Jordan University of Science and Technology
Faculty of Computer & Information Technology
Network Engineering And Security Department

NES510 Network Simulation And Modeling

Summer Semester 2019-2020

Course Catalog
3 Credit Hours. Introduction to simulation concepts, discrete event simulation, random number generation, input modeling; statistical analysis of simulation, computer networks simulation, Discrete time Markov chains (DTMC), Continuous time Markov chains (CTMC), Queuing models (M/M/1, M/M/c/k, M/G/1). Well-known network simulation packages such as ns2 and/or Qualnet.

Text Book	
Title	Discrete Event System Simulation
Author(s)	Jerry Banks, John S. Carson II, Barry L. Nelson, and David M. Nicol
Edition	5th Edition
Short Name	Ref#1
Other Information	

Instructor	
Name	**Dr. ABDALLAH ALMA'AITAH**
Office Location	-
Office Hours	Sun : 09:00 - 10:00 Sun : 10:00 - 11:00 Mon : 13:00 - 14:00 Tue : 09:00 - 11:00 Wed : 09:00 - 11:00
Email	ayalmaaitah@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Mon, Tue, Wed : 11:30 - 13:00 Room: NES02-E1L3

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
1754160	NES416 Network Programming	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2	Introduction to Simulation	**CH1** From **Ref#1**
Weeks 3, 4	Simulation Examples	**CH2** From **Ref#1**
Weeks 4, 5	General Principles	**CH3** From **Ref#1**
Weeks 6, 7, 8	Generating Random Variables with arbitrary Distribution	**CH7,8** From **Ref#1**
Weeks 9, 10	Input Modeling	**CH9** From **Ref#1**
Weeks 11, 12, 13	Absolute performance	From **Ref#1**
Weeks 14, 15, 16	Queuing Models	**CH6** From **Ref#1**

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Understand the basic concepts of discrete event simulations and carry out hand simulations [1SO1, 1SO2]	10%	
Generate random numbers and apply uniformity and independency test [1SO2]	15%	
Generate random variate from RN to meet a predefined probability PDFs and PMFs [1SO1, 1SO2]	15%	
Modeling inputs for a given simulation based on data collection categorization, selecting proper PDFs and associated parameters, then testing the resultant model [1SO1, 1SO2]	20%	
Calculate confidence intervals (CIs) and prediction intervals (PIs) for output data [1SO1, 1SO2]	20%	
Compute performance parameters of Queuing systems and their relevance to computer networks simulation [1SO2]	10%	
Using a software package to simulate different computer network topologies [1SO2]	10%	

Relationship to Program Student Outcomes (Out of 100%)																
A	B	C	D	E	F	G	H	I	J	K	SO1	SO2	SO3	SO4	SO5	SO6	SO7
											32.50	67.50					

Evaluation

Assessment Tool	Weight
First Exam	20%
Second Exam	20%
Lab assignments	20%
Final exam	40%

Policy	
General Policies:	Makeups ? Makeup exam should not be given unless there is a valid excuse. Drop Date ? Last day to drop the course is before the 12thweek of the current semester. Cheating ? Standard JUST policy will be applied. Attendance ? Excellent attendance is expected. JUST policy requires the faculty member to assign ZERO (35%) if a student misses more than 10% of the classes without an excuse. Attendance will be taken by calling the names or passing a sign-up sheet. If you miss a class, it is your responsibility to find out about any announcements or assignments you may have missed. Workload ? Average work-load student should expect to spend is 6 hours/week. Graded Exams ? Graded exam papers will be returned within a week. Participation ? Participation in the class will positively affect your performance. ? Disruption and side talks will possibly result in dismissal from class. ? No eating or chewing gums are allowed in class.

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