COURSE UNIT DESCRIPTION

Course unit title	Course unit code
Software testing	

Lecturer(s)	Department where the course unit is delivered
Coordinator: mgr. Dmitrij Nikolajev **Other lecturers:**	Faculty of Mathematics and Informatics Vilnius University

Cycle	Type of the course unit
1st (BA)	Compulsory

Mode of delivery	Semester or period when the course unit is delivered	Language of instruction
Face-to-face	5 semester	Lithuanian

Prerequisites
Prerequisites: Procedural programming, Object-Oriented Programming, Software Engineering I and II.

Number of credits allocated	Student's workload	Contact hours	Individual work
5	136	68	68

Purpose of the course unit: programme competences to be developed

Purpose of the course unit – to acquire knowledge of software systems testing theory as well as its application expertise, get acquaintance with methods and tools used in software systems testing, understand the role of software systems testing in software systems development process.

Generic competences:

- Communication and collaboration *(GK1).*
- Social responsibility *(GK3).*

Specific competences:

- Knowledge and skills of underlying conceptual basis *(SK4).*
- Software development knowledge and skills *(SK5).*
- Technological and methodological knowledge and skills, professional competence *(SK6).*

Learning outcomes of the course unit: students will be able to	Teaching and learning methods	Assessment methods
Master principles, methods and tools of systems testing.	Problem-oriented teaching, coursework reports, case studies, individual literature reading, information search.	Written examination, coursework and result reasoning, presentation on a chosen topic.
Understand the role of systems testing in the development process and think of testing as a process.		
Write testing plans, test cases, defect reports and relevant documentation.		
Gather information, produce reports and reason on actual topics.		

Course content: breakdown of the topics	Contact hours							Individual work: time and assignments	
	Lectures	Tutorials	Seminars	Practice	Laboratory work (LW)	*Tutorial during LW*	**Contact hours**	**Individual work**	**Assignments**
Fundamentals of testing: terms and definitions, key testing principles, purpose of testing, test documentation and standards, test cases	4						**4**	**4**	Literature reading. Presentation on chosen topic. Exercises: 1) Design and development of automatic tests (submission by 6th week): a) environment setup, b) test automation, c) reading data from file, d) orchestration setup. 2) Creation of tests for web services, usage of preconditions and different types of variables, command line execution (submission by 9th week); 3) Creation and execution of performance tests (submission by 12th week); 4) Security testing exercises (submission by 15th week).
Test automation: test automation challenges, test automation purpose, test automation efficiency, return on investment, test automation guidelines and best practices, orchestration and reporting	8			14			**24**	**16**	
Performance testing: operational profiles, test planning, types of performance tests, correlation of requests in performance testing	2			6			**6**	**8**	
Security testing: automatic vulnerability scanners, functional security testing, examples of software vulnerabilities	2			6			**10**	**16**	
Application programming interface testing: types of interfaces, methods, typical test cases	2			6			**6**	**8**	
Testing process: testing activities throughout the software development life cycle, test levels, test types	2						**2**	**4**	
Static test techniques: review process and review types	2						**2**	**4**	
Dynamic test techniques: white box testing, black box testing, experience-based testing	2						**2**	**4**	
Test management: test organization, test planning and estimation, test monitoring and control, configuration management, risk-based testing, defect management	2						**2**	**4**	
Acceptance testing: acceptance testing plan and scope, roles and responsibilities, traceability of requirements and tests, result reporting and demonstrations	2						**2**		
Test team: roles and responsibilities, building a test team, leadership and competence building, testers role in Scrum team, effective communication	2						**2**		
Test efficiency and metrics: test objectives and associated metrics, types of metrics, recommendations to implement effective tracking of metrics	1						**1**		
Test process maturity: reasons for test process improvement, test process maturity assessment and key improvement methods, change management, critical success factors	1						**1**		
Preparation for exam. Exam.		2					**4**		2 hours for tutorial, 2 hours for exam
Total	**32**	**2**		**32**			**68**	**68**	

Assessment strategy	Weight %	Deadline	Assessment criteria
Practice exercises	40%	During semester	Practice exercises have to be completed based on the instructions and recommendations given. A total of 4 points can be earned: - ≈40% – design and development of automatic tests (6th week) - ≈20% – creation of web service tests (9th week) - ≈20% – creation of performance tests (12th week) - ≈20% – security testing exercises (15th week) If submission is delayed for more than 1 week, evaluation is reduced by 25%, for more than 2 weeks - by 50%.
Presentation on chosen topic.	10%	During semester	Fluency, critical thinking, pro activity (in class), understanding the topic and ability to reason about it. Max 1 point toward final evaluation can be earned.
Exam	50%	During exams session	Exam can be taken after collecting at least 1 point from the practice exercises. Ability to demonstrate knowledge and its application is assessed during the exam. Exam to be comprised of open/closed/open and closed questions. The questions are formulated from the topics presented during the lectures. Max 5 points can be earned.

Author	Publishing year	Title	Number or volume	Publisher or URL
Required reading				
International Software Testing Qualifications Board	2018	ISTQB Foundation Level Syllabus		https://www.istqb.org/certifications/certified-tester-foundation-level
Recommended reading				
International Software Testing Qualifications Board	2019	ISTQB Advanced Level Syllabus: Technical Test Analyst		https://www.istqb.org/certifications/technical-test-analyst
Rex Black	2017	Agile Testing Foundations		BCS, The Charted Institute for IT
Brian Hambling	2018	Software Testing – An ISTQB-BCS Certified Tester Foundation guide (Third edition)		BCS, The Charted Institute for IT
Graham Bath, Judy McKay	2014	The Software Test Engineer‘s Handbook		Rockynook
Graham Bath, Erik van Veenendaal	2014	Improving the Test Process		Rockynook
Rex Black, Leo van der Aalst, James L. Rommens	2017	The Expert Test Manager		Rockynook
Dorothy Graham, Mark Fewster	2012	Experiences of Test Automation		Addison-Wesley