributed in an acceptable way.

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:

- Staff handbook

- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
The teaching staff at FEEIT is distributed within 10 institutes according to the disciplines/areas of teaching-scientific domain. The faculty's staff members have different academic positions. There are full professors, associate professors, assistant professors, and teaching assistants. All professors hold PhDs, independent of the rank, while the teaching assistants hold master's degrees. By the time of the on-site visit, FEEIT academic staff consists of 40 full professors, 14 associate professors, 15 assistant professors and 17 teaching assistants. The faculty also recruits industry representatives as external lecturers.

The academic staff is supported by additional technical and administrative staff, who is involved mainly in laboratories, in the student service office, or the library and archive, among others. The professors emphasize that the non-academic employees have important responsibilities in the field of administration, organization of teaching and exercises, organization of exams and the exam period, as well as other forms of support, assistance and counseling to students.

During the on-site visit, the peers learn that the teaching staff at FEEIT (and in North Macedonia in general) is working under difficult financial conditions, not only because of a very low monthly income but also due to the lack of financial support from the government in order to implement larger projects or to invest in new equipment. In the past, it has also been very difficult to receive budgets for extending contracts and this has only improved during the last two years, so that by the time of the on-site visit, the faculty has sufficient staff resources in order to successfully implement the study programs and conduct research. The university is not allowed to employ staff members without the consent of the government. The peers are very impressed by the active, dynamic and highly dedicated FEEIT team that is trying very hard to constantly improve the curricula in order to keep up with the international standard, despite the poor financial conditions. They acknowledge that the staff members are involved in many important projects that they carry out with industry representatives, and many of them maintain close contacts with universities abroad.

Overall, the peers confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programs. The panel is impressed by the excellent and open-minded atmosphere among the students and the staff members. Both confirm that in case of questions or problems, there is always an academic advisor available to solve the issues together with the student.

Criterion 4.2 Staff development

Evidence:

- Rulebook for scientific and professional development
- Self-assessment report
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:

Staff development in terms of research and teaching activities takes place mainly within the faculty itself. New and young employees receive supporting lessons, for example on teaching methods, time management and research skills, from the faculty's senior professors. In principle, all staff members have the possibility to participate in (international) conferences and are encouraged to do so on a regular basis. Since there is not always a sufficient budget to allow all faculty members to attend conferences, financial resources from other faculties may be borrowed for this purpose as well. The peers learn that central, university-wide facilities, such as career or didactics centers, do not exist at the university. Although all PhD students have access to centrally organized training opportunities that focus on the further development of research skills or on conducting good scientific practice, the peers are of the opinion that there is significant room for improvement in the area of staff development. They welcome and understand well that it is the faculty's tradition to perform internal knowledge transfer and share teaching and research experiences among the teaching staff. However, the peers recommend establishing additional instruments and support mechanisms that are offered by (external) pedagogical and research experts who are not professors at the faculty. These could include regular coaching offers or workshops on innovative teaching and research methods, for example. At the same time, the peers encourage the faculty to enhance interdisciplinary research and in this regard, strengthen cooperation with other faculties, such as the computer science faculty. Through increased exchange with other faculties, all participants could benefit from and complement each other based on their expertise in different areas.

FEEIT promotes, organizes and carries out research, both individually and collectively in accordance with the rulebook for scientific and professional development. The peers acknowledge that the faculty collaborates with a large number of companies when it comes to the implementation of research projects. They also welcome that each professor carries out many different independent research projects outside the university, which are organized by themselves and implemented with practice partners or other institutions. According to the Macedonian Law on Higher Education, every member of the teaching staff in a period of five years has the right on paid sabbatical leave with the duration of one year or

unpaid leave for up to three years. During the on-site visit, the peers learn that the university does not have official budgets for improving teaching and research activities. Sabbaticals are funded as long as the budget allows so. The teaching staff confirms that it is generally possible to apply for and take a sabbatical year; however, this opportunity is hardly taken in practice, as it required a great deal of time and effort to find suitable replacements for the professors so that teaching can continue during the sabbatical period. However, the number of sabbaticals taken at FEEIT is relatively high compared to other faculties of the university. This is because FEEIT generally supports any kind of career and personal development and therefore strives to provide the financial resources accordingly. Moreover, the distribution of sabbatical leaves at FEEIT tends to be straightforward and with minimal bureaucratic effort, as the decisions are taken by the institutes (which are rather small), while the faculty only formally confirms the requests.

The peers conclude that the faculty is actively promoting and supporting internal knowledge transfer and encouraging its employees to further develop their professional and educational skills. Nevertheless, they make the point that the faculty (and the university as a whole) should extend its staff development activities, in particular in terms of additional mechanisms that go beyond the borders of the faculty.

Criterion 4.3 Funds and equipment

Evidence:

- Self-assessment report
- Discussions during the on-site visit
- Inspection of laboratories and other facilities during the on-site visit

Preliminary assessment and analysis of the peers:

Ss. Cyril and Methodius University is a public university that is financed by the Macedonian ministry of education as well as tuition fees (for master's degrees), scientific activities and services to the industry. The government only covers the employees' salaries and overhead costs for general utilities, such as electricity or heating. In turn, each faculty generates its own financial resources and manages its own budget. The institutes use their own funds – acquired through research activities and contracts with industry – and combine them with the faculty funds in order to procure equipment and provide technical support necessary for teaching, especially for the laboratories. A common fund of all faculties is distributed among all of them, so that weaker faculties receive some financial support from the stronger ones. The peers learn that FEEIT is by far the strongest and most important faculty in terms of financial income; not only at the university but also within the whole country.

In the self-assessment report, the faculty gives an extensive overview of the available learning spaces and libraries. Moreover, they list detailed information of all laboratories available for the study programs under review. By the time of the on-site visits, 12 laboratories with a total area of 1,745m² and 349 seats, and 4 computer classrooms with 83 computer workstations are available in order to carry out laboratory and computer exercises.

During the on-site visit, the peers inspect the different facilities of the faculty, and in particular the laboratories that are used in the four study programs. While they confirm that the labs and their equipment are generally up to date, they note during the inspection that the faculty is not using sufficient space for the laboratories. For example, they find large robots in relatively small labs that are placed standing freely and unprotected in the middle of the room. This, in turn, can cause problems in terms of international safety requirements due to the very close proximity between electromechanical setup and student workplaces. Such industrial robots, but with a reliable and tested control system, are necessarily to be caged. With the robot in the laboratory, the control system is just being realized, thus, unexpected movement is more likely, which can be dangerous for people in vicinity. Second, the students face the opposite way and are not aware of the movements of the robot. At the same time, the peers learn from those responsible for the programs and labs that some of the equipment is outdated and until about five years ago, it was very challenging to keep up with the acceleration of technological progress and to invest in new equipment due to the poor financial conditions. Over the last five years, it has been possible to purchase new equipment with the support of donations, contracts and services to the industry, as well as by own funds. This new equipment comprises three photovoltaic power plants with a total capacity of 32KW, a PLC laboratory, a laboratory for robotics, a laboratory for renewable energy sources, and four new computer classrooms with appropriate server equipment. In 2021, the faculty computer network will be completely upgraded by a novel solution and new equipment will be purchased for all laboratories. The peers are pleased to learn that the faculty has succeeded in acquiring new equipment in recent years, despite very limited financial resources. In order to keep up with the international standard, the peers point out that the laboratory equipment should be continuously enhanced and modernized. With a high priority, the faculty has to use more available space and expand the laboratories accordingly. The international safety standards must also be taken into account.

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

The peers consider criterion 4 to be partially fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Website per program, where the module descriptions are published

Preliminary assessment and analysis of the peers:
The module descriptions are published on the faculty's website in both Macedonian and English, so that students and stakeholders can access them at any time.

After studying the module descriptions, the peers confirm that they include information about the persons responsible for each module, the teaching methods and work load, the credit points awarded, the intended learning outcomes, the applicability, the admission and examination requirements, as well as details explaining how the final grade is calculated. However, the peers note that the module descriptions are missing information on the forms of assessment. The peers emphazise that in order to fully meet this criterion, those responsible for the programs must provide sufficient information on the form of examination for each module.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample graduation certificate per program
- Sample transcript of records per program
- Sample diploma supplement per program

Preliminary assessment and analysis of the peers:
With the successful completion of their studies, the students receive a graduation certificate, a transcript of records, and a diploma supplement. The diploma supplements are issued in English and contain all relevant information on the student's qualifications profile and individual performance as well as the classification of the degree program with regard to its applicable education system.

Criterion 5.3 Relevant rules

Evidence:

- 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

- 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 Information Booklet

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

The students confirm that they receive all relevant information in due time, i.e. at the beginning of each semester, and that all course materials and official documents can be accessed easily, be it through the website or the electronic platform.

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

The peers consider criterion 5 to be partially fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-assessment report
- Quality manual
- Student success statistics
- Sample student survey
- Discussions during the on-site visit

Preliminary assessment and analysis of the peers:
From the thorough documentation within the self-assessment report, it becomes obvious to the peers that FEEIT has a multifaceted quality management system that aims at a constant development and improvement of the procedures, the programs and all individual

stakeholders. The faculty (and the university as a whole) applies both external and internal quality assurance. External quality assurance is implemented through national accreditation by the national higher education and takes place in the regular cycle of five years. Internal quality comprises two core activities for ensuring and monitoring the quality of the degree programs, which are a) the self-evaluation process and b) student evaluation. The faculty's self-evaluation is an integral part of the self-evaluation of the entire university and is performed by a self-evaluation commission of FEEIT at intervals of up to three years. During the self-evaluation process, the faculty prepares a self-evaluation report, which must be submitted to the faculty's teaching-scientific council and to the university's self-evaluation commission. Topics to be addressed and assessed in the self-evaluation report include the teaching process, resources, research activities, student activities as well as well as the overall functioning of the faculty. In this regard, the faculty is expected to analyze and clearly identify the strengths and weaknesses of its teaching and research and to derive potential improvement measures.

The evaluation of the teaching staff by the students 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. They are also included in the self-evaluation report. The student survey provides a continuous and direct feedback about student satisfaction of the teaching process and serves as a tool for assessing student satisfaction. The surveys are analyzed and discussed within the institutes and later on, the result are published and discussed with the students. The head of the institute, in close collaboration with all professors, is supposed to suggest and implement actions, where necessary.

Since 2015, FEEIT has also successfully been operating according to the established standard ISO 9001, maintaining a functional quality management system. 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.

The peers expressly welcome the faculty's close relationship with many different companies. From the documentation and the intense discussions during the on-site visit, it becomes apparent that the faculty works very closely with industry representatives and that these are regularly consulted in order to discuss the further development of the curricula. Industry partners are also represented in the Board for Cooperation and Public Trust at FEEIT, which needs to approve the curricula and any amendments made. However, the peers get the impression that the various collaborations with the industry are not much formalized. For example, the majority of contacts thus far has been organized rather "scattered" by individual professors or the respective dean. During the discussions with representatives of the industry sector, the peers learn that there is a considerable interest to

interact in a more regular and formal framework to identify areas of common interest and actively create win-win situations. An example in this case is the re-organization of the internship, which should be discussed jointly with the companies that take the students in. Moreover, the peers understood that the Board for Cooperation and Public Trust only meets in large intervals (i.e. only during the 5-year state accreditation cycle) and therefore only approves the curricula, which means that its participation during the process of developing/adapting the curricula seems to be limited. The peers therefore recommend strengthening and formalizing the cooperation with industry partners wherever possible. They would much appreciate if the two sides met more regularly and discussed questions on the revision of the curricula in more detail. The different kinds of collaboration should also be subject to formal cooperation agreements.

During the discussions on-site, the peers get the impression that the quality management system is working well in practice. They learn that the students, through their representatives in the faculty assembly, are involved in all committees of the faculty management, such as the teaching-scientific council, the dean's board, and the self-evaluation commission. There is also a university-wide student assembly, which consists of the student parliament of each faculty and meets once a year in order to discuss cross-faculty matters. The students confirm that they regularly participate in the evaluations taking place at the end of each semester, and that the results of these evaluations are discussed with them at the beginning of the next semester. The professors generally support the practice of conducting evaluations on a regular basis. However, they stress that direct, informal and bilateral feedback from the students is much more valuable, in particular because the surveys normally show only very positive results. The professors regret that the quality management system is very formal. This applies in particular to the national external quality assurance, which focuses exclusively on formal aspects, thereby ignoring the technical and content-related requirements. For example, during the accreditation period, they are only allowed to implement a maximum of 10 % of content changes, which is very challenging in the fast-changing engineering environment that normally requires regular adaptions. If they identify major changes to be necessary, it is possible to start the re-accreditation process earlier; however, additional fees apply. Although the peers understand the professors' concerns, they recognize that these are directed against state regulations, which are unlikely to be changed any time soon. They therefore welcome even more the fact that the faculty has opted for an international external review.

Summarizing, the peers are convinced that the university has a well-functioning, multifaceted quality management system, which includes a broad range of instruments that ensure a constant revision and improvement of the study programs.

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

The peers consider criterion 5 to be partially 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 expresses a sincere gratitude to the ASIIN Peer Panel, regarding the Accreditation Report, provided on 20.8.2021, for Cluster B (Computer Cluster). We appreciate the fact that the Peers had a positive impression of the work of our institution, and we believe that we will make the most of all recommendations and guidelines in the context of improving our potential.

From our point of view, we had an impression that the audit process was conducted in a highly professional manner, covering all general and specific parts that provide a clear picture of the way of functioning of our institution. Our opinion is that the facts presented in the report fully reflect our current situation, for which our statement contains only few specific comments and some additional explanations for some points, in order for the latest version of the report to be even more detailed.

2.1 Structure and modules

Current situation with the mandatory and the elective courses is rooted in the national legislation for higher education that was in power up to 2018. The new Law on Higher Education from 2018 requires that the number of mandatory courses is at least 70%. Therefore, all comments and suggestions from the peers will be implemented in order to improve the study programs.

Also, former legislation mandated that 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 program in order the improve internship quality.

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 remain prepared. Additionally, in order to improve student incoming/outgoing mobility, FEEIT will establish an international office.

4.2 Staff development

We acknowledge the need for basic staff training outside the faculty as an additional mean to strengthen their expertise. The university has taken an initiative to develop a career center on a centralized level for all faculties and this is ongoing in 2021. Professors from FEEIT are involved in the establishment of this university career center. Although it is primarily

for students, FEEIT will make efforts to introduce activities within this center targeting professors.

4.3 Funds and equipment

FEEIT is sharing its space with the Faculty for Computer Science and Engineering (FCSE), which was established in 2011 with staff coming from the computer science department of FEEIT. The government is building a dedicated space for FCSE in the center of the city so we expect to gain a lot more space available once the FCSE building is finished. Additionally, the faculty is constantly exploring opportunities for expanding its space. We will renovate a smaller building in our campus in 2021 and 2022 to free around 200m2 of space exclusively for laboratories.

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."

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.

F Summary: Peer recommendations (13.09.2021)

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Computer System Engineering, Automation and Robotics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Technologies and Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Hardware Engineering and Electronics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Telecommunication and Information Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027

Requirements

For all degree programmes

A 1. (ASIIN 4.3) More available space must be used in order to expand the laboratory facilities. The international safety requirements must be considered in doing so.

A 2. (ASIIN 5.1) The module descriptions must provide sufficient information on the individual forms of assessment.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is strongly recommended to strengthen the body of compulsory knowledge/competences during the first four semesters and restructure the further studies with electives clearly leading into the specific direction/goals of the program.

E 2. (ASIIN 2.1) It is recommended to restructure the internship so that it takes place in one combined/compact period in the final stage of the studies.

E 3. (ASIIN 2.1) It is recommended to further promote and facilitate student mobility for both incoming and outgoing students.

E 4. (ASIIN 4.2) It is recommended to set up mechanisms for staff development and inter-disciplinary exchange beyond the borders of the faculty.

E 5. (ASIIN 4.3) It is recommended to continuously enhance and modernize the laboratory equipment in order to keep up with the international standard.

E 6. (ASIIN 6) It is recommended to establish a formal procedure to involve the industry partners in the continuous improvement of the programs.

G Comment of the Technical Committees

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 Computer System Engineering, Automation and Robotics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Technologies and Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Hardware Engineering and Electronics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Telecommunication and Information Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027

Requirements

For all degree programmes

A 1. (ASIIN 4.3) More available space must be used in order to expand the laboratory facilities. The international safety requirements must be considered in doing so.

A 2. (ASIIN 5.1) The module descriptions must provide sufficient information on the individual forms of assessment.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is strongly recommended to strengthen the body of compulsory knowledge/competences during the first four semesters and restructure the further studies with electives clearly leading into the specific direction/goals of the program.

E 2. (ASIIN 2.1) It is recommended to restructure the internship so that it takes place in one combined/compact period in the final stage of the studies.

E 3. (ASIIN 2.1) It is recommended to further promote and facilitate student mobility for both incoming and outgoing students.

E 4. (ASIIN 4.2) It is recommended to set up mechanisms for staff development and interdisciplinary exchange beyond the borders of the faculty.

E 5. (ASIIN 4.3) It is recommended to continuously enhance and modernize the laboratory equipment in order to keep up with the international standard.

E 6. (ASIIN 6) It is recommended to establish a formal procedure to involve the industry partners in the continuous improvement of the programs.

Technical Committee 04 – Computer Science/Informatics (10.09.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and basically follows the decision of the peers. However, it slightly changes the recommendation E 6: From the point of view of the Technical Committee, not every type of collaboration should be formalized, since non-formalized collaborations based on verbal agreements can work very well in practice. In the present case, the Technical Committee rather sees a need for improvement with regard to the communication between the faculty and the industrial partners, which should take place more frequently and in an organized way.

The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Computer System Engineering, Automation and Robotics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Technologies and Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Hardware Engineering and Electronics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Telecommunication and Information Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027

Requirements

For all degree programmes

A 1. (ASIIN 4.3) More available space must be used in order to expand the laboratory facilities. The international safety requirements must be considered in doing so.

A 2. (ASIIN 5.1) The module descriptions must provide sufficient information on the individual forms of assessment.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is strongly recommended to strengthen the body of compulsory knowledge/competences during the first four semesters and restructure the further studies with electives clearly leading into the specific direction/goals of the program.

E 2. (ASIIN 2.1) It is recommended to restructure the internship so that it takes place in one combined/compact period in the final stage of the studies.

E 3. (ASIIN 2.1) It is recommended to further promote and facilitate student mobility for both incoming and outgoing students.

E 4. (ASIIN 4.2) It is recommended to set up mechanisms for staff development and interdisciplinary exchange beyond the borders of the faculty.

E 5. (ASIIN 4.3) It is recommended to continuously enhance and modernize the laboratory equipment in order to keep up with the international standard.

E 6. (ASIIN 6) It is recommended to establish a more intensive communication with the industry partners regarding the continuous improvement of the programs.

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 E 2 with regard to the structure of the internship. According to the Commission, internships with a duration of only one month are not very useful, since on the one hand, it is more difficult for the students to find a placement, and on the other hand, the industry partners do not recognize any added value. The Commission therefore decides to make the recommendation an urgent recommendation. Regarding the recommendation E 6, the Commission agrees with the modified wording of the Technical Committee 04.

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 Computer System Engineering, Automation and Robotics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Technologies and Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Computer Hardware Engineering and Electronics	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027
Ba Telecommunication and Information Engineering	With requirements for one year	30.09.2027	EUR-ACE®	30.09.2027

Requirements

For all degree programmes

A 1. (ASIIN 4.3) More available space must be used in order to expand the laboratory facilities. The international safety requirements must be considered in doing so.

A 2. (ASIIN 5.1) The module descriptions must provide sufficient information on the individual forms of assessment.

Recommendations

For all degree programmes

E 1. (ASIIN 2.1) It is strongly recommended to strengthen the body of compulsory knowledge/competences during the first four semesters and restructure the further studies with electives clearly leading into the specific direction/goals of the program.

E 2. (ASIIN 2.1) It is strongly recommended to restructure the internship so that it takes place in one combined/compact period in the final stage of the studies.

E 3. (ASIIN 2.1) It is recommended to further promote and facilitate student mobility for both incoming and outgoing students.

E 4. (ASIIN 4.2) It is recommended to set up mechanisms for staff development and interdisciplinary exchange beyond the borders of the faculty.

E 5. (ASIIN 4.3) It is recommended to continuously enhance and modernize the laboratory equipment in order to keep up with the international standard.

E 6. (ASIIN 6) It is recommended to establish a more intensive communication with the industry partners regarding the continuous improvement of the programs.

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:

Computer System Engineering, Automation and Robotics:

https://feit.ukim.edu.mk/en/computer-system-engineering-automation-and-robotics/

Computer Hardware Engineering and Electronics:

https://feit.ukim.edu.mk/en/computer-technologies-and-engineering/

Computer Hardware Engineering and Electronics

https://feit.ukim.edu.mk/en/computer-hardware-engineering-and-electronics/

Telecommunication and Information Engineering

https://feit.ukim.edu.mk/en/telecommunication-and-information-engineering/