610072-EPP-1-2019-1-LV-EPPKA2-CBHE-JP
"Development of a flexible, innovative and practical framework for Work-based Learning in higher education of Armenia and Russia" (FlexWBL)

REPORT

On "061103.01.7– Computer Engineering" Curriculum Analysis

Table of Contents

Introduction

"061103.01.7– Computer Engineering" Curriculum analysis was carried out by the GSU Academic Board staff within the framework of FlexWBL Erasmus+ project. The analysis tends to reveal, within the project mentioned, the appropriate possibilities that would enable the functioning curriculum turn into an integrated curriculum (i.e. using work-based learning principles).

1. Curriculum analysis methodology and results

"061103.01.7– Computer Engineering" Master Degree curriculum analysis has been carried out with the use of a number of indicators which have been developed, discussed and confirmed within the FlexWBL Erasmus+ project WP2.2 working package framework on the initiative of Klaipeda University. The results of the analysis are presented in Table 1below.

Table 1. "041301.13.7- Project Management" Curriculum Analysis

NN	Indicators	Description
1	Study program code	061103.01.7
2	Study program title	Computer Engineering
3	Qualification	Master of Informatics
4	Students	
4.1	Total number of the students involved in the study program	16 students
4.2	Number of working students	16 students
4.3	Number of the students working in profession	9 students
5	Curriculum development process	
5.1	Curriculum developers (name of the department)	Academic Board, Faculty Board
6	Curriculum approval process	A working group is formed coordinated by the Faculty Board. The curriculum draft is developed and discussed by different stakeholders. The final version of the curriculum together with the attached report is submitted to the Academic Board by the Faculty Board to be discussed and approved at the upcoming regular meeting.

6.1	The curriculum approving body	Academic Board
6.2	Stages of Approval	1. Curriculum draft development. 2. Discussion among the stakeholders. 3. Preparation of the final version recommended by the releasing chair. 4. Discussion by the Faculty Board 5. Approval by the Academic Board
7	Study program goal and learning outcomes	*The goal* of "Computer Engineering" study program is 1. To provide students with in-depth knowledge of cybernetics, informatics, modern information technologies, computer-telecommunication technical means and software, so that in the course of their work they can use the latest theoretical-applied achievements in the mentioned fields, 2. Develop students' ability to conduct independent research, develop research results, and publish reports and scientific articles that meet contemporary requirements. 3. To train students to work in a field that

		meets the requirements of the IT market, as well as to organize their own business in the field of computer systems, network hardware and software, 4.To provide students with knowledge on social sciences, social, economic and legal relations, modern issues of natural sciences, creation and maintenance of information resources in various sectors of the economy, and the formation of a member of the information society. 5. Guide students and assist them in their postgraduate studies at the third level of higher education to obtain a degree. *The learning outcomes* of the program: The student a. Masters modern information technologies, can formulate objective problems, choose algorithms and methods to solve them, compile and implement relevant programs, b. Can develop technical tasks for conducting research and development projects, calendar plans, as well as develop separate tasks for performers,

		c. Can collect, systematize, analyze and process the scientific and technical information necessary for the work performed, as well as process and compile it in the form of scientific and technical articles and reports, d. Can design individual components of regional computer networks, high productivity and parallel data processing computer complexes, as well as participate in their development and implementation. e. Can set up and solve the problem of the system information protection under development and select (if necessary, develop) and apply the necessary algorithms and means, f. Possess standards and technologies for creating technical documents, instructions, methodological and normative materials of the developed system, g. Possess both modern Web technologies and CASE tools and can use them in the development of various systems, databases and software maintenance.
8	Assessment of knowledge and competences	Evaluation methods. · Oral inquiry · Written inquiry, · Test evaluation

		· Evaluation of participation in seminars, · Public protection of individual work, · Assessment of student activity . Examinations, . Course project, . Practical work, . Internship, . Master's Thesis.
9	Possibilities for the students to find a job *(note the field, state or private sector enterprise, organization, company, office, etc)*	The areas of professional activity of the program graduates are the following: · Computers, local area networks; · Information systems, databases, · Management information systems, · Big data processing և artificial intelligence systems; The objects of the professional activity of the program graduate are:

		· Computers, local area networks; · Information systems, databases, · Management information systems, · Big data processing և artificial intelligence systems; · Technical, mathematical, software, information, linguistic, ergonomic, organizational-legal support of the mentioned systems; The types of professional activities of the program graduate are the following: · Design and constructional, · Design-technological, · Research, · Scientific-pedagogical. After the graduation the alumni have the opportunity to be employed by state or private sector enterprises.
10	What percentage of the study program graduates start work immediately (average data)?	70%

11	Study program duration (note how many years/months/terms)	2 years / 4 semesters
12	Study program workload	
12.1	Student's work volume in hours	3600
12.2	Sum total of credits (ECTS)	120
12.3	Classroom hours	1120
12.4	Individual work	1040
12.5	Number of lectures (percentage in the total)	57.5%
12.6	Number of practical classes (% within the total hours)	43.5%
13	Duration of the field study /credits acquirable	8 weeks / 8 credits
13.1	Period of the field study	May-July
14	Curriculum structure	Annex 1
14.1	The ratio of specializing subjects in total (in %)	74% (out of 26 subjects 19 are of narrow specialization)
14.2	The important subjects for the students who work in their profession	.net programming, Design and implementation of computer networks, Artificial Intelligence systems, Artificial intelligence software tools, Leading web technologies
15	Syllabus elaboration *(Describe in concise the process of syllabus development process. Does it contain special academic hours envisaged for learning at the student's workplace off the University?)*	The Syllabus of specializing subjects is developed in accordance with the learning outcomes of these subjects which, in their turn, accord with the study program learning outcomes. Currently during the semester no classes are

		foreseen in the workplace of enterprises / organizations.
16	Strategy implemented under the study program *(Mention the students' and lecturers' norms of behavior within the program, particularly the student's attendance, teaching methods (lectures, interactive discussions, slide shows and other methods, etc.)*	The rules of ethics in Gavar State University include moral principles, value orientations, which contribute to the proper performance of the University actors' functions, conscientious fulfillment of their obligations, ensuring public trust in the University. The Syllabus of specializing subjects is developed in accordance with the learning outcomes of these subjects which, in their turn, accord with the study program learning outcomes. Currently during the semester no classes are foreseen in the workplace of enterprises / organizations. The principles of ethics applied in the university are 1) morality; 2) social justice; 3) democracy; 4) political restraint և neutrality; 5) honesty; 6) truthfulness; 7) objectivity; 8) impartiality; 9) accountability; 10) transparency;

		11) mutual respect; 12) mutual trust; 13) mutual attention, care; 14) devotion; 15) conscientiousness; 16) responsibility. The knowledge of GSU students is assessed by the lecturers on the principle of objectivity as an important condition for ensuring social justice. The activities of the employees of the University are evaluated according to the principles of social justice and objectivity, as well.
17	Student's work load per week (note: how many hours per week on average does the student spend at the university? What percentage of these hours provide theoretical and practical classes?)	Student's work load per week makes 30 academic hours on average. The Syllabus of Master Curricula doesn't include the division the total number of hours to theoretical and practical. Professors decide themselves in depend from the kind of subject.

2. How to make the curriculum integrated (based on WBL principles)

As a result of FlexWBL Erasmus+ Project realization it is envisaged to make some structural amendments in the Syllabus of some subjects in "061103.01.7– Computer Engineering" curriculum, including the hours to be spent in the workplace of the companies or industrial organizations.

Index	NAME OF EDUCATION BLOCK, COURSES, RESEARCH ACTIVITIES AND INTERNSIP	Distribution by semesters		Total credit	Number of hours			Semesters							
								I		II		III		IV	
		Examination	Test		Total	Classromm lectures/ practical/lab	Individual	Weekly hours:	Credit in the semester	Weekly hours	Credit in the semester	Weekly hours	Credit in the semester	Weekly hours	Credit in the semester
EDUCATION BLOCK		***26***		***72***	***2160***	***644/448/28***	***1040***	***26***	***27***	***28***	***24***	***26***	***21***		
GENERAL PROFESSIONAL COURSES		***3***		***6***	***180***	***28/56/0***	***96***	***4***	***4***	***2***	***2***	***0***	***0***		
0104/Ø14	Foreign language in the field of professional communication /English/-1	1		2	60	0/28/0	32	2	2						
0104/Ø15	Foreign language in the field of professional communication /English/-2	2		2	60	0/28/0	32			2	2				
0302/Ø02	Scientific Research Methodology	1		2	60	28/0/0	32	2	2						
SPECIALIZED TRAINING COURSES		***23***		***66***	***1980***	***616/392/28***	***944***	***22***	***23***	***26***	***22***	***26***	***21***		
MANDATORY COURSES OF THE TITLE PROGRAM		***19***		***53***	***1590***	***476/308/28***	***778***	***22***	***23***	***18***	***16***	***18***	***14***		
0202/Ø78	Mathematical programming	1		3	90	28/28/0	34	4	3						
0202/Ø43	Information protection and security	2		2	60	14/14/0	32			2	2				
0202/Ø59	Design and implementation of computer networks	1		4	120	28/14/14	64	4	4						
0202/Ø60	Network systems protection and security	2		2	60	14/14/0	32			2	2				
0202/Ø68	Neural networks	3		3	90	42/14/0	34					4	3		
0202/Ø61	Parallel computer architectures	3		2	60	14/14/0	32					2	2		
0202/Ø15	Micro and nano-technologies	3		3	90	28/14/14	34					4	3		
0202/Ø09	MATLAB-1 software complex	1		2	60	14/14/0	32	2	2						
0202/Ø10	MATLAB-2 software complex	2		2	60	14/14/0	32			2	2				
0202/Ø51	Programming in .Net environment -1	1		3	90	28/0/0	62	2	3						
0202/Ø52	Programming in .Net environment - 2	2		2	60	28/0/0	32			2	2				
0202/Ø13	Programming JAVA-1	1		3	90	14/14/0	62	2	3						

0202/Ø14	Programming JAVA-2	2		2	60	14/14/0	32			2	2				
0202/Ø79	Artificial intelligence systems	2		3	90	42/14/0	34			4	3				
0202/Ø18	Artificial intelligence software tools	1		4	120	28/28/0	64	4	4						
0202/Ø20	Leading Web technologies	1		4	120	42/14/0	64	4	4						
0202/Ø73	Leading Mobile technologies	2		3	90	28/28/0	34			4	3				
0202/Ø80	Servers of computing systems and networks	3		3	90	28/28/0	34					4	3		
0202/Ø81	Cloud technologies	3		3	90	28/28/0	34					4	3		
TITLE PROGRAM ELECTION COURSES		***4***		***13***	***390***	***140/84/0***	***166***	***0***	***0***	***8***	***6***	***8***	***7***		
0202/Ø71 0202/Ø33	1. Modern elemental database of computers 2. Software development management	2		3	90	28/28/0	34			4	3				
0202/Ø72 0202/Ø32	1. Automated design systems 2. Leading software architecture	2		3	90	28/28/0	34			4	3				
0202/Ø77 0202/Ø35	1. Big data processing systems 2. Complex systems modeling and reliability	3		3	90	28/28/0	34					4	3		
0202/Ø41 0202/Ø54	1. Object Oriented Analysis and Design 2. Decision-making methods	3		4	120	56/0/0	64					4	4		
AS A RESULT OF THE IMPLEMENTATION OF THE PROGRAM EDUCATION BLOCK		***26***		***72***	***2160***	***644/448/28***	***1040***	***26***	***27***	***28***	***24***	***26***	***21***		
RESEARCH BLOCK		***1***	***9***	***48***	***1440***			Îñ»¹Çï		Îñ»¹Çï		Îñ»¹Çï		Îñ»¹Çï	
0202/Ø27	Scientific seminar		1,2,3,4	12	360			3		3		3		3	
0202/Ø28	Research work		2,3.4	18	540					3		6		9	
0202/Ø29	Research internship		4	3	90									3	
0202/Ø30	Scientific and pedagogical internship		4	3	90									3	
FINAL ATTESTATION															
0202/Ø31	Defense of Master's thesis	4		12	360									12	

AS A RESULT OF IMPLEMENTATION OF PROGRAM RESEARCH BLOCK			*48*	*1440*			*3*	*6*	*9*	*30*
AS A RESULT OF COMPLETE IMPLEMENTATION OF PROGRAM			*120*	*3600*			*30*	*30*	*30*	*30*