COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Computer Science			**NQF level**	6
Course Title	**Simulation and modeling**	**Code**	**501351**	**Prerequisite**	852121
Credit Hours	3	**Theory**	3	**Practical**	0
Course Leader	Dr. Arwa Zabian	**email**	arwa@jadara.edu.jo		
Lecturers	Dr. Arwa Zabian	**emails**			
Lecture time	10- 11.30 Mon, Wed	**Classroom**	Distance learning		
Semester	First/ 2020-2021	**Production**		**Updated**	2020
Awards	Bachelor Degree			**Attendance**	Fulltime

Short Description
This   coures is an introduction to modelling and simulation concepts , system analysis and classification, continous and discrete models, pseudorandom number generation and testing, queuing system, simulation tools , how to build simulator using Matlab .

Course Objectives
- Define system components and attributes   - Identify the best model used in each situation   - Designing a model for any system   - Identify the type of input needed for any system   - Building or using simulator to simulate the system model   - Analysing feedback to modify the system in a manner to satisfy the problem requirements

Learning Outcomes
A. Knowledge - Theoretical Understanding
a1: **Define** the components of the system , entities and what are the relationships between them (K1)   a2: Compare between different models and find the best model to use (K2)
B. Knowledge - Practical Application
a3: **Apply** theoretical concepts for modeling any system (K4)
C. Skills - Generic Problem Solving and Analytical Skills
b1: Analyze model and determine input for the corresponding system (S1)
D. Skills - Communication, ICT, and Numeracy
E. Competence: Autonomy, Responsibility, and Context

c1: <u>Develop</u> simulation model , <u>formulate</u> and <u>estimate</u> the results for <u>improving</u> or <u>modifying</u> the studied system (C1)	

Teaching and Learning Methods

1. Using illustrative and code examples in the lectures.
2. Imitate real-world practices during lectures and labs and practice role playing.
3. Offering case studies according to the nature of the offered course, and offer them opportunities for presenting solutions that deem appropriate to solve a specific problem

Assessment Methods

By quizzes, assignments, practical exams, theoretical exams

Course Contents					
Week	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1.	3	a1	**What is modelling**	Distance learning	quiz
2.	3	a1	**What is simulation ? why we use simulation , advantage and disadvantage of simulation**	Distance learning	
3.	3	a1	**Type of models (continous, Discrete, stochahostic)**	Distance learning	quiz
4.	3	a1	**Type of models (continous, Discrete, stochahostic) continue**	Distance learning	
5.	3	b1	**How to build a model**	Distance learning	
6.	3	c1	**How to build a model (continue)**	Distance learning	quiz
7.	3	a2, a3	**how to generate an input (random number generation)**	Distance learning	
8.	1.5	a1, a2,a3, b1,c1	Mid exam	Distance learning	Midterm
	1.5	c1	**How to build a simulator using Matlab (continue)**		
9.	3	c1	**How to build a simulator using Matlab or python**	Distance learning	
10.	3	c1	**How to build a simulator using Matlab or python (continue)**	Distance learning	Assignment
11.	3	c1	**Staistical results analysis**	Distance learning	
12.	3	c1	**Staistical results analysis (continue)**	Distance learning	
13.	3	c1	**Complete case study**	Distance learning	Case study or project
14.	3	a1, a2,a3, b1,c1	Final exam	On line exam	Final exam

Infrastructure	
Textbook	**Introduction to Modeling and Simulation with Matlab and Python.** Steven I.Gordon and Brian Guilfoos. 2017. Taylor & Francis Group
References	**ISBN: -13: 978-1-4978-7387-4**
Additional reading	**1.** Computer Simulation Techniques: The definitive introduction! Harry Perros. 2009. The book is available at http://www.csc.ncsu.edu/faculty/perros//simulation.pd**f** **2.** Simulation with Arena. W.David Kelton, Randall P. Sdowski, Nancy B. Swetts. McGraw. Hill. Fifth Edition 2010. ISBN : 978-007-126771-7
Electronic materials	**http://elearning.jadara.edu.jo/CourseContent/index/9831/**
Other	

Course Assessment Plan						
Assessment Method	**Grade**	**CLOs**				
		a1	a2	a3	b1	c1
Midterm	30	6	6	6	6	6
Second (if applicable)						
Final Exam	50	10	10	10	10	10
Coursework	20					
Coursework assessment methods — Assignments						
Case study				6		
Discussion and interaction						
Group work activities					3	3
Lab tests and assignments						
Presentations						
Quizzes		4	4			
Total	100	20	20	22	19	19

Plagiarism
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). 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.