

## Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
IND304	Modeling and Simulation	6	3	0	0	3	5

Prerequisites	IND373-IND313
Admission Requirements	IND373-IND313

Language of Instruction	Turkish
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	Modeling and simulation are key tools for improving the performance of industrial systems. The purpose of this course is to give students both a conceptual and cultural practice in the field of modeling and simulation; introduce the applications of modeling and simulation to real problems and introduce students to the use of computer simulation tools.
Content	Course Introduction: Basic concepts of the system, model and simulation - Learning to live with the random and unpredictable - Computer simulation Concepts of the system, input, output, state - Taxonomy of the systems - Different approaches to system analysis - Different production systems and their problems Modeling approach - Modeling process - Modeling method Characteristics and interests of simulation - Monte Carlo Simulation - Random Number Generation - Time Control - Notions queue Simulation process - Simulation techniques Basic probabilistic simulation - Data modeling Analysis of problems and industrial cases with the simulation by hand Learning simulation softwares: Promodel, Servmodel, Medmodel Steps to design a simulation project - Structuring a real project simulation Statistical tests for model validation Verification, validation and analysis of simulation results, examples of real industrial cases Brief overview of simulation languages and simulation softwares
References	1.KELTON, W.D. et A.M. LAW (2007). Simulation Modeling and Analysis, (3ème ou 4ème éditions), McGraw Hill. 2. ERKUT, H. (2000). Yönetimde Simülasyon Yaklaşımı, İrfan Yayıncılık, İstanbul.

## Theory Topics

Week	Weekly Contents
1	Course Introduction: Basic concepts of the system, model and simulation - Learning to live with the random and unpredictable - Computer simulation
2	Concepts of the system, input, output, state - Taxonomy of the systems - Different approaches to system analysis - Different production systems and their problems
3	Modeling approach - Modeling process - Modeling method
4	Characteristics and interests of simulation - Monte Carlo Simulation - Random Number Generation - Time Control - Notions queue
5	Simulation process - Simulation techniques
6	Analysis of problems and industrial cases with the simulation by hand
7	Midterm
8	Basic probabilistic simulation - Data modeling

Week	Weekly Contents
9	Learning simulation softwares: Promodel, Servmodel, Medmodel
10	Steps to design a simulation project - Structuring a real project simulation
11	Statistical tests for model validation
12	Verification, validation and analysis of simulation results, examples of real industrial cases
13	Brief overview of simulation languages and simulation softwares
14	Presentation of projects