National University

Of Computer & Emerging Sciences
Karachi

Course Outlines of BS (CS) Degree Program

Course Instructor	Ms. Amber Shaikh	**Semester**	Spring
Batch/Section(s)	Batch 2019	**Year**	2022
Course Title	Simulation and Modelling	**Credit Hours**	3
Prerequisite(s)	Probability and Statistics	**Course TA**	

Text Book(s)

Title of book	Simulation Modelling and Analysis
Author(s)	Averill M Law

Reference Book(s)

Title of book	Discrete Event System Simulation
Author(s)	Jerry Banks, John S. Carson,…
Title of book	Stochastic Simulations
Author(s)	Brian .D Ripley

Course Description:

S. No.	Course Learning Outcomes (CLO)	Domain	Taxonomy Level	PLO
1.	Grasp modeling concepts with emphasis on performance analysis.	Cognitive	**2**	
2.	Build simulation models and their parameterization.	Cognitive	**2**	**2**
3.	Analyze simulation output data to evaluate performance criteria.	Cognitive	**3**	

Tentative Weekly Lectures Schedule:

Week	Contents/Topics	Remarks	Exercises	CLO's	Tools
Week 1	Introduction to modelling and simulation		**1.1-1.2 (LAW) 1-2.5(Zimmer)**	**1**	A1, M1, Q1, F
Week 2	Discrete- Event Simulation		**1.3.1-1.3.2(LAW)**		
Week 3	Simulation of Single Server queueing system Simulation of Inventory System		**1.4-1.5 (LAW)**		
Week 4	Alternative approaches to Modelling and simulation	Quiz no 1	**1.8 (LAW)**		
Week 5	Simulation Softwares' Introduction	Assignment no 1	**3.1-3.3 (LAW)**		
Week 6	**1st Mid Term Exam**				
Week 7	Review of Basic Probability and Statistics	Quiz no 2	**4.1-4.7(Law)**	**2**	A2, Q2 M2, F
Week 8	Simulation of Discrete, continuous probability distributions and empirical distributions		**6.1-6.4(LAW)**		
Week 9	Simulation of Multivariate distributions, correlation and stochastic processes		**6.10 (LAW)**		
Week 10	Models of Arrival processes	**Assignment 2**	**6.12 (LAW)**		
Week 11	**2nd Mid Term Exam**				
Week 12	Random number generators	Assignment no 3	**7.1-7.4(LAW)**	3	
Week 13	Monte-Carlo Simulations		**1.8.3 (LAW)**	**2**	A3,Q3,F
Week 14	Variance reduction techniques		**11.1-11.2(LAW)**		
Week 15	Building of some simulation models using above techniques, validation and verification of models. Output Analysis of models	Quiz no 3			
Week 16	Revision				

Marks Distribution:

Particulars	**% Marks**
1. Assignments and Presentations	20
2. First Mid Exam	15
3. Second Mid Exam	15
4. Final Exam	50
Total:	**100**