



## RTU Course "Modelling and Simulation in Logistics"

12111 Modelēšanas un imitācijas katedra

### General data

Code	DMI714
Course title	Modelling and Simulation in Logistics
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Jurijs Merkurjevs
Academic staff	Jūlija Petuhova Jelena Pečerska
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV, EN
Possibility of distance learning	Not planned
Abstract	The course "Modelling and Simulation in Logistics" is aimed at overviewing simulation application for analysis and operation improvement of logistic systems. Different simulation approaches to modeling logistic systems are introduced, including continuous and discrete-event simulation and systems dynamics. Basics of complex systems discrete-event simulation are given, as well as its application to analysis and design of logistic systems. Some examples of simulation-based analysis and operation improvement of logistic systems are discussed, including practical experiences of Latvian companies. Practical skills in realization of acquired simulation methods are provided on the basis of modern simulation software (for example, Simul8).
Goals and objectives of the course in terms of competences and skills	Competences and skills demonstrated: knowledge of complex systems simulation process and ability to implement it for analysis and operation improvement of logistic systems. After studying the course students are expected to comprehend the simulation process and be able to implement it for discrete-event systems, as well as to perform simulation-based analysis and operation improvement of logistic systems.
Structure and tasks of independent studies	Independent studies are performed through obtaining, generalizing and analyzing results of practical assignments.
Recommended literature	1. Yuri Merkurjev, Galina Merkurjeva, Miquel Angel Piera, Antoni Guasch (Eds.) Simulation-based Case Studies in Logistics: Education and Applied Research. Springer-Verlag, London, 2009. 2. Jerry Banks, John S. Carson, II, Barry L. Nelson, David M. Nicol. Discrete-event System Simulation. 5th edition, Prentice-Hall, 2009. 3. Stewart Robinson. Simulation: The Practice of Model Development and Use. John Wiley & Sons, 2004. 4. Jack P.C. Kleijnen. Design and Analysis of Simulation Experiments. Springer, 2009.
Course prerequisites	Basic knowledge in logistics, probability theory and mathematical statistics.

### Course outline

Theme	Hours
Basic concepts of modelling. Continuous and discrete-event system simulation. Systems dynamics.	8
Simulation applications in logistic systems	2
Simulation process and main simulation steps	8
Modelling of random variables	4
Design of simulation experiments	2
Processing and analysis of simulation results	4
Examples of simulation application to analysis and operation improvement of logistic systems	4
Practical assignments	32

### Learning outcomes and assessment

Learning outcomes	Assessment methods
To be able to interpret and use terminology in the logistic systems simulation area	Successfully passed exam
To be able to explain main stages of the simulation process	Successfully passed exam
To be able to provide examples on simulation application to analysis and operation improvement of logistic systems	Successfully passed exam
To be able to practically implement the simulation process for analysis and operation improvement of logistic systems	Successfully performed practical assignments

### Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	4.0	6.0	2.0	0.0	2.0		*	