ISYE 3044 SIMULATION ANALYSIS AND DESIGN

Required for BSIE

Prepared Profs. Alexopoulos, Kim, Song, Fall 2023.

Credit: 3-0-3

Prerequisite(s): ISyE 3030 and ISyE 3232

Texts:
Simio …

Catalog Description:
Discrete event simulation methodology emphasizing the statistical basis for simulation modeling and analysis. Overview of computer languages and simulation design applied to various industrial situations.

Course Description

Course Outline
The topics and approximate number of weeks of coverage are in the table below. (Cover all Simio objects)

Topics	Weeks
General principles and simulation languages	1
Estimation of error and risk in simulation experiments; simulation with spreadsheets	1.5
Fundamental Concepts from probability and statistics Queueing models	1
Random number generation	0.5
Random variate generation	1
Input modeling	1.5
Verification and validation	0.5
Output analysis for a single system	1
Comparison and evaluation of alternative system designs	1
Introduction to Simio	1
Animation in Simio	0.5
Entity routing logic	1
Advanced Modeling Techniques: Simio Processes	1
Modeling with Tables and External Data	1
Simulation of Systems with Moveable Resources and Conveyors	1

Total	14

Course learning outcomes and their relationship to BSIE student Outcomes

At the end of this course, students will be able to:

1. Evaluate the effects of randomness on system behavior and performance.
2. Develop credible and valid simulation models.
3. Fit statistical distributions to input data.
4. Analyze output data from simulations.
5. Compare alternative system designs using simulation.

Course outcome \ Program Outcomes	1. identify, formulate solve engg prob by engg, sci & Math	2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic	3 communicate with a range of audience	4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context.	5. effective on a team provide leadership, collaborative and inclusive envirn, plan tasks & meet objectives	6. develop and conduct experiment, analyze and interpret data & use engineering judgement to draw conclusions.	7. acquire and apply new knowledge using appropriate learning strategies
1. Evaluate the effects of randomness on system behavior and performance						M	
2. Develop credible and valid simulation models					H	H	
3. Fit statistical distributions to input data	H						
4. Analyze output data from simulation	H					H	
5. Compare alternative system design using simulation		H					

Evaluation of the important outcomes

Course outcomes 3 and 4 will be assessed on direct questions on final exam.
2 and 5 are assessed by the project or modeling assignment.