



Study Programme Description

Title of the study programme	National code of the programme
Software Engineering	621130001

Official name of the institution, faculty (s)	Language(s) of instruction of the programme
Vilnius University, Faculty of Mathematics and Informatics, Department of Software Engineering	Lithuanian, English

Kind of study	Cycle of studies	Level of qualification according to LQF (LKS)
University studies	Second cycle	VII

Mode of study and length of the programme in years)	Length of the degree programme in ECTS credits	Total student's workload	Contact hours	Self-study hours
Full-time, 2 years	120	3200	720	2480

Study area	Major study field (branch) of the programme	Minor study field (branch) of the programme (if applicable)
Physical sciences	Software Engineering	-

Qualification degree and (or) professional qualification (if applicable) awarded
Master of Software Engineering

Head of the study programme	Contact information of the head of the programme
Prof. dr. Romas Baronas	Vilnius University, Faculty of Mathematics and Informatics, Department of Software Engineering, Didlaukio Str. 47, LT-0830,3Vilnius E-mail: romas.baronas@mif.vu.lt; tel. (85) 219 50 40

Accreditation organization	The Programme accredited until
Center for Quality Assessment in Higher Education	31-12-2014

The purpose of the study programme
The purpose of the programme is to prepare high qualification software engineers that are able to carry out independently research; to lead software development, maintenance and process improvement projects; to apply their knowledge in different application areas; to make decisions under conditions of limited information, and logically, unambiguously and clearly argue them among specialists and non-specialists.

Study programme profile		
Content of the study programme: groups of subjects (modules)	Format of study programme	Distinctive features of the study programme
Study programme is composed of three groups of subjects: I. Theoretical and applied subjects (for more in-depth knowledge) – 45 pct. I.1 Compulsory subjects – 30.83 pct. I.2. Optional subjects – 14.17 pct.	Study programme combines a practical orientation with a developing ability to conduct research work.	Graduates of the programme acquire knowledge in technologies and management, and abilities to lead projects of software development, maintenance and process improvement.

II. Professional practice – 15 pct.		
III. Research work and the Master’s thesis – 40 pct.		

Admission requirements	Recognition of prior learning
Minimal education for admission – major university studies and the acquired Bachelor’s diploma. Successfully maintained the entrance examination of the major Software Engineering Bachelor’s study program sections, ensuring prerequisite general as well as specific knowledge and competence.	In accordance with procedures established at Vilnius University.

Access to further studies
Studies can be continued in informatics, informatics engineering or another related science at PhD cycle in Lithuania or abroad.

Employability
A graduate will be ready to work as a project manager in information technologies, as a manager of software process improvement; in addition, as an analyst, designer, programmer or researcher in private and public sectors in Lithuania or abroad.

Learning and teaching approaches	Assessment methods
Lectures, problem-oriented teaching, case analysis, projects, seminars, discussions, laboratory works, individual work, research, preparation of a final thesis.	Student’s knowledge and general performance are evaluated using grading scale from 1 (very poor) to 10 (excellent). Usually accumulative grades are applied as well. Matters evaluated: project reports, their defense, presentation, home and laboratory work assignments, scientific investigational work and its defense. Final assessment of subjects – examination (open-ended, semi-ended and close-ended type tasks and questions). Research works, Master thesis and professional practice results are defended in the meeting of the Commission.

General competences		Programme learning outcomes. Students have to be able to:	
1.	Teamwork and work in interdisciplinary environments.	1.1	work and communicate in a team, adapting to the ever-changing professional environment.
		1.2	communicate with representatives of other professional fields of business or science, while solving problems of other fields or interdisciplinary issues, and to act ethically.
2.	Planning and organization.	2.1	plan complex activities which consist of various interrelated tasks and organize their implementation.
		2.2	adjust a plan during its implementation process taking into account changes in the situation.
3.	Scientific investigations.	3.1	prepare specific investigation plans or projects, select methods and resources for the investigation.
		3.2	bring, develop, defend, and apply original ideas.
		3.3	estimate investigation results, determine their reliability, and appropriately document them.
Subject-specific competences		Programme learning outcomes. Students have to be able to:	
4.	Software requirements and design	4.1	practically use the most important methods of software requirements and design.
		4.2	conceptually and formally design objective field and evaluate the designed model.
		4.3	design the logical and technical architecture of software and to integrate design activities into software construction process.
5.	Software construction	5.1	construct software systems using heuristic and formal methods and tools of software engineering.
		5.2	evaluate methods and tools of software engineering and chose appropriate ones for construction of particular software.
6.	Software engineering process	6.1	easily and purposefully operate with the concepts of software engineering process.
		6.2	apply methods of development and process capability evaluation in developing results of the activity.
7.	Software engineering project management	7.1	plan, manage, and evaluate software engineering projects.
		7.2	manage software development, maintenance, and development projects.

8.	Software quality, security, acquisition, and maintenance	8.1	organize, perform, and evaluate software security, acquisition, and maintenance.
		8.2	apply models of software quality evaluation and methods of quality assessment and maintenance.

These competences and learning outcomes have been formulated on the basis of the long experience of Informatics (more than 30 years) and Software Engineering (12 years) studies in Vilnius University; bachelor study programmes of Software Engineering at universities in other countries; research on Software Engineering studies and projects on study programs definition [1,2]; demands of IT companies [3] and analysis of prerequisites for IT products and services export; recommendations of world leading professional organizations ACM/IEEE [4,5,6]; and criteria for accrediting Software Engineering study programmes in Europe [7] and USA [8,9].

1. A. Mitašiūnas and other. Informatics studies description, Vilnius, 2012. /in Lithuanian/ Internet access: <http://www.mii.lt/files/informatikos_ska_galutinis_2012_03_10.pdf> [Accessed: 30-05-2013].
2. L. Bukauskas and other. Methodology for competences development in Informatics studies. Vilnius University, Vilnius, 2011, ISBN 978-9955-526-78-0. /in Lithuanian/ Internet access: <http://www.ects.cr.vu.lt/Files/File/ECTS_informatika.pdf> [Accessed: 30-05-2013].
3. A. Poviliūnas and other. Results of Informatics professional field research: guidelines for study programmes updating. Vilnius, 2010. /in Lithuanian/ Internet access: <<http://www.ects.cr.vu.lt/Files/File/Informatikos%20technine%20ataskaita.pdf>> [Accessed: 30-05-2013].
4. Guide to the Software Engineering Body of Knowledge (Eds.: A. Abran, J.W. Moore), IEEE Computer Society, 2004. Internet access: <<http://www.computer.org/portal/web/swebok/htmlformat>> [Accessed: 30-05-2013].
5. Computing Curricula 2005. The Overview Report. The Joint Task Force for Computing Curricula 2005. A cooperative project of The Association for Computing Machinery (ACM), The Association for Information Systems (AIS), The Computer Society (IEEE-CS). ACM and IEEE. 2006. Internet access: <http://www.acm.org/education/education/curric_vols/CC2005-March06Final.pdf> [Accessed: 30-05-2013].
6. Graduate Software Engineering 2009 (GSWE2009). Internet access: <http://www.gswe2009.org/>.
7. Euro-Inf Framework Standards and Accreditation Criteria. EQANIE, 2011. Internet access: <<http://www.eqanie.eu/media/Quality%20Label/Euro-Inf%20Framework%20Standards%20and%20Accreditation%20Criteria%20V2011-06-29.pdf>> [Accessed: 30-05-2013].
8. Criteria for Accrediting Computing Programs 2013 - 2014 Accreditation Cycle. ABET Computing Accreditation Commission, 2012. Internet access: <http://www.abet.org/uploadedFiles/Accreditation/Accreditation_Step_by_Step/Accreditation_Documents/Current/2013_-_2014/cac-criteria-2013-2014.pdf> [Accessed: 30-05-2013].
9. Criteria for Accrediting Engineering Programs 2013 - 2014. ABET Engineering Accreditation Commission, 2012. Internet access: <http://www.abet.org/uploadedFiles/Accreditation/Accreditation_Step_by_Step/Accreditation_Documents/Current/2013_-_2014/eac-criteria-2013-2014.pdf> [Accessed: 30-05-2013].

The quality of the study programme is ensured by the programme Committee which estimates specific measures for observation of the study programme quality and development. At the end of every semester the study programme Committee arranges a students' opinion survey which is meant to estimate the quality of the study programme to foresee the means of the programme development. The study Committee includes at least one social partner which represents the business sector. The Committee of the study programme also includes a students' representative, with observer's rights, which is proposed by the Students' Representation. The study programme Committee regularly meets with the most important employers of the study programme graduates; possible ways of developing the study programme are discussed during the meetings, and the statistical data about the study programme graduates' placement is collected as well.

The Department of Software Engineering is responsible for implementation of the study programme. The activity of the study programme Committee is regularly (once a year) considered by the Council of the Faculty Mathematics and Informatics.

THE PLAN OF THE STUDY PROGRAMME (full-time studies)
(CORRELATION BETWEEN THE SUBJECTS (UNITS), COMPETENCES, AND THE LEARNING OUTCOMES)

Code	Study subjects (units) according to groups	Credits	Student's workload in total	Contact work	Autonomous work	Study programme competences															
						General competences						Subject-specific competences									
						1.	2.	3.			4.		5.	6.	7.	8.					
						Main learning outcomes															
						1.1	1.2	2.1	2.2	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2
YEAR I		60	1600	614	986																
SEMESTER 1		30	800	316	484																
Compulsory subjects (units)		30	800	316	484																
PMRI7124	<i>Requirements Engineering</i>	7	190	84	106	X							X	X		X					
PMPV7124	<i>Project Management</i>	6	160	66	94		X	X	X								X	X			
PMAP7124	<i>Software Systems Architecture and Design</i>	6	160	84	76	X							X	X	X	X					
PMLS7124	<i>Parallel and Distributed Computing</i>	5	130	66	64									X		X					
PMTD7124	<i>Research Work</i>	6	160	16	144			X		X											
SEMESTER 2		30	800	298	502																
Compulsory subjects (units)		19	520	157	363																
PMKM7124	<i>Software Engineering Methods and Tools</i>	7	190	82	108					X			X		X	X			X	X	
PMKV7124	<i>Software Process Assessment and Improvement</i>	6	160	65	95			X	X								X	X		X	
PMTD7224	<i>Research Work</i>	6	170	10	160					X	X	X	X	X							
Optional subjects (units) A		6	150	74	76																
PMIP7134	<i>Software Acquisition and Maintenance</i>	6	150	66	84			X					X					X		X	
PMZP7134	<i>Human Computer Interaction Design</i>	6	150	82	68		X			X			X			X		X			
Optional subjects (units) B		5	130	67	63																
PMSK7134	<i>Software Quality</i>	5	130	66	64			X						X						X	
PMIS7134	<i>Information Security</i>	5	130	68	62			X						X						X	

YEAR II		60	1600	106	1494																
SEMESTER 3		30	800	86	714																
Compulsory subjects (units)		24	640	20	620																
PGPR7124	<i>Professional Practice</i>	18	490	10	480	X	X	X	X						X	X	X	X	X	X	X
PMTD7324	<i>Research Work</i>	6	150	10	140					X	X	X	X	X	X	X	X	X			X
Optional subjects (units) C		6	160	66	94																
PMSM7134	<i>Statistical Analysis in Software Engineering</i>	6	160	66	94								X		X	X					X
PSTV7134	<i>Software Systems Testing and Configuration Management</i>	6	160	66	94									X	X	X					X
PSEP7134	<i>Electronic Signature Infrastructure and Electronic Commerce</i>	6	160	66	94		X	X						X		X					X
SEMESTER 4		30	800	20	780																
Compulsory subjects (units)		30	800	20	780																
MD7124	<i>Master's Thesis</i>	30	800	20	780					X	X	X	X	X	X	X	X	X	X		X