



UNIVERSITETI / UNIVERSITY
"ISA BOLETINI"
MITROVICË

Course Curriculum Model (Syllabus) Business Modeling and Simulation		
Faculty:	FACULTY OF MECHANICAL AND COMPUTER ENGINEERING	
Department:	Mechanical Engineering and Economic Engineering	
Study Program	MSc in Manufacturing Technology and Management	
Level:	Master	
Code of the course:	206 MTM	
Course:	Business Modeling and Simulation	
Course Status:	Elective	Mandatory/ Elective
Semester:	III	Winter /Summer
Number of hours per week:	2+1	
ECTS:	5	
Time / location:	Wednesday, 10:00–11:30, K 105	
Academic Year / Semester	2026/2027	
Language of Instruction:	Albanian (with flexibility in English)	
Lecturer:	Prof. Ass. Dr. Safet Abdullahu	
Assistant:		
Contact details:	Professor	Assistant
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Course Description	This course addresses the concepts, methods, and techniques of modeling and simulation of business systems. Students will learn to analyze and design organizational, operational, and managerial processes using mathematical modeling tools, discrete-event simulation, and specialized software (e.g., Arena, AnyLogic, Simul8). The course includes practical applications in production management, logistics, resource management, and strategic decision-making.	
Course Purpose / Course Goals	The aim of this course is to provide students with advanced knowledge and practical skills in modeling and simulating business systems in order to optimize processes and support decision-making.	

Course Objectives	- To understand the importance of modeling and simulation in managing production and organizational processes. - To apply various modeling methods (statistical, probabilistic, discrete, dynamic). - To develop skills in the use of simulation software for real-world scenarios. - To evaluate managerial alternatives through experimental models. - To develop the ability for data-driven decision-making and analysis.
Intended Learning Outcomes (ILOs)	Knowledge - K1: Understands the basic principles of modeling and simulation of business systems. - K2: Describes simulation methodologies and statistical analysis techniques. - K3: Identifies modern software and tools for simulation and modeling. Skills - S1: Builds mathematical and computer-based models of business processes. - S2: Applies simulations to optimize workflows, capacities, and resources. - S3: Analyzes simulation results and translates them into practical recommendations. Competences - C1: Designs and implements innovative solutions for process management. - C2: Makes simulation-based decisions for improving organizational performance. - C3: Works in multidisciplinary teams for integrated business management solutions.

	Weeks	Lecture	
Program	First week	Introduction to business modeling and simulation	
	Second week	Fundamental principles of mathematical modeling	
	Third week	Discrete-event simulation and systems	
	Fourth week	Simulation software (Arena, AnyLogic, Simul8)	
	Fifth week	Modeling of production and logistics processes	
	Sixth week	Modeling of service systems	
	Seventh week	Midterm test	
	Eighth week	Modeling of resource management	
	Ninth week	Simulation of strategic decision-making	
	Tenth week	Experimentation and result analysis	

	Eleventh week	Case studies: applications in production and management
	Twelfth week	Sustainability and modeling of complex systems
	Thirteenth week	Group simulation project
	Fourteenth week	Student presentations
	Fifteenth week	Summary and review

Literature / Reading List:

Literature	Main Literature • Banks, J., Carson, J. S., Nelson, B. L., & Nicol, D. M. (2021). <i>Discrete-Event System Simulation</i>. 6th Edition, Pearson. • Kelton, W. D., Sadowski, R. P., & Zupick, N. B. (2020). <i>Simulation with Arena</i>. 6th Edition, McGraw-Hill. • Law, A. M. (2019). <i>Simulation Modeling and Analysis</i>. 5th Edition, McGraw-Hill. Additional Literature • Borshchev, A. (2016). <i>The Big Book of Simulation Modeling: Multimethod Modeling with AnyLogic</i>. AnyLogic Press. • Pidd, M. (2017). <i>Simulation for the Social Scientist</i>. 2nd Edition, Palgrave Macmillan. Journals: • <i>Journal of Simulation</i> (Palgrave) • <i>Simulation Modelling Practice and Theory</i> (Elsevier)

Teaching and Learning Methods	The learning process combines traditional and modern teaching methods to ensure acquisition of theoretical knowledge and development of practical skills. The main methods include: • Structured lectures • Problem-Based Learning (PBL) • Project-Based Learning (group/individual project) • Case study method • Software and laboratory demonstrations • Computer simulations • Industry presentations • Guest lecturers from industry			
	Contribution to student workload (which should correspond to student learning outcomes - 1 ECTS credit = 25 hours)			
	Activity	Hours	Days/weeks	Total
	Lectures	2	15	30
	Exercise sessions (with TA)	1	15	15
	Practical work	—	—	—
	Office hours	1	15	15
	Fieldwork	2	1	2
	Midterms, seminars	2	10	20
	Homework	3	2	6
	Self-study	2	5	10
	Final exam preparation	2	5	10
	Time spent in exams	—	—	—
	Projects, presentations, etc.	4	3	12
Total				125

Evaluation	Assessment Methods and Criteria:		
	Activity	Weight (%)	
	Midterm Exam	20%	
	Project Report & Defense	30%	
	Seminar Presentation	10%	
	Final Exam	40%	
	Total	100%	
	(according to the Statute and Regulation for studies of UMIB)		
	Final grade	Points (%)	Mark
		91 – 100	10
	81 - 90	9	
	71 - 80	8	
	61 - 70	7	

		51 - 60	6
Academic policies	• Active participation in lectures and exercises is mandatory. • Deadlines for assignments and projects must be respected. • Work and projects must be original – plagiarism is punishable under university regulations. • Digital devices may be used only for academic purposes. • Students have the right to appeal grades within the legal deadlines according to the UMIB Statute. Ethics in teaching: Graphic works should be personal works of each student. There will be no tolerance for copying, "borrowing" from the Internet or any other material. The same or similar works will have negative evaluations in the final evaluation of the student. Time: In agreement with the students, the deadlines for submitting works will be determined. There will be no tolerance for delays in the submission of works. Failure to arrive at the time when the assignment is explained does not justify the student for not submitting the paper. The deadline will be given earlier. If you are going to travel abroad, then you need to submit the paperwork in advance. The student has the right to request a consultation with the professor whenever he / she deems it reasonable and necessary for the performance of his / her work. Rules of conduct and academic policies: • active participation of students in lectures o participation in discussion, comments and free expression of opinion, opinion and academic position (with arguments) • mandatory independent work and use of additional sources of information (various scientific websites, scientific journals, conference proceedings, etc.) • respecting lecture schedules without compromising academic freedom (silent cell phones) of respecting the word, thoughts and ideas of colleagues, • it is not allowed to arrive late and leave without a valid reason from the lecture, test or exam o preparation and holding of relevant lectures, (obligation of the teacher). • if the student is absent more than four times without reason in lectures and exercises, does not receive the signature for attendance. o the student cannot take the exam without an official document, • if the student is dissatisfied with the grade obtained, has the right to complain in writing to the dean, within two working days after the announcement of the results, UMIB Statute o if the student does not follow the rules, in the exam uses tools that are not allowed, it is evaluated with a negative grade. Plagiarism or cheating will be penalized according to university regulations.		