

ASIIN Seal & EUR-ACE[®]-Label & Euro-Inf[®]-Label

Accreditation Report

Bachelor's & Master's Degree Programmes

Ba & Ma Information Systems Ba & Ma Radioengineering, Electronics and Telecommunications Ba & Ma Electrical Power Engineering

Provided by M. Kozybayev North-Kazakhstan University

Version: 22 March 2024

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A About the Accreditation Process

Name of the degree pro-	(Official) English	Labels applied for	Previous	Involved
gramme (in original lan-	translation of the	1	accredita-	Technical
guage)	name		tion (issu-	Commit-
			ing agency,	tees (TC) ²
			validity)	
информационные системы	Ba Information sys-	ASIIN, Euro-Inf®	ASIIN	FA 02, FA
	tems	Label		04
информационные системы	Ma Information Sys-	ASIIN, Euro-Inf®	ASIIN	FA 02, FA
	tems	Label		04
Радиотехника, электроника	Ba Radioengineering,	ASIIN, EUR-ACE®-	ASIIN	FA 02, FA
и телекоммуникации	Electronics and Tele-	Label		04
	communications			
Радиотехника, электроника	Ma Radioengineer-	ASIIN, EUR-ACE®-	ASIIN	FA 02, FA
и телекоммуникации	ing, Electronics and	Label		04
	Telecommunications			
Электроэнергетика	Ba Electrical Power	ASIIN, EUR-ACE®-	ASIIN	FA 02
	Engineering	Label		
Электроэнергетика	Ma Electrical Power	ASIIN, EUR-ACE®-	ASIIN	FA 02
	Engineering	Label		
Date of the contract: 18.03.20	22		L	
Submission of the final version	n of the self-assessmen	t report: 26.09.2021		
Date of the online audit: 11 -	13 05 2022			
	13.03.2022			
Peer panel:				
Prof. Dr. Reinhard Moeller, University of Wuppertal				
Prof. Dr. Frank Gronwald, University of Siegen				
Prof. Dr. Thomas Meuser, Hochschule Niederrhein				

¹ ASIIN Seal for degree programmes; EUR-ACE[®] Label: European Label for Engineering Programmes; Euro-Inf[®]: Label European Label for Informatics

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

Dr. Stephan Flake, S&N CQM GmbH	
Marat Aigerim Serikovna, Student at International University of Information Technolo- gies (Almaty)	
Representative of the ASIIN headquarter: Paulina Petracenko	
Responsible decision-making committee: Accreditation Commission for Degree Pro-	
grammes	
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	
Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/Eng- lish translation)	b) Areas of Spe- cialization	c) Corre- sponding level of the EQF ³	d) Mode of Study	e) Dou- ble/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Information Sys- tems	Bachelor of Technics and Technology		6	Full time	/	8 Semester	240 ECTS	autumn semester 01.09.1996
Information Sys- tems	M.Sc.		7	Full time	/	4 Semester	120ECTS	autumn semester 01.09.2001
Radioengineering, Electronics and Telecommunica- tions	Bachelor of Technics and Technology		6	Full time	/	8 Semester	240 ECTS	autumn semester 01.09.2004
Radioengineering, Electronics and Telecommunica- tions	M.Sc.		7	Full time	/	4 Semester	120ECTS	autumn semester 01.09.2008
Electrical Power Engineering	Bachelor of Technics and Technology		6	Full time	/	8 Semester	240 ECTS	autumn semester 01.09.2004
Electrical Power Engineering	M.Sc.		7	Full time	/	4 Semester	120ECTS	autumn semester 01.09.2008

For the <u>Bachelor's degree programme</u> <u>Information Systems</u> the institution has presented the following profile on their website:

"The Bachelor's degree programme "Information Systems" trains specialists in the field of IT technologies capable of managing the development, implementation, maintenance and modification of information systems at the enterprise based on the methodology of computer science using instrumental and computing environments. During the training period,

³ EQF = The European Qualifications Framework for lifelong learning

according to the curriculum of the EP "Information Systems", fundamental and elective modules of the curriculum will be studied, production, training and pre-graduate practices will be completed.

List of professions:

- Information systems administrator
- Business analyst in the field of Information technology
- IT Project Manager
- System analyst
- Service Security Specialist
- Specialist in conducting business analysis
- Database Management System Specialist

Types of professional activity:

- Organizational-management
- Design-development
- Industrial-technological
- Operational"

For the <u>Master's degree programme</u> <u>Information Systems</u> the institution has presented the following profile on their website:

"The educational programme of the Master's degree "Information Systems" is aimed at the formation of a highly qualified scientific and pedagogical worker capable of performing professional activities efficiently and effectively, solving standard and non-standard professional and pedagogical tasks, able to navigate in the social and professional space in the field of engineering and computer science.

During the training period, students will gain knowledge in the field of computer science, acquire skills and abilities sufficient to carry out their professional activities in the field of research, development, implementation of IT systems in all industries, including social, economic, technical, technological and other systems. They will acquire knowledge and skills for the implementation of educational activities for professional training in the field of computer science, as well as for the integration of knowledge, continuing education and advanced training in the field of computer science. According to the curriculum of the Master's degree programme "Information Systems", fundamental and elective modules of the curriculum will be studied, pedagogical and research practices will be completed, several research works will be conducted. In the process of passing pedagogical practice, undergraduates are trained in conducting practical and laboratory classes in various bachelor's

disciplines, attend classes of leading teachers of the department and participate in educational work.

Research practice is conducted in order to prepare a master's student for independent research, design work, solving production problems, writing a master's thesis. Research works of students in the educational programme Information Systems (Ma) are associated with the design, creation of components of information systems, production of programs and software complexes, modeling of processes and objects based on standard packages of computer-aided design and research, development and research of theoretical and experimental models of objects of professional activity in various fields in the conditions of the economy of the information society."

For the <u>Bachelor's degree programme</u> R<u>adio Engineering</u>, <u>Electronics and Telecommunica-</u> <u>tions</u> the institution has presented the following profile on their website:

"The Bachelor's degree programme "Radio Engineering, Electronics and Telecommunications" is aimed at the formation of a highly educated person capable of professional growth and mobility, possessing key and professional competencies in the field of telecommunications, as well as being able to solve professional tasks of an engineer in the field of radio engineering, electronics and telecommunications.

During the training period, according to the curriculum of the EP "Radio Engineering, Electronics and Telecommunications", fundamental and elective modules of the curriculum will be studied, production, training and pre-graduate practices will be completed.

Graduates of the programme successfully work in the installation and commissioning, organizational and managerial, design and technological, design and design, service and operational, experimental and research fields. They hold the positions of cellular communication engineers, FOCL (Fiber-optic communication line) design engineers, engineers-developers of equipment with neural network processing and control, design engineers, process engineers, engineers on engineering and technical methods of information protection and information security. The main areas of employment from the point of view of the employers' profile include enterprises and companies producing electronics, repair services, factories, telecommunications companies, cellular providers, law enforcement agencies, the military-industrial industry, etc."

For the <u>Master's degree programme</u> Radio Engineering, Electronics and Telecommunications the institution has presented the following profile on their website: "The <u>Master's degree</u> programme "Radio Engineering, Electronics and Telecommunications" is aimed at the formation of a highly qualified scientific and pedagogical worker capable of performing professional activities efficiently and effectively, solving standard and non-standard professional and pedagogical tasks, freely navigating the social and professional space in the field of communications and communication technologies.

During the training period, students will gain knowledge in the field of modern management tools, mathematical, engineering and technical calculations, as well as competencies in the field of financial literacy and the development of entrepreneurial skills. They will acquire knowledge and skills for the implementation of educational activities for professional training in the field of radio engineering, electronics and telecommunications, as well as for the integration of knowledge, continuing education and advanced training in the field of radio engineering, electronics and telecommunications.

Research practice is conducted in order to prepare a master's student for independent research, design work, solving production problems, writing a master's thesis.

The research work of students in the educational programme Radio Engineering, Electronics and Telecommunications (Ma) is associated with new developments in the field of communication networks and switching systems, ensuring stable and uninterrupted operation of radio communication systems and devices, including satellite, radio relay and mobile communication systems. Much attention is paid to improving the performance of data transmission systems and devices; the development of electronic and computer object management systems, effective methods of information transformation."

For the Bachelor's degree programme <u>Electrical Power Engineering</u> the institution has presented the following profile on their website:

"The educational programme "Electrical Power Engineering" is aimed at training highly qualified specialists in the field of electric power transmission systems and networks, relay protection and automation, with knowledge, skills and abilities sufficient to solve production-related tasks.

During the training period, according to the curriculum of the EP "Electrical Power Engineering", fundamental and elective modules of the curriculum will be studied, production, training and pre-graduate practices will be completed.

Graduates of the programme successfully work in the installation and commissioning, organizational and managerial, design and technological, design and design, service and operational, experimental and research fields. They hold positions of electrical engineers, electrical system maintenance specialists, power system dispatchers, electricians, power system operation specialists, energy security engineers. A graduate can realize himself at enterprises for the production, transmission, distribution and consumption of electricity, in construction organizations, transport enterprises, factories, housing and communal services, office centers, large stores, supermarkets. The main areas of employment from the point of view of the employers' profile include enterprises and companies producing electronics, repair services, factories, telecommunications companies, cellular providers, law enforcement agencies, the military-industrial industry, etc."

For the Master's degree programme <u>Electrical Power Engineering</u> the institution has presented the following profile on their website:

"The Master's degree programme "Electric Power Engineering" is aimed at the formation of a highly qualified scientific and pedagogical worker capable of performing professional activities efficiently and effectively, solving standard and non-standard professional and pedagogical tasks, freely navigating the social and professional space in the field of electric power.

During the training period, students will gain knowledge in the field of modern management tools, mathematical, engineering and technical calculations, as well as competencies in the field of financial literacy and the development of entrepreneurial skills. They will get an idea of the methods of modeling complex multidimensional systems and the basics of artificial intelligence, as well as competencies in the field of creating automated data collection systems and practical application of artificial intelligence systems in technical systems. They will form an idea about engineering in the electric power industry and the main causes of electricity losses in electric networks, as well as gain competencies in the field of high voltage engineering and the use of energy-saving technologies in power supply systems. They will gain knowledge about the design features of overhead and cable lines used for power supply to cities and industrial enterprises and acquire skills in designing automation and relay protection systems.

Research practice is conducted in order to prepare a master's student for independent research, design work, solving production problems, writing a master's thesis. The research works of students in the educational programme "Electric Power Engineering" are related to methods of improving the reliability of power supply and electric drive systems, problems of stable operation of electrical equipment, energy savings and unconventional methods of generating electricity."

C Peer Report for the ASIIN Seal⁴

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Report
- Discussions during the Audit
- Websites of all programmes
- Diploma Supplements for all programmes
- Module Handbooks for all programmes

Preliminary assessment and analysis of the peers:

For the degree programmes under review, the higher education institution (HEI) presents an extensive description of learning outcomes in the self-assessment report (SAR). This description is accompanied by learning module matrices for each programme, matching learning objectives, modules and the ASIIN Subject-Specific Criteria (SSC) as well as the criteria for the Euro-Inf[®] Label and the EUR-ACE[®]-Label. A short English description of the learning outcomes is also presented in the Diploma Supplements for all degree programmes. In addition, the module descriptions include the learning outcomes of each individual module.

The peers discuss the learning outcomes of each degree programme, which can be found in their entirety in the annex to this accreditation report, with regard to the following criteria: the level of academic qualification aimed at, the respective ASIIN subject-specific label (SSC), whether the intended qualification profiles allow the students to take up an occupation corresponding to their education, which stakeholders are involved in the continuous assessment and further development of the objectives. The peers refer to the SSC of the Technical Committees Electrical Engineering and Information Technology as well as

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.

Computer Science as a basis for judging whether the objectives and intended learning outcomes of the degree programmes under review correspond with the criteria.

The peers conclude that the objectives and intended learning outcomes of all degree programmes under accreditation are consistent with the EQF levels aimed at and adhere to the relevant ASIIN SSC. The peers remark, however, that the learning objectives as outlined in the SAR only marginally address the possible occupations of the graduates. Thus, the objectives do not clearly illustrate the variety of work places that the graduates are eligible to work at. For these reasons, the peers recommend that the learning objectives should contain more information on the specific fields in which the alumni should be able to work in. Furthermore, the peers remark that while the learning objectives can be found in the SAR, the Diploma Supplements and the websites of the respective study programmes, they are not fixated in any official binding document such as the study regulations for example. Although the websites are platforms that are easily accessible to the public, they do not constitute legally binding documents, which is why the learning objectives of all the programmes need to be defined in legally binding documents that are also accessible for all relevant stakeholders.

Since the university has also applied for the Euro-Inf[®] Label and the EUR-ACE[®]-Label, the peers assess whether the learning objectives correlate with the respective criteria of those labels. They conclude that the intended learning outcomes at the programme level also match the relevant subject-specific criteria of the Euro-Inf[®] Label and the EUR-ACE[®]-Label.

The peers discuss with the programme coordinators of NKU if and how the programme objectives and programme learning outcomes are regularly reviewed and updated. The peers learn that the university regularly organizes evaluations and feedback discussions in which the curricula and the learning objectives are reviewed by a range of stakeholders, including representatives from the industry, students and alumni. Part of the extensive monitoring system is among other things an annual survey of graduates on the quality of the degree programmes, learning environment and support services and a survey of employers on the quality of training of graduates, which takes place every two years.

The programme coordinators state that maintaining a close connection with the industry is at the heart of their efforts. In the audit conversation with the industry partners, representatives of companies confirm that they are in regular exchange with each other and the university (up to twice per month) in order to evaluate the learning objectives, discuss the curricula or organize events such as hackathons. The industry partners report that the curricula of the programs under review are constantly reviewed in the light of changing demands of the market and subsequently adapted to these. The peers are satisfied knowing that the objectives and learning outcomes are continuously updated and believe that especially the input of the external stakeholders ensures that students are best qualified for a successful career after graduation.

The close relationship to the regional market is continued after the students' graduation as most of the graduates find an employment in the surrounding area. The peers learn that the majority of graduates work in the local industry in the areas of research, development and implementation. Only few students decide to continue with a Master's degree after their Bachelor studies due to attractive job offers from regional companies. The peers learn furthermore that many Master students decide to study a Master's degree programme after already having worked for a few years. Those who are pursuing a Master's degree often intend to become teachers or pursue an academic career. The peers are informed that in Kazakhstan the numerous requirements for a PhD constitute a barrier for many students, which is why only few decide to pursue an academic career.

In conclusion the peers are satisfied with the qualification objectives and learning outcomes of each degree programme as they match EQF, ASIIN SSC criteria and criteria of EUR-ACE and Euro-Inf Label, are continuously evaluated and developed by all relevant stakeholders and are published transparently. Nonetheless, the objectives need to be officially anchored in a legally binding document and supplemented by a more detailed list of possible workplaces for graduates. The peers furthermore appreciate the strong collaboration between the university and the regional market, which is among other things reflected in the curriculum that prepares students for a profession in local companies. However, due to the strong focus on the local industry the curriculum seems slightly one-sided, which is why the peers recommend expanding the range of modules according to the state of the art of similar programs. This aspect will be further elaborated under criterion 1.3.

Criterion 1.2 Name of the degree programme

Evidence:

- Appendix Diploma Supplements for all degree programmes
- Appendix Module Handbook for all degree programmes
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The peers agree that the names of the degree programmes adequately reflect their respective aims, learning outcomes and curricula.

Criterion 1.3 Curriculum

Evidence:

- Appendix Curricula for all degree programmes
- Appendix Module handbooks for all degree programmes
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

All the <u>Bachelor programmes</u> have a duration of four years, whereas the Master programmes have a duration of two years. The curricula of each Bachelor programme consists apart from technical subjects also of a variety of general subjects such as "History of the State" or "Social and Humanitarian Knowledge". In their self-assessment report as well as the module handbook, the university explains in detail the individual competences and skills that are associated with each of these module groups and which individual modules are contained in which group. The peers thus gain a distinct overview of the curricular content of all degree programmes (cf. annex to this accreditation report).

The presented curricula of all <u>Ba degree programmes</u> leave the expert panel with the impression that these curricula offer a comprehensive overview and sound basis of information systems, radio and telecommunications engineering, and electrical power engineering, respectively. The curricula of the Ma degree programmes equally satisfy the peers as they offer a deepened education of the respective fields. The curricula of all programmes appear reasonable and meaningfully designed, thereby ensuring that students will achieve the above-mentioned learning outcomes. In particular, the auditors come to see that the students gain the skills and competences defined by the SSC of the Technical Committees 02 and 04. In addition, the curricula of the Bachelor and Master programmes Information systems also match the standards described by EQUANIE (Euro-Inf® Label). The programmes Ba and Ma Radio Engineering, Electronics and Telecommunications and Ba and Ma Electrical Power Engineering furthermore correspond with the standards of ENAEE (EUR-ACE®-Label). The skills and competences students are expected to acquire in the broad fields of information systems, radio and telecommunications engineering, and electrical power engineering are not only adequately reflected in the Learning Objective Matrix but also plausibly implemented and operationalized in the curricula of the programmes. This is transparently indicated in the Learning Objective matrices and generally evidenced in the module descriptions.

Nonetheless, there are a few uncertainties that arise from the self-assessment report and the supporting documents. For example, the peers inquire about the area of Business Administration within the <u>Information Systems</u> programmes: During the last accreditation procedure, it was recommended to incorporate more elements of Business Administration in the syllabi, yet, the peers cannot find those elements in the current curricula. The programme coordinators explain that they do have expanded this field within the syllabi but more in the context of other modules, such as "Automation and Designing" and "Business Administration in Information Systems" rather than dedicating a separate module to this topic. The peers are satisfied that the university followed the recommendation of the last accreditation and increased the portion of Business Administration in the curriculum.

Moreover, the peers ask why the module "Operational management in business administration" has been removed from the <u>Master programme Information Systems</u>. The programme coordinators refer to the recommendation from the last accreditation, in which it was suggested to increase the programmes' research profile. On this basis, the programme coordinators replaced some modules with more research-oriented modules, which also focus more on the programme's specialization in computer science. The peers can understand the reasoning behind this decision and support the increased focus on research.

Another question that arises from the curriculum of the <u>Ma Information Systems</u> regards the seemingly incoherent contents taught in the module "Information Protection and Neurocomputer Systems". In the audit discussions, the programme coordinators explain that these elements are taught simultaneously because of the intended accumulative effect when combined. In addition, Master and PhD students use those disciplines together to process and protect big data and as the basis for further research projects. The peers accept the connection of these topics against this background.

In the context of internationalization strategies that will be further discussed in criterion 2.1 of this report, the peers notice the lack of technical modules offered in the English language in <u>all programs</u>. During the last accreditation the peers recommended to establish more courses in English and while the programme coordinators assure that English–language courses have been introduced, these only focus on language skills but not on the technical terminology of the respective fields. The peers are told that the university currently designs and launches new engineering programs, which are more internationally oriented such as the programme "Software Architect" that started in 2019 and are carried out as a collaboration with the University of Arizona. The peers are impressed with the university's strategies and new programs, nevertheless, it seems that the current programs under review are to a certain extent neglected whereas most of the progressive strategies are applied on the new programs only. Thus, the peers recommend that technical modules in

English are also offered in the programs under accreditation so that students are not only prepared for studies abroad but also for international professions or research activities.

Finally, as has already been mentioned under criterion 1.1 the peers note down that the curriculum is highly adapted to the demands of the regional industry which includes among other things broadcasting stations, machine building plants, electro-technical plants, and network security firms. While on the one hand, this ensures that students are well prepared for a workplace in the regional market, on the other hand, the peers believe that this results in slightly one-sided curricula, which primarily focus on applications rather than on actual research/publications. Furthermore, the peers notice that all programs only offer a relatively small range of elective modules that the students can choose from and which hinders students in specializing in a field that goes beyond the traditional subjects that are needed in the regional industry. Therefore, the peers recommend to extend the range of elective modules according to the state of the art of similar programs such as "Renewable Energy" in Electrical Power Engineering or "IT Security" in Information Systems.

Criterion 1.4 Admission requirements

Evidence:

- "Regulations of Enrolment in educational programs in higher and postgraduate education"
- Self-assessment report
- "Academic policy"

Preliminary assessment and analysis of the peers:

Based on the documents defining the admission requirements, the peers learn that most of the admission policy is centrally regulated and follows the "Standard Rules for Admission to Training in Educational Organizations Implementing Professional Educational Programs of Higher Education". Generally, people with a "secondary, technical, vocational, post-secondary, higher education are accepted at the <u>Bachelor's Degree</u> EP of M. Kozybayev NKU". Furthermore, students interested in one of the three Bachelor's degree programs under review need to have completed the single national testing (UNT) in three mandatory subjects, which are Mathematical literacy, Reading literacy, and History of Kazakhstan, and in the two specialized subjects Mathematics and Physics. According to the self-assessment report "applicants must score at least 50 points, including at least 5 points in each discipline, the maximum score is 140. Applicants for the largest number of points on a competitive basis are awarded state grants. Applicants who do not pass the competition, but have reached the threshold level of points, are entitled to study on a paid basis. Applicants who have not reached the points threshold are enrolled on a paid basis and must resubmit the UNT at the end of the first academic period to confirm their knowledge." The number of students enrolled in the programs can vary due to changing numbers of applicants who have won the state grant, as well as the number of applicants who want to study on a fee basis. Thus, the peers notice the relatively small number of students enrolling in the programs under review and inquire about the reasons for the low enrollment rate. In 2020, for example, only 14 students enrolled in the programme Ba Information Systems, 61 students in the Ba programme Electrical Power Engineering, and 37 in the Ba programme Radio Engineering, Electronics and Telecommunications. Overall, the student beginners in the Ba programme Information Systems have fluctuated over the last eight years as the numbers increased: From 2014 with 21 new students to 2018 with 28 students, they increased and then dropped to 14 students by 2020. A similar trend can be observed in the student numbers of the Ba programme in Radio Engineering, Electronics and Telecommunications: in 2014 there were 21 new students, in 2018 61 students and in 2020 27 new students. In the Electrical Power Engineering Ba program, on the other hand, numbers rose steadily from 2014 with 20 students to 2020 with 61 students. The programme coordinators explain that many young people decide to study at universities located in bigger cities around Petropavlovsk, which is why it is challenging for NKU to retain students. According to the SAR, the university is already implementing measures to attract more students such as offering targeted career guidance work among graduates of urban and rural schools and colleges.

In order to be admitted to one of the <u>Master programs</u> under review, students need to have completed a higher education program. In addition, students interested in a Master programme must participate in a competitive test (CT) in which the student's knowledge in a foreign language, their expertise in a group of programs and their readiness for training are assessed. Furthermore, the admission requirements define that "admission of persons to the magistracy on a paid basis is carried out according to the results of the CT in accordance with the Scale of the 150-point rating system for the CT in the magistracy with Kazakh or Russian language of instruction according to Annex 7 to these Model Rules: not less than 50 points, while in a foreign language - not less than 25 points, in the profile of a group of educational programs: with the choice of one correct answer - at least 7 points, with the choice of one or more correct answers - at least 7 points, according to the test for determining readiness for training - at least 7 points."

Here again, the peers remark the low numbers of enrollments in the Master degree programs. In the Ma programs Electrical Power Engineering and Radio Engineering, Electronics and Telecommunications, the numbers fluctuated slightly after 2014, but remained low overall, amounting to three enrolled students in Electrical Power Engineering and two students in Radio Engineering, Electronics and Telecommunications in 2020. In the Ma programme Information Systems, however, the numbers rose from 2014 with four new students to twelve new students in 2020. The university states in their self-assessment report that dynamic number of students enrolling in the Master programs is influenced by the number of grants allocated by the MES of the Republic of Kazakhstan. Furthermore, as outlined in criterion 1.1 of this report, a Master degree is often only of interest for those who intend to pursue an academic career, become a teacher or deepen their knowledge in a special field.

The auditors find the terms of admission to be binding and transparent as they are available on the website of the North-Kazakhstan University in both Russian and English. 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 university refrains from submitting a statement. The experts therefore adhere to their assessment, which was presented in the preceding text, and formulate the requirement that NKU must ensure that the qualification objectives are bindingly anchored so that the stakeholders can refer to them. Moreover, the peers recommend that the learning objectives should contain more information on the specific fields in which the alumni should be able to work in. In terms of the curriculum, the peers recommend the extension of the range of elective modules according to the state of the art of similar programs (e.g. renewable energy in power engineering or IT-security in information technology) and to provide technical modules also in English.

In conclusion, the peers consider this criterion to be not fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

• Objective-Module Matrix for all programmes

- Module Handbooks for all programmes
- Study Plans/Curricula for all programmes
- Self-assessment report
- "List of universities in the technical field that have agreements on cooperation
- "Rules for recognition of the results of formal and non-formal learning at the North Kazakhstan University named after M. Kozybayev"
- "Academic Policy"

Preliminary assessment and analysis of the peers:

The study programmes under review are divided into modules, which comprise a sum of teaching and learning. The panel finds the structure of the modules to be adequate and manageable. However, as touched upon in Criterion 1.3 the peers review the documents and conclude that the curricula of all programs are rather rigid since the students only have a limited number of elective modules, they can choose from. In fact, the number of modules listed in the curriculum (including those designated as electives) corresponds exactly to the number of modules listed in the module handbooks. For example, for the Ba programme Information Systems, in both the study plan and the module handbook there are altogether 31 modules offered of which 19 are marked as mandatory. Generally, in the Ba programmes, the total number of modules varies between 30 and 31, while in Ma programmes the number of modules varies between 14 and 18. Consequently, the peers are confused about the total number of modules offered in each degree programme and the range of elective modules offered, as it appears that a student must complete all of the elective modules offered in order to achieve the total of 240 or 180 ECTS per degree program. During the audit, the programme coordinators explain that the students of all programs are offered a range of elective modules which are also compiled in a catalogue per program. Yet, they also point out certain limitations that should ensure that, for example, the workload of the students is not exceeded. Furthermore, the peers learn that students are supported in their module selection by advisors, the Dean or the teachers themselves. Since this support is not formalized though, the peers require that a system is established in which guidelines for the selection of elective modules are defined and a monitoring system is introduced to control that the chosen elective modules fit the general curriculum. Thereby, students should receive a clear understanding of how to choose which modules in order to build a coherent curriculum that corresponds to their interests. In this context, the peers would also like the university to clarify the definition and offering of elective modules itself, as this is not transparently presented in the submitted documents. Moreover, as mentioned in Criterion 1.3, the peers deem the range of modules as slightly onesided and primarily application-oriented. Thus, many of the modules focus on only a few competences that are required by the regional industry. Exemplary modules that illustrate this in the case of the Electrical Power Engineering programme are "Microprocessor Electronics", "Technical Equipment of Power Plants" and "Energy Transmission and Energy Security". For these reasons, the peers recommend extending the range of elective modules according to the state of the art of similar programs such as "Renewable Energy" in Electrical Power Engineering or "IT Security" in Information Systems.

Furthermore, the peers also wish for more flexibility in relation to the new programs that are currently designed and implemented. The programme coordinators report of various new engineering programs that are currently developed and which will be partially taught in English and in cooperation with foreign universities. The peers deem these programs to be great additions to the faculty but recommend that the students of the existing programs also receive the chance to complete modules from the new programs if they fit into the profile of the respective student's program. When asked about this opportunity, the students in the audit discussions confirm that they would appreciate this possibility.

As already mentioned, the peers appreciate the close connection between the university and the local industry. As a result of this close cooperation, students of all the <u>Bachelor</u> <u>programs</u> under review are obliged to complete the module "Final Internship". The module is to be completed in the eighth semester and consists of the "Work Experience Internship 3" and the "Pre-Graduation Internship". These internships function as preparation for their final thesis, in which they carry out research activities. Upon the question of the peers as to why the final thesis only constitutes a relatively small part of the entire curriculum (11 ECTS from overall 240 ECTS), the programme coordinators explain that the students already carry out most of the preparatory work for the thesis in the framework of the "Final Internship", which is credited with 15 ECTS points. Furthermore, the students of all mentioned Bachelor programs have the opportunity to take the elective module "Basics of the Profession" in which they are introduced to the basics of the respective discipline and have to apply their acquired knowledge in a "Practical Training". Furthermore, each of the BA programs offers specific technical modules, in which students need to undergo "Work Experience Internships" and complete an Internship Report Defense.

In the <u>Master programs</u> to be accredited, students equally complete a significant number of research internships. Thus, in all Ma programs there are four mandatory "Research work" modules. These can be carried out either at the university or at external organizations or companies. Furthermore, the students conclude their studies with a Master thesis that is credited with 11 ECTS. The programme coordinators inform the peers that many Master students decide to carry out their research externally, where they also receive the option to be paid for their internship.

The basis for all internships is a bilateral agreement, which is concluded between the university and the enterprise or organization. Management of practice is carried out on both sides: on the part of the university by qualified teaching staff, on the part of the enterprise or organization by the head or leading specialists.

To conclude, the peers are very satisfied with the range of opportunities students are given to carry out internships, where they can apply their knowledge in a practical context and perform research activities. The peers are convinced that the many encounters students have with the industry during their studies prepares them well for their future career.

Mobility

Internationalisation is of growing importance to NKU, as can be seen in the new international programs in which the university collaborates with the University of Arizona. Furthermore, the university is eager to increase the English skills of their students and teachers by offering more English-language courses. Yet, the peers criticize that in the programs to be accredited there are no technical modules offered in English. The students share this criticism and articulate their wish for more modules in English. When asked about the opportunities of studying abroad, the majority seems to be aware of the options but only few declare to have used the chance to study abroad. The low participation is mirrored in the official numbers provided in the self-assessment report. Hence, between 2016 and 2020 only six students from the programmes to be accredited have spent a semester abroad. The students name, among other things the, Covid 19-pandemic as a reason for the common low interest in studying abroad. Yet, they assure that the university has laid out the conditions and procedures for international exchange transparently. Through a learning agreement, it is guaranteed that all modules are recognized at the home university as well. Furthermore, all students applying for a stay abroad need to prove English skills of at least B+ and need to participate in a preparatory online session. In addition, the university provides statistics on the number of international students, who carried out their entire studies at NKU in one of the degree programmes under review. Thus, on average in the last five years one to two international students completed one of the programmes at NKU.

The peers are overall glad to hear that the university supports students before, during and after their mobility. However, they believe that enhancing the internationalisation of the six programmes under review would not only encourage more students from NKU to study abroad but also attract more incoming students. Thus, the peers recommend to offer more technical modules in English, increase the number of English-speaking teachers, and establish a window of mobility i.e. a certain semester that is designated for students to go abroad.

Criterion 2.2 Work load and credits

Evidence:

- Module Handbooks for all programmes
- "Academic Policy"
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

NKU uses the ECTS Users' Guide for the calculation of the credits. One ECTS point corresponds to 30 hours of study time, which includes teaching and self-study time. The SAR and the study plans illustrate that the workload is evenly distributed in all programs. Thus, the total amount of the planned student workload does not exceed 30 ECTS credits per semester in all programs. In the Bachelor programs, every academic hour of lecture or (practical) seminar is obligatory accompanied by two hours of students' independent work. In the Master programs, every academic hour of lecture or (practical) seminar is accompanied by three to four hours of independent work of the students. In the students discussion round, the students report that they are familiar with the workload regulations and that all teachers follow these norms. Therefore, the work load is evenly balanced and manageable. Furthermore, the students point out that all examinations are evenly balanced in terms of the level of difficulty, which is why nobody ever encountered noteworthy struggles. The peers are satisfied to hear that the workload norms are transparently communicated and that all teachers follow these regulations so that no peaks in the work load emerge.

In addition, the students' workload is regularly surveyed. The monitoring is carried out in two ways: In the eighth academic week, the curator holds a meeting with the students, whose feedback regarding the educational load, types of educational activities or teaching methods will be directly forwarded to Academic Committee or the graduating department, where further implementations are developed. The second step consists of a questionnaire on completion of the training discipline. Students confirm that their feedback is taken into account in the evaluation process, and report an instance where a students' complaint about an exam spike was processed directly and exams were rescheduled as a result. In conclusion, the peers are very satisfied with the distribution and the monitoring of the workload.

Criterion 2.3 Teaching methodology

Evidence:

- Module Handbooks for all programmes
- Self-Assessment Report
- Discussions during the audit
- Annex 13: Assessment of disciplines and teachers by students
- Annex 14: Research Work of Students

Preliminary assessment and analysis of the peers:

From the presented material as well as the discussions on site, it becomes apparent that members of the NKU are highly invested in offering students a high quality of teaching and overall studying experience. According to the self-assessment report, it is the goal of the university to design the teaching methods in a way that students gain skills in critical thinking, independent work with scientific literature, and in the field of engineering creativity.

To achieve these goals various forms of training activities are carried out in the programs to be accredited such as lectures, practical classes, seminars, laboratory sessions, student's independent work, students' independent work under the guidance of the teacher, course papers/projects, professional internships and final academic assessments. Furthermore, the university informs the peers that foreign teachers and industrial specialists are regularly consulted regarding the further development of teaching methods. The peers are satisfied with the diversity of teaching methods and are especially glad to see that the students receive numerous opportunities to learn and apply their knowledge in practical lessons such as laboratory sessions or internships. As already mentioned, in the Bachelor programs the ratio between teaching and independent study time is one to two hours, whereas in the Master programs the ratio constitutes one to three to four hours. The peers are content with the ratios and deem them adequate for the respective Bachelor and Master level.

Based on the last accreditation, in which it was recommended that NKU increase the research work of the students, the university has changed the curricula and included more opportunities for students to carry out research. While in the Ba programs, the independent research part was increased in the form of the mandatory module "Final Internship", in the Ma programs students have to complete four compulsory research modules. To conclude the peers are satisfied with the variety of teaching methods that correspond to the achievement of the learning objectives.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The peers get a comprehensive impression of the offers related to support and assistance for the students at NKU. Many students, for instance, receive financial support in the form of a scholarship. Scholarships are awarded based on both the academic performance and the financial situation of the students. If students encounter any problems there are different entities which they can consult for help. The main contact points in these situations are the faculty advisor and the student support department. Furthermore, NKU has a psychological office, which offers students psychological support, conducts surveys on how to improve the help for students and staff, and provides workshops. The peers are also informed that if students cannot attend an examination due to sickness, they receive the possibility to re-take the exam at another time and individual support from the teachers to catch up on the missed material. The peers are content to hear of the various platforms and services that offer student support their students to the best of their ability. For example, students praise the friendly relationship they have with their teachers and the teachers' willingness to help students at any time when they are having difficulties. Teachers confirm that mentoring students outside of class is an integral part of their duties, but also acknowledge that the intensive mentoring comes at a price, as these extra hours that teachers invest in mentoring students often extend their paid work hours. In conclusion, the peers are convinced that the support and assistance measures in place at NKU contribute to the successful completion of the study programmes under review.

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

The university refrains from submitting a statement. The experts therefore adhere to their assessment, which was presented in the preceding text, and formulate the requirement that elective modules must be transparently marked as such and that a system must be established in which the students' selection of elective modules is guided and monitored. Furthermore, with regard to matters of mobility the peers recommend to establish a window for mobility.

In conclusion, the peers consider this criterion to be not fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Module Handbooks for all programmes
- Annex 14.2 examinations schedule example
- Annex: Graded exams, reports, final projects and other student work
- "Academic Policy"
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

All course content within the reviewed study programmes is examined. The examination type is defined in the module descriptions. Overall, there are three examination types through which students' knowledge is assessed: the "current control" which examines students' performances during the course, for example, at practical and laboratory classes,

mid-term examinations, and final exams. The final exam constitutes 40% and the mid-term examination 60% of the final grade. For the current control and the mid-term examinations a variety of examinations forms may be applied such as oral surveys (colloquium), written surveys, reference paper defenses, defense of reports on laboratory work, control works, semester tasks, solving situational problems, creative tasks (presentation and defense of creative homework, essays, projects), group discussions of problematic issues, or defenses of the internship report. Furthermore, each programme is concluded with a final thesis and defense thereof. Generally, the examination periods for the final exams take place in winter and summer. Each examination period lasts at least one week. The peers are content with the variety of the examinations. The students report to be equally satisfied with the number, diversity, and distribution of the examination.

Failed exams can be repeated in two ways: either during the summer, in which all re-take exams take place, or in the next year. However, students will receive an interim certificate that acknowledges their other previous achievements in that course including their midterm examination.

Each <u>Bachelor</u> student finishes his/her studies with the completion of the modules "Final Internship" and "Final Academic Assessment". These two modules are carried out in the eight semester and are credited with 15 ECTS points each. As already mentioned, the internship serves as the basis and preparation for the final thesis, in which students carry out research and collect data for their thesis. In the module "Final Academic Assessment", the students are required to succeed in a State Exam and to defend their thesis. Similarly, it is mandatory for <u>Master</u> students to complete at the end of the studies the module "Research Scientific Training", in which students have to submit an internship report + defense, and the module "Final Academic Assessment", which also consists of a State Exam and Master thesis as well as a defense. The "Research Scientific Training" is credited with 8 ECTS points and the "Final Academic Assessment" module with 15 ECTS points.

NKU has handed in a number of exams as well as Bachelor and Master theses for the peers to review. The peers are able to confirm that the quality of both exams and Bachelor and Master theses match the EQF level 6 and 7 respectively.

The peers conclude that the criteria regarding the examination system, concept, and organization are fulfilled and that the examinations are suitable to verify whether the intended learning outcomes are achieved. Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

The university refrains from submitting a statement. The experts therefore adhere to their assessment, which was presented in the preceding text.

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

4. Resources

Criterion 4.1 Staff

Evidence:

- Annex 15: Employee Book
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The documents submitted by NKU offer an extensive overview over the staff involved in the six programs under review. Accordingly, in the Bachelor programmes there are 92 teachers among them ten members with the title "Doctor of Science" as professors and 42 "Candidates of Science" as associate professors. In the Master programmes, there are altogether 34 teachers, among them five Doctors of Science/professors and 19 Candidates of Science/associate professors. When reading the curriculum vitae of the members of staff prepared by NKU as part of their self-assessment report, the peers conclude that the teaching staff is highly qualified and covers all areas of expertise necessary for both degree programmes.

In the audit discussions with the teachers, the peers learn that every teacher has an overall teaching load of 680 hours. The teachers inform the peers that the teaching load used to be 900 hours but has been reduced in order to give the staff more time for research. The overall workload of each member of staff including research projects depends upon their exact position. In addition, many staff members indicate that they also take over further administrative tasks such as assisting in the admissions office. As already mentioned, the teaching staff communicates that their actual time for teaching or rather guidance and supervision of the students often exceeds their official teaching load. Consequently, the teachers regularly have to dedicate their personal time to support every student individually with her/his project. The peers recommend, therefore, monitoring the actual workload

of the teachers to avoid an overload of the teaching staff. The peers conclude that the students are very well supported and supervised during classes and projects. However, this is primarily achieved through additional work of the staff, which is why the workload of the teachers should be monitored.

The university also indicates in the self-assessment report that several international teaching members are involved in the programs to be accredited. Furthermore, NKU provides a list of foreign scientists invited to NKU illustrating the international exchange of teaching staff. Guest lecturers include, for example, Norbert Rimer from INOMICS LLC, Germany, A.N. Kolesnikov from Joensuu University, Finland, and Robert Andrew Stodden from University of Hawaii at Manoa, USA. Nonetheless, from the data and the audit discussions the peers consider the overall and regular international exchange of teaching members as relatively low. The teachers confirm this themselves by articulating the wish for more international collaborations and exchange regarding research and teaching. Hence, the peers recommend to establish more collaborations with foreign universities and to invite guest lecturers more frequently. The peers are convinced that not only teachers at NKU would benefit of an increased internationalization but also the students.

In summary though, the peers confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes. The students are supported by an extensive advisory system, which ensures that every student has an academic advisor.

Criterion 4.2 Staff development

Evidence:

- Annex 16: Advanced Training of Faculty
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

According to the self-assessment report and the audit discussions, staff development is carried out on a regular basis to improve the quality, competence and performance of the teaching staff. It is compulsory for all teaching staff to undergo an advanced training in terms of their professional development at least once in five years. Training and support staff need to complete a training at least once per year. The goals of the professional development training are among other things to deepen the staff's theoretical knowledge, improve the methodological culture and the pedagogical skills, and enhance the skills in the application of modern technical tools for educational purposes. The professional development can be carried out in different forms such as technical trainings, refresher courses at the Institute of Retraining and Advanced Training of NKU and other universities, training in specialized training centers, participation in scientific and methodological seminars and conferences, exhibitions and other events, etc. In the audit discussions, the teachers at NKU add that the university offers a variety of excellent workshops and courses in the field of didactics, which most of the present teachers have participated in. In addition, the peers are glad to hear about the wide range of further training possibilities, which are anchored in the university's academic policy.

Furthermore, the peers learn that NKU has implemented a number of measures to increase the research profile of the university since the last accreditation. Thus, several international research projects were launched by the Energy and Radio Electronics Department such as "the Development of two cycle innovative curricula in microelectronic engineering (DOCMEN)" (2015-2018) and "New and Innovative Courses for Precision Agriculture (NICOPA)" (2018-2021). Both projects were carried out under the ERASMUS+ Programme – Capacity Building in Higher Education program. The teaching staff reports that the university moreover introduced financial incentives for research projects. Thus, teachers receive additional grants if they publish their research work. Generally, the teaching staff admits during the audit that the ministry is continuously increasing the demands for teachers at universities, which is why all teaching staff is impelled to regularly publish articles in prestigious international journals.

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

Criterion 4.3 Funds and equipment

Evidence:

- PowerPoint presentations illustrating the laboratories and equipment
- Video depicting the campus, laboratories, teaching spaces and equipment
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

In their SAR, the university states that enough funding is provided to maintain and update the working spaces. The programme coordinators add that the ministry has agreed to give

special funding to NKU for the expansion and improvement of their facilities. Thus, the university provides a detailed list of renovations and acquisitions in the last years, which underline the university's continued endeavour to update all facilities and equipment to modern standards. In 2020, for example, the financial means in the department of Energy and Radioelectronics amounted to 158,247 Euros for personnel remuneration and 5,696 for material means. In the same year the department of Information and Communication Technologies spent 100,618 Euros for personal remuneration and 31,551 Euros for material investment. Currently a new educational and laboratory building is being built for the faculties of engineering, agricultural technology and medical areas. The new building should accommodate nine laboratories for the programmes to be accredited worth 603,460 Euros. From the audit discussions with the teachers and students, it becomes apparent that these new laboratories shall significantly contribute to enhancing the quality and range of educational experiments. Furthermore, in the self-assessment report the university proves a detailed overview of the library, its services and materials (both in print and electronically).

As the audit was conducted online, the peers were not able to visit the laboratories and teaching spaces. Instead, NKU has provided comprehensive documentation, including lists of laboratories and equipment and an extensive video. In addition, during the audit, the programme coordinators gave detailed presentations on the classrooms, laboratories and equipment of each department. The department of Energy and Radio Electronics alone offers 21 laboratories. The peers are convinced that the teaching and office facilities, the libraries and the computer labs are sufficient for all students and staff members.

In summary, the peers confirm that NKU holds enough work spaces and laboratories and that all laboratories are equipped with modern and sophisticated instruments to accommodate the needs of the students as well as the teaching staff in conducting practical training and research. In addition, the current funding allows maintaining the current standard and purchasing further instruments if necessary.

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

The university refrains from submitting a statement. The experts therefore adhere to their assessment, which was presented in the preceding text, and recommend to strengthen the international cooperation in terms of lectures and research. Moreover, they recommend to monitor the actual workload of the teachers to avoid an overload of the teaching staff.

In conclusion, the peers consider this criterion to be not completely fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

• Annex 1-6 Module Handbooks for all degree programmes

Preliminary assessment and analysis of the peers:

The peers review the module descriptions for the programmes and see that they provide adequate information about the respective content, learning outcomes, examinations, workload distribution and grading. The students confirm during the discussions that information about the courses are always available online and that details concerning examinations and contents are provided at the beginning of each course by the teaching staff.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Student Diploma Supplement Samples for all degree programmes
- Student Diploma Samples for Ba Electrical Power Engineering and Ma Information Systems including transcript of records

Preliminary assessment and analysis of the peers:

At graduation, each student is provided with a Diploma as well as a Diploma Supplement providing information about the programme, the curriculum, the individual grading, the average grading and the higher education system in Kazakhstan.

Criterion 5.3 Relevant rules

Evidence:

 All relevant regulations on the course of studies, admission, degree, examinations, quality assurance, etc., including information on the status of the binding character are available.

Preliminary assessment and analysis of the peers:

From the documents provided and the discussion during the audit, the peers learn that NKU ensures that all students are familiar with the university's policies and regulations. All documents and regulations are transparently accessible through the university's website. The discussion with the students confirms that they feel well informed about regulations

and comfortable about the access to any information about their degree programmes. Nevertheless, programme coordinators and faculty acknowledge that particularly young students frequently ask about the regulations and procedures. Thus, they assure them that they will continue to work to make the material even more accessible.

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

The university refrains from submitting a statement. The experts therefore adhere to their assessment, which was presented in the preceding text.

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

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Annex 13 Results of discipline assessment
- Annex 23 Results on graduation and further employment
- Sample student survey questionnaire
- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:

At NKU, a thorough system of quality management has been introduced after the last assessment by ASIIN. Most significantly, in 2016 the Policy of Internal Quality Assurance was established which subsequently implemented a row of strategies to monitor and ensure the development of all programmes. As a result, a variety of evaluations is regularly carried out. These include an internal annual examination of the methodological support and an annual analysis and expansion of the catalogue of elective courses under the involvement of employers. Furthermore, there is an annual survey of graduates on the quality of the degree programme, learning environment and support services, and a survey of employers on the quality of training of graduates, which takes place every two years. Lastly and most importantly, students have the chance to submit their feedback on classes and teaching staff during the term and at the end of every academic period. Both industry partners and students confirm that these assessments are conducted in form and rhythm according to the guidelines of NKU and that their feedback is acknowledged and successfully utilized for further improvement of the programmes. The students moreover point out that the assessment of the modules also often happens on an informal basis, where students are welcome to articulate their feedback at any moment during the semester.

One indicator of the resulting quality of the degree programmes is the employment rate of its students. Hence, in all of the degree programmes to be accredited, the rate has been almost consistently at 100 % during the last six years. Thus, the peers gain the impression that the Quality Assurance system at NKU and especially within the programmes under review is well balanced and involves all relevant stakeholders.

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

The university refrains from submitting a statement. The experts therefore adhere to their assessment, which was presented in the preceding text.

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

D Additional Documents

No additional documents needed.

E Comment of the Higher Education Institution

The institution refrained from submitting a detailed statement.

F Summary: Peer recommendations (09.08.2022)

The peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum dura- tion of accredita- tion	Subject-specific label	Maximum dura- tion of accredita- tion*
Ba Information Systems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Information Sys- tems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Radioengineering, Electronics and Tele- communications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Radioengineering, Electronics and Tele- communications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ba Electrical Power En- gineering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Electrical Power En- gineering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027

Requirements

For all degree programmes

- A 1. ASIIN 1.1. Ensure that the qualification objectives are bindingly anchored so that the stakeholders can refer to them.
- A 2. ASIIN 2.1 It is required that elective modules are transparently marked as such and that a system is established in which the students' selection of elective modules is guided and monitored.

Recommendations

For all degree programmes

E 1. ASIIN 1.1 It is recommended that the learning objectives contain more information on the specific fields in which the alumni should be able to work in.

- E 2. ASIIN 1.3 It is recommended to extend the range of elective modules according to the state of the art of similar programs (e.g. renewable energy in power engineering or IT-security in information technology).
- E 3. ASIIN 1.3 It is recommended to provide technical modules in English.
- E 4. ASIIN 2.1 It is recommended to establish a window for mobility.
- E 5. ASIIN 4.1 It is recommended to strengthen the international cooperation in terms of lectures and research.
- E 6. ASIIN 4.1 It is recommended to monitor the actual workload of the teachers to avoid an overload of the teaching staff.

G Comment of the Technical Committee 02 - Electrical Engineering/Information Technology

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the assessment 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 programme 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 dura- tion of accredita- tion	Subject-specific label	Maximum duration of accreditation*
Ba Information Systems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Information Systems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029

Degree Programme	ASIIN Seal	Maximum dura- tion of accredita- tion	Subject-specific label	Maximum duration of accreditation*
Ba Radioengineering, Electronics and Telecom- munications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Radioengineering, Electronics and Telecom- munications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ba Electrical Power Engi- neering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Electrical Power En- gineering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027

H Comment of the Technical Committee 04 - Informatics/Computer Science

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and is in favor of replacing the word "system" with the word "procedure" in requirement A 2. In addition, the committee proposes to add the word "program" to recommendation E 1 in order to list an unambiguous formulation. Otherwise, the Technical Committee agrees with the experts without any changes.

Assessment and analysis for the award of the Euro-Inf[®] Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the Subject-Specific Criteria of the Technical Committee 04 – Informatics/Computer Science.

Assessment and analysis for the award of the ASIIN seal:

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

Degree Programme	ASIIN Seal	Maximum dura- tion of accredita- tion	Subject-specific label	Maximum dura- tion of accredita- tion*
Ba Information Systems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029
Ma Information Sys- tems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Radioengineering, Electronics and Tele- communications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Radioengineering, Electronics and Tele- communications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ba Electrical Power En- gineering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Electrical Power En- gineering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027

Requirements

For all degree programmes

- A 1. ASIIN 1.1. Ensure that the qualification objectives are bindingly anchored so that the stakeholders can refer to them.
- A 2. ASIIN 2.1 It is required that elective modules are transparently marked as such and that a system procedure is established in which the students' selection of elective modules is guided and monitored.

Recommendations

For all degree programmes

E 1. ASIIN 1.1 It is recommended that the programme learning objectives contain more information on the specific fields in which the alumni should be able to work in.

- E 2. ASIIN 1.3 It is recommended to extend the range of elective modules according to the state of the art of similar programs (e.g. renewable energy in power engineering or IT-security in information technology).
- E 3. ASIIN 1.3 It is recommended to provide technical modules in English.
- E 4. ASIIN 2.1 It is recommended to establish a window for mobility.
- E 5. ASIIN 4.1 It is recommended to strengthen the international cooperation in terms of lectures and research.
- E 6. ASIIN 4.1 It is recommended to monitor the actual workload of the teachers to avoid an overload of the teaching staff.

I Decision of the Accreditation Commission (23.09.2022)

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

The Accreditation Commission discusses the procedure and follows the assessment of the peers. They accept, furthermore, the changes of some terms as suggested by 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.

Assessment and analysis for the award of the Euro-Inf[®] Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the Subject-Specific Criteria of the Technical Committee 04 – Informatics/Computer Science.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum dura- tion of accredita- tion	Subject-specific label	Maximum dura- tion of accredita- tion*
Ba Information Systems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029

Degree Programme	ASIIN Seal	Maximum dura- tion of accredita- tion	Subject-specific label	Maximum dura- tion of accredita- tion*
Ma Information Sys- tems	With require- ments for one year	30.09.2029	Euro-Inf®	30.09.2029
Ba Radioengineering, Electronics and Tele- communications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Radioengineering, Electronics and Tele- communications	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ba Electrical Power En- gineering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027
Ma Electrical Power En- gineering	With require- ments for one year	30.09.2029	EUR-ACE®	30.09.2027

*Subject to the approval of the ENAEE Administrative Council

Requirements

For all degree programmes

- A 1. (ASIIN 1.1) Ensure that the qualification objectives are bindingly anchored so that the stakeholders can refer to them.
- A 2. (ASIIN 2.1) It is required that elective modules are transparently marked as such and that a procedure is established in which the students' selection of elective modules is guided and monitored.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.1) It is recommended that the programme learning objectives contain more information on the specific fields in which the alumni should be able to work in.
- E 2. (ASIIN 1.3) It is recommended to extend the range of elective modules according to the state of the art (e.g. renewable energy in power engineering or IT-security in information technology).
- E 3. (ASIIN 1.3) It is recommended to provide technical modules in English.

- E 4. (ASIIN 2.1) It is recommended to establish a window for mobility.
- E 5. (ASIIN 4.1) It is recommended to strengthen the international cooperation in terms of lectures and research.
- E 6. (ASIIN 4.1) It is recommended to monitor the actual workload of the teachers to avoid an overload of the teaching staff.

J Fulfilment of Requirements (22.03.2024)

Analysis of the experts and the Technical Committees (01.03.2024)

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Ensure that the qualification objectives are bindingly anchored so that the stakeholders can refer to them.

Initial Treatment	Initial Treatment				
Peers	fulfilled				
	Vote: unanimous				
	Justification:				
	The NKU has also published the qualification objectives on its				
	website. The websites now clearly describe the learning out-				
	comes of the different study programmes.				
TC 02	fulfilled				
	Vote: unanimous				
	Justification: The TC 02 follows the vote of the experts.				
TC 04	fulfilled				
	Vote: unanimous				
	Justification: The TC 04 follows the vote of the experts.				
AC	fulfilled				
	Vote: unanimous				
	Justification: The commission follows the vote of the experts and				
	the TCs.				

A 2. (ASIIN 2.1) It is required that elective modules are transparently marked as such and that a procedure is established in which the students' selection of elective modules is guided and monitored.

Initial Treatment				
Peers	not (completely) fulfilled			
	Vote: majority			
	Justification:			
	NKU presents a revised overview of the modules of the degree			
	programmes and the registration procedure for electives, which			

	is also reflected in the submitted Academic Policy Paper. The ex-
	perts note that there is now a clear distinction between compul-
	sory and elective courses.
	However, the experts do not see clear documentation of the im-
	plementation of the requirement to establish a system in which
	the selection of elective modules is controlled and monitored by
	, the students. NKU vaguely refers to the Academic Policy, which
	states that students are supervised by advisors both organisa-
	tionally and methodologically according to a precise schedule.
	The experts therefore ask for a clearer presentation of the regis-
	tration process for modules (particularly when a student is con-
	sulted by an advisor) and for examples that illustrate the issue in
	more detail.
TC 02	not completely fulfilled
	Vote: unanimous
	Justification: The TC 02 follows the vote of the experts.
TC 04	not completely fulfilled
	Vote: unanimous
	Justification: The TC 04 follows the vote of the experts.
AC	not fulfilled
	Vote: unanimous
	Justification: The commission follows the vote of the experts and
	the TCs.
Secondary Trea	atment
Peers	Fulfilled
	Justification:
	NKU provides revised student registration rules, several registra-
	tion examples and revised curricula. The experts note that elec-
	tive modules are marked as such in the registration examples
	and also in the individual curricula. They note that an individual
	adviser and a methodological adviser have been appointed for
	each student. The experts find that the selection and registration
	process for elective modules is now clearly demonstrated.
TC 02	fulfilled
	Vote: unanimous
	Justification: The TC 02 follows the vote of the experts.
TC 04	fulfilled
	Vote: unanimous
	Vote: unanimous Justification: The TC 04 follows the vote of the experts.
AC	Vote: unanimousJustification: The TC 04 follows the vote of the experts.fulfilled
AC	Vote: unanimous Justification: The TC 04 follows the vote of the experts. fulfilled Vote: unanimous

Decision of the Accreditation Commission (22.03.2024)

Degree Programme	ASIIN Seal	Maximum dura- tion of accredita- tion	Subject-specific label	Maximum dura- tion of accredita- tion*
Ba Information Systems	All require- ments fulfilled	30.09.2029	Euro-Inf®	30.09.2029
Ma Information Sys- tems	All require- ments fulfilled	30.09.2029	Euro-Inf®	30.09.2029
Ba Radioengineering, Electronics and Tele- communications	All require- ments fulfilled	30.09.2029	EUR-ACE®	30.09.2027
Ma Radioengineering, Electronics and Tele- communications	All require- ments fulfilled	30.09.2029	EUR-ACE®	30.09.2027
Ba Electrical Power En- gineering	All require- ments fulfilled	30.09.2029	EUR-ACE®	30.09.2027
Ma Electrical Power En- gineering	All require- ments fulfilled	30.09.2029	EUR-ACE®	30.09.2027

According to the self-assessment report, the following objectives and learning outcomes (intended qualifications profile) shall be achieved by the Bachelor's degree programme Information Systems:

Programme Objectives

Learning Outcomes

being initiative, adaptive to the changing re- formation technology quirements in the field of information technology, able to work in a team with the necessary competencies in the field of future professional activity

O1Training of a modern specialist in the field of LO1 Possess knowledge in mathematics and computer science with broad Basic knowledge, natural sciences, information systems and in-

LO2 Know theoretical and experimental research methods, in order to create new promising areas in the field of computer science

LO3 Possess skills of using application software packages for calculations, simulation and automation of information processes and systems design.

LO4 Possess methods of analysis and evaluation of the effectiveness of information system development, implementation and operation, make technical documentation for the developed information system

LO5 Analyze the purpose of information in modern society, methods and approaches of information protection and the basic requirements for information security; select the architecture and integration of information systems hardware

LO6 Possess programming skills using modern tools.

LO7 Possess the skills to assess the reliability and quality of the design object.

LO8 Apply the methods of theoretical and experimental research, be ready to participate in setting up and conduct of experimental studies, compare the results of experimental data and the solutions obtained.

LO9 Work with equipment and software-hardware complexes of information systems

LO10 Design information systems and their elements in specific areas and adapt the applications to the operating conditions; ensure the security and integrity of data information systems; maintain the performance of information systems according to the specified functional properties; elaborate instructions for the operation of information systems.

LO11 Possess the skills of using mathematical methods of processing, analysis and synthesis of research results, conduct pre-design study of the design object and system analysis of the course area.

O2 Training of specialists who are fluent in the LO12 Possess the elements of spiritual, aesstate language, the language of international thetic and ethical culture; form judgments takcommunication and one foreign language to ing into account social and ethical aspects. Posprovide and document information that sess the skills of conceptual, logical and analytdemonstrates the skills of conceptual, analytical and logical thinking, as well as creative approach to work and study, who are able to work tion. in a national and international team, acquiring the strategy of life-long learning

ical thinking, fulfill the professional potential in solving problems and their proper documenta-

LO13 Acquire communication skills, express ideas and professional decisions in writing or orally. Demonstrate creativity in the development of group projects, critical thinking skills and creativity, the ability to self-organization and self-education

LO14 Possess the required level of physical fitness to ensure full social and professional activity

According to the self-assessment report, the following **objectives** and **learning outcomes** (intended qualifications profile) shall be achieved by the Bachelor's degree programme Radioengineering, Electronics and Telecommunications:

Programme Objectives

Learning Outcomes

O1Training of highly qualified specialists in the LO1Possess knowledge in the field of matheabilities sufficient to solve problems in the pro- ities. fessional field

field of radio engineering, electronics and tele- matics and natural sciences, as well as of inforcommunications, with knowledge, skills and mation technologies used in professional activ-

LO2 Demonstrate knowledge of the basics of electronic system design and installation.

LO3 Demonstrate a profound level of knowledge in the field of digital and electronic technologies.

LO4 Be able to use application software packages for calculations, modeling and automation of electronic devices and systems design works.

LO5 Understand the principles of construction and functioning of analog and digital signal processing devices in the field of speech, sound and image transmission.

LO6 Know the basics of the theory of radiation and radio waves reception, the most common types of antenna-feeder devices and methods of their calculation

LO7 Apply methods of optimal solutions theory in designing of information communication radiosystems, radiolocating and radio-navigation systems.

LO8 Demonstrate knowledge of the requirements for standardization, metrological support and life safety in the development and operation of devices and systems.

LO9 Define technical and economic requirements for the designed devices and systems, conduct experimental studies and interpret the results.

LO10 Develop a globally competitive content

O2 Training of specialists who are fluent in the LO11 Possess the elements of spiritual, aesstate language, the language of international thetic and ethical culture; form judgments takcommunication and one foreign language to provide and document

ing into account social and ethical aspects. Possess the skills of conceptual, logical and analytical thinking, fulfill the professional potential in solving problems and their proper documentation.

information that demonstrates the skills of con- LO12 Acquire communication skills, express ceptual, analytical and logical thinking, as well as creative approach to work and study, who are able to work in a national and international team, acquiring the strategy of life-long learning

ideas and professional decisions in writing or orally. Demonstrate creativity in the development of group projects, critical thinking skills and creativity, the ability to self-organization and self-education.

LO13 Possess the required level of physical fitness to ensure full social and professional activity.

According to the self-assessment report, the following objectives and learning outcomes (intended qualifications profile) shall be achieved by the Bachelor's degree programme **Electrical Power Engineering:**

Programme Objectives

Learning Outcomes

tion, with knowledge, skills and abilities suffi- mation technologies. cient to solve problems of industrial nature

O1Training of highly qualified specialists in the LO1.Possess knowledge in mathematics and field of electric power transmission systems natural science, electrical engineering, theoretand networks, relay protection and automa- ical basics of electrical engineering and infor-

LO2. Apply theoretical and experimental methods of research, in order to create new promising areas in the field of electrical power engineering.

LO3.Be able to use application software packages for calculations, modeling and automation of electric power device, system and network design works.

LO4. Calculate the operating modes of electric power plants for various purposes; determine the composition of equipment and its properties and circuits of electric power facilities. Select control system equipment, switching equipment, wire and cable hardware.

LO5. Analyze, calculate and electrical schematic diagram of electrical networks, relay protection and automation.

LO6. Demonstrate knowledge of the requirements for standardization, metrological support and life safety in the development and operation of electric power devices and systems.

LO7. Define technical and economic requirements for the designed devices and systems, conduct experimental studies and interpret the results.

LO8. Possess the skills of design, construction, installation and operation of power plants and systems.

LO9. Analyze and take into account principles of operation, technical properties and design features of electric power devices.

LO10. Develop a globally competitive content

provide and document information that

O2 Training of specialists who are fluent in the LO11.Possess the elements of spiritual, aesstate language, the language of international thetic and ethical culture; form judgments takcommunication and one foreign language to ing into account social and ethical aspects. Pos-

cal and logical thinking, as well as creative apin a national and international team, acquiring tion. the strategy of life-long learning

demonstrates the skills of conceptual, analyti- sess the skills of conceptual, logical and analytical thinking, fulfill the professional potential in proach to work and study, who are able to work solving problems and their proper documenta-

LO12. Acquire communication skills, express ideas and professional decisions in writing or orally. Demonstrate creativity in the development of group projects, critical thinking skills and creativity, the ability to self-organization and self-education.

LO13. Possess the required level of physical fitness to ensure full social and professional activity.

	and the second sec	Modu								Sen	lester	13. JZ		0
Module No.	Module	le Scope ECTS credit s	Final Control Form of the Module	Course	Scope of the Course, ECTS credits	Control Form of the Course	1	2	3	4	5	6	7	8
			Basic	Modules (all courses of the modul	e are compul	ory for learning)								
1	Basics of Natural Sciences	3	Examination	Physics	3	Computer-Based Testing	3							
2	Basics of Mathematics	6	Evamination	Mathematics 1	3	Computer-Based Testing	3							
2	Dasies of Maniellaries	0	LAMIMATON	Mathematics 2	3	Computer-Based Testing		3						
3	History of the State	4	State Exam	Modern History of Kazakhstan	4	Computer-Based Testing		4				· · · · ·		
4	Foreign Lenguage	0	Comprehensive	English (German) Language	6	Written Control Work	6					· · · · ·		
4	roreign Language	y	Examination	English (German) Language	3	Computer-Based Testing		3						
5	N.c. 11		Comprehensive	Kazakh Language	6	Written Control Work	6				3. 	36		
2	National Language	9	Examination	Kazakh Language	3	Computer-Based Testing		3			2	36		
6	Recreation Classes	4	Craded Test	Physical Education	2	Graded Test	2				2×	3C	- Y	
0	(Beginner Level)	-	Gladed Test	Physical Education	2	Graded Test		2			5	2 3		
7	Recreation Classes	4	Graded Test	Physical Education	2	Graded Test			2		5			
1	(Intermediate Level)		Gladed Test	Physical Education	2	Graded Test				2		333 - 97 197		
				Manashtanu	1	Reference Paper	1					5.9 97 		
8	Social and Humanitarian	8	Comprehensive	Political and Social Studies	4	Computer-Based Testing	4							
	Knowledge		Examination	Cultural Studies and Psychology	3	Computer-Based Testing		3						
9	Programing Basics	7	Examination	Algorithms, Data Structures and Programming	7	Computer-Based Testing		7						
10	Mathematics	5	Examination	Mathematics 3	5	Computer-Based Testing			5					
11	Information and Communication Technologies	5	Examination	Information and Communication Technologies	5	Computer-Based Testing			5					

The following curricula for all BA Programmes is presented:

Table 2.1 Curriculum of Information Systems Degree Programme (Bachelor's Degree)

22	Processes and Systems	7	Comprehens	Systems Analysis and Simulation / System analysis	3	Course Paper		3				
22	Simulation		Examination	Work Experience Internship 1	4	Internship Report Defense		4				
23	Automation and	11	Comprehens ive	Financial Activities Automation / Metrology, Standardization and Certification in Information and Communication / Architecture of Computers and Systems	4	Written Control Work		4			-	
	Designing		Examination	Accounting in Information Systems / Multimedia Technologies and Animation Graphics / Design of Information Systems	7	Computer-Based Testing	7				2	
24	Software and Network	12	Comprehens	Operating Systems and System Programming / System and Application Software	6	Written Control Work			6			
24	Engineering	12	Examination	Computer Networks / Information Transmission Systems and Networks	6	Computer-Based Testing				6		
	Applied Aspects of		Comprehens	WEB-Programming/ Client-Server Applications Designing	8	Course Paper			8			
25	Information Systems	14	ive Examination	Graphic Means of Information Systems/ Information Technologies of Visualization	6	Written Control Work			6			
26	Information Protection	4	Examination	Information Security / Information Protection	4	Computer-Based Testing				4		
	Puringer Administration		Comprehens	Information Technologies in Accounting / Three-Dimensional Simulation and Flash Technologies / Simulation of Information Processes and Systems	6	Course Paper				6		
27	in Information Systems	10	ive Examination	Protocols and Interfaces of Information Systems / Technical Design Tools and Interactive Graphics Systems / Knowledge Representation Model in Information Systems	4	Computer-Based Testing				4		
28	Artificial Intelligence	10	Comprehens ive	Artificial Intelligence Systems/Intelligent Information Systems	6	Computer-Based Testing				6		
	бузісць		Examination	Work Experience Internship 2	4	Internship Report Defense				4		

	- C - C - C - C - C - C - C - C - C - C											201	
12	Profound Language	6	Comprehensive	Professional Kazakh (Russian) Language	3	Computer-Based Testing				3			
12	Learning	0	Examination	Professionally-Oriented Foreign Language	3	Computer-Based Testing				3			
13	Basics of Information Systems	3	Examination	Basics of Information Systems	3	Computer-Based Testing				3			
14	Philosophy	5	Examination	Philosophy	5	Computer-Based Testing				5			
15	IT-Infrastructure	5	Examination	IT-Infrastructure	4	Written Control Work					5		
16	Databases in Information Systems	5	Examination	Databases in Information Systems	5	Written Control Work					5		
17	First Interachie	16	Internship	Work Experience Internship 3	10	Internship Report Defense							10
17	rmai mensup	15	Report Defense	Pre-Graduation Internship	5	Internship Report Defense							5
10	Final Academic	15	State Exam	State examination in the specialty	4	Written Control Work							4
18	Assessment	15	Diploma Thesis Defense	 Developing and defending a thesis 	11	Bachelor's Thesis Defense							11
				Elective Modules (containing	elective c	ourses)							
				Programming Technics/Software Programming Languages	5	Written Control Work	5						
19	Basics of the Profession	10	Comprehens ive Examination	Introduction to the Profession/Introduction to the Specialty	3	Computer-Based Testing		3					
	2			Practical Training 1,2	2	Internship Report Defense		2					
20	Technologies of Technogenic Risk Management	3	Examination	Basics of Law and Anti-Corruption Culture/Basics of Financial Literacy/Economic and Business Studies/ Power Saving Technologies in Modern Industries/Ecology and Sustainable Development/Information and Quality Management/Health and Safety Basics	3	Computer-Based Testing				3			
	Databases and		Comprehens	Database Systems / Databases and Knowledge Bases	7	Computer-Based Testing			7				
21	Information Protection	11	ive Examination	Programs and Means of Information Protection / Reliability of Information Systems	4	Written Control Work			4				

			Comprehens	IT Project Management / Information System Management	8	Course Paper							8	
29	IT-Technologies	14	ive Examination	IT Technologies in Scientific Research / Organizing of Scientific Research	6	Computer-Based Testing	97 — X						6	Ø
30	WEB Designing	8	Examination	WEB Applications Designing / Internet Applications Designing	8	Course Paper							8	3(
31	Information Systems Software	8	Examination	Information Systems Software / Economic Information Systems	8	Computer-Based Testing					-		8	22 S
		Total	ECTS per seme	sters			30	30	30	30	30	30	30	30
		Total	Exams (Final C	ontrol Forms)		Examinations	1	6	3	6	3	4	3	-
				LOW WARE CONTRACTOR		State Exam	-	1		-	1.000	100	-	1
						Internship Report	-	1		1	1.00	1	-	2
						Defense								
						Graded Test	1	1	1	1		1997	-	-
						Course Paper	-	-	-	1	1	1	2	-
						Defense								
						Bachelor's Thesis	-	-	-		-	1000	-	1

Table 2.2Curriculum of Radio Engineering, Electronics and Telecommunications Degree Programme (Bachelor's Degree)

		Modu						8	9	Seme	ster	9	10 - 38 10	-
Module No.	Module	le Scope ECTS credit	Final Control Form of the Module	Course	Scope of the Course, ECTS credits	Control Form of the Course	1	2	3	4	5	6	7	8
			Basi	c Modules (all courses of the module ar	e compulsory for learn	ing)								
1)	Physics	6	Examination	Physics	6	Computer- Based Testing		6					3 - 7	
2	Basics of Mathematics	10	Comprehens ive	Mathematics 1	5	Written Control Work	5							
			Examination	Mathematics 2	5	Computer- Based Testing		5		27X			9X	
3	History of the State	4	State Exam	Modern History of Kazakhstan	4	Computer- Based Testing	4						3X	
4	Foreign Language	9	Comprehens ive	English (German) Language	6	Written Control Work	6						.e - \0	
			Examination	English (German) Language	3	Computer- Based Testing		3					2	

	2 GAN (1992)		• (c) (c)	- 2019) R-2019	1000					20 C		12		
5	National Language	9	Comprehens ive	Kazakh Language	6	Written Control Work	6							
			Examination	Kazakh Language	3	Computer- Based Testing		3						
6	Recreation Classes	4	Graded Test	Physical Education	2	Graded Test	2							
	(Beginner Level)	10220		Physical Education	2	Graded Test	16 8	2						
7	Basics of Electrical	12	Comprehens	Electric Circuit Theory	5	Control Work			5					
	Engineering		ive Examination	Basics of Electronic and Measuring Equipment	4	Computer- Based Testing				4				
				Basics of Radio Engineering and Telecommunications	3	Written Control Work				3				
8	Information and Communication Technologies	5	Examination	Information and Communication Technologies	5	Computer- Based Testing	· · · · · ·		5					
9	Philosophy Recreation Classes (Intermediate Level 1)	5	Examination	Philosophy	5	Computer- Based Testing			5					
10	Recreation Classes	4	Graded Test	Physical Education	2	Graded Test			2					
	(Intermediate Level 1) Theory of Electrical		3	Physical Education	2	Graded Test	3e			2			%©	6
11	Theory of Electrical Communication	5	Examination	Theory of Electrical Communication	5	Computer- Based Testing	36			ee	5		xC	
12	Profound Language Learning	6	Comprehens ive	Professional Kazakh (Russian) Language	3	Computer- Based Testing				6. S		3	9 99	
	U U		Examination	Professionally-Oriented Foreign Language	3	Computer- Based Testing						3		
13	Social and Humanitarian Knowledge	8	Comprehens ive	Social and Political Studies	4	Computer- Based Testing	4							
			Examination	Cultural Studies and Psychology	3	Computer- Based Testing		3						
10000000				Manashtanu	1	Reference Paper	1							
14	Final Internship	15	Internship Report Defense	Work Experience Internship 3	10	Internship Report Defense								10
				Pre-Graduation Internship	5	Internship Report Defense								5
15	Final Academic Assessment	15	State Exam	State examination in the specialty	4	Written Control Work								4
			Diploma Thesis Defense	Developing and defending a thesis	11	Development and Diploma Thesis Defense								11

				Elective Modules (containing elective co	urses)								
16	Basics of the Profession	8	Comprehens ive	Introduction to the Profession / Introduction to the Specialty	3	Reference Paper		3					
			Examination	Materials Science in Radio Engineering/ Basics of Materials Science	3	Computer- Based Testing		3					
				Practical Training	2	Internship Report Defense		2					
17	Computer-Based Simulation	4	Examination	Computer Graphics / Computer Simulation	4	Creative Examination	4						
18	Electrical Circuits and Radio Measurements	14	Comprehens ive	Electric Circuit Theory 2/Basics of Electric Circuit Theory;	6	Course Paper Defense				6			
			Examination	Metrology and Radio Measurements / Engineering Measurements	4	Written Control Work			4				
				Work Experience Internship 1	4	Internship Report Defense				4			
19	Design of Electronic Devices	9	Comprehens ive	Radio Circuits and Signals/Analysis and Synthesis of Radio Signals	5	Written Control Work			5				
			Examination	Circuity Engineering of Analog Electronic Devices/Circuity and System Engineering of Electronic Devices	4	Course Paper Defense				4			
20	Technologies of Technogenic Risk Management	3	Examination	Basics of Law and Anti-Corruption Culture/Basics of Financial Literacy/ Economic and Business Studies/ Power Saving Technologies in Modern Industies/Ecology and Sustainable Development/Information and Quality Manazement/Health and Safety Basics	3	Computer- Based Testing				3			-
21	Data Transmission in Telecommunication	9	Comprehens ive	Information Theory / Steady State Radio Engineering	5	Written Control Work					5		 -
	Systems		Examination	Smart Technologies in Telecommunication Networks and Systems / Multichannel Telecommunication Systems	4	Course Paper Defense						4	
22	Digital Control Systems	9	Comprehens ive Examination	Digital Devices and Microprocessors/Integrated and Micro- processor Devices	5	Course Paper Defense					5		
				Microcontrollers and Microprocessors / System Design based on Programmable Logic Integrated Circuits	4	Computer- Based Testing						4	
23	Antenna-Feeder Devices	8	Comprehens ive	Antenna-Feeder Devices /Microwave Devices	4	Computer- Based Testing						4	

			Examination	Work Experience Internship2	4	Internship Report Defense						4		
24	Receiving and Transmitting Devices	14	Comprehens ive	Signals Generating and Transmitting Devices/Radio Transmitters;	5	Course Paper Defense					5			
			Examination	Signals Receiving and Processing Devices/Radio Receivers	4	Course Paper Defense						4		
	1			Smart-City Power Sources / Power Supply of Radio Electronic Devices and Systems	5	Written Control Work					5			
25	Automation	4	Course Paper	Basics of Automation / Automatic Control	4	Course Paper Defense				4				
26	Occupational Safety	5	Examination	Industrial Safety/Electrical Safety	5	Written Control Work							5	
27	Robotics Basics	9	Comprehens ive	Process Sensors/Measuring Signal Transducers	5	Written Control Work					5			
			Examination	Basic of Smart-City Hardware and Software System De-sign/Robotic Systems	4	Computer- Based Testing	3 Ø					4		
28	CAD Systems	4	Examination	CAD Systems/ Basics of Computer-Aided Design	4	Creative Examination			4					
29	Radio Engineering Systems	10	Comprehens ive	Radio Engineering Systems Simulation/Data Collection and Processing Systems;	5	Computer- Based Testing							5	
			Examination	Radio Engineering Systems/Measurement, Transmission and Control Systems	5	Course Paper Defense	06			06	2		5	
30	Modern Communication Systems	15	Comprehens ive	Satellite Monitoring Systems in Smart-City / Wireless Data Transmission Systems	5	Computer- Based Testing	Q			ee			5	
			Examination	Digital Devices for Signal Generation and Pro-cessing/Protection and Secrecy of Information	5	Course Paper Defense	3 6						5	
				Smart Technologies in Information Display Devices and Systems/ Basics of Television and Video Equipment	5	Computer- Based Testing				3			5	
		Total	ECTS per seme	sters			30	30	30	30	30	30	30	30
		Total	Exams (Final C	ontrol Forms)		Examinations State Exam Report Defense Graded Test Course Paper	1 1 - 1 -	6 - 1 1 -	3 - 1 -	4 - 1 3	1 - - 2	6 - 1 - 2	3	1 2
						Defense Bachelor's Thesis Defense	-	-			3	E.	-	1

		Modu						8		Sem	ester		100	87
Module No.	Module	le Scope ECTS credit	Final Control Form of the Module	Course	Scope of the Course, ECTS credits	Control Form of the Course	1	2	3	4	5	6	7	8
			Bas	ic Modules (all courses of the module are compuls	sory for learnin	g)								
1	Physics	6	Examination	Physics	6	Computer-Based Testing		6						
2	Basics of Mathematics	7	Comprehens ive	Mathematics 1	3	Written Control Work	3							
			Examination	Mathematics 2	4	Computer-Based Testing	3	4		3				
3	History of the State	4	State Exam	Modern History of Kazakhstan	4	Computer-Based Testing	4			3				
4	Foreign Language	9	Comprehens ive	English (German) Language	6	Written Control Work	6							
			Examination	English (German) Language	3	Computer-Based Testing		3						
5	National Language	9	Comprehens ive	Kazakh Language	6	Written Control Work	6							
			Examination	Kazakh Language	3	Computer-Based Testing	22	3						
6	Recreation Classes	4	Graded Test	Physical Education	2	Graded Test	2			G		<u> </u>	1	1
	(Beginner Level)			Physical Education	2	Graded Test		2		S			1	
7	Recreation Classes	4	Graded Test	Physical Education	2	Graded Test			2		1		1	
	(Intermediate Level)			Physical Education	2	Graded Test				2				
8	Electrical Engineering	9	Comprehens	Theoretical Basics of Electrical Engineering 1	5	Control Work			5					
- 293 		0.	ive Examination	Theoretical Basics of Electrical Engineering 2	4	Computer-Based Testing				4				
9	Electrical Machinery	5	Examination	Electrical Machinery	5	Computer-Based Testing					5			
10	Profound Language Learning	6	Comprehens ive	Professional Kazakh (Russian) Language	3	Computer-Based Testing						3		
20			Examination	Professionally-Oriented Foreign Language	3	Computer-Based Testing						3		
11	Information and Communication Technologies	5	Examination	Information and Communication Technologies	5	Computer-Based Testing			5					

Table 2.3Curriculum of Electrical Power Engineering Degree Programme (Bachelor's Degree)

	12	Industrial Electronics	3	Examination	Industrial Electronics	3	Computer-Based Testing				3			
	13	Philosophy	5	Examination	Philosophy	5	Computer-Based Testing			5				
	14	Social and Humanitarian	8	Comprehens	Manashtanu	1	Reference Paper	1						
		Knowledge	14.10	ive Examination	Political and Social Studies	4	Computer-Based Testing	4			8			
					Cultural Studies and Psychology	3	Computer-Based Testing		3				_	
	15	Final Internship	15	Internship Report	Work Experience Internship 3	10	Internship Report Defense							10
				Defense	Pre-Graduation Internship	5	Internship Report Defense							5
	16	Final Academic Assessment	15	State Exam	State examination in the specialty	4	Written Control Work							4
				Diploma Thesis Defense	Developing and defending a thesis	11	Bachelor's Thesis Defense	0	ai V		3			11
1					Elective Modules (containing elective course	es)		-	-			_		-
1 Basic 7	cs of the Profession	9	Comprehens ive	Introducation to the Profession / Introducation to the Specialty	3	Reference Paper	3	3						
				Examination	Practical Training	1	Internship Report Defense	3	1		3			10
					Materials Science in Power Industry / Basics of Materials Science	5	Computer-Based Testing	22	5					2
1 8	Basio	cs of Simulation	4	Examination	Computer Graphics / Computer Simulation	4	Creative Examination	4	8					
1 9	Auto	mation	4	Course Paper	Basics of Automation / Automatic Control	4	Course Paper	1			4			
2 0	Basio	cs of Equipment Operation	14	Comprehens ive	Electromagnetic Capability/Basics of Heat Supply	4	Computer-Based Testing			4				
				Examination	Basics of Nanotechnology/Electroinsulating Devices	4	Reference Paper			4				
					Electric Power Plants and Substations/Equipment of Electric Power Plants and Substations	6	Course Paper				6			
2	Tech Risk	nologies of Technogenic Management	3	Examination	Basics of Law and Anti-Corruption Culture/Basics of Financial Literacy/ Economic and Business Studies/ Power Saving Technologies in Modern Industries/Ecology and Sustainable Development/Information and Quality Management/Health and Safety Basics	3	Computer-Based Testing				3			

2 2	Metrological Support of Electrical Equipment	10	Comprehens ive	Data Measuring Equipment/ Engineering Measurements	5	Computer-Based Testing	T		5			
			Examination	Process sensors/ Transducers of Measuring Signals	5	Computer-Based Testing			5			
23	Switching Devices in the Electric Power Industry	8	Comprehens ive Examination	Relay Protection of Electric Power Systems / Elements of Automation and Relay Protection Devices	4	Course Paper				4		
				Transients in Electric Power Systems / Insulation and Overvoltage in Electrical Equipment	4	Computer-Based Testing				4		
2 4	Power Supply	6	Course Paper	Industrial Power Supply/ Power Supply of Facilities	6	Course Paper			6			
2 5	Microprocessor Electronics	4	Examination	Microcontrollers and Microprocessors / Design of Systems Based on Programmable Integrated Circuits	4	Computer-Based Testing				4		
26	Promising Directions of Electrical Power Engineering	13	Comprehens ive	Electrical Power Generation / Reliability and Quality of Power Energy	4	Computer-Based Testing		4				
	Development		Examination	Electrical Power Engineering / General Issues on Power Engineering	5	Written Control Work	5					
				Work Experience Internship 1	4	Internship Report Defense		4				
27	Design of Electrical Systems	13	Comprehens ive	Alternativel and Renewable Power Sources / Basics of Power Saving	4	Written Control Work			4			
			Examination	Electrical Engineering Equipment / Electrical Machinery	5	Computer-Based Testing			5			
				Power Systems and Networks / Modes of Power Systems	4	Course Paper				4	C	
28	Technical Equipment of Power Facilities	8	Comprehens ive	Power Devices / Electromechanical and Electronic Relays and Automation Devices	4	Computer-Based Testing				4	C	
			Examination	Work Experience Internship 2	4	Internship Report Defense				4		
2 9	Power Transmission and Power Safety	10	Comprehens	Industrial Safety / Power Safety	5	Written Control Work	5			5	5	
			Examination	Electrical Power Transmission and Distribution / High-Voltage Equipment	5	Computer-Based Testing		2			5	
3	Application of Electrical Power	10	Examination	Electrical Drive / Special Electrical Drive	5	Course Paper		5 3		5 - 3	5	
0				Electrical Drive Control Circuits/ Electrical Drive Integrated Automation	5	Written Control Work					5	
3	Ensuring Control of Emergency Situations	10	Comprehens ive	Control in Electric Power Systems / Power System Automation and Control	5	Written Control Work					5	
			Examination	Electric Power System Automation / Technical Means of Power System Automation	5	Computer-Based Testing					5	

Total ECTS per semesters		30	30	30	30	30	30	30	30
Total Exams (Final Control Forms)	Examinations	1	6	3	4	2	5	3	-
	State Exam	1	-	-	-	-	-	-	1
	Report Defense	1	1	-	1	-	1	-	2
	Graded Test	-	1	1	1	-	-		-
	Course Paper	-	-	-	2	1	2	1	-
	Defense								
	Bachelor's Thes	s -		-		-	-		1
	Defense					100			

According to the self-assessment report, the following objectives and learning outcomes (intended qualifications profile) shall be achieved by the Master's degree programme Information Systems:

Programme Objectives

Learning Outcomes

field of computer science with knowledge, skills and abilities sufficient to carry out their professional activities in the field of research, development, implementation of IT-systems in

O1Training of highly qualified specialists in the LO1Know the methodology of software development, IT-organization processes (management of the organization's environment, management of the IS life cycle, software quality management, etc.), models, processes and stages of the life cycle and design.

all sectors, including social, economic, technical, technological and other systems

LO2 Know the principles of organization management, system analysis, strategic management, planning of works on the system analysis taking into account assumptions, restrictions and dependencies of ICT projects of the organization, management of ICT projects of the organization.

LO3 Be able to conduct research using methods of analysis, synthesis, optimization and forecasting of the information processes quality; to carry out the formulation and conducting of experiments on the chosen method and analyze the results.

LO4 Be able to carry out simulation of processes and objects on the basis of standard packages for computer-aided design and scientific researches.

LO5 Be able to support the design, implementation and maintenance of information systems and technologies.

O2 Training of highly qualified specialists with knowledge, skills and abilities sufficient for the implementation of educational activities for professional training in the field of computer science LO6 Know didactics of higher education; theory and technology of pedagogical integration; theory and technology of pedagogical integration; theory ory and methods of teaching special disciplines; scientific problems of the relevant field of science and technology knowledge.

LO7 Know the legal framework in the field of education and science of Kazakhstan, system and integrated knowledge in the field of psychological and pedagogical sciences, pedagogical management and pedagogical interaction.

LO8 Be able to independently determine the content and choose the forms, methods and means of learning sessions in accordance with the objectives of the course; to independently select methods, forms and means of learning adequate to the objectives of the course, to develop learning materials in accordance with the objectives of the course; to design the results of scientific research in the learning materials.

LO9 Be able to manage the research made by students and undergraduates (together with professors); to carry out scientific management of a group of workers in the study of independent topics and developments that are part (section, stage) of the topic.

LO10 Be able to integrate scientific knowledge from various fields; to conduct research and development as a performer of the most complex and responsible works; to develop plans and methodological programs for research. O3Training of highly qualified specialists with LO11 Know the system approach to processes knowledge, abilities and skills sufficient for the and systems, principles of synthesis and sysimplementation of the integration of tematization of knowledge. knowledge, continuing education and training in the field of computer science

LO12 Know the principles of world science development and methods of obtaining new knowledge, competence characteristics of the modern specialist, trends in computer science.

LO13 Be able to search, collect, process and analyze professional information, classify and systematize new knowledge, make correct decisions on the selection of the method of professional development.

LO14 Be able to identify and synthesize innovative knowledge and technology, use the capabilities of modern technology and software for self-development and self-improvement.

LO15 Be able to independently acquire new knowledge required for professional activities, as well as to select a competent certification body for advanced training in the field of IT.

According to the self-assessment report, the following objectives and learning outcomes (intended qualifications profile) shall be achieved by the Master's degree programme Radioengineering, Electronics and Telecommunications:

Programme Objectives

Learning Outcomes

ern trends, principles, methods and approaches research and design of devices and systems. to the development of devices and systems related to radio engineering, electronics and telecommunications; possessing the skills and knowledge for working with the latest software; demonstrating knowledge of modern achievements in the field of creation, operation and development prospects of complex and radio engineering systems.

O1 – Training of specialists competent in mod- LO1. Possess computer-based simulation in the

LO2. Apply automated design and simulation systems in solving professional problems.

LO3. Possess the skills of designing electronic devices of different levels of complexity.

LO4. Carry out technical calculations and determine the economic efficiency of research and design works.

LO5. Possess the skills of working with and simulation of different types of antennas, antenna arrays and waveguides

LO6. Work with modern intelligent systems including Smart-city.

LO7. Be able to programme and write codes using modern software for the latest microcontrollers and microprocessors.

LO8. Configure wireless networks and systems, including intelligent ones.

LO9. Apply methods of digital signal processing and Z-transformations for the description of discrete systems.

O2–Training of highly qualified specialists with LO10. Be competent of Basic scientific and vocain-depth scientific and pedagogical knowledge who can carry out collection, processing, analysis and systematization of scientific and technical information on the latest innovations, as well as who possess the skills of logical analysisof solutions and the culture of communication and speech during discussions, possessing the technology of communicative interaction in scientific, industrial and educational fields.

tional training and modern information technologies, be able to define and solve modern scientific and practical problems; plan and conduct scientific/experimental research work on the selected scientific speciality; teach at universities; successfully perform research and administrative activities.

LO11. Describe the possibilities of advanced scientific methods and technical means and use them at the level required for the prompt decision on production and technological problems.

LO12. Present design, research, inventive and innovative activities, as well as introduce elements of commercialization of technologies in the field of radio electronics and telecommunications.

LO13. Evaluate the role of scientific and pedagogical schools (continuity) in the field of radio electronics; apply the knowledge of university psychology and pedagogy in practice; apply active teaching methods for the formation of students' creative thinking and abilities, to demonstrate innovations in the use of teaching methods, to meet all the requirements for personal qualities at a higher level.

LO14. Fluently speak the national and foreign language for getting full information and to express knowledge in the correct, logically connected oral and written form; possess the skills of public speech, argumentation, discussion and debate, and of practical analysis of various kinds of reasoning; possess the leadership features.

According to the self-assessment report, the following objectives and learning outcomes (intended qualifications profile) shall be achieved by the Master's degree programme_Electrical Power Engineering:

Programme Objectives

in-depth scientific and pedagogical training, possessing modern, highly effective methods of research in the electrical power engineering

O1. Training of highly qualified specialists with LO1. Know the basic laws of science and technology development in the field of electrical power engineering, scientific and technical problems in electrical power engineering

Learning Outcomes

LO2. Know mathematical models and methods for in-depth analysis of scientific calculations and optimization of deterministic and random phenomena and processes in power systems; possess the skills of analysis and application of mathematical simulation methods in the study and design of power systems

LO3. Know the methods of experiment in power devices and system;, be able to plan and conduct experiments in electric power plants; be able to use modern information technologies in the research, development and operation of power facilities and systems

LO4. Know the promising directions of electrical power engineering development, be able to use modern systems of data processing and collection while conducting a technical experiment

LO5. Speak foreign language to the extent necessary to obtain information of professional content from foreign sources

LO6. Possess the skills and methods of teaching electrical engineering courses. Be able to use innovative methods of giving various types of classes in electrical engineering courses

O2. Training of masters with the skills of logical LO7. Apply active methods of training and eduanalysis of solutions to problems, culture of cation; carry out experiments in the classroom communication and speech during discussions, in order to form students' creative thinking and possessing communication skills for interaction abilities, demonstrate innovations in applying in national and international teams different teaching methods

LO8. Fluently speak the national and foreign language forgetting full professional information content from scientific sources, integrate knowledge of languages and express it in a correct, logically relatedoral and written form.

LO9. Demonstrate skills of public speech, argumentation, discussion and debate; practical analysis of various kinds of reasoning

LO10. Explain the choice of the required research methods; analyze and comprehend the realities of modern theory and practice on the basis of the methodology of natural science knowledge and apply these teaching methods in practice.

LO11.Demonstrate the skills of preserving the stylistic features of the business style when filling out documents and the skill of analytical thinking in solving problems and their proper documentation.

		Module	337 (3-5)		Scope of the		Semester 1 2 3		nester	
Module No.	Module	Scope, ECTS credits	Final Control Form of the Module	Course	Course, ECTS credits	Control Form of the Course	1	2	3	4
		4	Basic Modules (a	all courses of the module are compulsory for learnin	g)			2		
1	Basics of Scientific and Research World View	6	Comprehensive Examination	Foreign Language (Professional)	3	Computer-Based Testing	3			;
				History and Philosophy of Science	3	Oral Examination	3		10	
2	Psychological and	6	Comprehensive	Psychology	3	Oral Examination	3			
	Pedagogical Education		Examination	Pedagogics	3	Computer-Based Testing	3			
3	Research Work 1	6	Research Work Report	Research Work	6	Scientific Research Report Defense	6			
4	Analysis, Simulation and Design of Information	11	Comprehensive Examination	Research Work	8	Scientific Research Report Defense		8		
	Systems			Analysis, Simulation and Design of Information Systems	3	Oral Examination		3		
5	Research Work 3	9	Research Work Report	Research Work	9	Scientific Research Report Defense			9	
6	Teaching Practice	3	Practice Report	Teaching Practice	3	Internship Report Defense			3	
7	Research Work 4	7	Research Work Report	Research Work	7	Scientific Research Report Defense				7
8	Research Practice	9	Practice Report	Research Practice	9	Internship Report Defense				9
9	Final Academic	14	State Exam	Comprehensive examination	4	Oral Examination				4
	Assessment	1 100	Thesis Defense	Master's thesis defense	10	Thesis Defense		0	12 W	10
	12		Elec	tive Modules (containing elective courses)						
10	Methodology of Scientific Research	3	Examination	Methodology of Scientific Research / Methodology of Work with Scientific Texts (in Kazakh)	3	Computer-Based Testing	3			
11	Information Protection and Neurocomputer	9	Comprehensive Examination	Information Protection Methods/Information Security	6	Oral Examination	6			
	Systems			Neurocomputing Systems/ Applied Fuzzy Systems	3	Computer-Based Testing	3			
12	Mathematical Simulation in Information Systems	10	Comprehensive Examination	Mathematical Simulation in Information Systems/Simulation of Information Processes and Systems	5	Oral Examination		5	39N	
				formation Systems Infrastructure/ Information Systems Administration	5	Computer-Based Testing		5	39N	
13	Information Systems in Management and	9	Comprehensive Examination	Information Systems in Management / Corporate Information Systems	4	Oral Examination		4	20X3	

The following curricula for all MA Programmes is presented:

-	Education			Modern Information and Communication Technologies in the Education System / Information Control Systems in Education	5	Computer-Based Testing		5		
14	Project and Information Management	18	Comprehensive Examination	Design of Information Systems / IT Projects Quality Management	6	Computer-Based Testing			6	
				Modern Trends in Artificial Intelligence Systems/ Global computer networks	6	Computer-Based Testing			6	
				Data and Knowledge Management in Information Systems / Computer Network Security	6	Computer-Based Testing	с— с		6	
8		Total E	CTS per semsters				30	30	30	30
5		Total E Forms)	xams (Final Control			Examinations State Exam Internship Report	4	4	1 - 1	- 1 1
						Defense Scientific Research Report Defense	1	1	1	1
						Master's Thesis Defense	5.0	-32	- 27.5	1

		Module	Long the second second	Scope of the Control Form of the 1		Sem	ester			
Module No.	Module	Scope, ECTS credits	Final Control Form of the Module	Course	Course, ECTS credits	Control Form of the Course		1 2 3		4
	and the second second second second second	7.5	Basic Modules (a	ll courses of the module are compulsory for learning	ig)					
1	Basics of Scientific and Research World View	6	Comprehensive Examination	Foreign Language (Professional)	3	Computer-Based Testing	3			
				History and Philosophy of Science	3	Oral Examination	3			
2	Psychological and	6	Comprehensive	Psychology	3	Oral Examination	3			
	Pedagogical Education		Examination	Pedagogics	3	Computer-Based Testing	3			
3	Current Problems of Technical Sciences	3	Examination	Scientific and Technical Problems of Radio Engineering, Electronics and Telecommunications	3	Computer-Based Testing	3			
4	Scientific Research1	7	Research Work Report	Scientific Research	7	Scientific Research Report Defense	7			
5	Scientific Research2	7	Research Work Report	Scientific Research	7	Scientific Research Report Defense		7		
6	Scientific Research3	7	Research Work Report	Scientific Research	7	Scientific Research Report Defense			7	
7	Teaching Practice	3	Practice Report	Teaching Practice	3	Internship Report Defense			3	

8	Scientific Research4	7	Research Work Report	Scientific Research	7	Scientific Research Report Defense				7
9	Research Scientific Training	8	Practice Report	Research Scientific Training	8	Internship Report Defense				8
10	Final Academic	15	State Exam	Comprehensive examination	4	Oral Examination			2	4
	Assessment		Master's Thesis Defense	Defense of Master's Thesis	11	Master's Thesis Defense				11
			Ele	ctive Modules (containing elective courses)						
11	Organizing of Scientific Research	5	Examination	Research Management/Commercialization of Scientific Projects	5	Computer-Based Testing		5		
12	Current Trends in Radio Engineering and Telecommunications	5	Examination	Current State of Radio Engineering, Electronics and Telecommunications /Modern Methods of Measurement in Radio Engineering and Telecommunication Networks	5	Computer-Based Testing	5			
13	Computer-Based Research in Radio Engineering	8	Comprehensive Examination	Information Technologies in Radio Engineering and Telecommunications/Network Technologies.	3	Oral Examination		3		
				Computer-Aided Design and Basics of CAD/Modern CAD Systems/Wavelet Theory	5	Computer-Based Testing		5		
14	Simulation Tools for Radio Engineering	10	Comprehensive Examination	Elements of Artificial Intelligence in Technical Systems/System Simulation/ Databases.	5	Oral Examination		5		
	Systems			Systems of Computer Mathematics/ Visual Simulation Systems/Automated Data Collection Systems.	5	Computer-Based Testing		5		
15	Information Coding and Protection	8	Comprehensive Examination	Complex Types of Modulation and Coding in Multichannel Telecommunication Systems/ Analysis and Development of Switching Systems of the Third Generation/ IP-Telephony Telepresence.	3	Oral Examination			3	
				Modern Cryptographic Methods of Information Protection/ Analysis of Technologies and Technical Means of Information Protection in Telecommunications/Service Quality in Telecommunication Networks	5	Computer-Based Testing			5	
16	Modern Signal Processing and Transmission Systems	6	Examination	Digital Systems Simulation/Analysis of Object Remote Control Systems/Analysis of Television Signal Transmission Technologies	6	Computer-Based Testing			6	
17	Microcontrollers in Radio Engineering Systems	6	Examination	Modern Microcontrollers and Communication Microprocessors/Microcontrollers and Microprocessors in Control Systems/Design of Radio Electronic Devices Based on Microcontrollers	6	Computer-Based Testing			6	
18	Methodology of Scientific Research	3	Examination	Methods of Organizing of Scientific Research/Methods of Organization of Work with Scientific Texts (in Kazakh)	3	Computer-Based Testing	3			

Total ECTS per semsters		30	30	30	30
Total Exams (Final Control	Examinations	5	3	3	-
Forms)	State Exam	-	1	-	1
	Internship Report	-	-	1	1
	Defense		10.00		
	Scientific Research	1	1	1	1
	Report Defense	1986	93	100	
	Master's Thesis	-	-	-	1
	Defense				