Fall 2022 (1st 2022/2023)

Course name:	Simulation
Course code:	0936553
Credits hours	3
Contact hours/room:	Sec1: Sun, Tue, Thu 8:30-9:30 (IE 101 → Comp Lab1) Sec2: Sun, Tue, Thu 9:30-10:30 (Chem 001 → Comp Lab1)
Course instructor's name, E-mail, and phone:	Mohammad Shbool, Ph.D. m.shbool@ju.edu.jo 22872
Course Coordinator:	Mohammad Shbool, Ph.D.
Textbook:	*Simulation with Arena*, Kelton, W. D., Sadowski, R. P., and Zupick, N. B. (2015), 6th Edition, McGraw-Hill Education.
Other references:	*Discrete Event Simulation*, Banks, J., et al., 4th edition
Course Description:	The course presents two theoretical contact hours per week covering: introducing the role and importance of simulation in engineering, probability models, manual simulation, input models, modelling analysis of various systems and study situations, accuracy and validity of simulation models, reading, interpreting, analysis and evaluation of outputs, reduce contrast in outputs. In addition, students are required to practice simulation during three contact hours per week on a project using one of the most common simulation software.
Providing Department:	Industrial Engineering
Prerequisite Course:	Probabilistic Operations Research (0916555)
Course type	Mandatory

Assessment Methods:	Method	Weight %	Date
	Mid-term Exam	30	
	Mini-Project	15	
	Lab Work	5	
	Final Exam	50	

Course Learning Outcomes:	#	After successful completion of this course, the student will be able to	SO
	CLO1	Be able to describe, model, and document a problem in preparation for the application of simulation solution techniques	1
	CLO2	Be able to explain simulation time advance mechanisms and perform a manual simulation	1
	CLO3	Be able to analyze, model, and select appropriate input distributions	6
	CLO4	Be able to use the Arena simulation language to model and analyze problems found in industrial engineering practice and communicate the results	6
	CLO5	Be able to validate and verify a simulation model using appropriate validation and verification procedures.	6
	CLO6	Be able to apply appropriate simulation statistical output techniques	1, 6
	CLO7	Be able to perform a case study and communicate and present the results effectively	3, 6

	# of Weeks	Reading Material	Topic
A brief list of topics	1	Ch1 – text	Introduction
	2-5	Ch2 - text	Simulation Basics and Fundamental Concepts
	6	Ch3 - text	Introduction to Arena (Single server example)
	7	Handout	Review: Probability Distributions and Statistics
	8-10	Ch4 – text	Modeling Basic Operations and Inputs
	11-13	Ch5 – text	Modeling Detailed Operations
	14-16	Ch6 - text	Statistical Analysis of Output from Terminating Simulations

Important Notes:	• Class notes, in-class drills, and any handout you receive from the instructor are required as part of the course. • Do not hesitate to ask questions • The student is required to bring a notebook and take notes in classes. • Students are expected to attend every class session, and they are responsible for all material, announcements, schedule changes, etc., discussed in class. • Discuss the assignments (the ungraded assignments) with your classmates. • If the assignment is declared graded, students MUST work on it individually. NO late assignment will be accepted. • Do not Cheat; direct copying of others' work will NOT be allowed or tolerated and will result in a grade reduction. If a student is found cheating in an exam or assignment, even signing the roll sheet for another student, he/she will be given an "F" for the course. There will be no exceptions. • All cases of academic dishonesty will be handled per university policies and regulations. JU policy requires the faculty member to assign a ZERO grade (F) if a student misses 15% of the classes that are not excused and 20% of the classes that are excused • Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or home works. • Any student with disabilities who needs accommodations in this course is encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.

The B.Sc. in Industrial Engineering program enables students to achieve, by the time of graduation, the following program learning outcome (SOs)			
1	*An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics*	*5*	*An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*
2	*An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors*	*6*	*An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions*
3	*An ability to communicate effectively with a range of audiences*		
4	*An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts*	*7*	*An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.*