



MODULE DESCRIPTION

Module title	Module code
Operating Systems	

Lecturer(s)	Department where the module is delivered
Coordinator: assoc. prof. dr. Antanas Mitašiūnas Other lecturers:	Department of Computer Science Faculty of Mathematics and Informatics Vilnius University

Cycle	Type of the module
First	Optional

Mode of delivery	Semester or period when the module is delivered	Language of instruction
Face-to-face	6 semester	Lithuanian

Prerequisites
Prerequisites: Procedural programming, Computer architecture, Algorithms and data structures

Number of credits allocated	Student's workload	Contact hours	Self-study hours
5	130	68	62

Purpose of the module: programme competences to be developed		
Purpose of the module – to build the competence in Operating systems, familiarize the students with fundamental principles of design and operation of Multiprogramming Operating Systems, analyse components of operating systems and their aggregation a whole by implementation of modelling multiprogramming operating system.		
Generic competences: <ul style="list-style-type: none"> • Communication and collaboration (<i>GK1</i>). • Life-long learning (<i>GK2</i>). 		
Specific competences: <ul style="list-style-type: none"> • Knowledge and skills of underlying conceptual basis (<i>SK4</i>). • Software development knowledge and skills (<i>SK5</i>). • Technological and methodological knowledge and skills, professional competence (<i>SK6</i>). 		
Learning outcomes of the module: students will be able to	Teaching and learning methods	Assessment methods
<ul style="list-style-type: none"> • operate operating systems concepts and notions fluently and focused; • know structure and principles of operation of multiprogramming operating systems; • able to design and develop simplified multiprogramming operating system; • Acquire team work experience. 	Teaching methods: <ul style="list-style-type: none"> • Lectures; • Laboratory works. Learning methods: <ul style="list-style-type: none"> • Actual knowledge gathering and accumulation; • Knowledge synthesis – generalization, abstraction and aggregation of actual knowledge; • Knowledge analysis – new knowledge matching with aggregated knowledge, their verification and correction is needed; • Application of aggregated and validated knowledge. 	Examination. Laboratory works presentation. Criteria: <ul style="list-style-type: none"> • Use of exercises to assess understanding and ability to apply theoretical knowledge • Ability to design and develop simplified multiprogramming operating system

Content: breakdown of the topics	Contact hours						Self-study work: time and assignments		
	Lectures	Tutorials	Seminars	Practice	Laboratory work (LW)	Tutorial during LW	Contact hours	Self-study hours	Assignments
Evolution and categories of Operating Systems	2				2	8	4	2	I. Design of Virtual and Real machine. II. Implementation of Virtual and Real machine. III. Design of simplified multiprogramming operating system. IV. Implementation of simplified multiprogramming operating system.
Virtual Machines	2				4		6	6	
Parallel processes, their interaction and notation	2				2		4	2	
Critical section problem and its solution	2				2		4	2	
Semaphores and their implementation. Applications	4				2		6	4	
Virtual memory and implementation	4				4		8	6	
Descriptors and primitives of processes and resources	6				8		14	12	
Microkernel architecture	2				2		4	2	
Input-output processes	2				2		4	2	
File system	6				4		10	6	
Self-preparation and exam		2					4	18	2 hours for tutorial, 18 hours for preparation, 2 hours for exam
Total	32	2			32	8	66	62	

Assessment strategy	Weight %	Deadline	Assessment criteria
Exam (written)	60	Exam session	Evaluation of theoretical knowledge using open question tasks. Performance of tasks is assessed in points from 0 to 3. The points of 2 tasks are summed up. The assessment result is a value from 0 to 6.
Performance of laboratory works	40	3 rd , 7 th , 12 th and 16 th week of semester	Four laboratory works are assessed. The weight of first two works – 0,75 point. The weight of third work – 1 point and fourth – 1,5 points. Minimal value of assessment that ensures the right to pass exam is 1 point, i.e. 25 % of assessment fully performed all laboratory works.

Author	Publishing year	Title	Number or volume	Publisher or URL
Required reading				
Lubomir F. Bic, Alan C. Shaw.	2003	Operating Systems Principles		Prentice-Hall
William Stallings.	2001	Operating systems. Internals and Design Principles		Prentice-Hall
Abraham Silberschatz, Peter B. Galvin, Greg Gagne.	2003	Structured computer organization		John Wiley & Sons, Inc.
Recommended reading				
Andrew S. Tanenbaum	2001	Modern Operating Systems		Prentice-Hall
Gary J. Nutt.	2002	Operating Systems. A Modern Perspective,		Addison Wesley