ASIIN Certification Report

PhD Programmes
Computer Science
Computing Sciences and Software
Informatics, Computer Engineering and Management
Information Systems
Mathematical and Computer Modeling
Mathematics

Provided by
al-Farabi Kazakh National University

Version: 11 November 2014

Table of Content

A About the Certification Process

Title of the PhD Programme	**Previous certification**
Computer science	n/a
Computer Science and Software	n/a
Informatics, Computer Engineering and Management	n/a
Information Systems	n/a
Mathematical and Computer Modeling	n/a
Mathematics	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:** 18th of July 2014 **at:** al-Farabi Kazakh National University, Almaty, Kazakhstan	
Peer panel: Kuanysh Amanbayev (student peer), South Kazakhstan State University named M. Auezov; Prof. Dr. Andreas Griewank, Humboldt-Universität zu Berlin; Prof. Dr. Bettina Harriehausen-Mühlbauer, Darmstadt University of Applied Sciences; Prof. Dr. Vera Meister, Brandenburg University of Applied Sciences; Prof. Dr. Thomas Ottmann, University of Freiburg; Jürgen F. Schaldach, formerly T-Systems GEI GmbH	
Representative of the ASIIN headquarter: Marie-Isabel Zirpel	
Responsible decision-making committee: Certification committee	
Criteria used: 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).

European Qualifications Framework for Lifelong Learning (Council of the EU and the European Parliament, 23.04.2008)

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 Programmes

a) Name of the course	b) Degree awarded upon conclusion	c) Mode of Study	d) Duration & Credit Points	e) First time of offer & Intake rhythm	f) Number of students per intake	g) Fees
Computer science	PhD DSc in Computer Science	Full time	6 Semester 75 credits (113 ECTS)	September 2001, annual intake	Varies depending on state grants	n/a
Computer Science and Software	PhD in Computer science and software	Full time	6 Semester 75 credits (113 ECTS)	September 2010, annual intake	Varies depending on state grants	n/a
Informatics, Computer Engineering and Management	PhD in Informatics, Computer Engineering and Management	Full time	6 Semester 75 credits (113 ECTS)	September 2011, annual intake	Varies depending on state grants	n/a
Information Systems	PhD in Information Systems	Full time	6 Semester 66 credits (110 ECTS)	April 2004, Annual intake		800 000 kzt
Mathematical and Computer Modeling	PhD in Mathematical and Computer Modeling	Full time	6 Semester 75 credits (125 ECTS)	April 2010, Annual intake	Varies depending on state grants	n/a
Mathematics	PhD in Mathematics	Full time	6 Semester 75 credits (125 ECTS)	April 2010, Annual intake	Varies depending on state grants	n/a

For the PhD Programme Computer Science, the self-assessment report states the following **intended learning outcomes**:

"I. Knowledge

1. Demonstrate knowledge within the field of computer science, covering theoretical and formal aspects such as technology and methodologies;
2. Identify and analyze criteria and specifications appropriate to specific problems of computer science;
3. Understand complex scientific work on the current state of the art in computer science;
4. Recognition of the need for and an ability to engage in continuing professional development;
5. Take on complex problems with an innovative approach, with which they are familiar through;

6. Determine requirements for systems in an application area such as databases, networks, robotics, or others.

II. Understanding

1. Contribute to the work of the research group, which is equally characterized by innovative ideas as well as thorough expertise;

2. Write and verbal present of technical scientific topics;

3. Formulate, organize and formalize the problems associated with developing new directions in the field of computer science;

4. Identify, formulate, and solve engineering problems and analyze a problem, and identify and define the computing requirements appropriate to its solution;

5. Evaluate abstract mathematical structures, mathematical techniques, and formal mathematical reasoning as they pertain to the area of computer science;

6. Explain encrypt techniques and verify the integrity of data transmitted between network nodes;

7. Interpret knowledge and experience in the field of computer science that is based on sound mathematical theory or set of approved approaches and methods.

Results of training programmes

1. Application

1. Apply design and development principles in the construction of software systems of varying complexity;

2. Apply knowledge of computing and mathematics appropriate to the discipline;

3. Design, implement, and evaluate a computer-based system, process, component, or programme to meet desired needs;

4. Use current techniques, skills and tools necessary for computing internship;

5. Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;

6. Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems;

7. Solve problems that are non-standard, poorly defined, or have more than one possible specification;

8. Implement, test, and deploy a computer-based system applying current and emerging methodologies and technologies.

2. Analysis

1. Analyze a problem, and identify and define the computing requirements appropriate to its solution;

2. Analyze the local and global impact of computing on individuals, organizations, and society;

3. Develop own approaches to research and to elaborate them as far as possible in order to achieve new results;

4. Develop the communication, teamwork, and leadership skills necessary to function productively and professionally;

5. Work in an international field and exchange and disseminate scientific findings;

6. Develop efficient algorithms for solving problems, analyze the efficiency of parallel computation to implement feature-rich applications;

7. Integrate and apply the knowledge and skills students have learnt in the course to a large, self-directed project;

8. Analyze, design and build the industry-standard solutions for servers and storage systems.

2. The synthesis

1. Organize their activities both individually and within their research groups, as well as to coordinate study and work;

2. Integrate ethical behavior in the work environment and in any other professional activity they pursue;

3. Synthesize algorithms of signal and image processing, analyze their quality and computational efficiency;

4. Evaluate, verify, trouble-shoot, test and analyze an existing computer-based system, process, component or program;

5. Integrate knowledge, to take out judgments on the basis of incomplete or limited information taking into account ethical and social responsibility for applications of these judgments and knowledge;

6. Generalize scientific information, to build the new scientific facts in a context of the general knowledge;

7. Locate, analyze, synthesize, and evaluate information, create and document algorithms.

3. Evaluation

1. Evaluate and choose the best components of complex software systems, and assess the safety of these systems;

2. Conduct research on design and implementation methodologies towards the solution of challenging problems in computer science applications;

3. Conduct, report, and defend original research that makes a scholarly contribution to their field;

4. Prepare a detailed research proposal, which includes a thorough review of the relevant scientific literature;

5. Define a research problem and specify a systematic plan for its investigation;

6. Evaluate methodologies used for the analysis of the problem, which may include experimental techniques, numerical/mathematical methods and software tools;

7. Carry out research assignments in a responsible scientific fashion and be able to report about the assignments;

8. Use the metrics of cost, speed-up and efficiency to analyze the performance of given parallel algorithms and compare between them and their sequential programs."

The following **curriculum** is presented:

Title of modules	Course code	**Title of courses**	Credit	**ECTS/ credits**	**Lec/prac /Lab.**	**Sem.**
1. Compulsory State Module (3 Credits)	IAA 7201	Research and Analysis of Algorithms	3	5	2+1+0	1
2. Elective Modules of Professional Specialization (15 credits)	**6D060101 - The theory-intensive tasks**	**6D060102 - Theory of System Programming**				
	TPS 7202 Software Measurement and Testing (in English)	TM 7202 Theory of Models	1	2	2+1+0	1
	TV 7203 Computability Theory	PKS 7203 Computer system Design	1	2	2+1+0	1
	MOUDIP 7204 Models of Organization and Management of Data and Applications	MSDP 7204 Models of data structure and Applications	2	3	2+1+0	2
	NOKS 7205 Computer Systems Reliability and Fault Tolerance (in English)	PPP 7205 Applied Software Design (in English)	2	3	2+1+0	2
	MA 7206 Models and Algorithms (in English)	AUZITR 7206 Administration and management of completed IT - solutions	2	3	2+1+0	2
3. Modules of Individual Educational Paths (18 credits)	**Modules of Individual Educational Paths (Modules for Individual Educational Trajectories (MIOT))**					
	MIOT 1 6D060101 - The theory-intensive tasks	**MIOT 2 6D060102 - Theory of System Programming**				
	TOPV 8301 The Theory of Parallel Computing (in English)	TOV 8301 The theory of cloud computing	3	5	2+1+0	3
	MLFM 8302 Mathematical logic and Formal methods	MSRV 8302 Models of real-time systems	3	5	2+1+0	3
	PRV 8303 Enterprise Distributed Computing	PRPO 8303 Advanced software engineering	3	5	2+1+0	3
	IaCLC 8304 CTL, LTL and CTL languages	PDI 8304 Protocols and drivers of information transfer	3	5	2+1+0	4

	VIW 8305 Data visualization using WebGL	RZTF 8305 Solving three phase filtration tasks (in English)	3	5	2+1+0	4
	SOS 8306 Service-oriented systems	TSSA 8306 The theory of syntactic and semantic analysis	3	5	2+1+0	4
4. Additional Types of Training	**4.1 Doctoral Student's Research Work and Fulfillment of Dissertation**		**28**			
	NIRD I NIRD 2 NIRD 3 NIRD 4 NIRD 5 NIRD 6	Research Seminar	1 8 1 8 1 9	2 13 2 13 2 15		1 2 3 4 5 6
	4.2 Professional internship (by internship)		6	10		
	PP IP	Pedagogical Internship Research internship	3 6	5 10		3 1-2
5. Final Attestation	5.1	Complex Examination	1	2		3
	5.2	Dissertation Fulfillment and Defence	3	5		2, 4
TOTAL			75 credits			

For the PhD Programme Computer Science and Software, the self-assessment report states the following **intended learning outcomes**:

"**1. Knowledge**

1. Graduates should acquire indepth knowledge of the theoretical and applied areas of computer science, computer engineering and management, and be able to carry out a fundamental analysis of the state of current research, teach at universities, successfully carry out research and management activities;
2. Development of system skills related to scientific problems, critical assessment of the original data, and communication. Ensure mastery of practical techniques and skills in the management of realtime systems;
3. Graduates have the skills of organizing and conducting scientific research in the field of embedded systems and realtime systems with the publication of major scientific results in international scientific conferences and abroad, and foreign scientific journals with non-zero impact factor.

2. Understanding

1. Have a fundamental scientific, professional training;
2. Own modern information technologies, including methods of obtaining, processing and storage of scientific information;
3. Be able to formulate and solve modern scientific and practical problems;
4. Organize and conduct research experiments and research activities in the chosen direction;
5. Successfully carry out research and administrative activities.

1. Application

1. The ability to think critically, to criticism and self-criticism;
2. Ability to conduct research and scientific and survey work as a team leader;
3. Ability to working in an interdisciplinary team, the ability to interact with experts in other subject areas;
4. Ability to work in an international context;
5. Making ethical differences and multiculturalism.

2. Analysis

1. To be able to assign tasks of research, develop programmes to implement them and guide the implementation of these programmes;
2. The ability to adapt to new situations. Ability to generate new ideas (creativity);
3. Ability to work independently, develop, and manage projects;
4. The ability to integrate knowledge, to make judgments on the basis of incomplete or limited information, based on ethical and social responsibility for the use of these opinions and knowledge;
5. Skills in time management and organizational skills to solve practical problems.

3. The synthesis

1. Have a thorough understanding of the present state of technical means of the latest scientific achievements;
2. Ability to organize and plan their professional, scientific and educational activities, as well as the activities of the collective;
3. Be able to use modern methods;
4. Research in the field of computer hardware and software;
5. The ability to synthesize scientific information to build new scientific evidence in the context of general knowledge;
6. Knowledge of at least one foreign language at the level of fluency.

4. Evaluation

1. Knowledge of the fundamental concepts of theoretical and experimental principles in the field of computer technology and software;
2. The latest in-depth knowledge in the areas of specialization;
3. Ability to collate, analyze and interpret complex experimental data and draw conclusions;
4. Planning, implementation and description of a serious research project;
5. Ability to solve theoretical and practical problems of computer equipment and software in a different context, and the ability to establish relationships between the problems and the basic principles."

The following **curriculum** is presented:

Title of modules	Course code	Title of courses		Credit	Unit (ECTS)	Lec/prac /Lab.	Sem.
Semester 1							
Compulsory State Module (3 credits)	MTPC7201	Methods and tools for process control		3	5	2+1+0	1
Elective Modules of Professional Specialization (15 credits)	**Elective Modules of Professional Specialization**						
	Theoretical approaches of software development		**Models and methods of organization and management of computer systems**				
	UP 7202Project management		KSNO 7202The reliability and fault tolerance of computer systems (in English)	3	5	2+1+0	1
	SVT 7203 Modern high technologies		PACEBSVT 7203 Designing analog and digital hardware components of computer equipment	3	5	2+1+0	1
Additional Types of Training	**Doctoral Student's Research Work and Fulfillment of Dissertation**						
	NIRD I	Research Seminar I		1	2		1,2,3, 4, 5,6
Semester 2							
Elective Modules of Professional Specialization (15 credits)	**Elective Modules of Professional Specialization**						
	Theoretical approaches of software development		**Models and methods of organization and management of computer systems**				
	PAA 7204 Design and analysis of algorithms		MMUKS 7204 Models and methods for managing computer systems	3	5	2+1+0	2
	RVOR 7205 The development and implementation of solutions cloud solutions		PMS 7205 Design of microprocessor-based systems	3	5	2+1+0	2
	VSRV 8306 Verification of Real-Time Systems		PPO 7206 Applied Software (in English)	3	5	2+1+0	2
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**						
	NIRD 2	Research Seminar 2		1(+3+4)	2(+5+6)		1,2,3, 4,5,6
	Professional internship			3			
	IP	Research internship		2	3		2,4
Semester 3							
Elective Modules of Professional Specialization (15 credits)	**Modules of Individual Educational Paths**						
	Theoretical approaches of software development		**Models and methods of organization and management of computer systems**				
	TITPO 8301 Theory of		IAGP 8301 Research and	3	5	2+1+0	3

	Software Measurement and Testing (in English)	analysis of graphics processors				
	OORV 8302 Organization of cloud and distributed computing	AMD 8302 Model-driven architecture (in English)	3	5	2+1+0	3
	TORR 8303 Technology for processing and speech recognition	GPSZ 8303 Models and methods for real-time systems	3	5	2+1+0	3
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 3	Research Seminar 3	1	2		1,2,3, 4,5,6
	Professional internship		3			
	PP	Pedagogical internship	3	5		3
Semester 4						
Elective Modules of Professional Specialization (15 credits)	**Modules of Individual Educational Paths**					
	Theoretical approaches of software development	**Models and methods of organization and management of computer systems**				
	MMSRV 8304 Hybrid parallelization challenges	OGS 8304 Organization of Grid Systems	3	5	2+1+0	4
	FMRPO 8305 Formal Methods in Software Development	OKhD 8305 Data Warehousing	3	5	2+1+0	4
	TPIS 8306 The theory of intelligent systems	TRMS 8306 The theory of the development of multi-agent systems	3	5	2+1+0	4
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 4	Research Seminar 4	1(+3+4)	2(+5+6)		1,2,3, 4,5,6
	Professional internship		3			
	IP	Research internship	1	2		4
Semester 5						
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 5	Research Seminar 5	1	2		1,2,3, 4,5,6
Semester 6						
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 6	Research Seminar 6	1(+8)	2(+13)		1,2,3, 4,5,6

For the PhD Programme Informatics, Computer Engineering and Management, the self-assessment report states the following **intended learning outcomes**:

1. "Knowledge

1. Graduates should acquire indepth knowledge of the theoretical and applied areas of computer science, computer engineering and management, and be able to carry out a fundamental analysis of the state of current research, teach at universities, successfully carry out research and management activities;
2. Development of system skills related to scientific problems, critical assessment of the original data, and communication. Ensure mastery of practical techniques and skills in the management of IT-Infrastructure and Services, robotics systems;
3. Graduates have the skills of organizing and conducting scientific research in the field of Technology of Computers Design and Technology of Embedded System Design with the publication of major scientific results in international scientific conferences and abroad, and foreign scientific journals with nonzero impact factor.

2. Understanding

1. Have a fundamental scientific, professional training;
2. Own modern information technologies, including methods of obtaining, processing and storage of scientific information;
3. Be able to formulate and solve modern scientific and practical problems;
4. Organize and conduct research experiments and research activities in the chosen direction;
5. Successfully carry out research and administrative activities.

Results of training programmes

1. Application

1. The ability to think critically, to criticism and self-criticism;
2. Ability to conduct research and scientific and survey work as a team leader;
3. Ability to work in an interdisciplinary team, the ability to interact with experts in other subject areas;
4. Ability to work in an international context;
5. Making ethical differences and multiculturalism.

2. Analysis

1. To be able to assign tasks of research, develop programmes to implement them and guide the implementation of these programmes;
2. The ability to adapt to new situations. Ability to generate new ideas (creativity);
3. Ability to work independently, develop, and manage projects;
4. The ability to integrate knowledge, to make judgments on the basis of incomplete or limited information, based on ethical and social responsibility for the use of these opinions and knowledge;
5. Skills in time management and organizational skills to solve practical problems.

3. The synthesis

1. Have a thorough understanding of the present state of technical means of the latest scientific achievements;
2. Ability to organize and plan their professional, scientific and educational activities, as well as the activities of the collective;
3. Be able to use modern methods;
4. Research in the field of computer hardware and software;
5. The ability to synthesize scientific information to build new scientific evidence in the context of general knowledge;
6. Knowledge of at least one foreign language at the level of fluency.

4. Evaluation

1. Knowledge of the fundamental concepts of theoretical and experimental principles in the field of computer technology and software;
2. The latest in-depth knowledge in the areas of specialization;
3. Ability to collate, analyze and interpret complex experimental data and draw conclusions;
4. Planning, implementation and description of a serious research project;
5. Ability to solve theoretical and practical problems of computer equipment and software in a different context, and the ability to establish relationships between the problems and the basic principles."

The following **curriculum** is presented:

Title of modules	Course code	**Title of courses**		Credit	**Unit (ECTS)**	**Lec/prac /Lab.**	**Sem.**
Semester 1							
Compulsory State Module (3 credits)	TOPKS 7201	Theoretical Bases of Planning of Computer Systems		3	5	2+1+0	1
Elective Modules of Professional Specialization (15 credits)	**Elective Modules of Professional Specialization**						
	Embedded systems and real-time		**Organization and management of computer systems**				
	TR 7301 The theory of robotics		NOS 7202 The reliability and fault tolerance systems (in English)	3	5	2+1+0	1
	TOS 7302 The theory of signal processing		TPBD 7203 Technology Database Design	3	5	2+1+0	1
Additional Types of Training	**Doctoral Student's Research Work and Fulfillment of Dissertation**						
	NIRD I	Research Seminar I		1	3		1,2,3, 4, 5,6
Semester 2							

Elective Modules of Professional Specialization (15 credits)	**Elective Modules of Professional Specialization**					
	Embedded systems and real-time	**Organization and management of computer systems**				
	UITIS 7203 Managing IT-Infrastructure and Services	MOS 7204 Models of Fault-Tolerant Systems (in English)	3	5	2+1+0	2
	RVRSOR 7204 The development and implementation of solutions for servers and cloud solutions	KM 7205 Computer Modeling	3	5	2+1+0	2
	RPP 7302 Applied Program Development (in English)	TABMD 7206 Theoretical aspects of large data	3	5	2+1+0	2
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 2	Research Seminar 2	1(+3+4)	2(+5+6)		1,2,3,4,5,6
	Professional internship		3			
	IP	Research internship	2	3		2,4
Semester 3						
Elective Modules of Professional Specialization (15 credits)	**Modules of Individual Educational Paths**					
	Embedded systems and real-time	**Organization and management of computer systems**				
	ASRV 8301 Analysis of real-time systems	ASRV 8301 Models of the theory of filtration (in English)	3	5	2+1+0	3
	MSUVP 8302 Methods and Tools for Management of Computing Processes	MSUVP 8302 Formal methods in the design of programmes	3	5	2+1+0	3
	TPAII 8303 Theoretical and applied aspects of artificial intelligence (in English)	PVS 8303 Analysis of cloud computing	3	5	2+1+0	3
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 3	Research Seminar 3	1	2		1,2,3,4,5,6
	Professional internship		3			
	PP	Pedagogical internship	3	5		3
Semester 4						
Elective Modules of Professional Specialization (15 credits)	**Modules of Individual Educational Paths**					
	Embedded systems and real-time	**Organization and management of computer systems**				
	TPVT 8304 Technology of Computers Design	TPVT 8304 Models and methods of parallel computing (in English)	3	5	2+1+0	4
	GV 8305 Grid computing	GV 8305 Models and methods for distributed	3	5	2+1+0	4

		computing (in English)				
	TPVS 8306 Technology of embedded system Design	TPVS 8306 Measurement and testing programs (in English)	3	E5D	2+1+0	4
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 4	Research Seminar 4	1(+3+4)	2(+5+6)		1,2,3,4,5,6
	Professional internship		3			
	IP	Research internship	1	2		4
Semester 5						
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 5	Research Seminar 5	1	2		1,2,3,4,5,6
Semester 6						
Additional Types of Learning	**Doctoral Student's Research Work and Fulfillment of Dissertation**					
	NIRD 6	Research Seminar 6	1(+8)	2(+13)		1,2,3,4,5,6

For the PhD Programme Information Systems, the self-assessment report states the following **intended learning outcomes**:

"Goal: Deeper knowledge of research techniques in mathematics, computer science and theoretical computer science.

Upon completion of the program, the doctoral student will be able to:

1. Use worldwide specific mathematics, computer science and information systems oriented literature;
2. Explore and understand new journals and papers in mathematics, theoretical computer science and information systems;
3. Investigate open problems;
4. Communicate with local and international professors in research-related fields;
5. Write articles and papers and submit them to world known journals and conferences;
6. Give talks at conferences;
7. Self study the related to the research thesis disciplines;
8. Develop the expertise and skills necessary to be an effective educator and faculty member;
9. Demonstrate superior oral and written communications skills relevant to Information Systems;
10. Lead and think strategically;
11. Provide innovative and creative solutions to everyday Information Systems problems.

Knowledge:

- Advanced knowledge in organization of scientific research;
- Advanced knowledge in information systems mathematics;
- Knowledge of programming languages and algorithms;
- Advanced knowledge in distributed databases. Principles of database systems, models of data, basic operations on the data, the basics of database design.

Understanding

- Understanding analysis, algebraic structures, geometry etc. needed for use in programming, computer science and information systems;
- Understanding algorithms reading, writing, analyzing and implementing;
- Understanding other fields of science related to Information Systems (Geo computer science, accounting etc.).

Training Outcomes

1. **Application**

- Being able to construct advanced algorithms and write programs;
- Being able to construct and manage new or existing business Information Systems;
- Interpret theoretical aspects of software design.

2. Analysis

Design an information model of a particular domain and use it to perform scientific modeling analysis."

The following **curriculum** is presented:

Title of modules	Course code	**Title of courses**	Credit	**Unit**	**Lec/prac /Lab.**	**Sem.**
Semester I						
	TI 7201	Theoretical Computer Science	6	10	2+1+0	1
Basic elective module I (BEM I) – 6 credits (21 ECTS)	**Module 1 Development of algorithms and formal grammars**					
	FGEYa 7301	Formal grammars of natural languages	3	5	2+1+0	1
	POIYa1103	Development of algorithms and their complexity	3	5	2+1+0	1
Additional types	**Portable unit 1 The research work of doctoral**					

of learning	NS I	Scientific Seminar I	3	5		1
Semester II						
Basic elective module 2 (BEM 2) – 3 credits (10,5 ECTS)	**Module 2 Expert systems**					
	ESOP 7303	The expert system based on rules	3	5	2+1+0	2
Profile elective module 1 (KEM 1) – 3 credits (10,5 ECTS)	**Module 2** Distributed Database Systems					
	RSBD 7401	Distributed Database Systems	***3***	5	2+1+0	2
	IRIS 7401	Research in distributed information systems	***3***	5	2+1+0	2
Additional types of learning	**Portable unit 1 The research work of doctoral**					
	NS II	Scientific Seminar II	3	5		2
Semester III						
Profile elective module 2 (KEM 2) – 6 credits (21 ECTS)	**Module 1 Engineering and Project Management**					
	APPS 8402	Analysis and design of software systems	3	5	2+1+0	3
	UPPS 8403	Project Management Software Systems	3	5	2+1+0	3
Additional types of learning	**Portable unit 1 The research work of doctoral**					
	NS III	Scientific Seminar III	5	8		3
	Portable unit 2 Professional Internship					
	PP	Pedagogical Internship	6	10		3,4
Semester IV						
Profile elective module 3 (KEM 3) – 6 credits (21 ECTS)	**Module 1 Research of IS and Security**					
	IIS 8404	Research of IS	3	5	2+1+0	4
	MMIBIS 8405	Models and methods of information security of IS	3	5	2+1+0	4
Total: Theoretical course of study - 30 **credits** (105 ECTS)						
Additional types of learning	**Portable unit 1 Scientific-research work of PhD Student**					
	NS IV	Scientific Seminar IV	5	8		4
	Portable unit 2 Professional Internship					
	PP	Pedagogical Internship	6	10		3,4
Semester V						
Additional types	**Portable unit 3 Preparing a doctoral thesis**					

of learning	PDD I	Preparing a doctoral thesis I	5	8		5
Semester VI						
Additional types of learning	**Portable unit 3 Preparing a doctoral thesis**					
	PDD II	Preparing a doctoral thesis II	5	8		6
Total: More types of training - 32 credits (112 ECTS)						
	IGA	Total state certification	4	6		6
	Comprehensive exam		1	2		6
	Defence of the thesis		3	5		6

For the PhD Programme Mathematical and Computer Modeling, the self-assessment report states the following **intended learning outcomes**:

I. **"Knowledge**

1. know Monte Carlo methods;
2. know Computational fluid dynamics;
3. know large eddy simulation and direct methods for solving problems of turbulence;
4. know mathematical modeling of turbulent flows;
8. know numerical simulation of unsteady three-dimensional turbulent flows;
9. know the area of the dissertation research;
10. read and understand complex research papers in mathematics and mathematical and computer modeling.

II. understanding

1. understand how to apply modeling techniques to problems of the dissertation research;
2. understand the planning of scientific research;
3. understand the specifics of the thesis.

Results of training programs

I. application

1. interpret the theoretical aspects of the terms of mathematical and computer modeling;
2. illustrate the results of solution of physical and mathematical tasks;
3. Solve situational problems of mathematics;
4. apply this knowledge to write a scientific article;
5. apply this knowledge to write the dissertation;
6. formulate a research problem in mathematics and mathematical and computer modeling, and state this problem as a mathematical conjecture;
7. Students will have experience with undergraduate teaching, specifically being instructor

of record in a multi-section course, designing and grading quizzes and tests, grading homeworks, and helping students during office hours.

II. Analysis

1. possession of methods of mathematical modeling in the analysis of global problems on the basis of physical laws;

2. the analysis and development of decisions in concrete PhD's subject domains;

3. analyze any problem and determine the mathematical methods of its solution;

4. analyze the results of solving the problems;

5. conduct independent research by synthesizing existing mathematical theory with new, original ideas, and communicate sophisticated mathematical concepts orally and in written form.

III. evaluation

1. evaluate the results produced by scientific research;

2 . evaluate the importance of scientific research;

3. communicate sophisticated mathematical concepts orally and in written form."

The following **curriculum** is presented:

B Characteristics of the PhD Programmes

Title of Module	Code	Discipline name (modules) and type of activity	Credits	Unit (ECTS)	Lay out	Se-mester
Semester 1						
3. Scientific and Pedagogical Direction (8 credits)	**Modern numerical methods**					
	SChMNPSS 7202	Modern numerical methods for time-dependent processes in complex systems (in English)	3	5	2+1+0	1
		Computational methods				
	VMDZh 7203	Computational methods in fluid dynamics (in English)	3	5	2+1+0	1
7. Research Direction 15 credits	NTDS 7202	Nonlinear theory of deformable media (in English)	3	5	2+1+0	1
	VRMRU 7303	Probability-difference methods for solving partial differential equations (in English)	3	5	2+1+0	1
9. Scientific and Pedagogical Direction 15 credits	MMKP 7202	Monte Carlo methods and their applications (in English)	3	5	2+1+0	1
	VG 7203	Computational fluid dynamics (in English)	3	5	2+1+0	1
Semester 2						
3. Scientific and Pedagogical Direction (18 credits)		**Direct methods**				
	PMRRU 7204	Direct methods of solving difference equations (in English)	3	5	2+1+0	2
		Parallel implementation of the finite difference schemes				
	PRRSRUPPVPS 7205	Parallel implementation of the finite difference schemes for solving the carry over equation of impurities on high-performance systems	3	5	2+1+0	2
		Modern methods in underground domains				
	SMOFPPM 7206	Modern methods of physical processes in underground domains	3	5	2+1+0	2
7. Research Direction 15 credits	VDPZh 7304	Wave dynamics of bubbly liquids (in English)	3	5	2+1+0	2
	NMDSP 7305	Nonlinear models of deformable systems and processes (in English)	3	5	2+1+0	2
	OKUANS 7306	The main criteria for stability and analysis of nonlin-	3	5	2+1+	2

		ear systems (in English)			0	
9. Scientific and Pedagogical Direction 15 credits	MKVPMRZT 7204	Large eddy simulation and direct methods for solving problems of turbulence (in English)	3	5	2+1+0	2
	TMM 7205	Turbulence: Models and Methods (in English)	3	5	2+1+0	2
	ChMNTTT 7206	Numerical simulation of unsteady three-dimensional turbulent flows (in English)	3	5	2+1+0	2
Semester 3						
1. Individual Educational Paths 1 (21 credits)	**Modeling of unsteady and technological processes**					
	MMTP 8301	Mathematical modeling of technological processes (in English)	3	5	2+1+0	3
	MNFP 8302	Simulation of unsteady physical processes (in English)	3	5	2+1+0	3
	Method of particles in the cells and Semiempirical theory of turbulence					
	MChYa 8303	Method of particles in the cells (in English)	3	5	2+1+0	3
2. Individual Educational Paths 2- (21 credits)	**Methods of Mathematical Physics**					
	RMSNU 8301	The solution of multidimensional steady and unsteady equations (in English)	3	5	2+1+0	3
	EAPVMFPEVM 8302	Effective algorithms of parallel calculations at modeling of physical processes on the Electronic Computer	3	5	2+1+0	3
	Problems of dynamics of multiphase media					
	SMVSZ 8303	Modern multiprocessor computer systems in problems of dynamics of multiphase media (in English)	3	5	2+1+0	3
4. Individual Educational Paths 3 (18 credits)		**Numerical solving problems of ecology and mathematical physics**				
	ChMZE 8301	Numerical simulation of ecology (in English)	3	5	2+1+0	3
	EChMRZMF 8302	Efficient numerical methods for solving problems of mathematical physics (in English)	3	5	2+1+0	3
		The finite element method and methods of constructing difference schemes				
	MKEZChA 8303	The finite element method in numerical analysis (English)	3	5	2+1+0	3
5. Scientific and Pedagog-		Method of particles and Renormalization group theory				

ical Direction (18 credits)	MChYa 8301	Method of particles in the cells (in English)	3	5	2+1+0	3
	TRGP 8302	Renormalization group theory and its applications (in English)	3	5	2+1+0	3
		Wavelet analysis and Spectral methods				
	SMRZ 8303	Spectral methods for solving problems (in English)	3	5	2+1+0	3
6. Individual Educational Paths 6 (18 credits)		**Functional Analysis and its Applications**				
	PFA 8301	Applied Functional Analysis (in English)	3	5	2+1+0	3
	SMP 8302	Spectral methods in applications (in English)	3	5	2+1+0	3
		Parallel computing, science and computer graphics				
	NKGVA 8303	Science and computer graphics (rendering, animation)	3	5	2+1+0	3
8. Individual Educational Paths 6 18 credits		**Analysis of deformable systems and processes**				
	MUNTP 8301	Modeling of stability of nonlinear technological processes and phenomena (in English)	3	5	2+1+0	3
	AMADSP 8302	Analytical methods for analysis of deformable systems and processes (in English)	3	5	2+1+0	3
		Simulation of stochastic processes and phenomena				
	USPYa 8303	Stability of stochastic processes and phenomena (in English)	3	5	2+1+0	3
Semester 4						
1. Individual Educational Paths 1 (21 credits)	**Method of particles in the cells and Semiempirical theory of turbulence**					
	PTT 8304	Semiempirical theory of turbulence (in English)	3	5	2+1+0	4
	Modeling of biomedical processes and processes of physical chemistry					
	MKMPFH 8305	Mathematical and computer modeling of physical chemistry processes (in English)	3	5	2+1+0	4
	MKMBP 8306	Mathematical and computer modeling of biomedical processes (in English)	3	5	2+1+0	4
2. Individual Educational Paths 2-	**Problems of dynamics of multiphase media**					
	MMTT 8304	Mathematical models of flow and heat transfer in internal problems of gas dynamics (in English)	3	5	2+1+0	4

(21 credits)	**Wavelet analysis and direct numerical simulation**					
	MPChM 8305	The method of direct numerical simulation (in English)	3	5	2+1+0	4
	MMVA 8306	Modeling techniques based on wavelet analysis (English)	3	5	2+1+0	4
4. Individual Educational Paths 3 **(18 credits)**		**The finite element method and methods of constructing difference schemes**				
	MKRSSS 8304	Methods of constructing difference schemes through account (in English)	3	5	2+1+0	4
		Numerical methods of optimization and inverse problems				
	ChMREZ 8305	Numerical methods for solving extremal problems (in English)	3	5	2+1+0	4
	ChMROZMF 8306	Numerical methods for solving inverse problems of mathematical physics (in English)	3	5	2+1+0	4
5. Scientific and Pedagogical Direction (18 credits)		Wavelet analysis and Spectral methods				
	VAP 8304	Wavelet analysis and applications (in English)	3	5	2+1+0	4
		Incorrect problems and the theory of flows of heterogeneous media				
	MRNZ 8305	Methods of solving incorrect problems (English)	3	5	2+1+0	4
	TBFT 8306	The theory of filtration and noninertial flows of heterogeneous media (in English)	3		2+1+0	4
6. Individual Educational Paths 6 **(18 credits)**		**Parallel computing, science and computer graphics**				
	TOPV 8304	Theoretical foundations of parallel computing (in English)	3	5	2+1+0	4
		Optimal control theory and variational methods				
	VVMO 8305	The calculus of variations and optimization techniques (in English)	3	5	2+1+0	4
	TOU 8306	Optimal control theory (in English)	3	5	2+1+0	4
8. Individual Educational Paths 6 **18 credits**		**Simulation of stochastic processes and phenomena**				
	MSATPYa 8304	Methods of stochastic analysis of technological processes and phenomena (in English)	3	5	2+1+0	4
		Modeling of pre-stressed environments				

	TSNN 8305	The theory of media with initial stresses (in English)	3	5	2+1+0	4
	PZTPNS 8306	Applied problems in the theory of pre-stressed environments (in English)	3	5	2+1+0	4
Doctoral Student's Research Work and Fulfillment of Dissertation (during 3 years)			28 credits (47 ECTS)			
Professional Practice			6 credits (10 ECTS)			
Final Attestation			5 credits (8 ECTS)			

For the PhD Programme Mathematics, the self-assessment report states the following **intended learning outcomes**:

IV. **"Knowledge**

1. know function theory;
2. know entire functions theory;
3. know functional spaces theory;
4. know numerical simulation;
5. know differential equations theory;
6. know the area of the dissertation research;
7. read and understand complex research papers in mathematics.

V. understanding

1. understand how to apply mathematics techniques to problems of the dissertation research;
2. understand the planning of scientific research;
3. understand the specifics of the thesis.

Results of training programmes

1. application

1. interpret the theoretical aspects of the terms of mathematics;
2. illustrate the results of solution of physical and mathematical tasks;
3. solve situational problems of mathematics;
4. apply this knowledge to write a scientific article;
5. apply this knowledge to write the dissertation;
6. formulate a research problem in mathematics and state this problem as a mathematical conjecture;
7. Students will have experience with undergraduate teaching, specifically being instructor of record in a multi-section course, designing and grading quizzes and tests, grading homeworks, and helping students during office hours.

2. Analysis

1. possession of methods of mathematics in the analysis of global problems on the basis of physical laws;

2. the analysis and development of decisions in concrete PhD's subject domains;

3. analyze any problem and determine the mathematical methods of its solution;

4. analyze the results of solving the problems;

5. conduct independent research by synthesizing existing mathematical theory with new, original ideas, and communicate sophisticated mathematical concepts orally and in written form.

3. evaluation

1. evaluate the results produced by scientific research;

2. evaluate the importance of scientific research;

3. communicate sophisticated mathematical concepts orally and in written form."

The following **curriculum** is presented:

Title of Module	Code	Discipline name (modules) and type of activity	Credits	Unit (ECTS)	Lay out	Se-mester
Semester 1						
Compulsory State Module – 3 credits	**Theory operatory**					
	APTDUVMTU 7201	Actual problems of algebra, mathematical analysis and probability theory	3	5	2+1+0	1
3. Elective Modules of Professional Specialization (15 credits)	**The theory of Lyapunov exponents**					
	TPL 7202	The theory of Lyapunov exponents (in English)	3	5	2+1+0	1
	Boundary value problems					
	KZDIDU 7203	Boundary value problems of differential and integral-differential equations	3	5	2+1+0	1
	Theory operatory					
	OM 7202	Operational methods	3	5	2+1+0	1
	Analytical theory of numbers					
	EGCH 7203	Elements of the geometry numbers and their applications to the restoration of functions and solutions of some equations of mathematical physics	3	5	2+1+0	1
Semester 2						
3. Elective Modules of Professional Specialization (15 credits)	**Modern problems of the theory of differential equations**					
	SPTDU 7204	Modern problems of the theory of differential equations (in English)	3	5	2+1+0	2
	Modern problems of the Control Theory					
	SPTU 7205	Modern problems of the Control Theory	3	5	2+1+0	2
	Modern Problems of the Theory of Computational Mathematics					
	SPTVM 7206	Modern Problems of the Theory of Computational Mathematics	3	5	2+1+0	2
	Inverse problems					
	TOZ 7204	The theory of inverse problems and soliton. Lax pair.	3	5	2+1+0	2

	Basic questions of functional analysis					
	TFP 7205	Theory of functions and spaces	3	5	2+1+0	2
	Integral geometry					
	IG 7206	Integral geometry and representation theory	3	5	2+1+0	2
Semester 3						
Individual Educational Paths 1 "Differential equations" (18 credits)	**Singular Pertubational of Hyperbolic Type**					
	TOPL 8301	Generalized Lyapunov's Exponents Theory (in English)	3	5	2+1+0	3
	SVUChPGT 8302	Singular Pertubational Partial Equations of Hyperbolic Type (in English)	3	5	2+1+0	3
	Stability theory of nonlinear systems with uncertainty					
	OPLSDU 8303	Theory of Generalized Regularization Linear Systems of Differential Equations (in English)	3	5	2+1+0	3
2. Individual Educational Paths 2- "Control theory" (21 credits)	**Sequential Models of Mathematical Physics**					
	SMMF 8307	Sequential Models of Mathematical Physics (in English)	3	5	2+1+0	3
	PKTOU 8308	Practical Course of the Optimization Control Theory	3	5	2+1+0	3
	The theory of control of dynamic system					
	TEZBP 8309	Theory of extremal problems in Banach space (in English)	3	5	2+1+0	3
3. Individual Educational Paths 3 "Mathematical analysis and theory function" (18 credits)	**Methods of theory functions**					
	TZF 8301	The theory for entire functions of several variables (in English)	3	5	2+1+0	3
	GMM 8302	Geometrical methods of mathematical physics (in English)	3	5	2+1+0	3
	Theory of analytic functions					
	KF 8303	The quadrature formula	3	5	2+1+0	3
Semester 4						
1. Individual Educational Paths 1 "Dif-	**Stability theory of nonlinear systems with uncertainty**					
	TUNSUN	Stability theory of nonlinear systems with uncer-	3	5	2+1+	4

ferential equations" (21 credits)	8304	tainty (in English)			0	
	Constructive theory of problems of ordinary differential equations					
	KTKZODU 8305	Constructive theory of problems of ordinary differential equations (in English)	3	5	2+1+0	4
	DUChPMP 8306	Partial differential equations with a small parameter (in English)	3	5	2+1+0	4
2. Individual Educational Paths 2- "Control theory" (21 credits)	**The theory of control of dynamic systems**					
	TUDS 8310	The theory of control of dynamic systems (in English)	3	5	2+1+0	4
	Optimal control of stochastic processes					
	OFSP 8311	Optimal control of stochastic processes (in English)	3	5	2+1+0	4
	OUDS 8312	Optimal control of dynamic systems (in English)	3	5	2+1+0	4
3. Individual Educational Paths 3 "Mathematical analysis and theory function" (18 credits)	**Theory of analytic functions**					
	TQA 8304	The theory of Q-analytic vectors and their applications (in English)	3	5	2+1+0	4
	TRAF 8305	Distribution theory and Fourier analysis (in English)	3	5	2+1+0	4
	ZVKL 8306	The problem of recovering at the end of the linear information (in English)	3	5	2+1+0	4
Doctoral Student's Research Work and Fulfillment of Dissertation (during 3 years)			28 credits (47 ECTS)			
Professional Practice			6 credits (10 ECTS)			
Final Attestation			5 credits (8 ECTS)			

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:
Relevant formal information on duration, credit points and study form are provided in the self-assessment reports. The formal requirements for PhD programmes are stipulated in the “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University”. The programmes require full-time involvement of students and extend over a period of three years. Participants are awarded with 66 - 75 Kazakh credits, which is supposed to equal 110 - 125 ECTS credit-points.

The self assessment reports stated tuition fees for the Bachelor’s and the Master’s degree programmes; no information is provided for the PhD programmes except the PhD programme Information Systems. From the “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University” (hereinafter Academic Policy) the auditors learned that “Admission for the PhD degrees of the Republic of Kazakhstan is carried out only based on educational grants, self-funded students cannot study at PhD degrees”.

The audit team considered the formal specifications of the PhD programmes to be adequately defined.

Criterion 1.2 Legal relationship: mutual rights and duties

Evidence:

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

Preliminary assessment and analysis of the peers:

The legal relationship between PhD students and the university had been documented in the Academic Policy. An English version of the Academic Policy had been provided to the

auditors prior to the on-site visit. It defines all rules and regulations and has been made accessible to all interested parties.

It is determined in the Academic Policy that each PhD student has one local adviser and one international adviser; the local research adviser must be a full-time professor of al-Farabi Kazakh National University. The international research adviser must be a full-time professor of an international university or research center. The PhD students are required to conduct parts of the research at the institution of the international research advisor and they must produce 7 academic pieces of works. If the completion of the dissertation exceeds the standard period of three years, the educational grant is not be prolonged and students have to live on their own funds.

The auditors concluded that the rights and duties applicable to PhD students at the al-Farabi University were clearly defined and made transparent to the relevant stakeholders.

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

The peers evaluated the requirements of the criterion as fulfilled.

2. Courses/Modules: Content, Policy and Implementation

Criterion 2.1 Learning outcomes of the course/module

Evidence:

- Self-Evaluation Report
- Objectives matrix
- Module handbook

Preliminary assessment and analysis of the peers:

The audit team acknowledged that Kazakhstan is currently introducing the PhD-cycle in accordance with the implementation of the three-cycle Bologna structure. One major stakeholder defining the overall structure of the study programmes is the Kazakh Ministry for Education and Science. This holds particularly true for the design of PhD-programmes.

Both audit team and faculty staff agreed that the most important learning outcome of the programmes is the competence of PhD-graduates to conduct independent scientific research competitively 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*.

For the PhD programme Computer Science the self-assessment report stated for the area of knowledge that graduates should "understand complex scientific work on the current state of the art in computer science". For the field of skills the report stated that graduates "formulate, organize and formalize the problems associated with developing new directions in the field of computer science". For the field of competences the report stated that graduates "conduct research on design and implementation methodologies toward the solution of challenging problems in computer science applications; conduct, report, and defend original research that makes a scholarly contribution to their field".
The auditors concluded that the intended learning outcomes corresponded to the requirement of the EQF descriptor.

The same applies to the PhD programme Computer Science and Software for which it is stated that graduates "should acquire in-depth knowledge of the theoretical and applied areas of computer science, computer engineering and management" (field of knowledge), they should "develop system skills related to scientific problems, critical assessment of the original data, and communication and ensure mastery of practical techniques and skills in the management of realtime systems" (field of skills). Furthermore, "graduates have the skills of organizing and conducting scientific research in the field of embedded systems and realtime systems with the publication of major scientific results" (field of competences).

The learning outcomes of the PhD Programme Informatics, Computer Engineering and Management also reflect the due level: "Graduates should acquire in-depth knowledge of the theoretical and applied areas of computer science, computer engineering and management" (field of knowledge). The skills to be obtained are defined as „Development of system skills related to scientific problems, critical assessment of the original data, and communication. Ensure mastery of practical techniques and skills in the management of IT-Infrastructure and Services, robotics systems". The competences are defined as "Ensure mastery of practical techniques and skills in the management of IT-Infrastructure and Services, robotics systems".

The same is true for the PhD Programme Information Systems. Knowledge is defined as "Advanced knowledge in distributed databases. Principles of database systems, models of data, basic operations on the data, the basics of database design". Skills are defined as

"Design an information model of a particular domain and use it to perform scientific modeling analysis". And as competence it is stated that "The first goal for the Ph.D. level programme is to focus on deeper knowledge of research techniques in mathematics, computer science and theoretical computer science in order to let the student be able to do a research on his own".

For the PhD programme PhD Programme in Mathematical and Computer Modeling the self-assessment report stated for the field of knowledge that graduates should "read and understand complex research papers in mathematics and mathematical and computer modeling". For the field of skills the report stated that graduates "understand how to apply modeling techniques to problems of the dissertation research". For the field of competences the report stated that graduates "conduct independent research by synthesizing existing mathematical theory with new, original ideas, and communicate sophisticated mathematical concepts orally and in written form".

Eventually, also the learning outcomes of the PhD Programme in Mathematics reflect the due level: Graduates "read and understand complex research papers in mathematics" (field of knowledge), "understand how to apply mathematics techniques to problems of the dissertation research" (field of skills) and "conduct independent research by synthesizing existing mathematical theory with new, original ideas, and communicate sophisticated mathematical concepts orally and in written form" (field of competences).

Altogether, the peers concluded that the intended learning outcomes of all programmes corresponded to the requirements of the EQF descriptors. But they noted that there were no large differences between the learning outcomes of the different programmes (for example between Computer Science and Software and Informatics, Computer Engineering and Management). They questioned on principle why the university offers six PhD programmes in the field of computer science and mathematics instead of two – one for each of the fields. In the discussion with the university they learned that the six PhD programmes were developed by the ministry which has defined respective qualification frameworks and has responsible experts for each of the programmes. Although the university designs individual trajectories and study plans for each PhD student and thereby in practice offers an individual course of study, it has to classify the trajectories and study plans into one of the six PhD programmes. The experts appreciated that the study plans are tailored to the needs of the individual students in practice. However, they did not follow the reasoning behind the decision of the ministry to offer six programmes with six different final degrees which does not correspond to common international practice. As the students of a PhD programme have to specialize in the context of their thesis anyway, the experts considered the classification in one of the six programmes as not useful but

possibly complicating further international activities of graduates. They would thus recommend reducing the number of PhD programmes (e.g. one in the field of informatics and one in the field of computer sciences).
The publication of the intended programme learning outcomes and their accessibility to all relevant stakeholders, especially teaching staff and students, play a crucial role for transparency and for quality-related reference by the stakeholders. The panel could not find any proof that the intended learning outcomes as they have been presented to the panel are published and accessible elsewhere. From the audit of Bachelor's and Master's programme of the same cluster, the panel acknowledged that the learning outcomes are published in an internal document-management system. However, under these premises the prospective study candidates cannot access them, which is crucial for a thorough decision making and comparison of different programs. Therefore, the panel considered the publication of the learning outcomes accessible to the public a necessity.

Criterion 2.2 Prospects of the labour market and practical orientation

Evidence:

- Statistics on graduates employment in terms of numbers and market sector
- Overview of companies for practical training
- Discussions with students/alumni

Preliminary assessment and analysis of the peers:
The number of PhD students who were accepted in the last years is very small. In Computer Science, since 2008, 13 students graduated. In Informatics, Computer Engineering and Management, which started in 2008, 8 students had been admitted so far, the same in Information Systems. At the time of the audit, no students had yet been enrolled in the programme Computer Science and Software. In Mathematical and Computer Modeling 6 students commenced their PhD studies. In Mathematics 6 students graduated 2013. Those who graduated were employed either by the university itself, by other universities in Kazakhstan or by external research institutes such as the "Scientific Research Institute of Mathematics and Mechanics" or the "Kazakh Scientific Research and Design Institute of Oil and Gas". The students confirmed that they aspire to a career as university teacher and they are confident of finding a suitable position. They mentioned that also the industry encourages students to conduct a PhD.

The auditors understood that the PhD candidates have to conduct research internships within current research projects of their professors in Kazakhstan as well as abroad and that most of them teach undergraduate students which gives them an opportunity for pedagogical practice. The panel deemed this to be positive for their further teaching ac-

tivities. The panel concluded that an acceptable relation to the practical, professional side of the programmes had been integrated into the courses.

Criterion 2.3 Admission requirements

Evidence:

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

Preliminary assessment and analysis of the peers:

The admission rules for the PhD programmes are clearly defined in the academic policy, based on the law developed by the Ministry of Education and Science of Kazakhstan based on the article number 4 of the law on Education (as of June 27, 2007). The admission decisions are made by the admission commission, including 3 university's professors nominated by Rector's decree.

As mentioned above, the PhD study places are only provided based on educational grants; self-funded students cannot study in PhD degrees. The state grants are awarded based on the best results of admission exams, which include an extensive foreign language test (TOEFLITP, TOEFL, at least 560 points, DELF – B2 or DALF C1, Deutsche Sprachprüfung für den Hochschulzugang – C1) and a programme based written exam which is focused on the chosen subject and contains two theoretical questions and one essay.

As another admission requirement each PhD student is required to have two supervisors, one from the al-Farabi Kazakh National University and one from abroad. The local scientific supervisor has to be a well-reputed scientist with at least one cited publication and at least one project which is funded by the ministry. The foreign scientific supervisor should be scientists with relevant scientific projects.

The auditors noted that all processes and quality criteria required for admission to the PhD programmes are defined in a transparent and binding way; the rules ensure that all admitted learners fulfill the necessary requirements. The thorough knowledge of the foreign language is an important prerequisite, given that PhD students are supposed to conduct research abroad, be able to read and synthesize scientific literature, as well as communicate without any linguistic obstacles with their foreign supervisors. The panel found this to be the case for the students they met during the on-site visit.

Criterion 2.4 Contents

Evidence:

- Module Descriptions
- Curriculum
- Discussion with students
- Discussion with teaching staff

Preliminary assessment and analysis of the peers:

As mentioned before, the overall structure of the programmes depends on state requirements, but the faculty can define their details autonomously. During the discussions it was clarified that the core of the programmes consists of the individual independent research work conducted by PhD-students. The experts questioned whether the university intends to offer general modules on a high level within these programmes or modules which offer a special preparation for the research work of the students. During the discussion they learned that the latter is the case: the university designs individual trajectories and study plans for each PhD student, and in this way offers an individual course of study. In most of the degree programmes only one of the modules is compulsory for the students. The other ones are selected and tailored to the needs of the individual students. In these modules the students are taught in scientific writing and publishing papers. Composition and structure of the thesis are discussed and supervisor and students discuss relevant literature. The panel also learned that the form of the lectures and seminars is different from the way these are taught for Bachelor's and Master's students – it is rather a discussion than lecturing within a very small circle: 1-2 students discussing with the professor, supported by additional reading and research related to the field of research implemented by students. The students and teaching staff confirmed the statement of the programme coordinators that these "taught" modules do not exceed 25-30% of their working time, while the mere analysis of the written-down curriculum might lead to the assumption that too much time is allocated to basic scientific courses which would not allow for a PhD level activity. In fact, modules take place two or three times a week after 5 pm and serve students to discuss their research work with their teachers. The third year of the study programme is dedicated to writing und publishing the thesis.
Prior to being accepted to present and defend the PhD thesis, the candidate has to prove the following publications:

- 1 paper in journal indexed by TR or Scopus
- 3 papers in journal recommended by Committee of Science
- 3 presentations at international scientific conferences, including at least 1 abroad

The auditors welcomed this publication obligation as well as the necessity to have a second foreign supervisor. They understood that in the past some of the students had defended their thesis but did not publish it afterwards. The obligation to publish twice a year has been taken as measure to prevent such situations. However, the auditors scrutinized the time-related consequences resulting from this new regulation (criterion 3.2).

Based on the self- assessment report and the module descriptions, the audit team nevertheless questioned the general level of the PhD programmes since many of the modules defined in the curricula demonstrate rather basic level at least as far as their titles are concerned. However, based on the discussions, the panel deemed the implementation of the modules to be on the due level and also to offer a laudable customized and individual approach to teaching at PhD level. Accordingly, the module descriptions have to be reworked: For instance, for the research seminars the detailed module descriptions are missing. The auditors discussed also the naming of some of the modules. They noted that the names did not always provide correct information about the intended learning outcomes and the content of the modules, in some cases the names seemed to be even misleading (e.g. Advanced Software Engineering seemed to be Fluid Dynamics). For reason of transparency, the auditors deemed it necessary to rename the modules so that they reflect the content and the intended learning outcomes. Also, the descriptions of the modules should be reworked: They should reflect the European Qualifications Framework level 8 in all cases and should place greater emphasis on the learning outcomes than on content and input. This would also allow tailoring the content of the modules on the individual needs of the students while achieving the same level of competences at the end of the programmes. In summary, the current practice of documenting the modules should be revised: an update, renaming and completion the respective descriptions in order to ensure that they reflect the high level of individuality and customization, publication on the website in order to make them accessible and usable as reliable reference for all relevant stakeholders.

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

The peers deemed the relevant aspects of the said criterion partly met.

They insisted on the requirement that the learning outcomes must be accessible to all stakeholders, including prospective students, potential employers and any interested party. Also the module descriptions have to be updated and missing descriptions have to be added. The names of the modules have to reflect the content and the intended learning outcomes. The descriptions have to be formulated outcome-oriented and reflect the learning outcomes at level 8 of the EQF.

Furthermore, the peers recommended reducing the number of PhD programmes (e.g. one in the field of informatics and one in the field of computer sciences).

3. Courses/Modules: Structures, Methods and Implementation

Criterion 3.1 Structure

Evidence:

- Curriculum overview in the self-evaluation-report
- Module descriptions

Preliminary assessment and analysis of the peers:
The PhD programmes last three years in full-time-provision. The research work of PhD-students is planned to start from the beginning. In the first two years, the individual research work is supplemented by courses adding in total to a workload reported to equal 110 - 125 ECTS (depending on the programme). This overall structure is defined by state regulations. Although there are some initial compulsory modules, most of the curriculum consists of electives, which can be adapted to students´ research work, and research seminars, in which substantial parts of the preparation of publications and of the dissertation take place. The third year is dedicated to the completion of the dissertation. The panel deemed it to be an especially commendable practice to enable students to go abroad for visiting their second advisor for at least four months. This period is funded by the Ministry of Education and Science of Republic of Kazakhstan.

Criterion 3.2 Workload

Evidence:

- Self-assessment report, Curriculum
- Auxiliary document: “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University”
- Discussions with students

Preliminary assessment and analysis of the peers:
The Academic Policy states that the average student workload of PhD Degree students must not exceed 57 hours per week; one hour auditorium workload must be followed by 7 hours self study. Even though this workload was considered very high by the auditors, the students confirmed that they can cope with their workload and consider it feasible

and acceptable. They confirmed that the modules offered are necessary and helpful. They highlighted that this way of learning, in almost individual classes is beneficial for their thesis. But the auditors remarked critically that the Academic Police was difficult to understand in the actual conversion of Kazakh credit points to ECTS points. For example it was not clear why the same number of Kazakh credits awarded for the programmes (75) results in different ECTS numbers – 113 and 125, as stated in the self-assessment reports. The majority of the auditors stated that the transformation of the Kazakh credit points into ECTS points must correspond to the ECTS regulation that one credit point is awarded for 25-30 hours student workload.

The auditors scrutinized the time-related consequences resulting from the publication obligation. Prior to being accepted to present and defend the PhD thesis, the candidate has to prove four publications and three presentations as described in section 2.4 above. The auditors questioned whether these requirements could be fulfilled within three years, given that it takes normally quite long until papers are accepted and published by internationally renowned journals. In fact, the auditors learned in the discussion with the students that the majority of the students complete der PhD studies within 3,5 years instead of 3 years, in some cases students need even 4 or 5 years due to the long period until their papers are published. Some students start publishing already in the course of the Master's programme in order to complete their PhD in due time as educational grants are not prolonged and students have to live on their own funds after the standards period of study. In order to accelerate the publishing of the papers students choose journals which are not so well-known and internationally renowned and which typically do not need so much time to accept submitted papers. The auditors considered this solution contrary to the aim of the original obligation as well as to good research practice. They recommend ensuring that the required number of publications does not lead to an undue delay between the defense of the thesis and the conferral of the PhD degree. They advised that at least in the field of computing there would be highly ranked, very competitive, trend setting international conferences with an even higher prestige than many international journals. And there would be no time delay at all: Already a few weeks after the submission of a paper authors are notified about acceptance.

Criterion 3.3 Teaching methodology

Evidence:

- Module descriptions

Preliminary assessment and analysis of the peers:

At the first glance, taking into account the module descriptions at hand, the course content of the PhD-programmes seemed to prolong the education at master´s level. This im-

pression could be clarified in the discussion with faculty staff responsible for programme coordination and teaching staff. The faculty could credibly demonstrate 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. For example, students are prepared to defend and argue about their thesis, are taught how to write and to publish scientific papers, and teachers (which are not necessarily the supervisors) give recommendations for the research work in the classes. The auditors appreciated the one-to-one tutoring and the individualized approach to tailor the content of modules to the scientific and research needs of PhD students in order to ascertain that they receive the scientific support facilitating the academic progress of the PhD candidates. The auditors confirmed that the teaching instruments thus support the learners in reaching the learning outcomes.

As mentioned above, each PhD student is required to have two supervisors, one from the al-Farabi Kazakh National University and one from abroad. The domestic supervisor is responsible for advising the PhD student to find a foreign supervisor and negotiate the preliminary dissertation. The foreign supervisors are invited to the al-Farabi University for at least 14 days per year to offer lectures and discussions for doctoral students. The university covers all relevant expenses. Furthermore, the foreign supervisor is requested to invite the doctoral student at least twice during the period of training for at least two months each time. The University covers all expenses for 4 months staying of doctoral student in the university of his foreign supervisor. The auditors were impressed by this international approach and are convinced that this concept is appropriate in reaching the learning outcomes at the level aimed at.

Criterion 3.4 Support and assistance

Evidence:

- Discussion with students

Preliminary assessment and analysis of the peers:

The auditors gained the conviction that the support and advice infrastructure at al-Farabi Kazakh State University was particularly well developed for PhD students. The university provides a good setting for development of the skills and competences as stated above. In particular, the support and assistance provided by the foreign supervisor was considered very valuable since this international cooperation broadens the scientific scope of the candidates and the language competences. The cooperation between student and supervisor is described as very good by the students. Overall, students expressed a very high level of satisfaction during their discussion with the peers.

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

The peers considered the criteria to be partly fulfilled.

The majority of the auditors confirmed the requirement that the transformation of the Kazakh credit points into ECTS points must correspond to the ECTS regulation that one credit point is awarded for 25-30 hours student workload.

With respect to the publication requirement for PhDs the auditors found them excessive, especially that the articles must not only have been accepted but actually appeared before the student can defend the thesis. They recommended ensuring that the required number of publications does not lead to an undue delay between the defense of the thesis and the conferral of the PhD degree. Also the acceptance should be enough for the defense to take place.

4. Examination: System, Policy and Forms

Criterion 4 Exams: System, policy and forms

Evidence:

- Auxiliary document: "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University"
- Module Handbook
- Discussion with student

Preliminary assessment and analysis of the peers:

All modules must be completed by passing an examination. The module descriptions explain the kind of examination that has to be passed. In most cases there are interim controls comprising attendance, in-class discussion, problem solving, and testing. Furthermore, there is normally a written final exam which contributes 50% to the overall grade of the module and which deals, for example, with the methods students used in their thesis. Taking into account that subjects and methods of courses at PhD-level can be adapted to the subjects of students´ research work and theses, the peers accept this manner of implementation.

The auditors questioned the purpose of the described state comprehensive exam which takes place at the end of the degree programmes when students have completely finished all courses. This state comprehensive exam, in the form of an oral exam, may range over the content of all the modules taught in the programme. As the achievement of the intended learning outcomes per module is assessed through module specific exams in all

modules, it is not clear which additional achievement the state comprehensive exam would assess. The achievement of overarching competences is to be assessed in the thesis. From the point of view of the majority of the peers, such an additional cumulative examination at the end of a study programme is also in contradiction to the basic concept of the Bologna reform emphasizing course related exams.

One third of the thesis dissertation comprises common questions, two third are concerned with the submitted thesis. The thesis has to be submitted also to the ministry. The responsible experts within the ministry review all theses.

The auditors had some difficulties in assessing the provided theses. None of them were in English and also abstracts, which should be available in English for all theses according to the university policy, have not been submitted in all cases, in particular not for Information Systems and Informatics, Computer Engineering and Management. Therefore the auditors asked the university for the submission of one PhD thesis in the field of Information Systems and articles in the field of Informatics, Computer Engineering and Management before making their final assessment.

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

The peers evaluated the requirements of the criterion as partly fulfilled. According to the majority of the peers the examination organization has to guarantee that the examinations accompany study and take place only on a course related basis.

The peers thanked the university for submitting one PhD thesis in the field of Information Systems and two articles in the field of Informatics, Computer Engineering and Management. They came to the conclusion that one of the articles and the PhD thesis reflects level 8 EQF and demonstrate that the PhD-students are able to conduct independent scientific research competitively at an international level (although the English abstract of the PhD thesis is in effect too abstract to learn about the aim of the thesis and its content). But they noticed that partly very few references are given and part of them only local. In this cases international references seemed to be neither looked at nor quoted. Hence, the experts would recommend to better prepare the PhD students to use scientific work methods.

5. Resources

Criterion 5.1 Staff

Evidence:

- Staff Handbook
- Discussions with programme coordinators, teaching staff and students
- List of international projects of the faculty

Preliminary assessment and analysis of the peers:

In the discussion with the peers, the members of the university management explained the still ongoing transformation process of al-Farabi University into a research institution after being a more educationally oriented university during the Soviet Union. 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 and the educational performance. The auditors understood in the discussion with the university that traditionally there was an institutional separation between universities and research institutions. However, a PhD degree programme (such as the programmes under review) should be based on recent research and development and should impart knowledge in the subject specific field of research. To ensure research-based teaching at PhD level there must be sufficient possibility for teachers to act themselves as researchers and developers in their subject fields.

There are fixed ratios of students to teaching staff required by the Ministry of Education. Generally, the approximate ratio is 3:1 at PhD level, which seems to be favorable. Also one supervisor cannot have more than two PhD students at once. However, in the discussion with the teaching staff the auditors learned that the teaching load seems to be very high. According to the lecturers met, most of their working time is spent for the purpose of teaching and student supervision. They conduct research projects normally not in the context of the university but in external research institutes were they are also paid and which enables them to participate in international conferences. Students work in these external research institutes as well in order to supplement their educational grant. In the discussion with members of the university management the auditors understood that research sabbaticals are approved on a regular basis, but in the meeting with the teachers they learned that in practice nobody had this opportunity in the last three years. Thus, the auditors concluded that in order to guarantee in a sustainable manner that the PhD programmes can be implemented on a relevant research basis, staff must be able to better combine teaching load with research work for the purpose of enabling the staff to conduct research and development. Sabbaticals should be conducted on a regular basis.

The university must clarify its policy in this regard, detail how the policy is implemented and demonstrate which teaching staff is involved in current and relevant research activities.

The majority of graduates of the PhD programmes were employed by the industry up to now which explains why there is only a small new generation of academics in the computer science department. Hence, the university has to invite international specialists to hold lectures in Kazakhstan. The auditors appreciated that the university is willing to make available resources to ensure that international professors visit al-Farabi University and contribute to capacity-building in the field of computer science.

Criterion 5.2 Institutional setting, funding and equipment

Evidence:

- Discussion with members of the university´s management
- Self-Evaluation Reports
- Visits of laboratories

Preliminary assessment and analysis of the peers:
In the discussion with the university the auditors discussed the financial basis of the programmes. They understood that the university receives state funding. Another part of the budget needed is financed by industry. The auditors gained the impression that the financing of the programmes is assured, at least for the accreditation period.

The audit team had the possibility to visit the relevant laboratories. The peers had the impression that in general a good infrastructure is provided, especially in the field of high performance computing. However, it did not become clear to the auditors to which extent access to required software and international journals was available. Whereas the university purchased a subscription to Springer and ACM/IEEE the students mentioned that they would need further access to scientific journals, in particular to MathSciNet. Furthermore, they complained that they do not have access to all required literature as there is also no possibility to order literature from other libraries. Overall, the auditors felt that the accessibility of relevant international journals, databases and literature should be improved and needs to be made transparent to all teaching staff and students,, not at least in light of the above-mentioned need for improving the research opportunities.

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

The peers regarded the requirements of the criteria as partly fulfilled.

As of now only a minority of the staff appears to be sufficiently active in research at an international level to supervise PhD students and to engage suitable foreign co-supervisors. 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 is implemented.

Furthermore, the auditors recommended that the accessibility of relevant international journals, databases and literature should be improved and made transparent to all teaching staff and students.

A minority of the experts stated that enrolling PhD students becomes a very expensive proposition for the university due to the costs for the visit of the foreign supervisor and for the four-month stay of the PhD students at a foreign university. Hence the minority of the experts recommended that the cost for the foreign supervisor and the two visits abroad are made part of the PhD scholarship or otherwise covered by the education ministry.

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”
- Discussion with staff responsible for the PhD-programme

Preliminary assessment and analysis of the peers:

The quality assurance policy and the different procedures are elaborated in the “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University”. The Methodological Bureau of Faculties is in charge of the overall quality control and quality assurance like “improvement of planning and organization of the educational process” or “improving the quality of teaching”. The Office of the Registrar is responsible for the registration services and all kinds of monitoring duties.

Concerning different elements of quality in teaching and learning, the university has in place several mechanisms: Firstly, the organizational setting with two supervisors, one from the faculty and one from abroad, aims at ensuring two independent perspectives and evaluation of the work done and therefore fulfills a key requirement for impartiality.

Secondly, there is a pre-defined maximum ratio of three PhD-students per supervisor aiming at a close contact and thus quick discovery of problems. Thirdly, there are regular evaluations of the modules: At the end of each semester, lecturers are assessed by students and other staff members; the data is analysed and made available to the Management and the Head of Department and has also an effect on the rating (and thereby on the salary) of the teachers. The students confirmed that evaluation questionnaires are handed out and are completed anonymously. But they were not informed about the results and therefore felt almost unable to assess whether there were any improvements derived from the evaluation results. Thus, the feedback loops of quality management activities could not yet be considered closed.

Criterion 6.2 Instruments, data and methods

Evidence:

- Data about statistic of graduates, result of state examination and diploma defence, statistics of first year students, statistic of first course students

Preliminary assessment and analysis of the peers:
Overall, the auditors concluded that the data collected and the tools foreseen put the university in a position to check whether its aims in general and the objectives of the programmes in particular are achieved.

As mentioned above, the peers pointed out that the current quality assurance system does not fully implement a closed cycle. This should be a concern of the further development of the quality assurance mechanisms.

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

The auditors insisted on the requirement that feedback loops in the student evaluation must be organized.

7. Documentation & Transparency

Criterion 7.1 Relevant documents

Evidence:

- Auxiliary document: “University-wide Academic Policies and Procedures of al-Farabi Kazakh National University”
- Self-assessment reports

Preliminary assessment and analysis of the peers:
The regulations are transparently presented and clearly explained by the "University-wide Academic Policies and Procedures of al-Farabi Kazakh National University". This policy is available in Russian language on the website of al-Farabi-University.

The audit team considered the provisions of the programmes with regard to for admission, actual study/training and conclusion to be adequately defined in the respective regulations.

Criterion 7.2 Certificate upon conclusion

Evidence:

- None

Preliminary assessment and analysis of the peers:
An example of the leaving certificate provided upon conclusion of the programmes was not made available to the panel. Such a certificate should contain information on programme's structure, contents and level of the concluded programmes, as well as the learner's individual performance, the calculation of the final mark including different weighting regulations for the separate modules. Therefore, the panel requested the submission of such certificate as additional document jointly with the comment of the university on this report. This document is needed for the final assessment of the programme.

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

The auditors received the Diploma Supplement of the Bachelor's degree programme Mathematics and some other documents and certificates for the Bachelor's and Master's degree programmes Information Systems, Computer Science, Mathematical and Computer Modeling and Computer Systems and Software. However, the peers concluded that a model for each PhD programme under review has to be provided. The Diploma Supplement has to give 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.

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:

D 1. Example of the leaving certificate for each programme
D 2. One PhD Thesis in the field of Information Systems
D 3. Articles in the field of Informatics, Computer Engineering and Management

E Comment of the Provider (20.10.2014)

The institution provided additional documents on the following issues:

- One PhD thesis in the field of Information Systems
- Two articles in the field of Informatics, Computer Engineering and Management
- Diploma Supplement of the Bachelor's degree programme Mathematics.
- Several degree certificates

F Summary: Peer recommendations (03.11.2014)

Taking into account the additional information given by al-Farabi Kazakh National University the peers summarized their analysis and **final assessment** for the award of the ASIIN certificate as follows:

PhD Programme	ASIIN Certificate	Maximum duration of certification
Computer Science	awarded with requirements	30.09.2020
Computer Science and Software	awarded with requirements	30.09.2020
Informatics, Computer Engineering and Management	awarded with requirements	30.09.2020
Information Systems	awarded with requirements	30.09.2020
Mathematical and Computer Modeling	awarded with requirements	30.09.2020
Mathematics	awarded with requirements	30.09.2020

Requirements

A 1. (ASIIN 2.1) The learning outcomes must be accessible to all stakeholders, including prospective students, potential employers and any interested party.

A 2. (ASIIN 2.4) It is necessary to update, complement and continuously monitor the quality of the module handbooks: Missing descriptions have to be added. The names of the modules have to reflect the content and the intended learning outcomes. The descriptions have to be formulated outcome-oriented and reflect the learning outcomes at level 8 of the EQF.

A 3. (ASIIN 4) The examinations process has to guarantee that the examinations accompany study and take place only on a course related basis.

A 4. (ASIIN 5.1) 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 is implemented.

A 5. (ASIIN 6.1) Feedback loops in the student evaluation must be organized.

A 6. (ASIIN 3.2) The transformation of the Kazakh credit points into ECTS points must correspond to the ECTS regulation that one credit point is awarded for 25-30 hours student workload.

A 7. (ASIIN 7.2) A programme-specific Diploma Supplement 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 2.1) It is recommended to reduce the number of PhD degree programmes.

E 2. (ASIIN 5.2) For the purpose of conducting research the accessibility of relevant international journals, databases and literature should be improved and made transparent to all teaching staff and students.

E 3. (ASIIN 3.2) It is recommended to ensure that the required number of publications does not lead to an undue delay between the defense of the thesis and the conferral of the PhD degree.

E 4. (ASIIN 4) It is recommend to better prepare the PhD students to use scientific work methods.

G Decision of the Certification Committee (11.11.2014)

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, the requirement 1 aiming at accessibility of programme information, including programme objectives to all internal *and external* stakeholders must be added to those procedures where it has not been issued.

With regard to the report at hand, the committee members questioned the relevance of former requirement 3. As it seemed to target a nation-wide, regulated exam which was not part of the university's scope of authority, they decided to delete it.

Furthermore, they made editorial amendments to the new requirements, 3, 5, and 6. In particular, 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, 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.

The Certification Committee also considered the availability of international journals, literature and databases to be essential to allow both students and staff adequate research and thus transformed a corresponding recommendation into the new requirement 7.

Further editorial amendments were made to the recommendations.

The Certification Committee decides to award the following certificates:

PhD Programme	**ASIIN Certificate**	**Maximum duration of certification**
Computer Science	awarded with requirements	31.12.2019 (upon fulfillment of requirements)

PhD Programme	ASIIN Certificate	Maximum duration of certification
Computer Science and Software	awarded with requirements	31.12.2019 (upon fulfillment of requirements)
Informatics, Computer Engineering and Management	awarded with requirements	31.12.2019 (upon fulfillment of requirements)
Information Systems	awarded with requirements	31.12.2019 (upon fulfillment of requirements)
Mathematical and Computer Modeling	awarded with requirements	31.12.2019 (upon fulfillment of requirements)
Mathematics	awarded with requirements	31.12.2019 (upon fulfillment of requirements)

Requirements

A 1. (ASIIN 2.1) The learning outcomes must be accessible to all stakeholders, including prospective students, potential employers and any interested party.

A 2. (ASIIN 2.4) It is necessary to update, complement and continuously monitor the quality of the module handbooks: Missing descriptions have to be added. The names of the modules have to reflect the content and the intended learning outcomes. The descriptions have to be formulated outcome-oriented and reflect the learning outcomes at level 8 of the EQF.

A 3. (ASIIN 5.1) 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 4. (ASIIN 6.1) Within the quality assurance policy feedback loops must be implemented.

A 5. (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 6. (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.

A 7. (ASIIN 5.2) 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.

Recommendations

E 1. (ASIIN 2.1) It is recommended to reduce the number of PhD degree programmes.

E 2. (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 3. (ASIIN 4) It is recommend to better equip the PhD students to use scientific work methods.