

Teacher					
Course	Modelling and Simulation of Production Systems in Logistics Systems				
Module	Optional course	ECTS	4	Course code	23SM.P.L.B.IEP.1.1

Major	Speciality	Academic year	
LOGISTICS	Industrial systems engineering	2023/2024	
Semester	SECOND	Year of studies	FIRST

Type of studies	Full-time				Extramural			
Type of classes	Lecture	Exercise	Laboratories	Project	Lecture	Exercise	Laboratories	Project
Amount of hours	30		30					
TOTAL	60							

Course objectives	The main goal of this course is to provide students with advanced level knowledge in modelling and simulation of production and logistics systems. The course provide practical experience in modelling coupled with theoretical depth in chosen methods.
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Minimum knowledge required from the student before the classes beginning	Basis knowledge in mathematical statistics and in logistics management or operations management
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Recommended literature to study before the classes beginning	

LEARNING OUTCOMES			KEK	METHODS OF ASSESSMENT	
KNOWLEDGE	K01	Ability to distinguish and describe logistics processes	K2_W01_L_P	EM11	reports evaluation
	K02	Understand theory basic (modelling and simulation)	K2_W01_L_P	EM13	student presentations
	K03	Understand the reasons for process modelling and simulation	K2_W01_L_P	EM15	evaluation of activity in the classroom
	K04	Ability to describe the programs and tools used in simulation and modelling	K2_W03_L_P	EM11	reports evaluation
	K05	Understand main concepts in modelling and simulation	K2_W01_L_P	EM13	student presentations
SKILLS	S01	Recognize the main types of tools and programs using in modelling and simulation	K2_U05_L_P	EM1	oral examination
	S02	Analyse and optimize processes using simulation	K2_U01_L_P	EM1	oral examination
	S03	Application of the selected tools in simulation	K2_U05_L_P	EM11	reports evaluation
	S04	Apply appropriate actions to improve the given logistic processes	K2_U02_L_P	EM1	oral examination
	S05	Preparation of logistics processes (scheme)	K2_U02_L_P	EM11	reports evaluation
SOCIAL COMPETENCE	SC01	The student is aware of the importance of modelling and simulation in solving production systems problems	K2_K05_L_P	EM16	evaluation of the work, cooperation of students in the classroom (verification of the acquired social competences)
	SC02	The student knows examples of simulation methods and understands main differences between them.	K2_K05_L_P	EM15	evaluation of activity in the classroom
	SC03	The student Is aware of capabilities and limitations of computer methods dedicated to production simulation.	K2_K01_L_P	EM16	evaluation of the work, cooperation of students in the classroom (verification of the acquired social competences)

	SC04	The Student is aware of the importance of understanding simulation methods for accelerating new devices design process and for improving economic competitiveness	K2_K02_ L_P	EM16	evaluation of the work, co-operation of students in the classroom (verification of the acquired social competences)
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Course contents	Lecture	input, throughput and output of processes, modelling and simulation of processes (in production and logistics)
	Exercises	Calculation of processes parameters
	Laboratories	programs and tools in simulation and modelling
	Projects	presentation on a given topic

Teaching methods	TM1	classroom lectures
	TM10	practice example exercises (case study)
	TM11	classroom discussions

Obligatory literature	1	Simulation Study of a Production System Author Eltayeb Khalid Abd-Allah Ahmed Eltayeb: Lambert Academic Publishing, 2020
	2	Banks J., Carson J.S., Nelson B.L., Nicol D.M., Discrete-Event System Simulation, Pearson, 2019
	3	Robinson S., Simulation: The Practice of Model Development and Use, Palgrave Macmillan, 2018

Additional literature	1	Borshchev A., The Big Book of Simulation Modeling: Multimethod Modeling with AnyLogic, AnyLogic North America, 2019
	2	Negahban A., Smith J.S., Simulation for Manufacturing System Design and Operation: Literature Review and Analysis, Journal of Manufacturing Systems, Elsevier, 2018
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Requirements to pass the course	
>50 % presence, active participation in classes, tests and case studies, the presentation	