

School of Engineering and Natural Sciences / Industrial Engineering (English)

2022 - 2023 Academic Year

MODELLING and SIMULATION

Syllabus

Course Description					
Name	Code	Semester	T+A Hour	Credit	ECTS
MODELLING and SIMULATION	IND3149030	Fall Semester	3+2	4	8
Prerequisites Courses	MODELLEME VE OPTİMİZASYONA GİRİŞ; STOKASTİK MODELLER				
Recommended Elective Courses					
Language of Instruction	English				
Course Level	First Cycle (Bachelor's Degree)				
Course Type	Required				
Course Coordinator	Assoc.Prof. Yasin GÖÇGÜN				
Name of Lecturer(s)	Assoc.Prof. Yasin GÖÇGÜN				
Assistant(s)					
Aim	To make students understand the real job applications and provide solutions to the job improvement processes by making simulation of them on a computer environment.				
Course Content	This course contains; Introduction to Simulation,Input Analysis,Random-Number and Random-Variate Generation,Monte Carlo Simulation Examples,Dynamic Simulation Examples,Discrete-Event Simulation in Arena - Basic Operations Validation,Discrete-Event Simulation in Arena - Detailed Operations,Output Analysis - Terminating Simulations,Discrete-Event Simulation in Arena - Intermediate Modeling,Output Analysis - Steady State Simulations,Discrete-Event Simulation in Arena - Entity Transfer,Sample Applications I,Sample Applications II,Arena Process Analyzer.				
Course Learning Outcomes			Teaching Methods	Assessment Methods	
1. Make a hand simulation and calculate the related statistics.			1, 15	A, C	
2. Explain what is Monte Carlo simulation and make an implementation of it.			1, 9	A, C	
3. Know the logic of generating a random number and use Linear Congrential Method.			1, 15	A, C	
4. Use the Arena Software and make a discrete-event simulation using Arena.			6, 9	A, D	
5. Analyze the outcomes of Arena and propose job improvement alternatives.			1, 6	A, D	
Teaching Methods	1: Lecture, 15: Problem solving, 6: Role Model, Making an example, 9: Simulation				
Assessment Methods	A: Written Exam, C: Homework, D: Project / Design				
Lecture Schedule					
Sequenc e	Topics	Preliminary Preparation			
1	Introduction to Simulation				
2	Input Analysis				
3	Random-Number and Random-Variate Generation				
4	Monte Carlo Simulation Examples				
5	Dynamic Simulation Examples				
6	Discrete-Event Simulation in Arena - Basic Operations Validation				
7	Discrete-Event Simulation in Arena - Detailed Operations				
8	Output Analysis - Terminating Simulations				
9	Discrete-Event Simulation in Arena - Intermediate Modeling				
10	Output Analysis - Steady State Simulations				
11	Discrete-Event Simulation in Arena - Entity Transfer				
12	Sample Applications I				
13	Sample Applications II				
14	Arena Process Analyzer				
Evaluation Methods		Weight(%)			
Midterm Exam		30			
General Exam		70			
Resources					
J. Banks, J.S. Carson, B.L. Nelson and D.M. Nicol, Discrete-Event System Simulation, 3rd Edition, Prentice Hall, 2001					
W.D. Kelton, R.P. Sadowski and D.A. Sadowski, Simulation with Arena, 2nd Edition, McGraw-Hill, 2002 3. S.H. Ross, Simulation, 2nd Edition, Academic Press,1997					