Arab Academy for Science and Technology and Maritime Transport
Computer Science Curriculum
Course Syllabus

Course Code: CS305	**Course Title:** System Modeling and Simulation	**Classification:**	**Coordinator:** Dr Essam Elfakharany **Lecturer:**	**Credit Hours:** 3
Pre-requisites: CS212 (Data Structures and Algorithms)	**Co-requisites:** None	**Schedule:** Lecture: 2 hours Tutorial-Lab: 2 hours		
Office Hours:				
Course Description: The course gives the theoretic aspects of simulation, followed by its probabilistic and statistical underpinnings, including random number generation. It addresses simulation-related theory of input analysis, and output analysis. It also provides a background about Markov chain processes and queuing theory. Finally, the course describes and illustrates modeling of some applications using simulation software. .				
Textbook: JERRY BANKS, JOHN CARSON II , DISCRETE-EVENT SYSTEM SIMULATION , PEARSON.				

References:

- Law, *Simulation Modeling and analysis*, McGraw-Hill, 2007.
- Tayfur Altiok, and Benjamin Melamed, *Simulation Analysis Modeling and with Arena*, Elsevier, 2007.

Course Objective/Course Learning Outcome:	**Contribution to Program Student Outcomes:**
1. Understand the basic principles of the field of Modeling and Simulation.	(SO-3) Communicate effectively in a variety of professional contexts.
2. Apply standard statistical techniques in analyzing input data for a simulation experiment.	(SO-1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions
3. Use Markov chains theory for modeling of queuing systems.	
4. Plan for and design a simulation experiment for some problems	(SO-2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
5. Evaluate performance of queuing systems.	

Course Outline: **Week 1.** Introduction to Simulation **Week 2.** Steps in Simulation Study **Week 3.** Monte Carlo Simulation **Week 4.** Discrete Event Simulation **Week 5.** Statistical Models in Simulation **Week 6.** Statistical Models in Simulation (cont.) **Week 7.** 7th Week Exam **Week 8.** Random-Number Generation	**Week 9.** Random-Variate Generation **Week 10.** Input Modeling **Week 11.** Output Analysis **Week 12.** 12th Week Exam **Week 13.** Markov Chain **Week 14.** Queuing Models **Week 15.** Revision **Week 16.** Final Exam
Grade Distribution: **7th Week Assessment (30%):** Quiz (5%) + Exam (25%) **12th Week Assessment (20%):** Exam (10%) + Project 10% **Year Work (10%):** Homework Assignments **Final Exam (40%)**	

Policies:

Attendance:
AASTMT Education and Study Regulations (available at aast.edu)

Academic Honesty:
AASTMT Education and Study Regulations (available at aast.edu)

Late Submission:
Late submissions are graded out of 75% (1 week late), 50% (2 weeks late), 25% (3 weeks late), 0% (more than 3 weeks late)