Syrian Arab Republic		الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالـــي
Syrian Virtual University		الجامعة الافتراضية السورية

Course Description: Modeling and Simulation

1- Basic Information:

Course Name	**Modeling and Simulation**
Course ID	**SM**
Contact Hours (Registered Sessions)	**16**
Contact Hours (Synchronized Sessions)	**16**
Mid Term Exam	**-**
Exam	**75 min**
Registered Sessions Work Load	**16**
Synchronized Session Work Load	**16**
Credit Hours	**4**

2- Pre-Requisites:

Course	ID
None	

3- Course General Objectives:

This course introduces simulation concepts, discrete event simulation, random number generation, input modeling; statistical analysis of simulation. ARENA, the well-known simulation package is used for practicing simulation.

After the course, the students will be able to build abstract models of systems, develop and run the discrete-event system simulation models using general and special purpose programming tools, understand and program statistical models in simulation, and analyze simulation data using various statistical techniques.

Intended Learning Outcomes (ILO):

Code	Intended Learning Outcomes
ILO1	Learn system theory and basic concepts in discrete-event simulation field: modeling, data collection for input parameters, output analysis, verification and validation, and experimentation.
ILO2	Learn creating a simulation model using software (Arena) to improve or design a system in industry and business.
ILO3	Develop critical thinking and creativity skills through project and design of experiment

	(sensitivity analysis)
ILO4	Students' communication skills will improve through writing reports, team work

4- Course Syllabus (18 hours of total synchronized sessions;18 hours of total Recorded Sessions)

- **RS:** Recorded Sessions**; SS:** Synchronized Sessions**;**

ILO	Course Syllabus	RS	SS	Type	Additional Notes
ILO1	• Introduction to Simulation • Simulation Examples • General Principles for Discrete-Event Simulations • Statistical Models in Simulation • Queueing Models			☐ Exercises	
ILO2	• Random Number Generation • Random-Variate Generation			☐ Exercises	
ILO3	• Input Modeling • Estimation of Absolute Performance			☐ Exercises ☐ Practices	
ILO4	Students select a subject and given an project to apply what he/she learned			☐ Assignments ☐ Projects	

5- Assessment Criteria (Related to ILOs)

ISC	Interactive Synchronized Collaboration		Ex	Exams		Rpt	Reports
PF2F	Presentations and Face-to-Face Assessments		PW	Practice Work			

ILO Code	ILO	Intended Results	Assessment Type				
			ISC	PW	Ex	PF2F	Rpt
ILO1	Learn system theory and basic concepts in discrete-event simulation field:		✓	✓	✓		

	modeling, data collection for input parameters, output analysis, verification and validation, and experimentation.						
ILO2	Learn creating a simulation model using software (Arena) to improve or design a system in industry and business.		✓	✓	✓		
ILO3	Develop critical thinking and creativity skills through project and design of experiment (sensitivity analysis)		✓	✓	✓		
ILO4	Students' communication skills will improve through writing reports, team work, and occasional presentation		✓				✓

7-Practice Tools:

Tool Name	Description
ARENA program	Arena is a discrete event simulation and automation software developed by Systems Modeling and acquired by Rockwell Automation.

8-Main References

- Uploaded pdf files on Moodle system

9-Additional References

- Discrete Event System Simulation
  Banks, J., Carson II, J.S., & Nelson, B.L. (1996) 2nd ed., New Jersey: Prentice Hall Int'l Inc.
- Simulation with ARENA
  W. David Kelton, Randall P. Sadowski and Deborah A. Sadowski (1998). WCB McGraw-Hill.
- http://info.arenasimulation.com