



RTU Course "Distributed Systems in Telecommunications"

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General data

Code	RAE359
Course title	Distributed Systems in Telecommunications
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Ingrīda Lavrinoviča
Academic staff	Viktors Zagorskis
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN
Annotation	Distributed systems are a continuously expanding area of computer science and computer engineering. The study course is intended for undergraduate studies in distributed systems in computer science and telecommunications engineering. The study course allows easily step into the understanding of any distributed system, further, a specific tool for modelling such as Petri Nets is used, therefore allowing to represent the fundamental processes of any distributed transmission system.
Goals and objectives of the course in terms of competences and skills	The goal of the study course is to provide information about distributed systems, theoretical backgrounds, and applicable tools for problem-solving in the telecommunications domain. The objectives of the study course are: * to introduce the keywords and basic relations of distributive messaging models; * demonstrate and strengthen scientific capacity utilizing object-oriented programming (OOP) - based system models; * to develop skills to solve intermediate level remote procedure problems utilizing Python and Java+ programming languages; * to introduce with Petri Nets in the context of distributed systems modelling.
Structure and tasks of independent studies	Students use interactive online learning resources, as well as supplementary materials offered and created during the study course. To evaluate results and control students' independent studies, lecture periodically organize seminars on homework, online tests, and semester stage assignments.
Recommended literature	Obligātā/Obligatory: 1. A. Kostin, L. Ilushechkina "Modeling and Simulation of Distributed Systems", World Scientific, 2010. – 440 p. Papildu/Additional: 1. F. Pierfederici "Distributed Computing with Python", Packt Publishing, 2016. – 156 p. 2. M. Raynal "Distributed Algorithms for Message-Passing Systems", Springer Berlin Heidelberg, 2013. – 517 p. 3. M. Takada "Distributed Systems for fun & profit", Online: https://github.com/mixu/distsysbook . Citi informācijas resursi/ Other information resources: 1. https://www-dssz.informatik.tu-cottbus.de/DSSZ/Software/Snoopy#downloads
Course prerequisites	Foundations of teletraffic theory and 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. Aim of the study course, goals, and methodology.	2	0	0	0
Statements of the research problems, tasks, simulation methods and tools.	2	2	0	0
Basic Concepts and Features of Distributed Systems.	8	8	0	0
Communication Patterns and Paradigms in Distributed Systems.	4	4	0	0
Modeling and Simulation of a Logistic System.	2	2	0	0
Languages to Describe and Control Models.	2	2	0	0
Models of Simple Information Systems and Their Components.	4	4	0	0
Models of Communication Protocols and Local Area Networks.	8	8	0	0
Protocol for Distributed Mutual Exclusion; Multicast-Based Anycast Protocol.	8	8	0	0
A Protocol of Distributed Leader Election.	8	8	0	0
Petri Nets for the Description, Modeling, and Investigation of Distributed Systems.	8	10	0	0
A Class of Extended Petri Nets for System Simulation.	4	4	0	0
Total:	60	60	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
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Is familiar with the foundations of modern distributed systems in the telecommunications domain by solving tasks, preparing reports, and presenting study results.	Homework, pre-class. Criterion: 1) not submitted; 2) formally submitted but the contribution is insufficient; 3) contribution matches expectations; 4) contribution exceeds expected results and quality.
Is familiar with the foundations of modern distributed systems in the telecommunications domain by solving tasks, preparing reports, and presenting study results.	Homework, pre-class. Criterion: 1) not submitted; 2) formally submitted but the contribution is insufficient; 3) contribution matches expectations; 4) contribution exceeds expected results and quality.
Is familiar with the basics of distributed systems utilizing Petri Nets, operating distributed computing models, preparing reports, and presenting study results.	Homework, pre-class. Criterion: 1) not submitted; 2) formally submitted but the contribution is insufficient; 3) contribution matches expectations; 4) contribution exceeds expected results and quality.
Is able to develop a distributed computing model in accordance with the conceptual design requirements. Is able to offer a working solution for a network application model, ensuring the functionality of the relevant telecommunications infrastructure element.	Tests and assignments. Criterion: 1) unattended; 2) formally participated but the contribution is insufficient; 3) contribution matches expectations; 4) contribution exceeds expected results and quality.
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. Criterion: 1) unattended; 2) formally participated but the contribution is insufficient; 3) contribution matches expectations; 4) contribution exceeds expected results and quality.

Evaluation criteria of study results

Criterion	%
Participation in class meetings	10
Homework	10
Tests and assignments	30
Pre-class activities	20
Exam	30
Total:	100

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	2.0	1.0	0.0		*	