RTU Course "Telecomunications and Computer Networks"

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General data

Code	RAE475
Course title	Telecomunications and Computer Networks
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Andris Skrastiņš
Academic staff	Laura Skladova
Volume of the course: parts and credits points	1 part, 5.0 Credit Points, 7.5 ECTS credits
Language of instruction	LV, EN
Annotation	The study course highlights common principles that permeate the functionality of today's telecommunications network systems with an emphasis on practical application. The most common network management techniques, as well as various solutions for network performance evaluation are studied. Respectively, students acquire the practical skills required to design, secure, and maintain real telecommunications systems using open-source tools.
Goals and objectives of the course in terms of competences and skills	The study course goal is showing students a modern idea of telecommunication network architecture, its management principles, and technologies. Objectives of the study course: * to introduce students to the methods, materials, tools, and standards in the context of the study course; * to develop students' skills and capabilities to solve network management problems; * to provide students with an option to evaluate the quality of service in telecommunication network infrastructures.
Structure and tasks of independent studies	Students develop capstone project using interactive online learning resources, as well as supplementary materials offered and created during the study course. To evaluate results and control students' independent studies, study course staff periodically organizes seminars on homework, online tests, and semester stage assignments. At the end of the study course students present their final capstone project.
Recommended literature	Obligātā/Obligatory: 1. F. Fitzek, F. Granelli, P. Seeling "Computing in Communication Networks", Academic Press, 2021. - 495 p. 2. J. M. Ortega "Mastering Python for Networking and Security", Packt, 2021. - 538 p. 3. M. Popovic "Communication Protocol Engineering", CRC Press, 2018. – 548 p. Papildu/Additional: 1. K. Okasha "Network Automation Cookbook", Packt, 2020. - 482 p. 2. J. F. Kurose, K. W. Ross "Computer Networks: A Top-down Approach 7th Ed.", Pearson Education Limited, 2017. - 853 p. Citi informācijas resursi/Other information resources: 1. https://www.freeccnastudyguide.com/study-guides/ 2. https://www.netacad.com/
Course prerequisites	In the basics of telecommunications and computer networks, teletraffic theory fundamentals, computer science.

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Introductory lecture. Study course overview, preliminaries and working environments.	1	0	0	0
Network Theory Elements.	8	10	0	0
Network and Process Management.	8	8	0	0
Infrastructures.	8	8	0	0
Network Architecture Models.	6	10	0	0
Standards in Networking.	6	8	0	0
Encryption Fundamentals.	8	10	0	0
Cloud Services.	8	10	0	0
WEB Technologies and Services.	8	10	0	0
Cybersecurity Fundamentals.	6	8	0	0
Networking in Dockers.	8	10	0	0
Networking tasks and challenges in IoT.	6	10	0	0
New Topologies and Next Generation Networks.	6	8	0	0
Closing lecture. Technology development trends and future networking tasks.	2	1	0	0
Total:	89	111	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
Knows modern telecommunications data network technologies by solving tasks, preparing reports, and presenting work results.	Homework.
Knows multi-layer network architectures, protocols, standards, as well as network switching principles by solving tasks, preparing reports, and presenting work results.	Homework.
Has mastered the basics of network security and maintenance by doing laboratory works, solving tasks, preparing reports, and presenting work results.	Laboratory works.
Is able to design a network model in accordance with the requirements, find a suitable architecture and solution to provide network application functionality in the cloud infrastructure by presenting the results of documentation research.	Tests and assignments.
Can show a holistic picture of the capabilities and skills in the context of a given course by demonstrating the results achieved during the course online or in the class.	Exam.

Evaluation criteria of study results

Criterion	%
Laboratory works	10
Homework	20
Tests and assignments	20
Exam	50
Total:	100

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	5.0	3.0	0.0	2.0		*	