COURSE UNIT DESCRIPTION

Course unit title	Course unit code
Computer networks	

Lecturer(s)	Department where the course unit is delivered
Coordinator: Vytautas Jančauskas **Other lecturers:** Kęstutis Mizara	Department of Computer science Faculty of Mathematics and Informatics Vilnius University

Cycle	Type of the course unit
First	Compulsory

Mode of delivery	Semester or period when the course unit is delivered	Language of instruction
Face-to-face	Spring semester (4)	Lithuanian

Prerequisites
Prerequisites: Procedural programming, Object oriented programming.

Number of credits allocated	Student's workload	Contact hours	Individual work
5	138	68	70

Purpose of the course unit: programme competences to be developed

Purpose of the course unit – to introduce students to the computer network architecture and operating principles. Provide management skills for Cisco network equipment. Subject different layers of multi-layer network architecture. Analyze routing algorithms and application layer protocols.

Generic competences:

- Life-long learning *(GK2).*

Specific competences:

- Knowledge and skills of underlying conceptual basis *(SK4).*
- 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
Understand computer network principles	Theory, practical examples, group discussions, individual reading, tests.	Implemented network programs, CCNA tests, exam (written)
Solve networking problems		
Control and manage Cisco network hardware		
Design and build computer networks		

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**
1. Computer network concepts, purpose, key concepts and relationship. Multilayer network architecture	4				2		**6**	**2**	
2. Introduction to socket programming	2				2		**4**	**4**	
3. Introduction to Cisco hardware. Introduction to Cisco IOS. Configuration examples	2				2		**4**	**4**	
4. Physical layer. Communication media. Cabling.	2				2		**4**	**2**	
5. Data link layer. Data link layer protocols. Media access control	2				2		**4**	**4**	
6. Ethernet	2				2		**4**	**4**	
7. Network layer. Network layer protocol. Routing	2				2		**4**	**4**	
8. IP Addressing. IPv4 address structure and addressing schemes. IPv6 address structure and addresing schemes	2				2	*8*	**4**	**4**	
9. Transport layer. Transport layer protocols. TCP and UDP	2				2		**4**	**4**	
10. Applicaation layer. Application layer protocols	2				2		**4**	**4**	
11. Network security. Network performance. Managing IOS configuration files	2				2		**4**	**4**	
12. LAN Swiching	2				2		**4**	**4**	
13. Routing between networks. Static routing	1				2		**3**	**4**	
14. VLANs. Inter-VLAN routing. Layer 3 swiching	1				2		**3**	**4**	
15. Dynamic routing algorithms. Implementing dynamic routing	2				2		**4**	**4**	
16. Access control lists. IP services	2				2		**4**	**2**	
18. Taking exam		2					**4**	**12**	2 hours for tutorial, 12 hours for preparation, 2 hours for exam
Total	**32**	**2**			**32**	*8*	**68**	**70**	

Individual reading; Implementation of simple application layer protocol; implementation of well-known application layer protocol; implementation of routing protocol; CCNA test pass

Assessment strategy	Weight %	Deadline	Assessment criteria
Exam	50	Exam session	Application of theoretical knowledge to the solution of practical tasks.
Simple application layer protocol implementation	10	Till 5th week	Functional implementation of simple application layer protocol (server and client) using C/C++ language. Student must explain protocol work principles and make program corrections in class. Rating is reduced for 0.2 per week after deadline.
Implementation of well-known application layer protocol by RFC specification	15	Till 10th week	Functional implementation of application layer protocol. Student must explain protocol work principles and make program corrections in class. Rating is reduced for 0.2 per week after deadline.
Implementation of routing protocol	15	Till 13th week	Functional implementation of routing protocol. Student must explain protocol work principles and make program corrections in class. Rating is reduced for 0.2 per week after deadline.
Resolution of CCNA tests	10	End of semester	Test in virtual learning environment. Closed type questions, complete or partial correctness of responses

Author	Publishing year	Title	Number or volume	Publisher or URL
Required reading				
Andrew S. Tanenbaum	2003	Computer Networks	4th or 5th edition	Prentice Hall
	2013	Cisco Training material	V5.0	Cisco Systems
Recommended reading				
Douglas E. Comer	1999	Computer Networks and Internets	Second Edition	Prentice Hall