



RTU Course "System Engineering"

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General data

Code	DSP347
Course title	System Engineering
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Mārīte Kirikova
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Annotation	Professional responsibilities of systems analyst require a good knowledge of methods and tools for identification of characteristics and operation principles of various types of systems. This course is focused on the specific method of systems theory – systems engineering, touching also main issues of systems theory and systems analysis. In the course the following topics are considered: systems notion, key concepts of systems thinking, systems engineering process and principles, systems models, modeling methods, techniques and languages, systems development life cycle, structured techniques, process of systems analysis and design and its support by SSADM methodology.
Goals and objectives of the course in terms of competences and skills	The goal of the course is to give theoretical knowledge on systems approach, systems thinking, systems engineering process and principles, as well as skills of systems modeling, development life cycle and structured techniques which support application of systems engineering approach for various types of systems.
Structure and tasks of independent studies	Students independently must work out the course work. Students by themselves must choose two different types of systems. The course work consists of 6 tasks which include the following topics: key concepts of systems thinking, creation of systems models, development of model of systems life cycle, construction of structured technique diagrams. The course work must be submitted before the examination session.
Recommended literature	1. Fenton, N.E., Hill, G. Systems Construction and Analysis: A Mathematical and Logical Framework. Mc Graw-Hill, 1993, 465 p. 2. Flood, R., Romm, N. Critical Systems Thinking: Current Research and Practice. Plenum, New York, 1996. 3. Skyttner, L. General Systems Theory: Problems, Perspectives, Practice. World Scientific Publishing Company, 2006, 536 p. 4. Bose, N.K. Multidimensional Systems Theory and Applications. Springer, The Netherlands, 2009, 292 p.
Course prerequisites	None

Course outline

Theme	Hours
Systems notion	2
Key concepts of systems thinking and their characteristics	4
Systems engineering process and its participants	2
Systems engineering principles (models, modeling techniques and languages)	8
Systems development life cycle	2
Basic components of structured techniques	2
Implementation of structured techniques	6
Support of systems analysis and design process in SSADM methodology	6

Learning outcomes and assessment

Learning outcomes	Assessment methods
Students are able to interpret the systems notion and key concepts of systems thinking for objects of real world	The first and the second task of the course work
Students know components and participants involved in systems engineering process	Systems engineering process and participants involved must be defined in examination
Students can apply systems engineering principles	The third and the fourth task of the course work
Students know systems development life cycle	Systems development life cycle must be defined and explained in examination
Students can implement structured techniques of systems engineering	The fifth and the sixth task of the course work
Students understand systems analysis and design process and its support in SSADM methodology	Systems analysis and design process and basics of SSADM methodology must be defined in examination

Study subject structure

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