

**IE 452**  
**Mathematical Modeling and Applications**  
**Spring'24**

**Instructor :** Dr. Ömer Kirca      **email:** [kirca@metu.edu.tr](mailto:kirca@metu.edu.tr)      **office:** IE217

**Assistant :**

**Schedule:**

**Prerequisite :**

- IE251, IE252 and IE323 (or equivalent)
- Competency in Math. Programming software such as GAMS, CPLEX, Ilog ...

**Topics :**

1. Introduction
2. Review of LP and IP Solution Methods
3. Network Flow Models
4. TSP and VRP models
5. Production Planning Models
  - Static PP
  - Dynamic PP and Lot sizing
  - Scheduling Problems
6. Location Models

**Text :**

Mainly lecture notes, papers and parts of certain text books.

**References:**

- Winston W.L., *Operations Research-Applications and Algorithms*, 4<sup>th</sup>ed, Duxbury Press Cal., 2004. (or latest edition)
- Hillier F.S., Lieberman G.J., *Introduction to Operations Research*, 9th ed., McGraw-Hill, 2010 (or latest edition)
- Pochet Y. and Wolsey, L.A. *Production Planning by Mixed Integer Programming*. Springer, 2006
- Williams, H. P., *Model-Building in Mathematical Programming*, 5<sup>th</sup> ed. , Wiley, 2013

**Work Load:**

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|----------------------|-----|
| 1. Homeworks, cases: | 30% |
| 2. Midterm:          | 30% |
| 3. Final:            | 40% |

**Conduct:**

1. The material and correspondence will be conveyed through **ODTUClass**
2. **Attendance is required and monitored.** (*at least 70% attendance is required to take the final exam*)
3. **Academic Integrity Guide for Students of METU** should be respected.
4. Makeups for the exams will be given after the final exam and will be comprehensive