



**The University of Jordan**  
**School of Engineering**  
**Industrial Engineering Department**  
**2<sup>nd</sup> semester 2020/2021**

<b>Course name:</b>	Simulation		
<b>Course code:</b>	0936553		
<b>Credits hours</b>	3		
<b>Contact hours/room:</b>	Sec 2: 8:30 – 10:00 Mon, Wed Sec 1: 12:30-13:30 Sun, Tue, Thu		
<b>Course instructor's name, E-mail, and phone:</b>	Mohammad Shbool, Ph.D. <a href="mailto:m.shbool@ju.edu.jo">m.shbool@ju.edu.jo</a>		
<b>Course Coordinator:</b>	Mohammad Shbool, Ph.D.		
<b>Text book:</b>	<i>Simulation with Arena</i> , Kelton, W. D., Sadowski, R. P., and Zupick, N. B. (2015), 6th Edition, McGraw-Hill Education.		
<b>Other reference(s):</b>	<i>Discrete Event Simulation</i> , Banks, J., et al., 4 <sup>th</sup> edition		
<b>Course Description:</b>	Probabilistic models, manual simulation, input modeling, simulation modeling, verification and validation of simulation models, output analysis, tools for reducing the variance of simulation outputs, applications and case studies.		
<b>Providing Department:</b>	Industrial Engineering		
<b>Prerequisite Course:</b>	Production Planning & Control (0906421)		
<b>Course type</b>	Mandatory		
<b>Assessment Methods:</b>	<b>Method</b>	<b>Weight %</b>	<b>Date</b>
	Mid-term Exam	30	
	Lab work & mini-Project	20	
	Final Exam	50	
<b>Course Learning Outcomes:</b>	#	<b>After successful completion of this course, the student will be able to</b>	<b>SO</b>
	<b>CLO1</b>	Be able to describe, model, and document a problem in preparation for the application of simulation solution techniques	<b>1</b>
	<b>CLO2</b>	Be able to explain simulation time advance mechanisms and perform manual simulation	<b>1</b>
	<b>CLO3</b>	Be able to analyze, model, and select appropriate input distributions	<b>6</b>
	<b>CLO4</b>	Be able to use the Arena simulation language to model and analyze problems found in industrial engineering practice and communicate the results	<b>6</b>
	<b>CLO5</b>	Be able to validate and verify a simulation model using appropriate validation and verification procedures.	<b>6</b>
	<b>CLO6</b>	Be able to apply appropriate simulation statistical output techniques	<b>1, 6</b>
	<b>CLO7</b>	Be able to perform a case study and communicate and present the results effectively	<b>3, 6</b>
<b>Brief list of topics</b>	<b># of Weeks</b>	<b>Reading Material</b>	<b>Topic</b>
		Ch1 – text	Introduction
		Ch2 - text	Simulation Basics and Fundamental Concepts
		Ch3 - text	Introduction to Arena (Single server example)
		Handout	Review: Probability Distributions and Statistics
		Ch4 – text	Modeling Basic Operations and Inputs
		Ch5 – text	Modeling Detailed Operations
	Ch6 - text	Statistical Analysis of Output from Terminating Simulations	

<b>Important Notes:</b>	<ul style="list-style-type: none"> <li>• Class-notes, in-class drills and any handout you receive from the instructor are required as part of the course.</li> <li>• Do not hesitate to ask questions</li> <li>• You are required to bring a notebook and take notes in classes.</li> <li>• Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class.</li> <li>• Discuss the assignments among yourselves</li> <li>• Don't Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for another student, you will be given an "F" for the course. There will be no exceptions.</li> <li>• All cases of academic dishonesty will be handled in accordance with university policies and regulations. JU policy requires the faculty member to assign ZERO grade (F) if a student misses 15% of the classes that are not excused, and 20% of the classes that are excused</li> <li>• 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.</li> <li>• Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.</li> </ul>
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<b><i>The B.Sc. in industrial Engineering program enables students to achieve, by the time of graduation the following program learning outcome (SOs)</i></b>			
<b>1</b>	<i>An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</i>	<b>5</b>	<i>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</i>
<b>2</b>	<i>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</i>	<b>6</b>	<i>An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</i>
<b>3</b>	<i>An ability to communicate effectively with a range of audiences</i>	<b>7</b>	<i>An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.</i>
<b>4</b>	<i>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</i>		