



BELARUSIAN STATE UNIVERSITY OF INFORMATICS AND RADIOELECTRONICS

Engineering and Psychological Maintenance of Information Technologies (Informatics)

OVERVIEW REPORT OF HIGHER EDUCATION STUDY PROGRAMME

Experts: Lina Kankevičienė
Danguolė Leščinskienė
Rasa Balynienė
Danutė Baravykienė
Richard Gatward
Patrick Lebeque
Michal Repca
Armaghan Moemeni

INFORMATION ON EVALUATED STUDY PROGRAMME

Title of study programme	Engineering and Psychological Maintenance of Information Technologies (Informatics)
Study area	Computer sciences
Study cycle	First
Study mode (length in years)	Full time (4), part time (5)
Volume of the study programme in ECTS credits	240
Degree and (or) Professional qualifications awarded	Bachelor

CONTENT

INFORMATION ON EVALUATED STUDY PROGRAMME	2
INTRODUCTION	4
I. ANALYSIS OF THE PROGRAMME	4
1.1. Programme aims and learning outcomes	4
1.2. Curriculum Design, Study process and Student Performance.....	7
II. RECOMENDATIONS	8

INTRODUCTION

The experts assessed the study programme and provided recommendations to coordinators for improving the study programme. During the updating of the study programme “Engineering and Psychological Maintenance of Information Technologies” experts and coordinators constantly communicated. The programme coordinators took into consideration the recommendations of experts and even some versions of the study programme were submitted. Evaluation of the study programme involve the analysis of:

- Aims and learning outcomes of the study programme “Engineering and Psychological Maintenance of Information Technologies”;
- Corellation between learning outcomes and subjects of the study programme “Engineering and Psychological Maintenance of Information Technologies”;
- Correlation between learning outcomes of the study programme and the educational standard approved by the Ministry of Education of the Republic of Belarus;
- Curriculum compliance with the aims of the project.

I. ANALYSIS OF THE PROGRAMME

1.1. Programme aims and learning outcomes

The aim(s) of this programme is to give / ensure that students are prepared to solve the following professional tasks:

- to conduct systems analysis and define engineering and psychological requirements to the information and technical systems;
- to make engineering and ergonomic evaluation and design of software and hardware.

Learning outcomes are listed according to Dublin Descriptors: **K – knowledge, P – professional skills, R – research skills, S – social skills.**

Main learning outcomes of “Engineering and Psychological Maintenance of Information Technologies“ specialist:

1. Apply basic scientific and theoretical knowledge to solve practical problem. **K**
2. Develop data structures for use in information systems, operational analysis systems and intellectual systems. **P**
3. Perform modelling, design of software tools and documentation to support activities in various subject areas. **P**
4. Perform comprehensive testing of the developed software products and applied software. **P**
5. Design interfaces and provide ergonomic evaluation of information systems. **P**
6. Analyse perspectives and directions of development of information systems and technologies. **P**
7. Work independently and in a team. **S**
8. Generate new ideas focusing on creativity, critical thinking, communication and collaboration. **S**

The programme aims and learning outcomes are well defined and clear, they are based on the academic and professional requirements, public needs and the needs of the labour market.

Foreign experts provided methodology for formulating study goals and outcomes, presented examples and actively participated in the process of creation the goals and outcomes.

It was important for the coordinators that the goals and learning outcomes of the study programme comply with the educational standard approved by the Ministry of Education of the Republic of Belarus, and for the experts – that the goals and learning outcomes of the study programme comply with Bologna process requirements.

For this reason the correlation between learning outcomes of “Engineering and Psychological Maintenance of Information Technologies” and the educational standard approved by the Ministry of Education of the Republic of Belarus was proposed to make for coordinators (Table 1). Correlation table is done and submitted in the description of the study programme.

Table 1

Study programme learning outcomes	Belarusian standard PC = professional competence AC = academic competence SPC = social and personal competence
1. Apply basic scientific and theoretical knowledge to solve practical problems.	–AC-1 Be able to apply basic scientific and theoretical knowledge to solve theoretical and practical tasks. – AC-3. Possess research skills. – AC-9. Study and improve one’s skills during the lifetime. – AC-10. Use main laws of natural science disciplines in one’s professional life. – AC-14. On a scientific basis, organize one’s work and independently assess activity results.
2. Develop data structures for use in information systems, operational analysis systems and intellectual systems	– AC-11. Know basic methods and means of obtaining, storing and processing information with the help of computer technology. PC-7. Design databases.
3. Perform modelling, design of software tools and documentation to support activities in various subject areas	– PC-6. Develop, install and maintain system and application software
4. Perform comprehensive testing of the developed software products and applied software	– PC-4 Carry out tests of prototypes of "man-machine" system elements; PC-5. Perform engineering and psychological assessment and design of software and hardware
5. Design interfaces and provide ergonomic evaluation of information systems	– PC-1. Distribute functions between a person and technical devices in the design of human-machine systems; – PC-2. Determine the number and type of necessary means of information interaction of a person and technical devices; – PC-3. Develop engineering and psychological requirements for input-output information; – PC-9. Carry out engineering and psychological assessment of "man-machine" systems; – PC-11. Develop and examine technical user documentation.
6. Analyse perspectives and directions of development of information systems and technologies	–AC-2. Be able to conduct system and comparative analysis. – AC-6. Have an interdisciplinary approach to problem solving. – PC-8. Carry out a system analysis of information and technical systems
7. Work independently and in a team	– AC-8. Have the skills of oral and written communication. – SPC-2. Be capable of social interaction. – SPC-3. Have the ability for interpersonal communication. – AC-4.

	To be able to work independently. – SPC-6. To be able to work in a team
8. Generate new ideas focusing on creativity, critical thinking, communication and collaboration.	– AC-5. Be able to generate new ideas (have creativity).

In the final version of the study programme “Engineering and Psychological Maintenance of Information Technologies” the goal and learning outcomes are in compliance with legal acts and other documents establishing academic and professional requirements for the qualifications of specialists trained.

The correlation between learning outcomes and subjects was done too (Table 2). It is commendable that all the subjects in the study plan, not just updated during the project, were presented in correlation with the study programme outcomes. In the evaluation of the relationship it has been observed that the subjects correlate with the outcomes of the study programme, are related and include all learning outcomes.

Table 2

Courses	Study program learning outcomes							
	1(K)	2(P)	3(P)	4(P)	5(P)	6(R)	7(S)	8(S)
Philosophy	+							+
Economy	+					+		
Political science	+					+		
History	+					+		
Professional English				+			+	
Discrete Mathematics	+					+		
Theory of Probability and Mathematical Statistics	+					+		
Object-oriented programming			+			+		
Databases		+				+		
OS			+					+
Computer networks						+	+	
Web technologies			+				+	
Testing programs and applications				+			+	
Programming Technologies			+				+	
Interfaces of information systems			+		+		+	
Law in the field of information technology	+							+
Verification and certification of software / Metrology, standardization and certification (in radio electronics, in infocommunications)				+	+	+		
Intellectual property in IT						+		+
Basics of Computer graphics/ Engineering computer graphics						+	+	
Basics of Software Engineering / Basics of algorithmization and programming			+				+	
Human health and safety	+							+
Cryptographic technologies			+			+		
Engineering psychophysiology	+			+	+			
Psychology, pedagogics of professional activity						+	+	
Ergatic systems					+	+		+
Psychology of information perception				+	+			+
Modern programming languages			+				+	
Engineering and psychological design			+		+	+		
Basics of information and analytical activities						+		+
Circuit design	+				+			+
Big data technology		+						+
Software design for mobile devices			+		+		+	
Technologies Of Designing 3-D Objects	+							+
Ergonomics of Information Systems			+		+	+		
Multimedia creation and processing technologies					+	+	+	
IT project management			+					+

Belarusian (Speech culture)	+						+
-----------------------------	---	--	--	--	--	--	---

Integrated courses

The programme aims and learning outcomes are consistent with the type and level of studies and the level of qualifications offered. The name of the programme, its learning outcomes, content and the qualifications offered are compatible with each other.

1.2. Curriculum Design, Study process and Student Performance

The study programme was upgraded introducing 12 new innovative courses (57 credits, 24%), defining new goals, outcomes and skills of the study programme as well as formulating principles of organization in implementation and innovative methods (Table 3).

Table 3

No	Courses EN	BSUIR need to integrate during the project	Study plan	ECTS
1	Law in the IT sphere / Право в IT сфере	3	Law in the field of information technology/ Право в области информационных технологий	3
2	Intellectual Property and Protection of Information / Интеллектуальная собственность и защита информации	3	Intellectual property in IT/ Интеллектуальная собственность в информационных технологиях	3
3	Psychology of Information Perception / Психология восприятия информации	3	Psychology of information perception/ Психология восприятия информации	3
4	Management of IT Projects / Управление ИТ проектами	3	IT project management / Управление ИТ-проектами	3
5	Multimedia Creation and Processing Technologies / Технологии создания и обработки мультимедиа	6	Multimedia creation and processing technologies/ Технологии создания и обработки мультимедиа	6
6	Computer Networks / Компьютерные сети	3	Computer networks/ Компьютерные сети	3
7	Web Technologies / веб технологии	3	Web technologies/ Веб технологии	3
8	English for Specific Purposes / Профессиональный английский	8	Professional English / Профессиональный английский	8
9	Software development for mobile devices / разработка программного обеспечения для мобильных устройств	5	Software design for mobile devices/ Разработка программного обеспечения для мобильных устройств	5
10	Programming Technologies / технологии программирования	7	Programming Technologies/ Технологии программирования	7
11	Technology of Design 3D Objects / Технологии проектирования 3D объектов	4	Technology of Design 3D Objects/ Технологии проектирования 3D объектов	4
12	Object-oriented programming / объектно-ориентированное программирование	9	Object-oriented programming/ Объектно-ориентированное программирование	9
	ECTS	57		57

The curriculum design meets legal requirements. Newly integrated study courses are spread evenly, their themes are not repetitive. The content of the courses is consistent with the type and level of the studies. The content and methods of the courses are appropriate for the

achievement of the intended learning outcomes. The content of the newly integrated study courses reflects the latest achievements in science and technologies.

The experts of Alytaus kolegija evaluate newly integrated courses descriptions and the methodological material presenting their conclusions and recommendations. Conclusions about course descriptions have already been written and submitted to course developers, methodological material is being prepared.

The relationship was maintained during the preparation of the courses between the learning outcomes of the programme, learning outcomes of the courses and study methods.

II. RECOMMENDATIONS

1. To publicize the study programme on TV, press, university website.
2. To collaborate with stakeholders, constantly review goals and learning outcomes of the study programme, implement innovations and new technologies.
3. To publicize the program in the international space in order to attract foreign students who can study in the Erasmus+ programme.
4. To promote students' research skills and engage in research activities.
5. Create freely accessible learning material for the new courses, adapt it to teaching foreign students.
6. Acquire e-learning equipment and provide opportunities for virtual mobility.