



## **Faculty of Eng. & Natural Sci.**

**IE312-202201**

### **Operations Research II**

#### **Instructor(s)**

<b>Name</b>	<b>Email</b>	<b>Office</b>	<b>Phone</b>	<b>Web</b>	<b>Office Hours</b>
Tonguç Ünlüyurt	tonguc@sabanciuniv.edu	FENS-1056	9504	<a href="http://myweb.sabanciuniv.edu/tonguc/">http://myweb.sabanciuniv.edu/tonguc/</a>	Tuesday 10:40-12:40

#### **Course Content**

Develop a broad perspective on the relationships between various types of optimization problems; acquire modeling and solution skills for various methodologies: integer programming, network flows, dynamic programming, heuristics; apply these skills to problems from domains such as service, production, transportation, and energy systems.

#### **Objectives**

To teach basic ingredients of deterministic optimization including integer programming modeling and solution methods, network models, dynamic programming and heuristics

## **Recommend or Required Reading**

### **Textbook**

Operations Research, Applications and Algorithms

Wayne L. Winston

## **Assessment Methods and Criteria**

	<b>Percentage(%)</b>	<b>Number of assessment methods</b>
Final	40	1
Midterm	50	2
Exam	10	4

## **Course Outline**

- Integer programming modeling.
- Branch and bound method.
- Introduction to networks.
- Shortest path, maximum flow and minimum cost network flow problems
- Characteristics of dynamic programming
- Dynamic programming examples
- Heuristic algorithms.
- Local search and metaheuristic algorithms.
- Overview and classification of optimization problems.

## **Learning Outcomes**

Have a basic understanding of integer programming modeling and branch and bound algorithm as a solution method.

Have an understanding of basic concepts related to networks, network models including shortest path, maximum flow and minimum cost network flow problems.

Have an understanding of dynamic programming.

Have an understanding of heuristic approaches.

Be able to implement developed models and/or solution methods using appropriate software

## **Course Policies**

In the computer-based lectures, we will use Gurobi/Python to implement the models/algorithms.

There will be two midterms and a final. The final exam will be comprehensive

There will a single comprehensive make up exam for those of you who miss an exam

There will be 4 quizzes/assignments. (10%)