

DESCRIPTION OF A STUDY COURSE – SYLLABUS

Title of a course	Modelling and Simulations				
Head of course	Marina Rauker Koch, Lecturer				
Study programme	Specialist professional graduate study of Information Technology in Business Systems				
Status of a course	Obligatory				
Year of study	1.	Semester	I	ECTS credits	6
Teaching plan (L + E + S+ Pr)	2+0+2+0				
Goals of a course					
Introduce students to the modelling process, implementation methodology and application of simulation models using computer simulation language.					
Conditions for enrolling course					
No conditions					
Learning outcomes on a level of a study programme which includes course					
Outcome 9: Develop a model and run a simulation in business systems. Outcome 15: Analyse and recommend the use of IT tools within a business organization. Outcome 17: Present ICT solutions in a business organization.					
Expected learning outcomes on a level of a course					
1. Interpret basic simulation ideas and manners of approaching simulation modelling. 2. Calculate statistical indicators in a simulation model. 3. Develop a queue simulation model. 4. Apply the selected simulation language in discrete simulation. 5. Analyse the results obtained by manual and computer simulation.					
Content of a course					
Basics of modelling: models and their classification. Modelling principles. Modelling methodology. Phases of modelling. Modelling as a base for decisions making. Types of modelling. Basics of probability and statistics. Selection of input distributions. Generation of patterns. Programming input data into a model. Output data analysis. Creating confidence in simulation models. Planning simulation experiments. System dynamics. Basic ideas of system dynamics. Approaches to simulation modelling. Classification of simulation models. Simulation experiments programming. Simulation models development. Discrete events simulation. Examples of simulation languages: CSMP (Continuous System Modelling Program), Jess (Java Expert System Shell), object simulation languages SERVICE MODEL. Simulation language: GPSS. System equations, programs and Dynamo language. Arena language. Virtual reality. Tool/language VRML.					
Teaching modes	<input checked="" type="checkbox"/> lectures <input type="checkbox"/> auditory exercises <input checked="" type="checkbox"/> seminars and workshops <input type="checkbox"/> distance learning <input type="checkbox"/> field classes		<input checked="" type="checkbox"/> individual assignments <input type="checkbox"/> multimedia and network <input type="checkbox"/> laboratory <input type="checkbox"/> supervisor's work <input type="checkbox"/> other _____		
Comments					
Students' obligations					
Grading, evaluation and monitoring of students' work continuously during lectures and exams					
Grading is based upon evaluation of course's learning outcomes' adoption. Grading is performed continuously during lectures and/or during exam, in compliance with the provisions of Regulation on the assessment of students.					

Continuous check-up:

Outcomes	Written examination	Practical assignments	Seminar / report	Presentation	Threshold	Max
Outcome 1	20				10	20
Outcome 2		15			7,5	15
Outcome 3		5	15	5	12,5	25
Outcome 4		15	10		12,5	25
Outcome 5			10	5	7,5	15
Percentage of ECTS	1,5	2	2	0,5		
Total	20	35	35	10	50 %	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Exam term:

Outcomes	Written exam	Oral exam	Max
Outcome 1	15	5	20
Outcome 2	15		15
Outcome 3	15	10	25
Outcome 4	15	10	25
Outcome 5		15	15
Percentage of ECTS	3,5	2,5	
Total	60	40	100 %

A student has passed the exam if he has acquired a percentage of credits for each learning outcome higher or equal to defined threshold.

Grading:

A student has passed the exam if he has acquired at least 50% of anticipated credits of a specific learning outcome.

If a student has passed learning outcomes of all courses, the accomplished credits (percentages) of all passed learning outcomes are being added, while the final grade is defined upon following table:

Range of credits (percentages)	Numerical grade	ECTS grade
90,00 – 100,00	Excellent (5)	A
75,00 – 89,99	Very good (4)	B
60,00 – 74,99	Good (3)	C
50,00 – 59,99	Sufficient (2)	D
0,00 – 49,99	Insufficient (1)	F

Obligatory literature

1. Čerić, V. (1993). Simulacijsko modeliranje. Školska knjiga.

Additional literature

2. Karian, Zaven A., and Edward J. Dudewicz. Modern statistical, systems, and GPSS simulation. CRC press, 1998.
3. Schriber, Thomas J. Simulation using GPSS. MICHIGAN UNIV ANN ARBOR, 1974.

