ASIN Certification Report

PhD Programme
Radioengineering, Electronics and Communication

Provided by
al-Farabi Kazakh National University

Version: 11.11.2014

Table of Content

A About the Certification Process

Title of the PhD Programme	Previous ASIIN certification
PhD in Radioengineering, Electronics and Telecommunications	n/a

Date of the contract: 25th of December 2012   **Submission of the final version of the self-assessment report:** 17th of February 2014   **Date of the onsite visit:** 20th of May 2014   **at:** al-Farabi Kazakh National University, Almaty, Kazakhstan
Peer panel: Prof. Dr. rer.nat. Madhukar Chandra, Technische Universität Chemnitz   Prof. Dr. rer. nat. Frank Obermeier, Bergakademie TU Freiberg   Dr. Klaus Pasemann, *former* Volkswagen   Ms. Anastassiya Krasnyuk (student peer), Technical State University Karaganda
Representative of the ASIIN headquarter Thorsten Zdebel
Responsible decision-making committee: Certification committee
Criteria used: European Qualifications Framework for Lifelong Learning *(level 8)*   Standards for the Certification of (Further) Education and Training for courses and modules related to Computer Sciences, Technology, Natural Sciences and Business Economics as of 27.07.11.   European Standards and Guidelines as of 2009 (3rd edition).

In order to facilitate the legibility of this document, only masculine noun forms will be used hereinafter. Any gender-specific terms used in this document apply to both women and men.

B Characteristics of the PhD Programme

a) Name of the pro-gramme	b) Degree awarded upon conclu-sion	c) Mode of Study	d) Duration & Credit Points	e) First time of offer & Intake rhythm	f) Number of students per intake	g) Fees
PhD in Radio-engineering, Electronics and Tele-communica-tions	Ph.D.	Full time	6 Semester 112,5 CP (ECTS, only coursework is credited)	Sep 2010, each year in September	3	650.000 kzt per year (if not cov-ered by state grant) 1.300.000 kzt (for foreign students if not covered by state grant)

For the PhD-Programme in Radioengineering, Electronics and Telecommunications the self-evaluation report states the following **intended learning outcomes**:

Train specialists with a high level of professional culture, including the culture of profes-sional dialogue, with strong civil position, who can formulate and solve modern scientific and practical issues in science and in industry, teaching at universities, for successful re-search and management activities in various industries and Radioengineering, Electronics and Telecommunications organizations.

Provide conditions for a full, high quality professional education, professional compe-tence in the field of Radioengineering, Electronics and Telecommunications.

Form ability to carry out independent scientific research and expertise in formulating their own opinions.

Deepen theoretical and practical knowledge in areas of Radioengineering, Electronics and Telecommunications, directed to the needs of the state and the market, scientific, practi-cal and teaching institutions that train doctorates in the specialty.

Form knowledge and critical assessment of contemporary issues, studied and debated within their areas of specialization in Radioengineering, Electronics and Telecommunica-tions.

Form ability for competent selection and implementation of modern methodological approaches.

Knowledge

1. Know theoretical basics of fundamental sciences as relevant to his (her) profession and specialization; PhD students have to know fundamentals of physics, higher mathematics including such different branches as mathematical analysis, differential equations, analytical geometry etc;
2. Know theoretical and practical foundations, main concepts, techniques and prospects of the development of Radioengineering, Electronics and Telecommunications, physics and engineering concepts necessary for solving different problems of electronics and telecommunications;
3. Knowledge about modern problems, latest researches and achievements in Radioengineering, Electronics and Telecommunications.

Understanding

1. Understanding the meaning of fundamental physical laws necessary for explanation of basic phenomena in electronics and telecommunications;
2. Understanding principles of operation of different devices used in electronics and telecommunications;
3. Understanding principles of organization of theoretical and experimental research work, rules for preparation of a research papers;
4. Understanding of the professional and ethical responsibilities in practical work.

Application

1. Design and conduct experiments in radio engineering and electronics, and to analyze and interpret the data generated by those experiments;
2. Apply the received practical skills and theoretical knowledge in their scientific research and in industry. Chose forms, methods and means of collecting information;
3. Work effectively on multi-disciplinary teams involving people from diverse backgrounds;
4. Illustrate the results of research activity;
5. Carry out research work devoted to study of selected problems of radio engineering, electronics and telecommunications;
6. Apply results of own research work and scientific work of other research groups for the development of radio engineering, electronics and telecommunications collection, storage and use.

Analysis

1. Identify and define problems in radio and computer engineering, and to generate and evaluate solutions to those problems;
2. Analyse results of research work and make conclusions according the obtained results;

3. Analyse preferences and disadvantages of different methods used in research work for study processes in electronic systems;
4. Analyse preferences and disadvantages of electronic devices used for supplying of radio engineering, electronics and telecommunications.

Synthesis

1. Recognize and respond to the need for life-long learning for a successful career in radio engineering, electronics and telecommunications;
2. Recognize the suitable methods for investigations of electronic and telecommunication systems;
3. Propose possible scientific methods of learning to achieve goals.

Evaluation

1. Discuss the modern system of organizing and financing scientific research;
2. Choose costing methods that are acceptable to the specific industry;
3. Protect the received digital data, applied methods and techniques;
4. Communicate effectively, both orally and in writing, in the field of radio engineering and electronics;
5. Estimate results of research work and branches of their applications.

The following **curriculum** is presented:

Title of modules	Course code	Title of courses	Credits	ESTC/hours	Lec/Prac/Lab.	Sem.
1. Core Elective Modules (23credits)	SChS 7202	Synchronization of Chaotic Systems	3	5/135	2+1+0	1
	PHSG 5202	Nonlinear dynamics of oscillatory systems	2	3/90	1+1+0	1
	FR 7203	Fractals in Radio Location	3	5/135	2+1+0	1
	NAS 7206	Nonlinear Analysis of Signals	2	3/90	1+1+0	1
	ECNG 5201	Physics of Optical Phenomena in Nanostructured Semiconductors	3	5/135	2+1+0	1
	ECNG 5202	Heterojunction in Solar Energetics	2	3/90	1+1+0	1
	PhSChS 7204	Physics of Stochastic and Chaotic Processes	2	3/90	1+1+0	2
	PHSG 5204	Physics of Open Systems	2	3/90	1+1+0	2
	GEOM 5203	Physics and Techniques of Optical Communications	2	3/90	1+1+0	2
	OS 7205	Fiber Optic Communications	2	3/90	1+1+0	2
2. Specialized elective modules (15 credits)	PHSG 6205	Theory of Information and Theory	3	5/135	2+1+0	2
	PHSG 6206	Technique of Coding of Signals	2	3/90	1+1+0	2
	GEOM 6205	Information Technologies on the Base of Dynamical Chaos	3	5/135	2+1+0	
	GEOM 6206	Information Security by use of Dynamical Chaos	2	3/90	1+1+0	
	ECNG 5203	Contemporary Systems of Communications	3	3/90	2+1+0	

	ECNG 5204	Wireless Communication Systems	2	3/90	1+1+0	
TOTAL			48			

C Peer Report for the ASIIN Certificate

1. Formal Information

Criterion 1.1 Formal Information

Evidence:

- Self-Evaluation-Report

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"

Preliminary assessment and analysis of the peers:

The formal specifications of the programme are presented in the Self-Evaluation-Report. The name of the PhD-programme comprises "Radioengineering, Electronics and Tele-communication". Concerning the question whether the name reflects the content properly, the audit team came to the conclusion, that the respective research work is visible in the area of *electronics*, but not yet in the fields of *radioengineering* and *telecommunication* (chapter 2.1). This is seen as an option for the enhancement of the yet nascent programme.

The formal structure of the programme derives from the state requirements for PhD-programmes in Kazakhstan. Upon completion, students are awarded with a PhD-degree. The programme requires full-time involvement of students and extends over a period of three years. Not all time spent within these three years is credited. Participants are awarded with 75 Kazakh credits, which is reported to equal 112.5 credit-points ECTS. There is an uncertainty in the conversion from Kazakh credits to ECTS, which is explained in chapter 3.2.

Study fees are usually covered by state grants, which are awarded to students in a competitive procedure. It is also possible for students to pay for studies by themselves. The PhD-programme requires annual study fees of 650.000 KZT for Kazakh students, which equals around 2.600€ (17th of July 2014). For foreign students this amount is doubled. Concerning student admission, the programme is planned for an intake of three students per year. While the Kazakh Ministry for Education and Science is not allocating student-grants for the PhD-programme in the last two years, just one enrolled student cohort (the first cohort) is about to finish the programme.

The audit team considers the formal specifications of the programme, with the exception of the mentioned conversion between ECTS and the Kazakh credit system, to be adequately defined. This information is published on the websites of al-Farabi Kazakh National University and in its "Academic Policy" (which is also available on the websites of the university).

Criterion 1.2 Legal relationship: mutual rights and duties

Evidence:

- Discussions with faculty members responsible for programme implementation

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"

Preliminary assessment and analysis of the peers:

PhD-Students are enrolled just as students at bachelor´s and master´s level and share the same rights and obligations as students in the first and second cycle do. In principle the methods of financing studies (*state grants* allocated by the Kazakh Ministry of Education and Science or *self-payment*) are working similar. Additionally, PhD-students can be engaged in the educational work of their supervisors to enhance their income. If the completion of the dissertation exceeds the standard-period of the programme, students will not be charged by the university anymore, but have to live on their own funds.

Overall the audit team does not see any reason to doubt that the legal status of PhD-students is defined properly.

Final assessment of the peers after the comment of the Provider regarding criterion 1:

The comments of the university rather deal with criteria 2 and 5 than criterion 1 and are thus dealt with in the corresponding sections of this report. The panel nevertheless considered this criterion to be fulfilled.

2. Courses/Modules: Content, Policy and Implementation

Criterion 2.1 Learning outcomes of the course/module

Evidence:

- Self-Evaluation-Report

- Discussions with the responsible members of university management

- Discussions with staff responsible for managing the study programmes

- Defined programme objectives and learning outcomes in the Self-Evaluation-Report

Preliminary assessment and analysis of the peers:

Kazakhstan is introducing the PhD-cycle following the implementation of the three-cycled bologna structure. This means that PhD-programmes are still in a nascent stage. One major stakeholder defining the overall structure of the study programmes in general and particularly of the PhD-programme is the Kazakh Ministry for Education and Science. This counts especially for the duration of PhD-programmes and the number of courses within the programmes. This structure, as presented in the Self-Evaluation-Report, led the peers to the misunderstanding of the PhD-programme being a mixture between a teaching- and a research-oriented programme. The discussion with faculty staff in charge reveals that within this framework given, the faculty can develop their subjects autonomously. These discussions convinced the audit team that the faculty is taking every means possible to strengthen the research orientation of the programme. The audit team furthermore strongly supports the efforts of al-Farabi Kazakh National University, which is reported to be working close with the ministry, to obtain more autonomy. The present certification is intended to be a part of these efforts.

Both audit-team and faculty-staff agree that the most important learning outcome of the programme is the competence of PhD-graduates to conduct independent scientific research competitive at an international level. As suitable generic assessment criteria, the highest level 8 of the European Qualifications Framework (EQF) is applied. This level defines that students acquire *knowledge at the most advanced frontier of a field of work or study and at the interface between fields*, achieve *the most advanced and specialized skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice.* They are able to *demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research*. This means that in terms of learning outcomes, the programme cannot be considered like a study programme with a thoroughly defined curriculum.

The formulation of the programme objectives, as presented ahead, could not catch up with the superlatives of the EQF ("most advanced"). Stressing the research-oriented objectives as communicated in the sessions with members from the rectorate and the faculty management, the audit team does not doubt that the intended outcomes of the programme are comparable to level 8 of the EQF. During the audit, the appointed team had the opportunity to assess the individual research projects of PhD-students in a laboratory

setting with students explaining their theses by themselves. Essential features of EQF level 8 (e.g. *demonstrating substantial authority* by required presentations on international conferences) are visible in the programme, that there is no principle restraint in attesting the adequacy of the programme. One major concern of the audit team is that the research performance of the faculty is not likewise visible in all subjects addressed by the title of the PhD-programme. Especially for *Radioengineering* and *Telecommunications-Engineering* the respective laboratory equipment, functioning as a prerequisite for an enhancement in those fields, is not seen as adequate (chapter 5). The audit team doubts that the intended learning outcomes of the programme with regards to competences in conducting experimental research in all fields addressed within the title of the programme can be achieved without an enhancement of the respective equipment.

Criterion 2.2 Prospects of the labour market and practical orientation

Evidence:

- Discussion with PhD-students

- Discussion with responsible staff from the faculty

- List of companies functioning as possible employers

Preliminary assessment and analysis of the peers:
Because of its yet nascent status, the programme has not yet produced graduates. At the time of the audit, one student cohort was about to finish the programme. Although other career paths are possible, the main purpose of the PhD-programme is to raise young scientists as prospective scientific staff for the faculty´s own human resource needs. The goal is to raise specialists capable of combining research and educational skills at the highest level possible. There is also a visible demand from industry – e.g. the developing industry of optoelectronics – but usually this need is sufficiently addressed by master´s graduates. Considering the – by means of selection procedures - elite status of the PhD-programme, the faculty is convinced that every successful graduate will find a suitable position at the academic labour market or in the industry. There is no reason for the audit team to doubt this statement.

Criterion 2.3 Admission requirements

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"

- Discussion with responsible staff from the faculty

Preliminary assessment and analysis of the peers:

The application to an announced PhD-position is open to interested master´s graduates from whole Kazakhstan and abroad. The Kazakh Ministry of Education and Science defines the subjects suitable for an admission in the specialty "Radioengineering, Electronics and Telecommunication" at PhD-level. In this case, also master´s graduates from physics can apply. Places in the PhD-programmes are very limited. Irrespective of the question whether the government allocates state grants or not, the programme offers three places. In all PhD-programmes combined, the faculty reports to have 15 new students per year. This clearly stresses the elite status of having a PhD-position (in terms of selection).

In comparison to selection procedures in the first cycle, generic competences (especially the command of English as a scientific language) are tested likewise, but the procedure at PhD-level heavily depends on a subject-specific examination in *physics* and *radio-electronics* conducted by a commission of the faculty. The requirements of the procedure are reported to be changing – the new approach requires applicants to create a seminar explaining the vision of their future research. This procedure is very important to the faculty because of the challenging publication requirements of the PhD-programmes: Having a paper with impact factor published in a refereed journal is a prerequisite for defending the final thesis. Because of publishing companies usually need up to nine months for the review process, it can be challenging in terms of time to meet those requirements. This means the faculty is very keen to look for master´s students who have already begun substantial research work, which is likely to be successfully pursued. The chairs are explicitly asked for a respective recommendation which students are capable of meeting the challenging publication requirements and to encourage them for an application to the PhD-programme.

Altogether, the selection procedure conducted for PhD-students admission clearly "ensure that all admitted learners fulfill the necessary requirements" as stated explicitly in the criteria. The overall procedure is explained in the "University-wide policy", which is accessible on the university´s website.

Criterion 2.4 Contents

Evidence:

- Self-Evaluation-Report
- Module descriptions

Preliminary assessment and analysis of the peers:

As mentioned before, the overall structure of the programme depends on state requirements, but the faculty can define the details autonomously. In the discussions it was perfectly clarified that the core of the programme consists of the individual independent re-

search work conducted by the PhD-students. The module descriptions provided together with the Self-Evaluation-Report only refer to supplementary parts of the PhD-programme. Within this framework, the faculty has chosen to define topics which are both relevant to the individual research work of PhD-students as well as to competences required for the human resource needs of the faculty itself. Upon entrance into the PhD-programme, every student creates his own trajectory of studies in cooperation with his supervisor.

The peers do not really support the amount of courses in the PhD-programme because they think that competences to be gained by coursework should be sufficiently addressed by the master´s programmes and that the PhD-level should be consequently sharpened towards the individual research work of PhD-students. But on the other hand, the peers accept that the amount of coursework does not belong to the faculty´s range of decisions and that the faculty is succeeding in adapting the courses to the individual theses of PhD-students. This will enable the students to perform their individual research projects.

The audit team supports the faculty in any means possible to further sharpen the structure of the programme towards more research orientation.

Final assessment of the peers after the comment of the Provider regarding criterion 2:

The panel members positively acknowledge the information from the university that a number of research devices in the field of radio- and telecommunication shall be bought according to a purchasing plan. In the same manner, the peers laud the intention of the faculty to apply for research grants from the Ministry of Education and Science and the Ministry of Defense. It is no clear, however, what the schedule of this purchasing plan is nor whether the applications for grants will be successful, and thus when students and staff can start their corresponding research activities. Consequently, the panel considers it necessary that a research plan with respect to the areas of radio engineering and telecommunications engineering has to be established and submitted.

The panel considers the other criteria to be fulfilled.

3. Courses/Modules: Structures, Methods and Implementation

Criterion 3.1 Structure

Evidence:

- Self-Evaluation-Report
- Module descriptions

Preliminary assessment and analysis of the peers:

The PhD-programme in Radioengineering, Electronics and Communication lasts three years in full-time-provision. The research work of PhD-students starts from the beginning (usually in continuation of research work done at master´s level). In view of the peers this is absolutely necessary to succeed in doing substantial research work and meeting the publication requirements of the PhD-programmes in the end. The individual research work is supplemented in the first one-and-a-half year of the programme by courses adding in total to a workload, which is reported to equal 112.5 ECTS. Although every module has a sound description, there are some uncertainties in the conversion of Kazakh credits to ECTS explained below.

The overall structure is defined by state regulations and cannot be changed by the faculty autonomously. It is explained with a mixed understanding of research- and teaching oriented PhDs deriving from history. Nevertheless, peers and faculty staff agree, that in terms of structure, a reduction of courses would be beneficial for sharpening the programme towards more research orientation.

With these strong recommendations, the audit team considers the structure of the programme to be clearly defined.

Criterion 3.2 Workload

Evidence:
- Module descriptions
- Discussion with students
- Discussion with responsible staff from the faculty

Preliminary assessment and analysis of the peers:

The defined credits of the PhD-programme only refer to the subsidiary modules provided by the curriculum. The audit team understands perfectly that the individual independent research work of participants, which is the central part of the programme, cannot be credited with ECTS. But concerning the conversion between the Kazakh credits system and ECTS, the audit team needs a reassuring clarification from the faculty. At bachelor´s and master´s level, 27 h of student workload were valued for one credit ECTS. Following this calculation, the modules in the PhD-programme should sum up to 125 credits ECTS.

Students at PhD-level did not complain about the amount of coursework in combination to their individual research work as suspected by the audit team. But in view of PhD-students, the focus lies clearly on research work and the respective thesis. They perceive the allocation of credits to be reasonable. The only pressure communicated as unneces-

sary derives from the harsh publication requirements, which have to be fulfilled for the permission to defend the dissertation. The faculty is perfectly aware of this imbalance, but the requirements have been defined by the Kazakh Ministry of Education and Science. The audit team encourages and supports the faculty in all efforts to level those requirements.

Criterion 3.3 Teaching methodology

Evidence:

- Module descriptions
- Discussion with students
- Discussion with teaching staff
- Discussion with responsible staff from the faculty

Preliminary assessment and analysis of the peers:

At the first glance, just having the module descriptions at hand, the course content of the PhD-programme seemed to prolong the education at master´s level. This could be clarified in the discussion with faculty staff responsible for programme coordination, teaching staff and PhD-students. The faculty could credibly reason, that the courses held specifically for the small number of PhD-students are in general conducted in a rather seminary and problem-oriented style and that they are specifically adapted to the needs of the individual research work of PhD-students. An additional purpose of the courses is to assure that PhD-students get in touch with every scientific school within the faculty.

Criterion 3.4 Support and assistance

Evidence:

- Discussion with responsible staff from the faculty
- Discussion with students

Preliminary assessment and analysis of the peers:

In view of the audit team, there is a strong approach for support and advice implemented in the PhD-programme. Each PhD-student has two advisors, one from the faculty and one scientist from abroad. Upon entrance of the programme, students´ are obliged to find an external supervisor for their thesis by reviewing international conferences and research publications. By criteria for the appointment of supervisors, they have to be a doctor of science with sufficient publication volume and impact within the realm of the PhD-students research work. There is a budget available, ensuring that PhD-students can visit the home-institution of the supervisors for four months and by this means getting access

to research equipment possibly not available at the home university. The budget also enables the external supervisor to visit the PhD-students at their home universities, getting their expenses compensated up to 15 days a year. The relationship to this external supervisor is structured by contracts. This is considered to be an excellent solution by the audit team. The relationship to the supervisor from the faculty is described by students as daily presence and communication.

The means taken by the faculty for supporting and advising students are completely appropriate in the eyes of the peers.

Final assessment of the peers after the comment of the Provider regarding criterion 3:

With regard to the credit point system, the panel acknowledged that the Kazakh system was based on staff work load as opposed to the student-workload base of the ECTS system. They also took into account that the university is not in a position to change the credit point system on its own; they would not expect them to do so. However, the difficulty the peers had with the credit point system was not the difference in per se but in the way the calculations have been made.

In their response, the university provided the following formula which they had used for the calculation of ECTS:

$$1 \text{ ECTS} \approx \frac{45 * 1 \text{ Kz credit points}}{27}$$

While this calculation corresponded to the oral information received during the onsite visit, the peers confirmed their impression that this calculation was not consistently used. The panel therefore considers it necessary that the correct conversion of Kazakh credits to ECTS is provided and made public so that internal and external stakeholders are informed correctly. This is particularly relevant for international mobility and exchange with other members of the European Higher Education Area.

The panel considers the other aspects of this criterion to be fulfilled.

4. Examination: System, Policy and Forms

Criterion 4 Exams: System, policy and forms

Evidence:
- Discussion with PhD-students
- Discussion with responsible staff from the faculty

Preliminary assessment and analysis of the peers:

Concerning the exams related to the modules within the PhD-programme, students are free to choose between oral and written exams. This is defined in the respective module descriptions. The discussion between audit team and faculty-staff reveals that neither peers nor faculty staff really see the necessity to assess PhD-students as in the first two cycles. Staff from the faculty looks at the small numbers of PhD-students who enroll each year and explains convincingly that the supervisors do not need any further examinations to know what their students are capable of or not. On the other hand, the audit team explains that at first glance, the defined curriculum raised the impression of ordinary lectures suitable just for the first two cycles. This was clarified in the discussion, when the faculty reasoned that subjects and methods of courses at PhD-level are adapted accurately to the subjects of the students´ research work and theses. The audit team accepts that within the given framework, the faculty retrieves the most benefit from the defined amount of courses (and examinations). The peers strongly support any efforts to enhance flexibility in the design of coursework at PhD-level.

Another feature of the programme to be handled like exams are the requirements with regards to publications. They are formal standards to be met to allow students defending their final thesis. The ministry defines three articles in total at minimum – hereof one article listed in SCOPUS/Thomson Reuters with an impact factor above zero – and four presentations at international conferences. The activities leading to the achievement of those requirements have to be reported annually to the scientific council of the faculty. Resuming their own academic career and the processes of publishing companies, the peers wonder how these ambitious goals can be achieved within the defined duration of the programme in addition to the dissertation. The faculty reassures the audit team, that the present student cohort exceeds those requirements - not least because of taking these requirements into account when selecting students for the PhD-programme. Students also reassure the audit team to meet the requirements – while at the same time requesting support for easing the pressure derived from these requirements. The audit team therefore strongly supports the faculty in any means convincing superior instances towards leveling reporting and publication requirements.

More important than course based exams or publication requirements is the assessment of the final PhD-thesis. For this purpose, the Kazakh Ministry for Education and Science appoints a Council for Defense of the PhD-theses, which is composed from 12-18 scientists in a particular field. Usually, one third each is recruited from National Universities, from other universities and from Kazakh research institutions. Students have to prepare a seminar and a report on the topic of their research work. The chair supervising the student then makes a decision whether to allow the defense of the final thesis or not. The

defense is a two staged procedure starting in the first stage with a decision on an adequate qualification of the council (with regards to the presented research work) and then proceeding with the defense itself. In the defense, PhD students are obliged to explain the scientific innovation as well as the practical value of their research work. The audit team accepts this elaborate but internationally unusual procedure. Additionally, in reviewing the topics of the present PhD-students and the language of their publication (up to now Russian and Kazakh only), the peers encourage the faculty to actively pursue the English language policy.

Final assessment of the peers after the comment of the Provider regarding criterion 4:

The peers appreciate the confirmation of the university that they view the improvement of English language skills as an element for enhancing the quality of the programme and facilitating the implementation of research on an international level. They therefore recommend the university to proceed in the way proposed.

The other aspects of this criterion are considered to be fulfilled.

5. Resources

Criterion 5.1 Staff

Evidence:

- Staff handbook in the Self Evaluation Report
- Discussion with members of the university management

Preliminary assessment and analysis of the peers:

In the discussion with the peers, the member of the university management resumes the yet ongoing transformation process of al-Farabi University into a research institution, after being a more educationally oriented university in former times. Concerning scientific staff, this is to be achieved by a results-based management approach, which appears in individual agreements on objectives and individual reporting, taking into account the research performance to 50%, the educational performance to 35% and to 15% the social work of teaching staff in creating a generation with a deep respect to society.

In general, the academic career stages lead from the position of a young researcher to an assistant professor to an associate professor and then to a full professorship with the latter being the only permanent position in the academic career. The appointment to titles is based on requirements set by the Ministry of Education and Science, mostly taking into account the number of publications and their impact factor. The requirements are ele-

vated towards the next position. Staff recruitment in general is conducted by open calls (e.g. announcements in newspapers) and for new specialities, staff is partly recruited directly from companies, partly from universities. There is also a governmental budget available for the integration of foreign researchers.

There is maximum number of PhD-students fixed stating three PhD-students per supervisor. The quality criteria applied for external supervisors count as well for internal supervisors. This means that supervisors have to be professors, holding a doctor of science and showing adequate research performance in terms of volume and impact. Concerning the present staff engaged in the PhD-programme, the audit team had a good overview through the staff handbooks provided in the Self Evaluation Report. The member from the university management confirms that the present faculty-staff is assured for the provision of the programme in the certification period.

The peers approve sufficient scientific quality and quantity of teaching staff to conduct the programmes – although, from their point of view, a broader research work directly connected to all subjects mentioned in the title of the programme is required. At present, substantial research work is visible in *Electronics*. The other two topics, *Radioengineering* and *Telecommunications,* are not present likewise and the research work visible depending heavily on simulations due to a lack of equipment for experimental works in those fields. This specific laboratory equipment has to be enhanced as a prerequisite for measuring up all topics addressed in the title of the programme (5.3.). As a first step, the peers require a plan for broadening the research performance in the mentioned fields.

Criterion 5.2 Institutional setting, funding and equipment

Evidence:
- Self evaluation report
- Visit of laboratories

Preliminary assessment and analysis of the peers:
The self-evaluation-report provides a detailed list of the laboratory and IT-equipment available. In addition to this, the audit team visited the specific laboratories of the Physical and Technical Faculty of al-Farabi University, having the research work explained by PhD-students in a laboratory setting. PhD-students confirm that they have access to the laboratories usually six days a week and on Sundays upon request. Further access to laboratory equipment is granted by the external supervisors from abroad and by means of cooperation (e.g. with the *Institute of Radioelectronics of the Russian Academy of Science*). Staff from the faculty management additionally resumes the plans to build a new research facility.

This is appreciated by the audit team, but there is a concern already posed at master´s level concerning the detected lack of application- and subject-specific laboratory equipment for *Radioengineering, Electronics and Telecommunication* (antennas, wave propagation, high frequency signals). The peers did not see most modern equipment enabling PhD-students to have a signal leaving an antenna and being received somewhere else. The equipment for electronics could also be modernized. At present, this experimental setting is substituted by simulations. Considering the expected learning outcomes of the programme, the peers require an improvement towards the hands-on-experiences of PhD-students with the adequate equipment. The already perceived need to include more modern design software (HP-ADS, CST) at bachelor´s and master´s level becomes more urgent at the PhD-level. Furthermore, the audit team did not see that the faculty already has an easy access to the latest publications in radioengineering at an international level. In view of the peers, these deficiencies cannot be adequately substituted by cooperation without narrowing the conditions for PhD-students to achieve the intended outcomes of the programme.

In view of the peers, the detected deficiencies have to be addressed in a research oriented plan spreading over the accreditation period.

Final assessment of the peers after the comment of the Provider regarding criterion 5:

The panel highly values the information about research equipment included in the purchasing plan as well as the intention of the university to invite international experts. However, as the university states that this expansion of laboratories will be made in the next couple of years. The peers point out that more immediate action is necessary as this is an essential step towards a better research base for the programme. Additionally, the submission of a detailed research plan is necessary. This plan must included detailed information about the exact dates when which devices are bought and planned to be bought in the next five years.

The panel commends the information about the availability of international journal as well as the access to the Springer database. However, the information about access via international and local partners remains vague. As with the laboratory equipment, the panel considers the availability of research level literature to be essential and thus expresses the need for an expansion of access a necessary improvement to be made in the short term.

Other aspects of this criterion are considered to be fulfilled.

6. Quality Management: Development and Enhancement

Criterion 6.1 Quality assurance & enhancement

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"

- Discussions with PhD-students

Preliminary assessment and analysis of the peers:

Concerning quality assurance and further enhancement, the member of the university management explains to have implemented an ISO 9001 approach for management- and administration-oriented issues.

Concerning the academic quality, the organizational setting with two supervisors, one from the faculty and one from abroad, fulfills a function of quality management. Additionally, there is a fixed ratio of three PhD-students maximum per supervisor. Concerning higher organizational instances, PhD-students point out that the *Vicerector for Academics Issues* is the relevant representative of the university management to consult if deficiencies would be perceived by students with regards to the quality of the PhD-programme.

Considering the yet nascent status of the PhD-programme, the audit team considers quality assurance procedures in place. But a quality assurance policy, as stated by criteria, is not yet visible. The audit team therefore recommends the faculty to devise a quality-assurance policy for PhD-programmes.

Criterion 6.2 Instruments, data and methods

Evidence:
- Self-Evaluation-Report
- Discussions with staff responsible for faculty management

Preliminary assessment and analysis of the peers:

The Self-Evaluation-Report for the PhD-programme presents information about teaching-staff-capacity and equipment. Since the first PhD-cohort is about to finish the programme and the ministry did not allocate state grants for the two previous years, data on students´ progress can inevitably not exceed small numbers.

The audit team does not request any further data, but considers this topic to be addressed with the recommendation on a quality assurance policy as already mentioned.

Final assessment of the peers after the comment of the Provider regarding criterion 6:

The panel takes into account the acknowledgement of the university that the quality assurance system needs to be adapted to the specificities of the PhD programme. They consider the drafting and implementation of a quality assurance policy to be highly advisable in order to enable the university to continuously control the achievement of their quality targets and further enhance the programme.

7. Documentation & Transparency

Criterion 7.1 Relevant documents

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"
- Self-Evaluation-Report of the PhD-programme

Preliminary assessment and analysis of the peers:

Most regulations-relevant topics are explained in the "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University" (*admissions, overall structure of programmes, examination, grading, organizational structure of the university*). This policy is published on the websites of al-Farabi-University.

The audit team considers the characteristics of the programmes to be adequately defined in the respective regulations.

Criterion 7.2 Certificate upon conclusion

Evidence:

- Self-Evaluation-Report of the PhD-programme

Preliminary assessment and analysis of the peers:

In line with the programme description provided in the Self-Evaluation-Report, graduates are awarded the title "Ph.D. in Radioengineering, Electronics and Telecommunication".

At present, the al-Farabi-University has just started to provide a diploma supplement as an auxiliary document to the degree certificate and the already delivered transcript of records (which was made available to the audit team). With regards to the objective of al-Farabi University to establish a conversion towards the European Higher Education Area as well as to the requirements of the ASIIN seal, the peers strongly support the idea of providing a diploma supplement to the graduates. This document should describe the awarded qualification and the educational system of Kazakhstan – in this way fostering

comprehensibility and comparability between the educational systems. Additionally, it should explain the calculation of the final grade and present statistical data on the distribution of marks.

Final assessment of the peers after the comment of the Provider regarding criterion 7:

The panel members understand that the university is not allowed to modify any official templates provided by the Ministry of Education and Science. Nevertheless, it would seem unusual that the university could not provide a Diploma Supplement which is based on the common provisions accepted by all Bologna Signatory countries. Thus, as no leaving certificate or diploma supplement was provided for the PhD programme under review, the peers would find it necessary that such documents are provided as is common in the European Higher Education Area where PhD programmes are considered to be the third cycle of higher education. While they had understood that the university has already begun the award, it is not sure to which extent this is included in programme regulations. They advise the university to make use of the model which was developed by the European Commission, the Council of Europe and UNESCO/CEPES.

D Additional Documents

Before preparing their final assessment, the panel ask that the following missing or unclear information be provided together with the comment of the provider on the previous chapters of this report:

D1.   Clarification on the conversion of Kazakh credits to ECTS points.

D2.   Diploma supplement (supplementary document, describing the qualification achieved and the educational system of Kazakhstan)

E Comment of the Provider (29.08.2014)

The institution provided a detailed statement. The university also submitted a number of Diploma Supplement models for Bachelor's degree programmes.

F Summary: Peer recommendations (10.10.2014)

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

PhD Programme	ASIIN Certificate	Maximum duration of certification
PhD-programme in Radioengineering, Electronics and Telecommunication	awarded with requirements	30.09.2019

Requirements

A 1.   (ASIIN 5.2) The scope of laboratory facilities and measuring systems in the areas of radioengineering and telecommunications engineering has to be increased as stated in the respective chapters of this report.

A 2.   (ASIIN 5.2) The availability of research level literature has to be vastly expanded.

A 3.   (ASIIN 2.4, 5.1, 5.2) A research plan in close connection to the PhD-programme, especially with respect to the areas of radioengineering and telecommunications engineering, has to be established. This research plan should state the enhancement of equipment and access to literature as stated in this report as well as the planned activities for strengthening/improving the research performance in those fields actually not visible. The timeframe should be oriented at the certification period.

A 4.   (ASIIN 3.2) The conversion of Kazakh credits to ECTS must be corrected and the corrected figures must be used in all published documents.

A 5.   (ASIIN 7.2) A Diploma Supplement must be submitted for each programme in line with the model developed by the European Commission, the Council of Europe and UNESCO/CEPES.

Recommendations

E 1.   (ASIIN 5.1, 2.1) A greater proportion of responsibility should be given to academic staff to define the programme in consultation with the ministry.

E 2. (ASIIN 3.3) The rigidity within the structure and the requirements concerning publi-cations and intermediate reports should be reviewed in order to facilitate a more flexible execution of the programme.

E 3. (ASIIN 2.1, 2.4, 4) English language skills of PhD-students should be proactively built further.

E 4. (ASIIN 6.1) A quality assurance policy for the PhD-programme should be devised to guide the future development of the programme.

G Decision of the Certification Committee (11.11.2014)

Assessment and analysis for the award of the ASIIN Certificate:

The Certification Committee discussed the procedure and the proposed requirements and recommendations. They noted that one of their tasks was to ensure consistency in the decision-making among the different certification procedures. Thus, they decided that some requirements and recommendations needed to be transferred, deleted or edited for each of the procedures.

In particular, with regard to requirement 4, they emphasized that the award of ECTS credit points was not mandatory for PhD programmes. However, if Al-Farabi University wishes to transfer its national Kazakh credit point system into ECTS, the calculation must be both consistent and in line with the ECTS Users' Guide. Additionally, the committee members considered it reasonable that credits would be awarded to the taught components, not for the research components or associated dissemination outputs. Similarly, concerning requirement 5, they did not consider the award of a Diploma Supplement, as reserved for First and Second Cycle degree programmes, reasonable whereas an informative leaving certificate or similar document would be beneficial for PhD holders.

Requirements 1-3 were also reworded to make the more transparent. Requirement 3 was deemed to be rather vague and thus targeted more towards the necessity of facilitating the research activities of teaching staff involved in the programme.

The committee members considered that former recommendation 1 was both too vague and would interfere with national legislation in a way exceeding the scope of the certification procedure. It was thus deleted. Editorial amendments were made to the other recommendations and requirements in order to improve their clarity. For transparency reasons, former recommendation 2 was split into two new recommendations, dealing with the publication requirements and the practice of interim testing respectively.

The Certification Committee decides to award the following certificates:

PhD Programme	ASIIN Certificate	Maximum duration of certification
PhD-programme in Radioengineering, Electronics and Telecommunication	awarded with requirements	31.12.2019 (upon fulfillment of requirements)

Requirements

A 1. (ASIIN 5.2) An investment plan for laboratory facilities and measuring systems in the areas of radioengineering and telecommunications engineering has to be increased as stated in the respective chapters of this report.

A 2. (ASIIN 5.2) For the purpose of enabling staff to conduct relevant research and to enhance further development, staff members must be enabled to better combine teaching load with research work. The university must clarify how the policy regarding sabbaticals and academic mobility of staff is implemented.

A 3. (ASIIN 5.1) For the purpose of conducting research, the accessibility of relevant international journals, databases and literature must be improved and made transparent to all teaching staff and students.

A 4. (ASIIN 3.2) If ECTS credits are used, the transformation of the Kazakh credit points into ECTS must correspond to the ECTS regulations that one credit point is awarded for 25-30 hours student workload and be in line with the Users' Guide. ECTS should be applied for taught parts of the programmes only.

A 5. (ASIIN 7.2) A programme-specific leaving certificate or equivalent document has to be prepared and handed out to students on a regular basis providing information about the objectives, intended learning outcomes, structure and level of the degree, as well as about an individual's performance. It must also explain the educational system of Kazakhstan in order to foster comprehensibility and comparability between the educational systems.

Recommendations

E 1. (ASIIN 3.2) It is recommended to ensure that the required publications and the admission to the defense of the thesis and the conferral of the PhD degree are better harmonized in order to avoid undue delays.

E 2. (ASIIN 4) The practice of interim testing should be carefully monitored in order to avoid student's overload without a considerable added value for their learning success.

E 3. (ASIIN 2.1, 2.4, 4) English language skills of PhD-students should be proactively built further.

E 4. (ASIIN 6.1) Within the quality assurance policy, feedback loops and further development of the programmes should be carefully implemented. In addition, the stu-

dents and other stakeholders should be involved in the quality assurance process more actively.