ASIIN Accreditation Report

Bachelor's and Master's Degree Programmes
Physics (Natural science trajectory)
Physics (Educational trajectory)
Mathematics (Educational science trajectory)

Provided by

East Kazakhstan State University
named after S. Amanzholov

Version: 1st of July 2016

Table of Content

A About the Accreditation Process

Title of the degree Programme	Labels applied for [1]	Previous ASIIN accreditation	Involved Technical Commit-tees (TC)[2]
Ba Physics (5B060400) – Natural science trajectory	ASIIN	N/A	TC 13
Ba Physics (5B011000) – Educational trajectory	ASIIN	N/A	TC 13
Ba Mathematics (5B010900) – Educational trajectory	ASIIN	N/A	TC 12
Ma Mathematics (6M010900) – Educational trajectory	ASIIN	N/A	TC 12
Ma Physics (6M060400) – Natural science trajectory	ASIIN	N/A	TC 13
Ma Physics (6M011000) – Educational trajectory	ASIIN	N/A	TC 13
Date of the contract: 09.07.2013 **Submission of the final version of the self-assessment report:** 14.01.2014 **Date of the onsite visit:** 06.-07.08.2014 **at:** VKGU administrative campus, Department for Mathematics			
Peer panel: Alexandra Dreiseidler, Emil-Fischer-Gymnasium Euskirchen; Prof. Dr. Michael Hietschold, Technical University of Chemnitz; Prof. Dr. Helmut Rudolph, Hochschule für Technik, Wirtschaft und Kultur Leipzig; Prof. Dr. Hans-Georg Weigand, University of Würzburg; Prof. Dr. Rita Wodzinski, University of Kassel; Aidana Batpanova, Student Representative, Technical University of Karaganda			
Representatives of the ASIIN headquarter: Mila Zarkh			
Responsible decision-making committee: Akkreditierungskommission für Studiengänge			

[1] ASIIN Seal for degree programmes
[2] TC 12 – Mathematics; TC 13 – Physics.

Criteria used:

European Standards and Guidelines as of 2009 (third edition)

ASIIN General Criteria, as of 17.04.2013

Subject-Specific Criteria of Technical Committee 12 – Mathematics, as of 13.02.2012

Subject-Specific Criteria of Technical Committee 13 – Physics, as of 13.02.2012

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 Degree Programmes

a) Name & Final Degree	b) Areas of Specialization	c) Mode of Study	d) Duration & Credit Points	e) First time of offer & Intake rhythm	f) Number of students per intake	g) Fees
Physics (5B060400) – Bachelor of Physics	Natural science trajectory	Full time	8 Semesters/ 211 ECTS	01.09.2013, annually in September (winter term)	Ca. 20 – 25	$2270 / year
Physics (5B011000) – Bachelor of Physics	Educational trajectory	Full time	8 Semesters/ 208 ECTS	01.09.2013, annually in September (winter term)	Ca. 20 – 25	$2270 / year
Mathematics (5B010900) – Bachelor of Mathematics	Educational trajectory	Full time	8 Semesters/ 213 ECTS	01.09.2013, annually in September (winter term)	Ca. 20 – 25	$2270 / year
Mathematics (6M010900) – Master of Pedagogical sciences	Educational trajectory	Full time	4 Semesters/ 86 ECTS	01.09.2013, annually in September (winter term)	Ca. 6 – 8	$2640 / year
Physics (6M060400) – Master of Science	Natural science trajectory	Full time	4 Semesters/ 97 ECTS	01.09.2013, annually in September (winter term)	Ca. 8 – 12	$2640 / year
Physics (6M011000) – Master of Scientific and Pedagogical Science	Educational trajectory	Full time	4 Semesters/ 87 ECTS	01.09.2013, annually in September (winter term)	Ca. 8 – 12	$2640 / year

For the Bachelor's degree programme Physics (Educational path, 5B011000), the university has provided the following list of the **learning outcomes** as additional document (as of 19.09.2014):

"**As a result, learning bachelor should know:**

- The basis of general physics, higher mathematics, theoretical physics, electronics and computer science;
- Methods of mathematical modeling;
- Legal and ethical standards that implement the relation of man to man, society and the environment;
- Philosophical and methodological bases of pedagogical research culture;
- The basis for the discipline of study;
- The theoretical basis of life safety, legal and regulatory framework of the legislation of occupational health and environmental safety standards system;
- Theoretical foundations of physics: an object, place, and specific relationship between science and science in general, the categorical system of scientific knowledge, methodology and logic of scientific and pedagogical research;
- Theoretical foundations and methods of teaching physics in terms of Special Education; structure and content of a particular academic discipline.
- Anatomical and physiological age and socio-psychological characteristics of students of different ages.

The graduate should be able to:

- Apply their knowledge in solving specific scientific and practical, and other tasks;
- Solve physical problems and applied research, to carry out the static analysis of the results of the experiment, perform mathematical and physical modeling of the properties of objects;
- Use methods of social sciences and humanities in various areas of their professional activities;
- On the basis of nuchnoy organize his job, own techniques and methods of data collection, storage and processing of information.

A graduate from training to have skills:

- Knowledge of Kazakh, Russian, and one of the foreign languages in the areas of welfare and scientific communication; be able to continue their education and to professional activity in a foreign environment;

- Ownership culture of thinking and public speaking; correct and logical design of their thoughts orally and in writing, to participate in discussions on professional issues;

- Scientific analysis and forecasting of various phenomena and processes;

- To work on interdisciplinary projects;

- Ensure safe working conditions;

- In support of its position on the professional and other matters.

He should have an idea:

- In the field of humanitarian and socio-economic sciences; - About contemporary sostoyanii.nauki **[SIC!]** and technology in the Republic of Kazakhstan and the world;

- New teaching technologies in Kazakhstan and abroad;

- On the principles of distance learning;

- The impact of globalization on education, on the main trends of integration of education into the world educational space.

Based on the above Knowledge, skills - skills formed competence of the teacher:

- The use of didactic principles and methods of teaching physics in high school;

- To use the latest educational technology in teaching (traditional teaching, non-violent pedagogy, technology collective thinking activity);

- The use of different learning models (traditional and innovative, technological conveyor, etc.);

- In the definition and specification of public and student-relevant goals and objectives of training in specific circumstances;

- To use the terminology of teaching (didactics, its functions and principles; pedagogical paradigm, reflection, interactive communication, communication is non-verbal and verbal, etc.);

- In working out methodolgy selection and implementation mechanism selected educational content uuebnom **[SIC!]** process;

- Basic knowledge in the use of psycho-pedagogical profile in today's educational institutions, to carry out the position of subject teachers in primary and secondary school levels profiled the Republic of Kazakhstan;

- Shared technologies oral and written communication, interaction with students, the ability to establish contact with students;

Guide in the activity fundamental public documents and regulations of the Republic of Kazakhstan on the management, organization and control of the educational process in secondary schools;

- In the possession of all of the major professional quality requirements to work as a teacher of secondary schools of Kazakhstan, to meet all the modern requirements to them by their employers;

- In matters of physics and physics teaching methodology, pedagogy and psychology.

Requirements for general education:

- Receipt of a complete and quality education, professional competence in the field of physics, pedagogy, psychology;

- To provide a holistic view of the processes and phenomena occurring in animate and inanimate nature, understanding of the possibilities of modern scientific methods of knowledge of the nature and ownership of them at a level necessary for the solution of problems arising in the performance of professional duties;

- Availability, methodological and psychological, to a change in the type and nature of their professional activities;

- Oucheniya **[SIC!]** continued in subsequent stages of professional education.

Requirement for social and personal competences:

- An understanding of the scientific, philosophical and religious pictures of the world, the variety of forms of human knowledge, the ratio of truth and error, the rational and the irrational, the spiritual values and their significance;

- Know about the history of the development of society, diversity of cultures, civilizations, forms of social experience of Kazakhstan in the world historical process;

- Know the basics of the legal system and laws of the Republic of Kazakhstan, the organization of the judicial and other pravoprimiritelnyh **[SIC!]** and law enforcement agencies;

- Know the basics of the legal, moral and ethical standards in the sphere of professional activity;

- Know the basics of the Constitution of the Republic of Kazakhstan, the ethical and legal rules governing the relation of man to man, society, the environment; be able to take them into account in the development of social projects;

- Own culture of thinking, to know its general laws, to be able to correct (logical) to present the results of their activities in oral and written form.

Requirements for economic, organizational and management competencies:

- Master the basic concepts of economic theory and the essence of economic processes;

- Own culture of thinking, knowledge of the fundamentals of industrial relations and the principles of management based on technical, financial and human factors;

- Promote creativity, implementation of domestic and foreign science, use of best practices, ensuring efficient operation of the university, schools and businesses;

- Organize the work to improve the skills of team members.

Requirements for professional competence:

The graduate should:

- Conduct a comprehensive analysis of the complex to justify the adopted and implemented its decisions, to seek opportunities most ratsonalnogo **[SIC!]** approach to the work performed; contribute to the implementation process, providing the necessary data, the flow of information, equipment and materials;

- Participate in the standardization of technical training, in consideration of various documents; prepare the necessary surveys, reviews, opinion;

- Provide guidance and practical help in the implementation of programs, plans, contracts, etc.;

- Ensure compliance with the established requirements, operating rules, regulations and standards;

- Be able to organize their professional activities on the basis of acquired knowledge; own methods of data collection, storage and processing of information used in the field of his professional activity in secondary and special schools.

Requirements for special competencies:

- An understanding of the phenomenon of culture and its role in human life, on the basis of cultural values and the place of Culture in civilization;
- Have an integrated view of man as an individual, the person, the subject of activity and identity of its methods of study;
- Be able to express and justify their position on matters relating to the valuable relation to the historical past;
- Svobdno **[SIC!]** own one of the foreign languages in the field of professional communication and translation of the relevant literature.

Availability requirements changing social, economic, professional roles, geographical and social mobility in terms of increasing the dynamism of change and uncertainty.

The graduate should be prepared to:

- For critical evaluation of the experience gained, the analysis of the capabilities in the dynamic development of science and changing social practices; to acquire new knowledge with the use of modern educational technologies;
- A change in the type and nature of their professional activities, to work on interdisciplinary projects;
- To frequent change of residence, caused by the demand for it in the most attractive projects.

Requirements for education in certain disciplines:

The bachelor should:

- Have a basic training in all disciplines included in the standard curriculum of the specialty;
- Own system knowledge ideological character;
- Be able to use the methods of the social sciences and humanities in various areas of their professional activities;
- Know the legal and ethical norms of communication in the annex to the profession;
- Be able to express their thoughts, both orally and in writing;
- Possess computer techniques and use them in their professional activities."

The following **curriculum for the Bachelor's programme Physics** (Educational path, 5B011000) is presented:

Список модулей/List of Modules		ECTS-кредиты/ECTS credits				
№	Модуль/Module	МЕД/ MNT	СД/ SS	УСЗ/ ASS	ВиМС/ ISC	Всего/ Total
1	Коммуникативті 1 Коммуникативный 1 Communicative 1				10	10
2	Коммуникативті 2 Коммуникативный 2 Communicative 2				10	10
3	Дүниетанымдық Мировоззренческий Worldview				5	5
4	Әлеуметтік саяси Социально-политический The socio-political				6	6
5	Бизнес және құқық Бизнеса и права Business and Law				6	6
6	Отан тарихы Отечественная история Domestic History				5	5
7	Ақпаратты-коммуникативті Информационно-коммуникационный Information and communication				5	5
8	Қоршаған ортаны және адамның денсаулығын қорғау Охрана окружающей среды и здоровье человека Protection of the environment and human health	6				6
9	Педагогикалық және психологиялық негіздер Педагогические и психологические основы	7				7

	Educational and psychological foundations					
10	Педагогикалық Педагогический Pedagogical				8	8
11	Кәсіби тілдер Профессиональные языки Professional training of the languages				6	6
12	Математикалық 1 Математические1 Mathematics1	5				5
13	Математикалық 2 Математические2 Mathematics2	5				5
14	Өзін-өзі тану және жас ерекшелік физиологиясы Самопознание и возрастная физиология Self-knowledge and age physiology	6				6
15	Радиоэлектроника және бағдарламалау Радиоэлектроника и программирование Electronics and Programming		8			8
16	Пәндердің әдістемесі Методика дисциплины Methods of discipline		8			8
17	Жалпы физика 1 Общая физика 1 General Physics 1		10			10
18	Жалпы физика 2Общая физика 2General Physics 2		10			10
19	Теориялық физика 1 Теоретическая физика 1 Theoretical physics 1		6			6

20	Теориялық физика 2 Теоретическая физика 2 Theoretical physics 2		11			11
21	Теориялық физика 3 Теоретическая физика 3 Theoretical physics 3		6			6
22	Физика негіздері және ықтималдылық теориясы Основы физики и теория вероятностей The foundations of physics and probability theory	8				8
23	Астрономия Астрономия Astronomy		5			5
24	Компьютерлік физика Компьютерная физика Computer science			8		8
25	Есептер шешу практикумы Практикум по решению задач Practical training session on problems decision			10		10
26	Информатиканы беру әдістемесі Методика преподавания информатики Methods of teaching informatics			5		5
27	Ашық жүйелер физикасы Физика открытых систем Physics of open systems	5				5
28	Физика тарихы және қолданбалы физика История физики и прикладная физика Applied physics			10		10
29	Иновациялық модуль Модуль инновационный Innovation module				8	8
Всего/Total		42	64	33	69	208
Процентная доля/Percentage		20,0	31,0	16,0	33,0	100

For the Master's degree programme Physics (6M011000), the university has provided the following list of the **learning outcomes** as additional document (as of 19.09.2014):

" Master should have an idea:

- The processes and phenomena of nature, social life, understand and own methods of knowledge at the level necessary to meet the challenges arising from the performance of professional duties;
- Modern teaching technologies;
- A system of standards in the field of environmental protection and rational use of natural resources, a system of standards for safety;

to know:

- The history of philosophy and science;
- The basics of pedagogy and psychology of higher education, theory and methodology of physics teaching in higher education;
- One of the foreign languages;

be able to:

- Apply their knowledge in solving specific scientific and practical, industrial and other purposes;
- Solve physical problems and applied research, to conduct statistical analysis of the experimental results, to carry out the mathematical, physical and numerical modeling of the properties of objects and processes, to scientific and technical documentation;
- To acquire new knowledge, using modern educational technology;
- Use methods of social sciences and humanities in various areas of their professional activities;

- On a scientific basis to organize their work, own examples and methods of data collection, storage and processing of information;
- Formulate and solve problems arising in the course of scientific and educational activities, and requires in-depth professional knowledge;
- Administer the exchange rate, discharge and dissertations of students;

have the skills to:

- Knowledge of Kazakh, Russian, and one of the foreign languages in the areas of welfare and scientific communication; be able to continue their education and to professional activity in a foreign environment;
- Ownership culture of thinking and public speaking; correct and logical design of their thoughts orally and in writing, to participate in discussions on professional issues;
- Scientific analysis and forecasting of various phenomena and processes;
- To work on interdisciplinary projects;
- Ensure safe working conditions;
- In support of its position on the professional and other matters;
- All types of training sessions (lectures, practical and laboratory classes) in higher education institutions;

be competent:

- The use of teaching the principles and methods of teaching physics in high school, - To use the latest educational technology in teaching (traditional teaching, non-violent pedagogy, technology collective thinking activity);
- The use of different learning models (traditional and innovative, technological conveyor, etc.);
- In the definition and specification of public and student-relevant goals and objectives of training in specific circumstances;
- To use the terminology of teaching (didactics, its functions and principles; pedagogical paradigm, reflection, interactive communication, communication is non-verbal and verbal, etc.);
- In working out the methodology of selection and implementation mechanism selected by the content of education in the learning process.

The following **curriculum (shortened version with all modules)** is presented for the Master's degree programme Physics (6M011000):

General compulsory modules:

- Foreign language (professional)
- Professional Kazakh Language

- Pedagogics
- Psychology
- History and philosophy of science
- Comparative Literature studies

Compulsory modules in the speciality:

- Topical issues of modern physics
- Nanotechnology and New Materials
- Physics of real gases
- Special workshop on methods of teaching physics in high school
- Innovative technologies in teaching specialization courses

Modules of choice for a particular speciality:

- Organization and planning of research in physics
- Selected chapters of methods of mathematical Physics
- Computer simulation of physical processes
- Selected chapters of Mechanics and molecular Physics
- Information technology in teaching physics
- Selected chapters of methods of electrics and optics

Optional modules beyond qualification:

- Informatics and mathematical modeling in science

Modules of practices:

- Teaching practice
- Research practice

Optional modules, beyond qualification (OMBK)

- The research work of a candidate for a Master's degree, including the implementation of master's thesis
- Defense of master's thesis
- Integrated examination

For the Bachelor's degree programme Physics (5B060400 – Natural Science Path), the self-assessment report states the following **intended learning outcomes**:

“Bachelor of Physics professional purpose is to:

have an idea:

- About the basic objects, subjects and areas of research in physics;
- The main experimental, theoretical and numerical methods for the study of physical phenomena and processes;
- The most well-known theories and models of physical phenomena and processes in various fields of physics and their practical applications;
- Of the state policy in the field of education and basic educational technologies used in the Republic of Kazakhstan;

to know:

- Basic concepts, laws and models of general and theoretical physics;
- The mathematical formalism and the mathematical methods used in physics;
- Basics of Radio Physics and Electronics, methods of mathematical physics;
- Computer-based data collection, storage and processing of information;
- Theory and methodology of physics teaching;
- One of the foreign languages and methods of scientific and technical translation (for professional workplaces);
- Experimental studies of physical phenomena, processes, physical properties of substances and determine the parameters of the states;
- Creation of mathematical models, the application of theoretical and numerical methods for the study of physical phenomena and processes;
- The processing of the results of research and analysis with the use of computer programs;
- Of physics lessons in secondary schools with the demonstration experiment and extracurricular educational activities;
- The translation of scientific - technical literature performances with the scientific report in a foreign language (for professional workplaces);

be competent in the following areas:

- Planning, organization, development and management of physical research;
- Content, methods and techniques of teaching physics;

- Computerization of the research and the educational process;

- The introduction of a quality management system in science - research, education, engineering - design and manufacturing organizations;

- Scientific and technical translation (for professional workplaces).

Based on the above knowledge - skills - skills formed structural, organizational, design, communication, intellectual competence.

Requirements for general education BA in 5V060400 - "Physics" must:

- Be familiar with the basic teachings in the humanities and social sciences; with the basics of the Constitution of the Republic of Kazakhstan law governing the relationship of man and society;

- Be able to scientifically analyze socially significant problems and processes; use the methods of the social and economic sciences in a variety of occupations.

Requirements for socio - ethical competence

Bachelor of physics must:

- Aware of the ethical standards of social relations;

- Be able to use them in organizing their operations;

- Own skills and abilities of the physical self-improvement;

- Have a culture of thinking and being able to logically interpret their thoughts in writing and speaking in the national language and the language of international communication, as well as a foreign language.

Requirements for economic, organizational and managerial competencies

Bachelor of physics must:

- Be familiar with the main directions of economic reforms in the Republic of Kazakhstan;

- An understanding of the economic decisions in different areas of public relations;

- Be able to use to improve the governance and organization of professional activities automated databases of scientific information, information - learning materials, as well as communication networks.

Requirements for professional competence

Bachelor of physics must:

- Know the basic laws of physics and mathematical techniques used in physics;

- Be able to apply them to the construction of physical and mathematical models to describe and predict various phenomena and processes;
- Be capable of high scientific and technological level to carry out various types of training sessions, organize educational work with students;
- Master the skills of research and educational process in secondary schools;
- Have a scientific understanding of management in the field of personnel management, as well as in the field of quality control;
- Be able to scientifically organize their work;
- Possess computer methods of data collection, storage and processing of information used in the field of professional activity;
- To be able to continue their education at the next level of higher education.

Availability requirements changing social, economic, professional roles, geographical and social mobility and the conditions of the growing dynamism of change and uncertainty.

Bachelor of physics must be methodologically and psychologically ready to change the type and nature of their professional activities, work on interdisciplinary projects. Knowledge of foreign languages to support scientific contacts with colleagues from other countries.

Requirements for education in basic cycles of academic disciplines

A study of general disciplines of physics bachelor must:

- Be familiar with the basic teachings of philosophy;
- An understanding of the environmental problems of the region and the world at large;
- To know the history of Kazakhstan, the main provisions of the Constitution of the Republic of Kazakhstan;
- Command of the state language, the language of international communication and foreign language;
- Be able to work on the computer, use the Internet for professional purposes.

As a result of the study subjects cycles of basic disciplines and majors bachelor must:

- Know the basic concepts, laws and models of mechanics, molecular physics, electricity and magnetism, optics, atomic and nuclear physics, condensed matter, theoretical physics;

- Be able to apply the basic definitions, concepts and theorems of mathematical analysis methods for solving differential and integral equations, analytic geometry and higher algebra, basics of vector and tensor analysis; methods of mathematical physics to solve scientific and practical problems;
- Know the basics of Radio Physics and Electronics, theory and methods of teaching physics."

The following curriculum for the Bachelor's degree programme Physics (Natural Science Path, 5B060400) is presented:

Список модулей/List of Modules		ECTS-кредиты/ECTS credits				
№	Модуль/Module	МЕД/ MNT	СД/ SS	УСЗ/ ASS	ВиМС/ ISC	Всего/ Total
1	Коммуникативті 1 Коммуникативный 1 Communicative 1				10	10
2	Коммуникативті 2 Коммуникативный 2 Communicative 2				10	10
3	Дүниетанымдық Мировоззренческий Worldview				5	5
4	Әлеуметтік саяси Социально-политический The socio-political				6	6
6	Бизнес және құқық Бизнеса и права Business and Law				6	6
8	Отан тарихы Отечественная история Domestic History				5	5
9	Ақпаратты-коммуникативті Информационно-коммуникационный Information and communication	5				5
10	Қоршаған ортаны және адамның денсаулығын қорғау Охрана окружающей среды и здоровье человека Protection of the environment and human health	6				6

12	Кәсіби тілдер Профессиональные языки Professional training of the languages				6	6
14	Математикалық Математический Mathematical	7				7
15	Математикалық анализ Математический анализ Mathematical analysis	5				5
16	Теориялық физика 1 Теоретическая физика 1 Theoretical physics 1		10			10
18	Теориялық физика 3 Теоретическая физика 3 Theoretical physics 3		7			7
19	Сәулеленудің затпен әсерлесуі Взаимодействие излучения с веществом The interaction of radiation with matter		5			5
20	Электроника Электроника Electronics	5				5
21	Конденсиялық күйдің физикасы Физика конденсированного состояния Condensed matter physics	12				12
23	Жалпы физика 1 Общая физика 1 General Physics 1		7			7
24	Жалпы физика 2 Общая физика 2 General Physics 2		10			10
26	Теориялық физика 2 Теоретическая физика 2 Theoretical physics 2		8			8
28	Жалпы физика 3 Общая физика 3 General Physics 3		10			10
30	Нанотехнология Нанотехнология Nanotechnology		**7**			7
31	Молекулалық физика және материалдарды таңдау әдістемесі Молекулярная физика и методология выбора материалов Molecular physics and materials selection methodology	**8**				8
33	Физика және еңбекті қорғау Физика и охрана труда Physics and labor protection				8	8

35	Эксперименттік зерттеу 2 Экспериментально-исследовательский 2 Experimental and Research 2			10		10
37	Эксперименттік зерттеу 1Экспериментально-исследовательский 1 Experimental and Research 1			5		5
39	Ядролық энергетика Ядерная энергетика Nuclear power engineering			6		6
41	Зертханалық талдаудың әдістемесі Методики экспериментального анализа Methods of experimental analysis			6		6
43	Ұнтақты металургия және нанотехнология Порошковая металлургия и нанотехнологии Powder metallurgy and nanotechnology			5		5
45	Металдардың және қортпаның механикалық құрамы Механические свойства металлов и сплавов The mechanical properties of metals and alloy materials			5		5
47	Рухани - өнегелі Духовно-нравственный Spiritual and moral				6	6
	Всего/Total		64	37	62	211
	Процентная доля/Percentage		30	18	29	100

For the degree programmes Physics (Natural Science path, 6M060400), the self-assessment report states the following **intended learning outcomes**:

“Master should have an idea:

- On the stages of formation and development of physics as a science, and the scientific world physics schools on the urgent problems of modern physics;

- About the latest achievements of science and technology;

- On the basis of scientific and technical translation in the specialty;

- On the state system for ensuring the uniformity of measurements, scientific methods of standardization and metrology;

to know:

- Current theoretical and experimental methods for studying physical phenomena and processes; actual problems of modern physics;

- One of the foreign languages;

be able to:

- Operate with huge scientific information to work independently with its various sources, select appropriate research methods, modify existing and develop new methods based on the objectives of a particular study;
- To freely navigate in fundamental and applied problems of the physics on which part of the educational program of the Judiciary conducted profile specialization;
- Use computer technology to solve professional problems creatively implement complex algorithms for the solution of complex professional tasks on the profile of specialization;

have the skills to:

- Organization, planning and research, the processing of their results in various forms of scientific production;

be competent in the following areas:

- The modern understanding of the organizational structure of matter, the fundamental physical laws of physical phenomena;
- The management of science and education in different countries;
- The state policy in the field of science and education in the Republic of Kazakhstan;
- The introduction of a quality management system for scientific research, education, design and production facilities."

The following **curriculum (shortened version, all modules available)** is presented for the Master's programme Physics (Natural Science Path, 6M060400):

General Compulsory modules:

- Foreign language (professional)
- Professional Kazakh Language
- Pedagogics
- History and philosophy of science
- Comparative literature studies

Compulsory modules on specialty:

- Introduction to Materials Science
- Modern Materials Science

- The basic principles of modern physics

Modules of choice of a particular specialty:

- Nuclear magnetic resonance spectroscopy
- Selected chapters of methods of theoretical physics
- Physical basis of nuclear energy
- Physics of open systems
- New technologies in the creation of structural materials
- Computer simulation of physical processes

Modules of practices:

- Teaching practice
- Research Practice

Optional modules, beyond qualifications:

- The research work of a candidate for a Master's degree, including the implementation of master's thesis
- Defense of master's thesis
- Integrated examination

For the bachelor's degree programme Mathematics (Educational Path, 5B010900), the self-assessment report states the following **intended learning outcomes**:

As a result of learning, pupils should know:

- Methodology of philosophical understanding of the world and education as an integrated system, the foundations ethnopedagogics;

- The theoretical foundations of mathematics: object, object, place, and specific relationship between science and science in general, the categorical system of scientific knowledge, methodology and logic of scientific and pedagogical research;

- Theoretical foundations and methods of science teaching mathematics in terms of Special Education; structure and content of a particular academic discipline in the logic of the ascent from the general to the particular, from the abstract to the concrete;
- Anatomical and physiological age and socio-psychological characteristics of students of different ages;
- Methodology and methods of planning and implementation of the research work, including in the area of subject training; theory and methodology of planning and organization of the communication process, including the use of a foreign language;

The graduate should be able to:

- To build interpersonal communication, a conversation in a foreign language in the volume, which allows to communicate with native speakers of the language, follow the rules of the culture of speech in public speaking;
- Use information and communication technologies in their teaching activities;
- To use the methods and techniques of creative thinking in teaching activity;
- Develop alternative teaching activities and decisions; resolve conflicts;
- To form students' skills in analyzing problems and making decisions;
- To recognize, articulate and resolve complex, controversial issues;
- Analyze, evaluate, and adjust the process and results of educational activities, monitor, analyze and adjust their behavior as a teacher;
- Apply various methods of psychological and educational research, organize and carry out research work, process and evaluate the results, summarize and draw conclusions;
- To carry out a reflection of pedagogical activity; analyze, evaluate, and adjust the process and results of educational activities; monitor, analyze and adjust their behavior as a teacher; exercise self-control in the process of social interaction:
- Develop scientific research apparatus: apply various methods of psychological and educational research; organize and carry out a research project; process and evaluate the results of scientific research: to recognize the essence of pedagogical phenomena.

A graduate from training should have skills:

- Modeling applications, analysis of the effectiveness of their operation, conduct classes in schools and specialized secondary educational institutions; be competent in matters of teaching, staging applications;

- The implementation of psychological, educational, and teaching of subject knowledge and applied skills in a particular situation;

- Organization of pedagogical collaboration (teacher-student, teacher-teacher, teacher-parent) in terms of Special Education; solutions professional-pedagogical and personal problems in the face of uncertainty;

- The organization of innovation in their subject area; implementation of reflection, self-monitoring and correction process and the result of teaching.

Based on the above Knowledge, skills - skills formed competence of the teacher: structural, organizational, design, communication, intellectual.

Requirements for key skills BA in 5V010900 - Mathematics must have an idea:

- In the field of humanitarian and socio-economic sciences;

- About contemporary sostoyanii.nauki **[SIC!]** and technology in the world and in the Republic of Kazakhstan;

- New teaching technologies abroad and in the country;

- On the principles of distance learning;

- The impact of globalization on education, on the main trends of integration of education into the world educational space;

to know:

- The contents of the legal framework of the education system of the Republic of Kazakhstan (laws, concepts, between folk agreements, standards, regulations, rules, etc.);

-trebovaniya **[SIC!]** mandatory minimum content of secondary (complete) general education in mathematics;

-structure and the content of school mathematics education (Propaedeutic, mandatory and profile training in mathematics);

- Requirements for the level of training in educational institutions of secondary education, vocational education and secondary special education (for each profile);

- System and assessment criteria at various educational technologies used in the educational institution;

- To the extent provided by the state educational standards for the profession system of knowledge in the subjects included in the cycles of general education, basic and majors;

- To the extent provided by the state educational standards in this specialty foundations of mathematical disciplines such as theory and methods of teaching mathematics; calculus, analytic geometry, algebra and number theory, differential equations, probability theory and mathematical statistics, computer technology, numerical analysis.

- The rights and responsibilities of students and teachers of mathematics (or other position);

-structure systems for scientific and educational information and RK developed foreign countries;

- The basis of general and applied psychology and pedagogy;

- Modern programming languages and software packages;

- Construction of mathematical models in different areas and implement algorithms constructed mathematical models;

- Procedures and methods for the protection of intellectual property;

- Rules and regulations of labor protection and life safety;

be able to:

- Express and justify their position on matters relating to the valuable relation to the historical past;

- Analyze, synthesize, and disseminate best teaching experience;

- Be guided in the literature according to specialization and related issues, conduct methodological work;

- Organize theoretical knowledge of basic research methods in the field of mathematics teaching methods, pedagogy, psychology;

- To choose the right machine and the method of the mathematical models of tasks;

- Analysis of the main steps of the proof the most complex theorems and propositions;

-primenyat **[SIC!]** modern educational technologies in the educational process, including the information;

-vesti **[SIC!]** search scientific and technical, scientific and educational information on traditional media and using the Internet global network

- To implement the state policy in the field of education;

- To motivate students to self-knowledge, self-education, and self-development throughout life;

have the skills to:

- Analysis and method of organizing the educational process;

- Research;

- Computer method of collection, storage and processing of information used in the field of his professional activity

be competent

- Basic knowledge in the use of psycho-pedagogical profile in today's educational institutions, to carry out the position of subject teachers in primary and secondary school levels profile RK;

- Shared technologies oral and written communication, interaction with students, to be able to establish contact with students;

Guide in the activity fundamental public documents and regulations of the Republic of Kazakhstan on the management, organization and control of the educational process in secondary schools;

- In the possession of all of the major professional quality requirements to work as a teacher of secondary schools of Kazakhstan, to meet all the modern requirements to them by their employers;

- In matters of mathematics and mathematics teaching methods, pedagogy and psychology.

Requirements for general education

Requirements for general education are available scientific knowledge in the field of social and human and natural sciences, the ability to analyze and solve educational problems; simulate, analyze, predict various phenomena and processes and the ability to use the methods of these sciences in a variety of professional and social activities.

Requirement for social and ethical competence

- Aware of the ethical and legal rules governing the relation of man to man, society, environment, be able to take them into account in the development of environmental and social projects;
- Master the social skills that enable a person to adequately perform the norms and rules of life in society;
- Possess the level of education, self-sufficient, self-support with cognitive problems and determining its position.

Requirements for economic, organizational and managerial competencies

Requirements for economic, organizational and managerial competencies is available scientific knowledge in the field of economics, psychology and special disciplines, allowing to solve management problems in organizations of enterprises of differe **[SIC!]**

Requirements for professional competence

Special competence - the ability to master the system of subject, psycho-pedagogical, methodological and socio-humanitarian knowledge and skills, the ability to carry out vocational training school students.

Communicative competence - the ability to establish and maintain the necessary contacts with other people, to be clear, to ease and so forth.

Information competence - the ability to hold information technology, working with all kinds of information; be able to search for, analyze and select relevant information in mathematics, structure, transform, store and transmit it.

Intellectual competence - the ability to think analytically and integrated approach to their duties; own methods of personal expression and self-development, by means of confrontation professional deformations of the individual.

Social competence - the ability to form and live in social interaction: change and adapt; to the rational and responsible discussion and consensus with others; maintain relationships in the professional community, take social responsibility for the results of their professional work.

Personal competence - a person's ability to identify, interpret and evaluate the chances of development, requirements and restrictions in the professions and public life; exercise their own talents, to explore and develop their plans, to develop methods for the physical, spiritual and mental self, emotional self-regulation and self-support, willingness and ability to improve the results of their work, improve work efficiency through the use of their own individual personal characteristics and professional psychological capacity , adequate representations of themselves, their qualities, characteristics, needs, goals, motives, value orientations.

Profile competence - the ability to career-oriented work, select the content of education in mathematics, depending on the profile of training, design and organize the educational process,; for the selection, adaptation and modification of innovative educational methods and technologies in preprofile and specialized classes; the organization of research activities of students in mathematics in specialized classes; to self-organization and self-education of the students in mathematics preprofile and specialized classes based on modern techniques.

Availability requirements changing social, economic, professional roles, geographical and social mobility in terms of increasing the dynamism of change and uncertainty

- To be able to continue their education and to professional activity in a foreign environment;
- Own culture of thinking, to be able to properly execute its results in speech and writing;
- Be able to in the conditions of development of science and changing practice to an overestimation of experience;
- acquire new knowledge, using modern information capabilities;
- Methodically and psychologically be ready to change the type and nature of their professional activities;
- Be geographically and socially mobile in terms of increasing the dynamism of change and uncertainty.

Requirements for education in basic cycles of academic disciplines

Requirements for education in general education disciplines:

- An understanding of the scientific, philosophical and religious paintings of the universe,

spirit, purpose and meaning of human life, the features of the functioning of knowledge in modern society;

- Have knowledge about the development of society: the variety of cultures, civilizations, forms of social experience, a place of Kazakhstan in the world historical process;
- Understand the role of science in razvitii.tsivilizatsii **[SIC!]**, the ratio of science and technology;
- Know the structure, forms and methods of scientific knowledge, their evolution;
- Have an understanding of the methods of acquisition, storage and transmission of social experience, the core values of the culture;
- Know the basics of Kazakhstan's legal system and legislation, legal, moral and ethical standards in the sphere of professional activity.

Requirements for education in basic disciplines:

- Have an understanding of the place and the role of mathematics in the modern world, culture and history;
- Be able to build a variety of mathematical models to describe and predict a variety of phenomena and facts of reality, to carry out their qualitative and quantitative analysis;
- To have a comprehensive knowledge of the person as an individual personality, the subject of activity and methods of its study;
- Understand the role of psychological factors in solving problems in applied learning environment, education and communication;
- To be able to see the psychological perspective in its specialty;
- An understanding of the logic, topological and algebraic structures of non-Euclidean geometry systems, the role of mathematics and computer science research in the humanities;
- To know the possibilities of computer technology and have experience in using it to solve professional problems.

Educational requirements for core subjects:

- Be able to choose the right device and method of testing simple problems of mathematics;
- Know modern algorithmic languages and programming techniques;

- To know the historical experience of mathematical sciences, mathematical education reform, the basic facts and laws of development of mathematics teaching process;
- To know the theory and methods of teaching mathematics, scientific understanding of reality, modern educational technology.
- Own educational programs, which should include a content profile of education in different classes."

Following **curriculum** of the Bachelor's programme Mathematics (Educational Path, 5B010900) is presented:

Список модулей/List of Modules		ECTS-кредиты/ECTS credits				
№	Модуль/Module	МЕД/ MNT	СД/ SS	УСЗ/ ASS	ВиМС/ ISC	Всего/ Total
1	Коммуникативті 1 Коммуникативный 1 Communicative 1				10	10
2	Коммуникативті 2 Коммуникативный 2 Communicative 2				10	10
3	Дүниетанымдық Мировоззренческий Worldview				5	5
4	Әлеуметтік саяси Социально-политический The socio-political				6	6
5	Бизнес және құқық Бизнеса и права Business and Law				6	6
6	Отан тарихы Отечественная история Domestic History				5	5
7	Ақпаратты-коммуникативті Информационно-коммуникационный Information and communication	5				5

8	Қоршаған ортаны және адамның денсаулығын қорғау Охрана окружающей среды и здоровье человека Protection of the environment and human health	6				6
9	Педагогикалық Педагогический Pedagogical				8	8
10	Кәсіби тілдер Профессиональные языки Professional training of the languages				6	6
11	Қолданбалы математика Прикладная математика Applied Mathematics	5				5
12	Педагогикалықжәне психологиялық негіздер Педагогические и психологические основы Educational and psychological foundations				7	7
13	Оқушылардың рухани және физикалық дамуы Духовное и физическое развитие школьников Spiritual and physical development of pupils				6	6
14	Бағдарламалау Программирование Programming	5				5
15	Математикалық талдау 1 Математический анализ 1 Mathematical analysis 1		7			7
16	Математикалық талдау 2 Математический анализ 2 Mathematical analysis 2		7			7
17	Математикалық талдау 3Математический анализ 3Mathematical analysis 3		10			10
18	Мектептегі математика Математика в школе Mathematics at school		5			5
19	Геометрия Геометрия Geometry	5				5
20	Алгебра Алгебра Algebra	9				9

21	Әдістемелік Методический Methodical			10		10
22	Есептер шешу практикумы Практикум по решению задач Practical training session on problems decision		7			7
23	Олимпиадалық есептер Олимпиадные задачи Olympiad problems	7				7
24	Дифференциалдық есептеулер Дифференциальные исчисления Differential calculus		7			7
25	Ықтималдық және статистика Вероятность и статистика Probability and Statistics		10			10
26	Геометрия және топология Геометрия и топология Geometry and Topology		5			5
27	Есептік тұрғыдан математиканы оқыту Задачный подход в обучении математике A task approach to teaching mathematics			5		5
28	Геометриялық есептер Геометрические задачи Geometric problems	5				5
29	Есептерді шешу әдістемесі Методика решения задач Method for solution			6		6
30	Әдістеменің заманауи сұрақтары Инновационные вопросы методики Innovative techniques questions			5		5
31	Мектептегі ықтималдықтар теориясы Теория вероятностей в школе Probability theory in school			5		5
32	Педагогикалық үрдісті басқару және электронды оқу құралдары Управление педагогическим процессом и электронные средства обучения Teaching process management and e-learning				8	8
Всего/Total		47	58	31	77	213
Процентная доля/Percentage		22	25	17	36	100

For the Master's degree programme Mathematics (5M010900), the additionally submitted document as of 10.09.2014 states the following **intended learning outcomes**:

"The results of the educational program Mathematics (Educational Path, 6M010900).

have an idea: on the stages of development of mathematics as a science, the main directions of its development and scientific world schools; on the urgent problems of mathematics and modern methods for their solution; the current state of science and education in the field of mathematics; of the basic laws of the market economy and the principles of innovative development of Kazakhstan;

know: the teaching methods of disciplines in higher education; analytical, qualitative and numerical methods of scientific research required to conduct an independent research project; methods of construction and use of mathematical models to describe and predict the various physico-chemical and natural processes and phenomena; foreign language at the level of ability to conduct a conversation on topics relevant to the socio-consumer and professional areas for reading and translation of literature; methods of teaching mathematics disciplines;

be able to: apply knowledge gained in the basic disciplines of the specialty for solving theoretical and practical scientific and mathematical problems; build standard mathematical models of physical, technical, economic and other processes; qualitative and quantitative analysis of the results; properly formulate the objectives and tasks of scientific research, the concept of scientific research; to conduct a patent search and apply for invention; to issue the results of research (articles, reports, records, etc.); on a scientific basis to organize their work, acquire new knowledge, using modern information technology.

have skills: the construction of mathematical and computer models of physical processes; teaching general subjects of mathematics; computer search, collection, preparation and processing of the information used in professional activities; update knowledge in the course of professional activities that provide an active search and the use of new information; be competent in matters of professional activity."

The following **curriculum of the Master's programme Mathematics (Educational Path, 6M010900)** is presented:

General compulsory modules:

- Foreign language (professional)
- Professional Kazakh language
- Organization and planning of scientific research
- History and Philosophy of Science
- Pedagogics
- Psychology

Compulsory modules by specialty:

- Fundamental questions of analysis
- Fundamental questions of algebra, geometry and logic
- Theoretical foundations differential equations and numerical mathematics

Modules of choice for a particular specialty (MCPS)

- Continuity in training search for solution of mathematical problems in school and university
- Competence approach to the formation of the content of mathematics education
- The method of studying the school course of probability theory
- Boundary problems of differential equations
- Variational methods
- Some problems of continuum mechanics

Optional modules, beyond qualification (OMBK)

- Informatics and Mathematical Modeling in Science

Modules of practices

- Pedagogical practice
- Research practice

Module of final examination

- Research work
- Integrated exam
- Defense of Master's thesis

C Peer Report for the ASIIN Seal

1. Formal Specifications

Criterion 1 Formal Specifications

Evidence:

- Self-assessment report
- University's website: http://www.vkgu.kz/ru/obrazovanie/bakalavriat.htm, as of 29.08.2014

Preliminary assessment and analysis of the peers:
The formal specifications in the self-assessment report state all relevant information on the programmes under review. A summary presentation of all Bachelor's programmes is also available on the internet (cf. link above). However, there is a contradictory information on the period of study, stating for instance for Mathematics 5B010900 a period of 2, 3, 4 or 5 years. Moreover, there is neither an information on the credit points awarded, nor information on fees.

The panel therefore recommends to complete and revise the overview of study programmes in order to increase visibility for prospective and actual students.

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

The assessment and the recommendations of the panel remains unchanged, since the university did not provide any additional comment on this criterion.

2. Degree programme: Concept & Implementation

Criterion 2.1 Objectives of the degree programme

Evidence:

- Self-assessment report

Preliminary assessment and analysis of the peers:

The panel analyzed the programme objectives presented in the self-assessment report and deemed them to be defined on the due level, however the panel insisted that every programme needs separate programme objectives in order to have a clear profile difference of the programmes of Educational Paths or Natural Science path respectively. The university delivered clearly separated definitions of programme objectives and learning outcomes on September 10th 2014 (Mathematics) and September 19th 2014 (Physics) as they are stated above. The programme objectives are very detailed and partly hardly possible to achieve. From the conceptual point of view, they however reflect the expected level of knowledge, skills and competencies foreseen for programmes allocated at level 6 of EQF (Bachelor's degree programmes) and level 7 of EQF (Master's degree programmes).

For instance, for the Bachelor's programmes Physics 5B060400, the self-assessment report states "prepare high skilled management and technical, scientific personell" and "prepare high skilled teacher personell for system of compulsory and higher education", which corresponds to the Bachelor's level descriptors of EQF, stating "advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study" and "take responsibility for managing professional development of individuals and groups". The same is true for Physics 5B011000, where the "ability to think creative, solve tasks in pedagogical sphere on high professional level" is defined as one of key competencies to be achieved. The panel deemed that also the Master's programmes Physics 6M060400 with the objective of "Training of qualified specialists capable independently to acquire new knowledge to adapt for changing social and economic conditions on internal and external labor markets" and Physics MA 6M011000 "Learn methods of building theoretical physical models and basic approaches of mathematical formalization and solution. Learn methods of physical processes' computer modeling" correspond to the required skills and competencies of "specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields".

For the programmes of mathematics the self-assessment report did not state any educational objectives. The panel analyzed the definitions submitted via e-mail on September 10th 2014 and deemed them also to be realistic, achievable, and reflect the requirements of international practice in teacher's education. For instance, the EQF descriptor for skills at level 6 (as quoted already in case of Physics) is reflected in the programme objective Nr. 5,targeting at facilitating at Bachelor's level the "Assimilation of the theoretical and practical fundamentals of mathematical analysis, algebra and number theory, geometry,

thus creating conditions for the development of creativity, initiative and innovation and continuing education students at a later stage of higher education at any university".

Also at Master's level, the allocation can be clearly done on the due level 7 of EQF based on the statement that "Preparation of competitive new formation, possessing fundamental knowledge, innovative approaches, research skills for scientific, educational, vocational and practical activities in higher education institutions, educational authorities, educational institutions, research organizations, education" is one of key objectives of the programme.

After the analysis of these additionally delivered documents, the panel deemed the objectives and the concepts of the programmes under review to correspond to respective level of qualification. The implementation of the programme allows for achievement of these aims (for detailed analysis cf. i.a. 2.6, 3.1, 3.2 and 5.2) in the national setting; however, in order to achieve the envisaged competitiveness of graduates on the labour market (cf. programme objectives of mathematics), several issues should be addressed (i.a. command of English language and use of modern soft- and hardware in mathematics, cf. 3.3). However, it has not become clear to the panel, in what document the programme objectives are incorporated and where they are published. The panel therefore requires a statement of the university on this issue.

Criterion 2.2 Learning Outcomes of the Programme

Evidence:

- Discussions with representatives of the university [objectives, classification]
- Self-assessment report

Preliminary assessment and analysis of the peers:

The revised versions of the learning outcomes are suitable for the assessment and reflect programme's concepts which mainly correspond to international practice. For instance, the Bachelor's graduate of Physics (Natural Science Path, 5B060400), is supposed to know "Basic concepts, laws and models of general and theoretical physics", "The mathematical formalism and the mathematical methods used in physics" as well as "Basics of Radio Physics and Electronics, methods of mathematical physics", which are then specified in more concrete terms "basic concepts, laws and models of mechanics, molecular physics, electricity and magnetism, optics, atomic and nuclear physics, condensed matter, theoretical physics". These statement almost completely reflects the content-wise require-

ments of the subject-specific criteria of ASIIN, stating as minimum standard "sound knowledge of classical physics (mechanics, electrodynamics, thermo-dynamics, vibrations, waves and optics)" and "fundamentals of quantum, atomic and molecular, nuclear, elementary particle and solid state physics." Also for skills, the ASIIN requirement of sound knowledge of mathematical methods and approaches used in Physics is reflected in the definition of the following expected skills: "Be able to apply the basic definitions, concepts and theorems of mathematical analysis methods for solving differential and integral equations, analytic geometry and higher algebra, basics of vector and tensor analysis; methods of mathematical physics to solve scientific and practical problems".

Also the competence to conduct "Experimental studies of physical phenomena, processes, physical properties of substances and determine the parameters of the states" corresponds to the ASIIN subject-specific criterion that graduates must be "familiar with basic principles of experimentation, are able to use modern physics measurement methods, and are in a position to assess the significance of results correctly." For the Bachelor's programme Physics (Natural Science Path, code 5B060400) the subject-specific requirements are fulfilled. It has however not become clear to the panel why even in the revised version of the learning outcomes for the Natural Science Path programme the ability of conducting "physics lessons in secondary schools with the demonstration experiment and extra-curricular educational activities" is required, or why graduates are supposed to "master the skills of research and educational process in secondary schools"; the panel learned during the audit that this programme was focusing on specialized education of physicist and not on secondary school teachers. Moreover, it is very seldom that Bachelor's graduates work at secondary schools – the panel was told that a special permission was needed and sharp need of teachers had to be proved, and moreover the salary was unattractive compared to the level paid in private companies. This issue did not become clear, and needs a separate statement of programme coordinators for explanation.

As for the Master's Natural Science Path Programme Physics (6M060400), the panel learned that the graduates were also supposed to be qualified for a career in the Higher Education, that is why the programme design was targeted at education of skilled researchers, but also on formation of teaching skills. The expected learning outcomes partly

reflect this approach to graduate's profile, stating as necessity the ability to "Operate with huge scientific information to work independently with its various sources, select appropriate research methods, modify existing and develop new methods based on the objectives of a particular study", which reflects content-wise the ASIIN requirement that graduates "have gained the capacity to acquaint themselves with any special area in physics/technology, to research and understand the relevant current international specialist literature, to conceive and conduct experiments or theoretical methods in the field, to classify the findings in the light of diverse physical phenomena, and to draw relevant conclusions for technical developments and scientific progress. " The foreseen ASIIN requirement that the graduates "have exemplarily applied their knowledge to complex physical problems and tasks to analyse, formulate, and possibly broadly solve them on a scientific basis" is reflected in the expectation that graduates are to "Solve physical problems and applied research, to conduct statistical analysis of the experimental results, to carry out the mathematical, physical and numerical modeling of the properties of objects and processes, to scientific and technical documentation". This statement is also in line with another ASIIN Master's characteristic, namely "They are qualified to plan, construct, and conduct experiments and interpret the results (focus on experimental physics) in order to solve complex physical problems or use simulation and modeling on the basis of physical fundamental principles (focus on theoretic physics)."

However, the panel deemed that a clearly subject-specific profile, stating in-depth studies of certain fields of the discipline, are still lacking. From the formulation of the learning outcomes, it does not become obvious that graduates "have advanced their knowledge in natural sciences and mathematics, extended their overview of inner-physical correlations as well as those with related disciplines, and have specialized themselves on one field of physics in such a way that they can find access to current international research", as foreseen by the Technical Committee. Even if from the curriculum, the profound study of related physical disciplines is obvious, in the programme learning outcomes – the key programme concept, it is not visible. The panel has rather gained the impression that the concept focuses on "New teaching technologies in Kazakhstan and abroad" and related communication skills, which are described in a very detailed way. However, since the pro-

gramme under review is still aiming at education of Physicist – it means primarily researcher and specialist, and only as second priority a Higher Education Institution teacher – on Master's level, the conceptual part of the programme should be revised and these inconsistencies eliminated.

For the Bachelor's programme Physics of the educational Path (code 6B011000) the learning outcomes of the project are less subject-specific but concentrate very much on the teaching skills and competencies as well as general soft skills and personal development of the students. For instance, the graduate is supposed to know "Theoretical foundations of physics: an object, an object, [sic!] place, and specific relationship between science and science in general, the categorical system of scientific knowledge, methodology and logic of scientific and pedagogical research"; moreover "The basis for the discipline of study" and "The basis of general physics, higher mathematics, theoretical physics, electronics and computer science". These formulations are the most subject-specific one; a more detailed formulation is not included. As for skills, the graduates are i.a. supposed to be able to "Solve physical problems and applied research, to carry out the static analysis of the results of the experiment, perform mathematical and physical modeling of the properties of objects", which corresponds to the requirements of the subject-specific criteria defined by the Technical Committee 13 Physics of ASIIN. The graduates are supposed to gain very sound teaching skills, such as "Ownership culture of thinking and public speaking; correct and logical design of their thoughts orally and in writing, to participate in discussions on professional issues", moreover "The use of didactic principles and methods of teaching physics in high school", "To use the latest educational technology in teaching (traditional teaching, non-violent pedagogy, technology collective thinking activity)" as well as "The use of different learning models (traditional and innovative, technological conveyor, etc.)" which definitely correspond to the expected profile of a successful teacher.

However, the subject-specific profile of the programme should be sharpened. From the point of view of international practice, a Physics teacher is a Physicist and in the same time a competent persons in questions of education and training, well-informed on peculiarities of discipline-specific didactics, pedagogy and developmental psychology. The cur-

riculum shows that a sound basis of Physics is provided (several modules on General Physics, theories and methods, Astronomy etc.) but the programme learning outcomes do not reflect it. Therefore the panel strongly recommends to revise the learning outcomes of the programme 6B011000.

As for the Master's aiming at education of secondary school teacher's, the programme aims at enabling the graduates to "solve physical problems and applied research, to conduct statistical analysis of the experimental results, to carry out the mathematical, physical and numerical modeling of the properties of objects and processes, to scientific and technical documentation" which partly reflects the subject-specific criterion of ASIIN saying that graduates must be "qualified to plan, construct, and conduct experiments and interpret the results (focus on experimental physics) in order to solve complex physical problems or use simulation and modelling on the basis of physical fundamental principles (focus on theoretic physics). " The knowledge-specific part of the learning outcomes is however not subject-specific again. The only statement on knowledge is that the graduates must know "the processes and phenomena of nature, social life, understand and own methods of knowledge at the level necessary to meet the challenges arising from the performance of professional duties", so that this definition appears as too weak in order to meet the ASIIN expectation that Master's students "have advanced their knowledge in natural sciences and mathematics, extended their overview of inner-physical correlations as well as those with related disciplines, and have specialized themselves on one field of physics in such a way that they can find access to current international research." On the other hand, the competence profile clearly described sound competence in "Modern teaching technologies", ability to conduct "All types of training sessions (lectures, practical and laboratory classes) in higher education institutions" which is clearly related to the expected graduate's competencies. However, also here the subject-specific profile – especially put in contrast to skills and competencies of a Bachelor's graduate, must be described also here in a conceptually consistent way.

As for the Bachelor's programme Mathematics (code 5B010900), "the theoretical foundations of mathematics: object, object [sic!], place, and specific relationship between science and science in general, the categorical system of scientific knowledge, methodology

and logic of scientific and pedagogical research" is defined as necessary knowledge, which is exactly the same as in case of Physics (code 6B011000). A specialized knowledge is mentioned in the expectation saying "state educational standards in this specialty foundations of mathematical disciplines such as theory and methods of teaching mathematics; calculus, analytic geometry, algebra and number theory, differential equations, probability theory and mathematical statistics, computer technology, numerical analysis", which corresponds to the competence profile for mathematicians developed by the ASIIN Technical Committee 12 - Mathematics. The skills and competencies described by the university are merely connected to Mathematics as discipline, besides "to know the possibilities of computer technology and have experience in using it to solve professional problems", more detailed "be able to choose the right device and method of testing simple problems of mathematics" and "Know modern algorithmic languages and programming techniques", which correlates with the ASIIN subject-specific criterion "can use basic methods of computer-aided simulation, mathematical software and programming to solve mathematical problems". Further statements are very detailed and very extensive, aiming at rather pedagogical and general communication skills, such as "the ability to master the system of subject, psycho-pedagogical, methodological and socio-humanitarian knowledge and skills, the ability to carry out vocational training school students." For instance, it is hardly possible to find a clearly defined expectation that students must be able to "recognise, formulate, classify and solve problems in a mathematical context", which would be an ASIIN prerequisite. That is why also here it is absolutely necessary to sharpen the programme subject-specific profile, especially since the panel was told that many of Mathematics graduates do not work in secondary education but rather in private companies, insurances and any other kind of business. Such a strong conceptual focus on soft skills, communication skills and teaching competencies is hardly enabling a due education of mathematicians (which is not reflected in the implementation, where the profile indeed becomes clear, cf. 2.6 curriculum).

As for the corresponding Master's programme, the definition of the learning outcomes shows a programme concept designed on a due level. The ASIIN Subject-specific criteria for Master's in mathematics, stating the knowledge of "the main mathematical disci-

plines, their methodological approaches and their interrelations" is reflected in the statement that the graduates should know "the teaching methods of disciplines in higher education; analytical, qualitative and numerical methods of scientific research required to conduct an independent research project; methods of construction and use of mathematical models to describe and predict the various physicochemical and natural processes and phenomena". Further on, according to ASIIN criteria, the graduates must be "able to work on and present mathematical problems on a sound scientific basis", which can be treated as a summary of the learning outcomes "properly formulate the objectives and tasks of scientific research, the concept of scientific research" or "to conduct a patent search and apply for invention" as well as "on a scientific basis to organize their work, acquire new knowledge, using modern information technology". The learning outcomes formulated for Master's are less generic and less detailed than in Bachelor's, which definitely enables more clarity of the graduates profile (even if some statements, such as "be competent in matters of professional activity" do not help at all in profile's description for being too abstract and not assessable). The pedagogical profile of the programme is shown by requiring students to know "methods of teaching mathematics disciplines" and "the teaching methods of disciplines in higher education", so that the panel deemed the programme learning outcomes presented here to be clear.

To sum up, peers would like to stress that it is not necessary, and moreover even not helpful to define several pages with bullet points of generic and very abstract kind of learning outcomes. Seven to ten clear statements on subject-specific, professional and interpersonal key competencies of graduates (competencies are based on knowledge and skills) are more helpful in order to grasp the key objectives of the programme as the revised version presented to the panel. For this reason, the panel deems a revision of learning outcomes for programmes stated above (Bachelor's programme Physics 6B011000, Master's programme Physics 6M060400 and also 6M01000 as well as Bachelor's programme Mathematics 5B010900) a necessity.

Additionally to the remarks made above, the panel points out the necessity to make the programme learning outcomes transparent and accessible to all relevant stakeholders, from a prospective student, to a potential employer, so that it is not enough to publish

the learning outcomes on the printed versions of the first-year guide, but they must be published on the university's website, making the profile of every programme transparent and clear. The panel deemed it for very positive that the university informs its prospective students on possible professional activities adequate to the qualification obtained upon the completion of the programme (cf. 2.4). However, the revised version of the learning outcomes must be incorporated in an official document and published – at least in the Diploma Supplement (cf. also 7.2).

Criterion 2.3 Learning outcomes of the modules/module objectives

Evidence:

- cf. module handbook

Preliminary assessment and analysis of the peers:

The panel found it commendable that the university separates module objectives (output-oriented approach) from the contents of the module (input-oriented approach), at least in the structure presented, and found that the structure of the module description can reflect all relevant information needed by students and teachers. However, the module objectives were too input-oriented, stating either only topics of the lectures without putting them into connection with the programme learning outcomes or just stating the level – introduction - and then a summary of topics treated in the course (cf. Mathematics 1 in 6B011000 Physics "introduction to the fundamental methods of research variables by infinitesimal analysis, which is based on the theory of differential and integral calculus"). Moreover, examination forms were mostly missing, or misleading, saying 1-semester-exam, but not stating the form used, so that the panel required a revised version of the module handbook, which has meanwhile been presented in Russian but not yet in English language. For a thorough assessment of the programme, a module handbook, presenting the module objectives in line with the overall programme concept (cf. learning outcomes), clear description of contents, a module description of the final thesis, and a clear allocation of teaching form, so that a clarity on the number of contact hours, of lab sessions and also guided self-study lessons must be provided. Sound calculation of credit points is also a must. The panel has moreover not seen a description of internships in the curricula, although a very important role is attached to the practical training within the self-assessment report. The panel has neither seen an example of a credited internship, besides "Workshop in solving of mathematical tasks", also named "Practical training" (p. 25 of the self-assessment report), nor a sound course description of these sessions in the module handbook. Moreover, the bibliography of most modules showed al-

most no modern publications on the disciplines, but many manuals from 1970es and 1980es, so that the panel strongly recommends to update the reading lists and include most recent journals and publications.

Another issue with need for improvement is the up-to-datedness of the module bibliographies. The panel acknowledged the point about some "classic editions" and traditional teaching volumes, such as Euclidian geometry, which maintain their actuality for longer time, as well as in the field of algebra and analysis, it can be still acceptable, but especially as far as didactics is concerned, there is a notable shift from the seventies to our days, and it should be reflected in the module bibliographies and reading recommendations. After the first revision of the module handbook, the dates of mathematical sources have been updated. Still, the panel noticed that the contents were mainly the same, it was just the last release of such a classical manual. Although in mathematics, this kind of procedure is not always optimum, but still acceptable, in Physics, where the sciences progresses very quickly, the old manuals are not helpful and not acceptable. For both disciplines the panel insists in including additional international and modern resources on the most recent findings into teaching in order to keep up with the rest of the scientific and academic world. It is necessary to update the list of sources for every module annually.

It is further on not acceptable that the module objectives presented for the modules "Differential equations" and "differential geometry" are exactly the same: "владеть (быть в состоянии продемонстрировать) методами решения обыкновенных дифференциальных уравнений, техникой дифференцирования и интегрирования функций одной и нескольких переменных, способами вычисления определителей, решения алгебраических уравнений, составления характеристического уравнения для системы, нахождения собственных чисел и собственных векторов матрицы." The module objectives of such different modules must be defined individually and thoroughly and make the difference in the contents, but in intended competences clearly visible. Therefore a sound revision of the modules handbooks is necessary for all programmes.

Criterion 2.4 Job market perspectives and practical relevance

Evidence:

- Homepage: http://www.vkgu.kz/ru/abiturient/spec/fmfit.htm, as of 29.08.2014
- cf. statistics on graduates employment in terms of numbers and market sector
- Overview of companies for practical training
- Description of expected learning outcomes
- Discussion with students/alumni
- Discussion with programme coordinator's

Preliminary assessment and analysis of the peers:

There is a clear and high demand for the alumni of the university, as statistics of the university as well as examples of job placements are proven. VKGU holds a unique position in the region by supplying the regional schools with prospective candidates for employment. For both Mathematics and Physics, one graduate has five to ten interested employers, and in the last ten years, no graduate remained unemployed. Based on the analysis of the statistical data provided by the university, the panel gained the impression that VKGU graduates do not cover the actual demand on the labour market. The panel found the connection between the programme's coordinators to employers to be especially good and productive, so that not only internships for VKGU students, but also research tasks for Bachelor's and Master's theses as well as continuous involvement of employers into the process of update of the programme design and learning outcomes are ensured.

The programme design shows a clear practical orientation with several teaching internships with a subsequent growth of responsibility. VKGU concluded a contract with several schools in the region where the students have a two weeks of "get-to-know"-internship with very basic observation and discussion with teachers and school psychologist; in the second year, the internship takes two weeks and is enriched by analysis and drafting of lesson relevant documentation; for the third year, a three-weeks internship with two or three lessons conducted by the student under surveillance of the mentor are conducted, and the last and most demanding internship – the pedagogical internship in the fourth year of study – takes two months and is targeted on fostering ownership and also solution-finding competence for complicated cases (e.g. four weeks of this internship can be dedicated to teaching and integrating disabled pupils to the class, or pupils with behavioral disorders. Previous to these internship, there is an internship conference where theoretical questions to be examined are discussed and determined. The panel deemed this practice to be very positive and fostering for the teaching skills of the students.

The panel moreover evaluated the practical relevance of scientific programmes as good and fostering, since the students get involved into research activities early compared to many other universities, i.g. first projects are run already during the Bachelor's studies. The head of the chairs conduct several research projects in the university's lab, and up to 30% of all Master's theses are compiled during such projects. The university applies for several research projects and tries to integrate as many students as possible from the very beginning of the career. In some state-funded projects, it is an absolute prerequisite that at least 20% of staff involved are students.

As another offer for fostering practical skills, the university organizes voluntary projects named “Жасыл ел” (“Green Country”) for students in the summer sessions, among which (re-)construction teams, leisure teams but also pedagogical team are operating. Another option for practical placement is a summer job in a children and youth camp “Madagaskar” in Almaty, where students can get additional experience in working with very heterogenic groups.

Many graduates of the Bachelor’s programme mathematics take a Master’s programme in Economics, which is another proof for practical focus of the Bachelor’s studies. The panel deemed the theoretical preparation of Master’s students to be on a due level and to have a good base; however, taking a PhD is rather a seldom option for Master’s graduates. VKGU has been certified for conducting PhD programmes but has got no grants for their implementation, which in Kazakhstan means that the programme has no funding sources (private funding is not yet possible). Given that the industry is very interested in highly qualified prospective employees, the university started the initiative to involve them as sponsors of PhD studies; nevertheless, until now these initiatives remained unfruitful.

It would be very beneficial for the university as well as for the region as such if funds for conducting PhD programmes, whatever source of funding, would be in place.

Criterion 2.5 Admissions and entry requirements

Evidence:

- University’s website: http://www.vkgu.kz/ru/abiturient/Pravila_priema.htm, as of 01.09.2014
- Admission rules for Master’s programmes: http://www.vkgu.kz/ru/obrazovanie/Poslevuz_obrazovan/magistratura/postupauchim_v_magistraturu.htm
- discussion with rectorate representatives, programme coordinator’s and teaching staff

Preliminary assessment and analysis of the peers:

The university provides a detailed and transparent description of the admission procedures for Bachelor’s and Master’s level, also for applicants with educational backgrounds diverging from an established standard (secondary school diploma), such as applicants with professional backgrounds, with education in different mother tongues, with foreign school or Bachelor’s diplomas etc. The admission rules are mostly prescribed by the Ministry of Education and Science.

The university offers eight months preparatory courses at the Foundation for Preparation for Higher Education "Golden Foundation of the East" for prospective applicants (paid privately by students), which the panel deemed to be an especially good practice for equalisation of knowledge and competences of the prospective first-year students. In order to attract better performing students, the university developed a strategy aiming at different fields of activities at on: there are not only extensive measures of professional orientation workshops at secondary schools, but also cooperation with High schools of the regions for joint design of mathematics/physics olympics and also an initiative enabling the winners to get free access to the preparatory courses.

The university showed a deep consciousness of the fact that especially the physics first-year students need additional educational and emotional support, therefore special importance is attached to good supervisor ratio and good advisory infrastructure (cf. 3.4)

As for admission to Master's programmes, the admission regulations are described on the website stated below and accessible to all interested parties. For successful admission, the applicant must submit a certificate on the command of a foreign language (TOEFL, DAF, Deutsche Sprachprüfung für den Hochschulzugang) at a level not lower than C 1, as well as pass an oral exam on the specialty with a duration of 30 minutes. The exam results are evaluated by a commission set up from the chair's staff and supervised by an authorised representative of the Ministry of Education. The examples of admission tests are available on the website and prove that a sound knowledge and advanced skills and competencies are needed in order to get admitted to a Master's programme. The award of the state grant is directly connected to the demand on the labour market, so that every year, the number of grants might slightly vary.

The admission requirements assure an adequate level of knowledge, skills and competences directly upon enrolment and support the achievement of the intended learning outcomes.

Criterion 2.6 Curriculum/Content

Evidence:

- Curriculum
- Examples of syllabi
- Self-assessment report

Preliminary assessment and analysis of the peers:

The curricula presented reflect the targets of the programmes and assure the achievement of the intended learning outcomes. The major difference lies in the trajectories (ei-

ther Bachelor's/Master's with a scientific or an educational focus) which are clearly visible from the curricula presented, and even more clear from the syllabus. In the educational programmes, special importance is attached to the didactics, educational design and developmental psychology (around 40% of the whole study programme, whereas 60% are dedicated to the specialized disciplines). Typical examples of pedagogical and educational disciplines are "E-learning in teaching mathematics", "Organization features of managing the pedagogical process in small schools" (BA Mathematics) or "Continuity in training search for solution of mathematical problems in school and university" (MA Mathematics), "The method of studying the school course of probability theory". Also in Physics, not only the difference between Educational and Natural Science Paths has become clear on the basis of the curriculum, but also the difference in level of Bachelor's and Master's. Whereas Bachelor's programmes were rather focusing on teaching fundamentals of the disciplines, the Master's courses were dedicated to selected problems of Physics (e.g. "Topical issues of modern physics") and the didactics were rather focusing on the university level, e.g. a "Special workshop on methods of teaching physics in high school (here high school means Higher Education Institutions, it is a translation issue). The panel herewith confirms that there is a clear difference in teaching approaches (cf. also 3.3).

The electives are moreover always connected to the current research projects of the chairs which ensures an early involvement of the students into the research activities and also a thematic variation in the modules offered in different cohorts.

In spite of a range of good initiatives, the panel found considerable weaknesses and lacks in the content-wise curriculum design of the programmes Physics on both levels. The contents taught are generally very conservative (lack of electronics/microelectronics, informatics in the teaching course) and some of them really outdated, and some critical topics as well as crucial points for industrial practice (solid state electronics, photonics, modern spectroscopy and microscopy) are missing. That is why the curricula of the physics courses – both of Bachelor's and Master's programmes of either directions – have to be modernized thoroughly and consistently. The contents must reflect the real state-of-the-art and the further development in science and application. The programmes should impart the knowledge and the competence to perform research, development, application and teaching activities adequate to the recent development of these fields.

Moreover, the curricula overviews were full of mistakes and partly incomplete. For instance, the curriculum for Master's programme Mathematics states Master thesis as an optional module. The same is true for Master's programme Physics (6M060400). Moreover, the final integrated exam as well as the defense are awarded one Kazakh credit point, but no number for ECTS was stated. Also the total of the ECTS was missing. The panel therefore required a thorough revision of curricula in terms of completion of missing ECTS

credits and errors in module titles. The overall structure of the programmes (i.e. also alternative electives with a clear hint how many elective are to be selected in what semester) must become visible.

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

The panel cannot follow the argumentation of the university that the programme objectives as well as the learning outcomes of the programmes are prescribed by the Ministry, since once the panel requested a revision of the first version of the learning outcomes (joint set of statements for both Bachelor's Physics programmes as well as for both Mathematics programmes were provided, which the panel requested to separate), the university was able to present a revised version, so that certain autonomy in the definition issues must be in place. The conceptual difference between the educational and the natural science path Physics programmes on both levels became clear from the statement of the University but does not become clear from the learning outcomes, thus the assessment of the subcriterion 2.2. does not change. The university provided a revised version of the module handbooks for the programmes before the compilation of the report, but only in Russian language. That is why the assessment of the subcriterion 2.3 remains unchanged. The same is true for the subcriterion 2.6: although the university provided a statement on the foreseen electives for Physics and also a range of measures for facilitating students mobility (increasing the number of credits for English teaching, increasing the number of courses taught in English for undergraduate students as well as fostering the reading of the English scientific literature). The panel appreciates the planned measures and strongly encourages to follow the envisaged course. The remarks on the needed modernization of the curricula of all Physics programmes continue to be valid since the university did not provide any further comment on the assessment of the panel. The progress will be assessed upon re-accreditation.

3. Degree Programme: Structures, Methods & Implementation

Criterion 3.1 Structure and modularity

Evidence:

- Curricula of the programmes
- Module descriptions

Preliminary assessment and analysis of the peers:

The modules of the programmes show a logical and coherent structure which includes practical lessons, lectures, laboratory hours as well as guided self study, so that the complete workload is reflected. The panel deemed to be positive that in the last year of studies, the number of theoretical teaching and credits is halved, which creates additional space for compilation of the Bachelor's thesis. In Master's studies, in the last year of studies, 18 ECTS are awarded for research work only, which the panel considered also commendable.

The programme design allow for individual choices of electives, an early involvement into research and also study-relevant periods conducted in the industry (internships), which are an integral part of the curricula and credited. The programme moreover includes an obligatory ten-days internship abroad for Master's students, which is awarded with a special grant for mobility and subsistence. The university established cooperations with a range of foreign Research Institutions, especially in Russia (e.g. with joint Institute for Nuclear Research in Dubna or at Kurchatov Centre of converging of Nano-, Bio-, Information and Congnitive Sciences and Technologies in Moscow) which enables an easier access to students.

The curriculum allows for taking a semester or a year abroad. Individual learning agreements on acknowledgement of work performed abroad are a prerequisite. By now, this option is however not used a lot, since the university is more focusing on incoming mobility than on outgoing perspective, and there are rather few grants, so that the outgoing mobility is low.

A clear difference between Bachelor's and Master's level is visible, e.g. in Mathematical didactics, the Bachelor's students are focusing on teaching methodology in general, whereas the Master's students examine "selected problems of methodology".

Criterion 3.2 Workload and credit points

Evidence:

- curricula, Self-assessment report
- Discussions with students

Preliminary assessment and analysis of the peers:

The students confirmed that they consider the workload as feasible. They stated that they feel well informed and supported, even though the panel assessed the presented documents as partly contradictory.

For instance, it has not become clear from the self-assessment report, nor from the curricula, what ratio for conversion of Kazakh credits to ECTS is used. The structural programme overview for Physics (Natural science trajectory, year 2012, cf. 32-34) states an award of 2 ECTS and 1 Kazakh Credit point respectively for "Introduction to pedagogical profession", which means a ration of 2:1, whereas for such modules as "Professional oriented foreign-language", "self-knowledge" or "Age physiology and school hygiene" 3 ECTS and 2 Kazakh Credit points are foreseen, which would mean a factor of 1,5, and for "Foreign language" the ratio is 10 ECTS to 6 Kazakh Credit points (factor 1,66). The same is true for Master's programmes, which the panel deemed to be confusing.

In the curriculum of the programme 5B010900 – Mathematics, no ECTS credits are awarded for the final exam State examination in the specialty; the overview states 2 KCP for "Maintenance of the thesis" and no ECTS at all; the same is true for "The 2nd state examination".

For a consistent and realistic monitoring of the student workload, all obligatory components of the study programme must be reflected in a realistic ECTS-allocation. Therefore the panel requests a clear statement on the ratio of Kazakh Credit Points to ECTS and also a comment how many student working hours are included in 1 ECTS.

Criterion 3.3 Educational methods

Evidence:

- Homepage: http://www.vkgu.kz/ru/umd/ychebnay_ymd/model-vypusknika-universiteta.htm, 29.08.2014
- Discussion with teaching staff
- Discussion with students

Preliminary assessment and analysis of the peers:
The panel deemed for very positive the fact that the university is maintaining two departments for every subject taught – a Kazakh and a Russian one, even if the intakes of each department do not exceed 10 students, mostly they are even less. In future, there will be a third department offering its courses in English language only. The students confirmed that there was a clear need in the polylinguistic offer; although the students of both backgrounds usually speak the first foreign language very well, they stated that they prefer to use their mother tongue in the academic writing. This approach to equal chances and polylinguism was deemed for especially positive (cf. also 5.3).

Another good aspect about the teaching methods at the East-Kazakhstan State University is a result of this polylinguistic approach: the cohorts of the respective departments and

also the subject groups are quite small, which allows for a very individual acquaintance with students and an excellent advisory situation. Also a thorough preparation and support during the internships help students to take out of these placements the best benefits for their professional development.

The students and teachers confirmed that there is a strict separation of subjects taught for scientific trajectories and the pedagogical trajectories. The teachers of the pedagogical trajectory are requested to have teaching experience at secondary schools and also to regularly take part in the further training on teaching methods (cf. 5.2). The students of the pedagogical trajectory are taking the pedagogy and learning psychology courses together with other sciences, so that they gain an interdisciplinary inspiration and exchange among themselves, but also with teachers of related disciplines. The panel has moreover seen that there is a clear difference in teaching approaches applied in the science-oriented programme (broad and deep teaching of analysis as mathematical method) and in the educational programme (teaching methodology, task-oriented teaching design etc.).

The teaching staff named interactive teaching methods and a highly application-centered approach as the key strategy for their teaching design, which the panel deemed to be positive. The panel was informed on the use of modern media implemented to some extent, as well as obligatory working sessions with MatLab, MatCad for modeling exercises and numeric mathematics and Cramer's system of linear equations. However, the panel deemed that there is need for improvement as far as the use of mathematical hardware as well as software is concerned. A skilled use of these facilities is not only of high importance for the professional development as mathematicians and physicists, but also for the teaching activities, since the requirements to school education are developing constantly.

The panel moreover found that the command of the English language not only among the students but also among the teachers should be significantly improved. A solid command of the English languages in Sciences is needed in order to be able to follow and participate in the relevant discourses. Especially considering the fact that the programme learning outcomes foresee a sound command of English, allowing for building up "interpersonal communication, a conversation in a foreign language in the volume, which allows to communicate with native speakers of the language, follow the rules of the culture of speech in public speaking" as it is the case in Mathematics (Bachelor's level), or to educate competitive graduates for international labour market, the current state of command and also teaching of English language is not enough. Therefore the panel strongly recommends to enrich the offer of the specialized language courses with significant num-

ber of conversation sessions and also of the relevant resources (journals, books, English-training software etc.). Also mobility is a good way to approach linguistic issues.

Criterion 3.4 Support and advice

Evidence:

- Discussion with students
- Discussion with teaching staff

Preliminary assessment and analysis of the peers:
The panel deemed the advice infrastructure to be very well developed and to be able to react to almost any kind of need, be it of advisory, social or psychological kind. The university described the advice and consultations system very thoroughly in the self-assessment report showing an excellent and well structured support system. For instance, all students from 4th year of study on have their own mentor/advisor, who helps with better planning of their studies, best choice of electives, who supports in cases where academic breaks are needed for disease- or pregnancy reasons. Further on, there are not only clear office hours of teachers were students can be sure to approach them with any concern, but also classes of guided self-study held on weekly bases where students get additional support for the studies lessons and further tasks and case studies to be solved. Also for students willing to go abroad, advisors and mentors of the course provide detailed briefings and individual consultation.

Excellent support is provided moreover before, during and directly after internships which facilitates best benefits of these practical assignments for students. All in all, the panel deemed the consultation and advice structure to be very good.

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

The assessment of the panel remains unchanged.

4. Examination: System, Concept & Implementation

Criterion 4 Exams: System, concept & implementation

Evidence:

- Self-assessment report
- Discussion with students
- Internal study management portal of the University (guest login)

Preliminary assessment and analysis of the peers:
The panel was informed that there are intermediate controls after seven weeks of each semester, which can consist of independently solved home works or short oral examinations. These intermediate controls are relevant for the final mark for every course; they count 60%, whereas the final written exam counts only 40%. It is a good practice in order to foster the ability of the student to work constantly during the whole semester by supporting them with such activities as guided-self study, and it also decreases the number of exams rated as failed. In the end of every term, every course is concluded by a final exam, the exam form is described in the syllabi.

There are all in all 50 exams in 4 years, which corresponds to a European average, and the students confirmed that the workload is not too high.

In the module descriptions, there are different assessment forms states for the obligatory state modules and the discipline-related modules. For instance, such subjects as History of Kazakhstan, Politology, Ecology and Environment Protection are assessed by using an "Oral quiz, written quiz, defense of a summary, testing, performance of an individual task". The same is true for "Informatics and Basics of Security and vital functions" ("oral survey, a written survey, protection of the abstract, testing, implementation of individual tasks"). The discipline-related subjects, such as Computer and mathematical modeling in science or Selected Chapters of Theoretical Physics, as well as Pedagogy and Self-Knowledge, rating exam is used, which is a multiple choice test. For some modules, no specific mode of an examination is stated at all, e.g. for Age-Specific Physiology and school hygiene and Methods of Teaching Mathematics, the self-assessment report only states "5-term-exam" if the respective course is offered in the 5th term. In the syllabi of the courses, there are detailed descriptions of examination modalities, as well as expected questions to be prepared. The syllabi provide the necessary visibility, and they are available in the virtual portal of the university in Russian language only. Here, the examinations forms do correspond to the module objectives and require an adequate level of knowledge and skills. Examples of solved exams have shown that students in most cases achieve the learning outcomes. Some of the disciplines mentioned in the syllabi are not part of the module handbooks presented in the self-assessment report (e.g. "Methodology of teaching Physics", code TM 03301), so that the panel gained no final clarity nor transparency as far as forms of examination are concerned.

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

The assessment of the panel remains unchanged.

5. Resources

Criterion 5.1 Staff involved

Evidence:

- cf. analysis of needs and capacities
- cf. staff handbook
- list of and information about research projects in the self-assessment report

Preliminary assessment and analysis of the peers:
In Kazakhstan, there are clear requirements set by the Ministry of Education and Science for the qualification of teachers for every level of programmes (at least Master's graduate for teaching Bachelor's students as Senior lecturer, PhD graduates for teaching in master's programmes, etc.). These rules apply also for VKGU, and the panel deemed the staff qualification to be adequate for maintaining the programmes. The panel moreover deemed that the student-professor ratio allows for individual support of learning activities and the human resources to be sufficient for adequate implementation of the programmes under review.

Criterion 5.2 Staff development

Evidence:

- Acceptance of non-teaching periods for research purposes
- Capacity development offers / Further education

Preliminary assessment and analysis of the peers:
As for staff development strategies, the university showed several approaches to challenges and chances faced by building up the appropriate human resources base.

There is an obligation of taking at least one further education training every five years, and there are numerous further training measures every year in order to fulfill this plan. Also there is a further education center at the university, with resources for foreign languages, rhetoric's lab, and also additional material on Psychology and Education/teaching. There is a State Academy "Altyn Sar" which is specialized on further training for teaching staff. The portfolio includes project-management related trainings helping the participants to successfully win tenders and conduct research projects. The coordinator's stated that there have been twenty nine certificates and seven different courses in the last year, which is a considerable and above-average number. All in all, the panel considered the offer for trainings and the measures taken as good and helpful for a sustainable staff development.

The university's leadership informed the panel on difficulties to motivate new staff to choice a research and teaching career, since the graduates benefit from the high demand on the labor market and get hired in institutions which have more competitive salaries. The university has options to offer better salaries for especially talented and promising candidates by officially inviting them to teach in order to be able to compete with the industry. A frequent solution for ensuring the needed teaching capacity is involving retired professors into regular teaching activities. The average age of the staff is around sixty years; since VKGU has no grants for PhD students so far, the university has difficulties to recruit young academics. The university makes use of the option of sending their PhD candidates to other universities in order to let them take their PhD externally and after that hire them in a higher position.

The university has informed the panel that the option of research leaves and sabbaticals used to be in place but has been skipped in the last years. The professors of the university conduct they research simultaneously to their regular teaching activities; in some cases, their teaching obligations get reduced, but this procedure needs a separate permission of the head of departments. Currently, the university is rather focusing on research in Physics then in mathematics, which was i.a. visible from the lab equipment. Currently, the university is focusing on fundamental research projects at the interface of Physics and Chemistry (chemical properties), e.g. "Receiving ferromagnetic semiconductor structures for electronics and informatics devices", "Development of technologies of smelting and the mechanical-thermal treatment of perspective austenitic corrosion-proof alloys with the enhanced technological and operational properties" or "Development of perspective technologies of effective transformation of chemical energy of hydrocarbonic raw materials in electricity on the basis of fuel elements". Also renewables are one of strategic foci of the university, since Kazakh National strategies foresees an emancipation from resources economy (cf. "Creation and operation of the wind turbine engine of the late pattern for wind power installations").

The programme coordinators further informed the panel that the teachers of educational paths involved in education-related teaching are always former secondary school teachers with several years of work experiences. Moreover, they attend regularly specialized further training courses targeting at further enhancement of command of training methodology, modern teaching tools and different approaches to didactics. One of such centers with which the university maintains a long-year cooperation in further training of teaching staff is the National Training center Orleu at the al-Farabi Kazakh National University. All in all, the panel found that the university offers good further training options to its staff.

The rector moreover quoted some of expected qualification requirements for new hired staff (excellent marks, scientifically profound thesis, publications, proof that the person brings added value the team etc.).Especially well-qualified candidates can be attracted by an official invitation to teach, because in these cases, the university is allowed to pay over-average salaries and can provide better work conditions compared to standard selection processes. The university's leadership stated that the university is struggling to obtain more autonomy in order to be able to have more flexibility in handling staff issues.

Criterion 5.3 Institutional environment, financial and physical resources

Evidence:

- Visitation of the labs
- Visitation of the center for further training
- Self-assessment report

Preliminary assessment and analysis of the peers:
The university has undertaken broad investments in laboratories, especially in the area of biology and chemistry, but also physics, and is currently planning to soon open further labs and consultation facilities, such as Phytochemistry lab, Composites Lab, Speech Therapy lab and a room for relaxation. Further on, a lab for botanical research, but also Forensics and Criminology lab as well as court simulation room for law students are in planning. These facilities are also used for commercialization and are often in joint use with companies and industry from the region (especially in the field of Biology and Chemistry). The panel deemed this strategy of further development of the infrastructure to be positive for the university as a whole, however, the actual equipment for Mathematics and Physics is rather basic. For instance, there is no separate lab for mathematical research, but a joint lab for mathematics and physics. So far, the research foci of the university are rather Psychology, Agriculture, Biology and Chemistry, but not Mathematics and Physic. The panel however deemed the lab equipment to be rather minimum, but sufficient for the due implementation of the programmes.

The means for academic exchange are by now rather used for incoming lecturers than for outgoing teaching staff of students. Since these means were deemed by the programme coordinators not to be enough to enable a broad participation of the students and staff in the academic mobility, they consider inviting foreign experts to be more efficient and beneficial for everybody. The further development of laboratories is also part of the mobility strategy: by making the location of the university more attractive, the rector envisages to gain better lecturers and scholars. By now, the university has cooperations with Poland, China, Korea and Russia, mostly with technical universities. The only stable meas-

ure for outgoings is a ten-days-internship during the Master's which is paid by the university and which students can take also abroad. The panel acknowledges the efforts undertaken in the direction of academic mobility. However, in order to further enhance the command of English language not only among students, but also among teachers (which will be needed at latest for opening the planned English department), the panel recommended strengthening cooperations with partners abroad and enabling more fund for outgoings.

Rather small cohorts of the programmes in spite of the apparently high demand for graduates seemed a contradiction; also in Kazakhstan, the sciences have difficulties to attract a due number of students because of very different, but mostly rather low level of preparation at secondary school. In the last years, there is a positive tendency and secondary school graduates come better prepared, but still the university struggles for every student. The university has enough funds for ensuring the existence of the programmes for the next five years since there are state grant guarantees for Physics of fifteen years and of Mathematics for at least ten years in order to ensure that the demand of teachers is covered.

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

The panel acknowledged the plans for further development of mathematics modules and deemed them to be adequate. Besides this, the assessment of the panel remains unchanged.

6. Quality Management: Further Development of Degree Programmes

Criterion 6.1 Quality assurance & further development

Evidence:

- Self-assessment report
- Discussion with programme coordinators

Preliminary assessment and analysis of the peers:

There is a range of quality assurance and enhancement measures in place, such as a (meanwhile re-certified) Total Quality Management System, a policy on undergoing a system evaluation and accreditation as well as state licensing (as in case of PhD, even if no grants have been yet awarded) not least to be stated specialized programme accredita-

tion. After several years of cooperation with Kazakh accreditation agencies, the university now changed the policy and seeks international acknowledgement of its quality in teaching and learning by undergoing international accreditation.

Criterion 6.2 Instruments, methods and data

Evidence:

- Self-assessment report

Preliminary assessment and analysis of the peers:

All in all, the panel gained the preliminary impression that the involved stakeholder, not least students, were well informed on the quality assurance processes in place at their university, which is an indicator that loop closing and feedback after surveying indeed take place (academic council of the faculty, regular meetings of the chairs are typical forum for discussing findings and rankings). However, some additional documents are needed in order to assess the quality assurance system thoroughly. The panel has not seen an example of a student's questionnaire on teacher's ranking, nor on course evaluation. Especially the student's ranking of teachers is important, since it has a direct influence on prolongation of working contracts, but also on reward for best teacher. Moreover, alumni surveys, statistics on average duration of studies as well as a process map of the quality assurance system at university, but also at faculty level is needed for further assessment.

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

The panel deemed the presented questionnaires to be adequate but partly very general, so that benchmarking with different international examples is encouraged. The presented process landscape provides a mostly comprehensive information on the Total Quality Management system in place, although some minor questions on the presented scheme remained not clarified probably due to linguistic and translation issues. All in all, the panel deems the quality assurance system as adequate but strongly encourages to ensure that all loop-closing relevant measures are taken.

7. Documentation & Transparency

Criterion 7.1 Relevant Regulations

Evidence:

- Admission regulations, cf. website

- Examination regulations, cf. website

Preliminary assessment and analysis of the peers:
The university provides all the relevant documents in the valid and approved version in diverse chapters and subchapters of the website, so that they are available to prospective student, actual students but also third parties. This practice is commendable, since many universities in Kazakhstan do not publish the relevant rules on the website but limit the publication only to printed versions on black boards of the universities.

Additionally to the remarks made above in the report, the panel must state that in spite of being provided additional time to follow up recommendations made in the audit on the definitions of learning outcomes, the university apparently has not taken the time to properly revise the translation, so that there are still Russian words written in Latin letters in the statements as marked in italics in the following examples: "In working out *metodolgii* selection and implementation mechanism selected educational content *uuebnom* process" (Physics 6B011000), *"Oucheniya* continued in subsequent stages of professional education", (Physics 6B011000); or "About contemporary *sostoyanii.nauki* and technology in the Republic of Kazakhstan and the world" (Master's Physics 6M060400). The university should consider that if it really plans to implement the English department, as stated by the rector, it will have to thoroughly revise, update, complement and further enhance all relevant documentation in English language – module handbooks, curricula, syllabi – on a regular basis. Also for peers and Technical Committees of ASIIN, a thorough definition of the learning outcomes is necessary. Therefore the panel requests a linguistically revised version of the learning outcomes incorporated in one of relevant and publicly available document jointly with the statement of the university to this report.

Criterion 7.2 Diploma Supplement and Certificate

Evidence:

- Self-assessment report

Preliminary assessment and analysis of the peers:
The panel acknowledged that the university issues a diploma supplement in three languages, which is already a very good practice for international comparability. However,

the diploma supplement does not include the learning outcomes, nor information of weighting the modules or statistics of the cohort's performance according to the ECTS user's guide. Therefore the panel requested a revised and complemented draft version of the diploma supplement for every programme together with the comment of the university on this report.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 7:

The university stated that it has no influence on the form and content of the diploma supplement since it is only issued by the Ministry of Science and Education of Republic of Kazakhstan. The panel understands the argument and requests the university to communicate to the Ministry that the diploma supplement as issued by now does not correspond to international standards and might be an obstacle in students mobility and graduates employability abroad. The follow-up of this recommendation will be assessed upon re-accreditation.

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 Higher Education Institution on the previous chapters of this report:

D 1. Abstracts of the Bachelor's and Master's theses in English Language (delivered on 10.09.2014)

D 2. Statement on the conversion of Kazakh Credit Point-System to ECTS and on the working hours allocated to 1 ECTS

D 3. A clear statement of the programme coordinators whether the graduates of Physics 5B060400 are supposed to become secondary school teachers or not.

D 4. Example of student's questionnaire on teacher's ranking

D 5. Example of process map of the QMS at the university, but also at the faculty level.

D 6. Draft version of an official document where a linguistically revised version of the learning outcomes is made accessible to public (e.g. diploma supplement)

D 7. A revised draft version of the Diploma supplement according to the comments made in the report.

E Comment of the Higher Education Institution (01.11.2014)

The institution provided a detailed statement as well as the following additional documents:

D 1. Abstracts of the Bachelor's and Master's theses in English Language (delivered on 10.09.2014)

D 3. A clear statement of the programme coordinators that the graduates of the Bachelor's programme Physics 5B060400 are supposed to become secondary school teachers or not.

D 4. Example of student's questionnaire on teacher's ranking

D 5. Example of process map of the QMS on university, but also faculty level.

D 6. Draft version of an official document where a linguistically revised version of the learning outcomes is made accessible to public (e.g. diploma supplement)

D 7. A revised draft version of the Diploma supplement according to the comments made in the report.

F Summary: Peer recommendations (05.11.2014)

Taking into account the additional information and the comments given by the East Kazakhstan State University named after Amanzholov the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific Label	Maximum duration of accreditation
Bachelor's programme Physics – Natural Science Trajectory	With requirements for one year	n.a.	30.09.2020
Bachelor's programme Physics – Educational Trajectory	With requirements for one year	n.a.	30.09.2020
Bachelor's programme Mathematics – Educational Trajectory	With requirements for one year	n.a.	30.09.2020
Master's programme Mathematics – Educational Trajectory	With requirements for one year	n.a.	30.09.2020
Master's programme Physics – Natural Science Trajectory	With requirements for one year	n.a.	30.09.2020
Master's programme Physics – Educational Trajectory	With requirements for one year	n.a.	30.09.2020
Bachelor's programme Physics – Natural Science Trajectory	With requirements for one year	n.a.	30.09.2020

Requirements

For all degree programmes

A 1. (ASIIN 2.2) It is necessary to publish the programme learning outcomes for all programmes in relevant regulative documents (e.g. in the Diploma Supplement).

A 2. (ASIIN 2.2) The subject-specific profile of the Bachelor's programme Physics (6B011000), Master's programmes Physics (6M011000) and Physics (6M06400) as well as Bachelor's programme Mathematics (5B010900) must be sharpened in order

to make visible that a graduate is supposed to gain sound knowledge and skills as Physicist or respectively Mathematician, and not only as future teacher.

A 3. (ASIIN 2.3) The module descriptions must be updated according to the comments made in the accreditation report (coherent descriptions of internships with a clear allocation of relevant learning outcomes, module description of the final thesis, description of teaching forms, examination forms, clear allocation of contact hours, seminar hours as well as self study, revised and updated bibliography resources for every module).

A 4. (ASIIN 2.6) A revision of curricula overviews in terms of errors in module titles as well as completion of missing ECTS and overall structure is required in order to ensure transparence for all stakeholders.

For all Bachelor's and Master's programmes in Physics (both educational as well as natural science trajectories):

A 5. The curricula of either directions have to be modernized thoroughly and consistently. The contents must reflect the real state-of-the-art and the further development in science and application. The programmes should impart the knowledge and the competence to perform research, development, application and teaching activities adequate to the recent development of these fields.

Recommendations

For all programmes

E 1. (ASIIN 1) It is recommended to publish formal specifications of the programmes on the website in order to increase the visibility of the programmes.

E 2. (ASIIN 3.3) It is recommended to update the reading lists of the modules at least annually.

E 3. (ASIIN 3.3) It is recommended to further develop and enhance the command of the English language of students as well as of teachers by introducing adequate measures.

E 4. (ASIIN 5.3) It is recommended to strengthen international cooperations and enable additional funds for academic mobility of students and teachers.

For Bachelor's and Master's degree programmes in Mathematics:

E 5. (ASIIN 3.3) It is recommended to strengthen the use of the modern mathematical soft- and hardware in applied teaching methods.

G 1. Comment of the Technical Committee 12 – Mathematics (14.11.2014)

Assessment and analysis for the award of the ASIIN seal:

After the clarification that in case of Mathematics Bachelor's and Master's degree programmes, only educational trajectories were presented for the assessment, the Technical Committee 12 recommends to award the accreditation for the programmes under review. However, the Technical Committee considers the recommendation E 5 by the peer panel to be as relevant for the successful implementation of the programmes as to change it into a requirement for accreditation, since also teaching staff must be able to use the mathematical soft- and hardware. Hereto the Technical Committee points out that the university does not have to purchase all the soft- and hardware by itself, but that ensuring the necessary equipment and facilities by strengthening cooperation with research-relevant industry and companies could be an adequate and sustainable solution.

The Technical Committee 12 – Mathematics recommends the award of the seals as follows:

Degree Programme	**ASIIN seal**	**Subject-specific labels**	**Maximum duration of accreditation**
Bachelor's programme Mathematics – Educational Trajectory	with requirements for one year	n.a.	30.09.2020
Master's programme Mathematics – Educational Trajectory	with requirements for one year	n.a.	30.09.2020

G 2. Comment of the Technical Committee 13 – Physics (14.11.2014)

Assessment and analysis for the award of the ASIIN seal:

After the report by Prof. Wodzinski as well as a thorough discussion of the findings of the panel, the Technical Committee considers it impossible for the university to foster the research activities in a way that would make them internationally competitive. However, the initiatives to promote the research activities with the available means and infrastructure are visible and aim at achieving the best possible results. The university conducts applied research which is not comparable with the research done in Germany at the university level, but comparable with the research activities as conducted by the universities of applied sciences, which equally serve as a basis for the education activities done in the Master's programmes.

The Technical committee deems that the current definition of the requirement A 5 cannot be fulfilled within the time framework on nine months which is foreseen for fulfilling the accreditation requirements. According to the Technical Committee, the actual problem lies in the fact that the university has to improve the financial resources as well as staffing of the programmes. For doing so, it is necessary to set up a binding concept which allows for fulfilling the conditions stated in the requirement. The Technical Committee discussed in detail whether or not the procedure should be suspended due to the conceptual as well as financial circumstances, but deemed finally that with the fulfillment of the requirement A 5 in its changed definition, the criteria for the accreditation will be fulfilled in the most cases. The current definition of the requirement A 5 should be changed into a recommendation which will be assessed upon re-accreditation. Based on several critical points, the Technical committee suggests to reduce the accreditation period and recommends to award the accreditation until 30.09.2018.

The Technical Committee 13 – Physics recommends the award of the seals as follows:

Degree Programme	**ASIIN seal**	**Subject-specific labels**	**Maximum duration of accreditation**
Bachelor's programme Physics – Natural Science Trajectory	with requirements for one year	n.a.	30.09.2018
Bachelor's programme Physics – Educational Trajectory	with requirements for one year	n.a.	30.09.2018

Master's programme Physics – Natural Science Trajectory	with requirements for one year	n.a.	30.09.2018
Master's programme Physics – Educational Trajectory	with requirements for one year	n.a.	30.09.2018

Requirements

For all degree programmes

A 1. (ASIIN 2.2) It is necessary to publish the programme learning outcomes for all programmes in relevant regulative documents (e.g. in the Diploma Supplement).

A 2. (ASIIN 2.2) The subject-specific profile of the Bachelor's programme Physics (6B011000), Master's programmes Physics (6M011000) and Physics (6M06400) as well as Bachelor's programme Mathematics (5B010900) must be sharpened in order to make visible that a graduate is supposed to gain sound knowledge and skills as Physicist or respectively Mathematician, and not only as future teacher.

A 3. (ASIIN 2.3) The module descriptions must be updated according to the comments made in the accreditation report (coherent descriptions of internships with a clear allocation of relevant learning outcomes, module description of the final thesis, description of teaching forms, examination forms, clear allocation of contact hours, seminar hours as well as self study, revised and updated bibliography resources for every module).

A 4. (ASIIN 2.6) A revision of curricula overviews in terms of errors in module titles as well as completion of missing ECTS and overall structure is required in order to ensure transparence for all stakeholders.

A 5. (ASIIN 5.1, 5.3) The university is required to provide a concept how to strengthen the research activities for the short, medium as well as long term perspective.

For Bachelor's and Master's degree programmes in Mathematics:

A 6. (ASIIN 3.3) It is necessary to strengthen the use of the modern mathematical soft- and hardware in applied teaching methods.

Recommendations

For all programmes

E 1. (ASIIN 1) It is recommended to publish formal specifications of the programmes on the website in order to increase the visibility of the programmes.

E 2. (ASIIN 3.3) It is recommended to update the reading lists of the modules at least annually.

E 3. (ASIIN 3.3) It is recommended to further develop and enhance the command of the English language of students as well as of teachers by introducing adequate measures.

E 4. (ASIIN 5.3) It is recommended to strengthen international cooperations and enable additional funds for academic mobility of students and teachers.

For all Bachelor's and Master's programmes in Physics (both educational as well as natural science trajectories):

E 5. (ASIIN 2.6) It is recommended to modernize the curricula of either branch in a thorough and consistent manner. The contents should represent the state of the art and should be continuously updated to reflect the further development in science and its application. The programs should impart knowledge and competence to the students to perform independent research, development, and teaching adequate to recent progress in these fields.

H Decision of the Accreditation Commission (05.12.2014)

Assessment and analysis for the award of the subject-specific ASIIN seal:
The accreditation commission discussed the changes of the definitions of requirements and recommendations as stated in the audit report. The accreditation commission decided to accept the suggested changes and to shorten the accreditation period also for the Bachelor's and Master's programmes Mathematics. Moreover, the accreditation commission decided to edit the definition of the requirements A 1, A 2 and A 4.

The Accreditation Commission for Degree Programmes decided to award the following seals:

Degree Programme	**ASIIN seal**	**Subject-specific labels**	**Maximum duration of accreditation**
Bachelor's programme Physics – Natural Science Trajectory	With requirements for one year	n.a.	30.09.2018
Bachelor's programme Physics – Educational Trajectory	With requirements for one year	n.a.	30.09.2018
Bachelor's programme Mathematics – Educational Trajectory	With requirements for one year	n.a.	30.09.2018
Master's programme Mathematics – Educational Trajectory	With requirements for one year	n.a.	30.09.2018
Master's programme Physics – Natural Science Trajectory	With requirements for one year	n.a.	30.09.2018
Master's programme Physics – Educational Trajectory	With requirements for one year	n.a.	30.09.2018

Requirements

For all degree programmes

A 1. (ASIIN 2.2) It is necessary to publish the programme learning outcomes for all programmes in relevant documents (e.g. in the Diploma Supplement).

A 2. (ASIIN 2.2) The formulation of the learning outcomes of the programmes focused on the educational professional activity (Bachelor's programme Physics (6B011000), Master's programmes Physics (6M011000) and Physics (6M06400) as well as Bachelor's programme Mathematics (5B010900)) should make visible that the graduates are gaining a sound knowledge in the respective natural sciences.

A 3. (ASIIN 2.3) The module descriptions must be updated according to the comments made in the accreditation report (coherent descriptions of internships with a clear allocation of relevant learning outcomes, module description of the final thesis, description of teaching forms, examination forms, clear allocation of contact hours, seminar hours as well as self study, revised and updated bibliography resources for every module).

A 4. (ASIIN 2.6) A revision of curricula overviews with respect to errors in module titles as well as completion of missing ECTS and overall structure is required in order to ensure transparence for all stakeholders.

A 5. (ASIIN 5.1, 5.3) The university is required to provide a concept how to strengthen the research activities for the short, medium as well as long term perspective.

For Bachelor's and Master's degree programmes in Mathematics:

A 6. (ASIIN 3.3) It is necessary to strengthen the use of the modern mathematical soft- and hardware in applied teaching methods.

Recommendations

For all programmes

E 1. (ASIIN 1) It is recommended to publish formal specifications of the programmes on the website in order to increase the visibility of the programmes.

E 2. (ASIIN 3.3) It is recommended to update the reading lists of the modules at least annually.

E 3. (ASIIN 3.3) It is recommended to further develop and enhance the command of the English language of students as well as of teachers by introducing adequate measures.

E 4. (ASIIN 5.3) It is recommended to strengthen international cooperations and enable additional funds for academic mobility of students and teachers.

For all Bachelor's and Master's programmes in Physics (both educational as well as natural science trajectories):

E 5. (ASIIN 2.6) It is recommended to modernize the curricula of either branch in a thorough and consistent manner. The contents should represent the state of the art and should be continuously updated to reflect the further development in science and its application. The programs should impart knowledge and competence to the students to perform independent research, development, and teaching adequate to recent progress in these fields.

I Fulfillment of Requirements (11.12.2015)

The accreditation commission discusses the procedure. Taking the statements of the peer panel and the technical committees into account, it assesses requirements 1, 3 and 6 to be not fulfilled.

- Requirement 1: As the diploma supplements provided by the HEI only contain a list of the modules, but no overall learning objectives the accreditation commission assesses requirement 1 for all study programs to be not fulfilled.
- Requirement 3: In terms of the module description the accreditation commission finds quality differences between the different study programs:
    - The module descriptions for the Bachelor/Master Physics (Natural Science resp. Educational Trajectory) reveal serious shortcoming:
        - The learning outcomes remain predominant unspecific and less meaningful (cf. for example “Physics 2”)
        - The English translations are in some parts not understandable (cf. for example “General Physics 2”)
        - Some module descriptions don´t match with the respective module title.
    - The module descriptions for the Bachelor/Master Mathematics (Natural Science Trajectory) are of a better quality

  Therefore the accreditation commissions assesses requirement 3 for the Bachelor/Master Physics (Natural Science resp. Educational Trajectory) to be not fulfilled and for the Bachelor/Master Mathematics (Natural Science Trajectory) to be fulfilled.
- Requirement 6: Based on the statement of the HEI in remains still unclear, whether and in what manner the listed IT-tools are used didactical and methodical for the teaching process. Therefore the accreditation commission assesses requirement 6 to be not fulfilled

The accreditation commission took the following decision:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation

Bachelor's programme Physics – Natural Science Trajectory	Requirement1,3 not fullfilled	n.a.	30.09.2018/6 month prolongation
Bachelor's programme Physics – Educational Trajectory	Requirement1,3 not fullfilled	n.a.	30.09.2018/6 month prolongation
Bachelor's programme Mathematics – Educational Trajectory	Requirement 1,6 not fulfilled	n.a.	30.09.2018/6 month prolongation
Master's programme Mathematics – Educational Trajectory	Requirement 1,6 not fulfilled	n.a.	30.09.2018/6 month prolongation
Master's programme Physics – Natural Science Trajectory	Requirement 1,3 not fulfilled	n.a.	30.09.2018/6 month prolongation
Master's programme Physics – Educational Trajectory	Requirement 1,3 not fulfilled	n.a.	30.09.2018/6 month prolongation

J Fulfillment of Requirements (01.07.2016)

Taking the assessment of peers and technical committees into account, the accreditation commission estimates requirements one and six to be fulfilled. The accreditation commission takes note that the module descriptions for the Physics degree programs still reveal *selective* shortcomings. As at least some of these shortcomings obviously can be traced back to translation errors it assesses the respective requirement three to be fulfilled as well. The shortcomings should be nevertheless indicated in the decision letter.

The accreditation commission decides the prolongation of the accreditation as follows:

Degree Programme	**ASIIN seal**	**Subject-specific labels**	**Maximum duration of accreditation**
Bachelor's programme Physics – Natural Science Trajectory	All requirements fulfilled*	n.a.	30.09.2018
Bachelor's programme Physics – Educational Trajectory	All requirements fulfilled*	n.a.	30.09.2018
Bachelor's programme Mathematics – Educational Trajectory	All requirements fulfilled*	n.a.	30.09.2018
Master's programme Mathematics – Educational Trajectory	All requirements fulfilled*	n.a.	30.09.2018
Master's programme Physics – Natural Science Trajectory	All requirements fulfilled*	n.a.	30.09.2018
Master's programme Physics – Educational Trajectory	All requirements fulfilled*	n.a.	30.09.2018

* It is pointed out, that the module descriptions will be carefully checked in the course of the re-accreditation.