RTU Course "Teletraffic Theory"

13104 Telekomunikāciju tīklu katedra

General data

Code	RAE555
Course title	Teletraffic Theory
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Electronics and Telecommunications
Responsible instructor	Gunārs Lauks
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, RU
Possibility of distance learning	Planned
Maximum auditorium capacity	100
Maximum number of students per semester	100
Abstract	The course covers the experimental systems in relation to telecommunications network systems. Within the framework of the course students will discuss the network management and control methods. Students will be enabled to promote their understanding of the performance of real systems. Important part of the course is evaluation methods as well as current trends and problems in the context of Internet, mobile and broadband communications.
Goals and objectives of the course in terms of competences and skills	The goal of the course is to give competence (skills and knowledge) in performance analysis of telecommunications networks and systems, such as •competence to use actual network simulation methods and tools and to evaluate the simulation results • competence, using traffic measurements, to choose and test the traffic models, simulate, and to evaluate the simulation results • competence to choose appropriate routing methods and protocols, and evaluate the network performance • competence to choose appropriate management and control methods and protocols of network resources, and evaluate the network performance • competence to use data (traffic measurements)
Structure and tasks of independent studies	There will be sixteen lectures and eight practical meetings (exercises). Exercises are an essential part of the course. The material will be presented rigorously during the class for the most important results. Additional material is made available at the class websites.
Recommended literature	Literatūra (2048 rakstu zīmes) 1.Lauks G, Teletrafika teorija, Lekciju konspekts, RTU, 2007 gads 2.Kavacis A, Lauks G , Daudzprotokolu iezīmju komutēšana MPLS, RTU, Rīga , 2008 Grāmatas elektroniskā formātā 3.Philippe NAIN, BASIC ELEMENTS OF QUEUEING THEORY, Application to the Modelling of Computer Systems, Lecture Notes, INRIA, France 4.AndreasWillig. A Short Introduction to Queueing Theory, Technical University Berlin, Telecommunication Networks Group 5.Robert B. Cooper. Introduction to Queueing Theory. Florida Atlantic University 6.Harry Perros , Computer Simulation Techniques: The definitive introduction!, Computer Science Department, NC State University 7.Ivo Adan and Jacques Resing, Queueing Theory, Department of Mathematics and Computing Science Eindhoven University of Technology, The Netherlands 8.Georges Fiche & Gerard Hebuterne, Communicating Systems & Networks: Traffic & Performance, London and Sterling 9.Dr.-Ing. Andreas Willig, Performance Evaluation Techniques – Summer 2004, Hasso-Plattner-Institut, Universit¨at Potsdam, June 29, 2004 10.ARUN K. SOMANI, SURVIVABILITY AND TRAFFIC GROOMING IN WDM OPTICAL NETWORKS, Cambridge University Press 11.Handbook “TELETRAFFIC ENGINEERING”, Geneva, January 2005
Course prerequisites	Teletraffic theory, telecommunications and data networks

Course outline

Theme	Hours
Introduction. Objectives and methodology	2
Problem statement. Overview of mode-driven architecture methodology: metamodels and models for telecom systems	4
Traffic engineering: Overview of tasks, methods, tools and decision making methodology	4
Traffic models: modeling, simulation, analysis and forecasting	6
Routing algorithms: models, methods, simulation and evaluation of simulation results	4
Queueing and Scheduling: algorithms and evaluation of algorithms	4
Management and control of network resources: methods and their evaluation	4

Admission Control in packet networks	4
Traffic measurements: problem description, tasks, tools and methods of data preprocessing	4
Data mining in traffic engineering: tasks, methods, tools and results	4
Knowledge management in traffic engineering	6
Conclusions. Advanced Topics	2

Learning outcomes and assessment

Learning outcomes	Assessment methods
Students are able to use actual network simulation methods and tools and to evaluate the simulation results	Exam. Test. Homework
Students are able, using traffic measurements, to choose and test the traffic models, simulate and evaluate the simulation results	Exam. Test. Homework
Students are able to choose appropriate routing methods and protocols, and evaluate the network performance	Exam. Test. Homework
Students are able to choose appropriate management and control methods and protocols of network resources, and evaluate the network performance	Exam. Test. Homework
Students are able to use data (traffic measurements) preprocessing methods and data mining methods to obtain new knowledge about traffic characteristics	Exam. Test. Homework

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	4.5	2.0	1.0	0.0		*	