



COURSE DESCRIPTIONS

Faculty	Engineering				
Department	Civil Engineering			NQF level	9
Course Title	Engineering Systems Simulation	Code	704772	Prerequisite	
Credit Hours	3	Theory	3	Practical	0
Course Leader	Dr. Faten Albtoush	email	f.albtoush @jadara.edu.jo		
Lecturers	Dr. Faten Albtoush	emails	f.albtoush @jadara.edu.jo		
Lecture time	[15:00 – 18:00] Sat & [18:00-21:00] Mon	Classroom	Online D401	Attendance	Fulltime
Semester	3 rd Semester	Production	10/2022	Updated	7/2024
Type of Teaching	<input type="checkbox"/> Face to Face <input checked="" type="checkbox"/> Blended <input type="checkbox"/> Online				

Short Description
<p>This course prepares graduate students to design, model, and analyze real systems using discrete event simulation. Student will understand the function and characteristics of discrete event simulation modeling. The students will be able to formulate a simulation model for a real system, then they will be able to construct the model by using a computer program. Finally, the students will be able to run the model and evaluate the output results.</p>
Course Objectives
<p>Simulation modeling using Arena Software</p>

Course Intended Learning Outcomes (CILOs)
A. Knowledge - Theoretical Understanding
<p>a1. Understand: simulation models and specific function and type of data input.</p>
B. Knowledge - Practical Application
<p>a3.</p>
C. Skills - Generic Problem Solving and Analytical Skills
<p>b1. ability to formulate the real system characteristics and capture the existing logic. b2. An ability to collect data and use input analyzer to create cost/time distributions. Ability to analyze the run results and realize consequences.</p>
D. Skills - Communication, ICT, and Numeracy
<p>C1: ability to design a computer model that match the real system characteristics. C2: ability to write scientific research of a realistic application related to construction management</p>

E. Competence: Autonomy, Responsibility, and Context			
Teaching and Learning Methods			
<input checked="" type="checkbox"/> Face to Face Lectures <input checked="" type="checkbox"/> Using Video <input type="checkbox"/> Field visit	<input type="checkbox"/> Brain Storming <input checked="" type="checkbox"/> Discussions <input checked="" type="checkbox"/> Problem solving	<input type="checkbox"/> Synchronous remote <input type="checkbox"/> Research Project	<input checked="" type="checkbox"/> Asynchronous remote <input type="checkbox"/> Case Study
Assessment Methods			
<input type="checkbox"/> Formative Assessment <input type="checkbox"/> Project Assessment	<input checked="" type="checkbox"/> Quiz <input checked="" type="checkbox"/> Oral Presentation	<input checked="" type="checkbox"/> Lab Exam <input checked="" type="checkbox"/> Midterm	<input checked="" type="checkbox"/> Homework <input checked="" type="checkbox"/> Final Exam

Course Contents					
Week	Hours	CILOs	Topics	Teaching & Learning Methods	Assessment Methods
1.	3	a1	Chapter One: What Is Simulation?	Face to Face Lectures,	
2.	3	a1	Chapter Two: Fundamental Simulation Concepts	Face to Face Lectures, Asynchronous remote & Using Video	Homework
3.	3	b1	Chapter Three: A Guided Tour Through Arena	Face to Face Lectures, Asynchronous remote & Using Video	Quiz
4.	3	b1	Chapter Three: A Guided Tour Through Arena	Face to Face Lectures, Asynchronous remote	Homework
5.	3	b1 & c1	Chapter Four: Modeling Basic Operations and Inputs	Face to Face Lectures, Asynchronous remote	Quiz
6.	3	b1 & c1	Chapter Four: Modeling Basic Operations and Inputs	Face to Face Lectures, Asynchronous remote	Homework
7.	Midterm Exam 30%				
8.	3	b1 & c1	Chapter Four: Intermediate Modeling and Steady-State Statistical Analysis	Face to Face Lectures, Asynchronous remote	Homework
9.	3	b1 & c1	Chapter Four: Intermediate Modeling and Steady-State Statistical Analysis	Face to Face Lectures, Asynchronous remote	Quiz
10.	3	b1 & c1	Chapter Five: Entity Transfer	Face to Face Lectures, Asynchronous remote	Homework
11.	3	b1 & c1	Chapter Five: Entity Transfer	Face to Face Lectures, Asynchronous remote	Homework
12.	3	b1 & c1	Chapter Six: A Sampler of Further Modeling Issues and Techniques	Face to Face Lectures, Asynchronous remote	Quiz

13.	3	b1 & c1	Chapter Six: A Sampler of Further Modeling Issues and Techniques	Face to Face Lectures, Asynchronous remote	Homework
14.	3	b1 & c1	Chapter Seven: Statistical Analysis of Output from Terminating Simulations	Face to Face Lectures, Asynchronous remote	
15.	2		REVISION	Face to Face Lectures, Asynchronous remote	
16.	2	Final Exam 40%			

Infrastructure	
Textbook	Title: Simulation with Arena. Author David Kelton. Year: 2020.
References	Title: Simulation Modeling and Arena. Author: Manuel D. Roseetti. Year: 2016
Required reading	
Electronic materials	Handouts & lecture links loaded on e-learning system.
Other	

Course Assessment Plan							
Assessment Method		Grade	CILOs				
			a1	b1	b2	c1	c2
First (Midterm)		15	5	5		5	
Second (if applicable)							
Final Exam		25	5	5	5	10	
Coursework							
Coursework assessment methods	Assignments	20			20		
	Case study						
	Discussion and interaction	10		10			
	Group work activities	20				10	
	Lab tests and assignments						
	Presentations	5					5
	Quizzes	5				5	
Total		100	10	20	25	30	15

Plagiarism
<p>Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).</p> <p>Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.</p>

