

Specification for the book of courses

Study program		Computing and Informatics		
Module		Information Systems and Technologies		
Type and level of studies		Master studies		
The name of the course		Computer Simulation		
Lecturer (for lectures)		Vučković V. Vladan		
Lecturer/associate (for exercises)		Vučković V. Vladan		
Lecturer/associate (for OFE)				
Number of ECTS		4	Course status (obligatory/elective)	Elective
Prerequisites				
Course objectives		Mastering basic knowledge necessary for the use of basic procedures and procedures in computer modeling and simulation.		
Course outcomes		Theoretical knowledge: mastering mathematical techniques for computer modeling and simulation; 3D modeling and programming simulations on a computer.		
Course outline				
Theoretical teaching		Basics of computer simulation. General approach to system simulation. Mathematical basics of the simulation system. Mathematical modeling of physical processes and sensor data. Stochastic and deterministic approach in simulation. Continuous and discrete simulations. Efficient data structures and simulation algorithms. Access via differential algebraic equations. Local and distributed simulations. Discrete event simulation (DES). Aggregate Level Simulation Protocol (ALSP), Distributed Interactive Simulation (DIS), High Level Architecture (HLA). Introduction to 3D software. 3D simulations in real time. Parallel algorithms in simulation systems. Optimization of hardware for simulation machines.		
Practical teaching (exercises, OFE, study and research work)		Hierarchies in 3D software and animation with expressions. Practical 3D modeling on a computer. Use of modern 3D modeling software. Basic simulation procedures. Keyframe animation - rotations and sizes (squash and stretch). NURBS modeling - lines. NURBS modeling-shapes. Introduction to polygonal modeling. Quad modeling. Polygonal modeling of a simple character. Polygonal modeling of a character by task. Torzo. Polygonal modeling of a character by task. Head: eyes, lips, ear. UV mapping. Digital driving. Basics of 3D materialization. Riging - Introduction to skeletal systems. The term driven key. Creating and selecting attributes. Programming various simple simulator classes.		
Textbooks/references				
1		Modeling and Simulation in Engineering, Edited by Catalin Alexandru, ISBN 978-953-51-0012-6, Hard cover, 298 pages, Publisher: InTech, Published: March 07, 2012 under CC BY 3.0 license.		
2				
3				
4				
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	0		
Teaching methods		Lectures, exercises on the board, laboratory exercises, students' independent work on homework assignments and projects, consultations.		
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures			Written exam	
Exercises		30	Oral exam	40
Colloquia		10		
Projects		20		