**OR 607 GAME THEORY AND COMPETITIVE STRATEGIES**  
**FALL 2023**

**Instructor:** Özgen Karaer, IE 209, okaraer@metu.edu.tr

**Course webpage:** [https://odtuclass.metu.edu.tr/](https://odtuclass.metu.edu.tr/)

**Course time and place:** TBD

**Course objective:** To understand the basics of game theory and study its use in operations management problems. By the end of this course, the students will be able to
- Understand game theory concepts and assumptions
- Model a conflict with multiple agents using the game theory framework and find the solution as a prediction of the outcome
- Get familiarized with the use of game theory in the operations management literature, and understand concepts such as double marginalization, inefficiency due to lack of coordination (price of anarchy), competition & collaboration
- Present and evaluate theoretical work effectively

**Course conduct:** First 10-11 weeks of the semester will be lectures on game theory and equilibrium concepts. In the last 4-5 weeks, students will take the lead in presenting and discussing selected research papers (see below). Students are required to attend the class well prepared and are expected to actively participate in class discussions.

**Textbook:**

**Reference Material:**

**Background:** Basic math and economics  
Familiarity with OM problems and solution tools

**Grading:** Evaluation of students will be based on
- Class participation & quizzes (10%)
- Midterm (2) (20%, 40%)
- Paper presentations (12%)
- Research project (18%)

**Course Outline:** (NOTE: The selected papers are subject to change)
Week 1-2-3. Static Games of Complete Information
Week 4-5-6. Dynamic Games of Complete Information (and Midterm 1)
Week 7-8. Static Games of Incomplete Information
Week 9-10. Dynamic Games of Incomplete Information (and Midterm 2)
Week 11


Week 12.


Week 13.


Week 14.


Additional Papers:

**Research project:** Students are expected to submit a project report on a stream of literature (max. 8 pages). The report should contain at least 7 published articles related to the research stream. For each paper, students are expected to
1. describe the problem setting studied,
2. list the research questions,
3. summarize the main findings, and
4. discuss contribution of the paper (to the literature) and its value to practice

The papers must be published in one of the following journals: Management Science, Operations Research, Manufacturing & Service Operations Management (MSOM), Production and Operations Management, European Journal of Operational Research, Journal of Operations Management. *The list of journals can be relaxed upon consultation with the instructor.*

Students can also introduce a potential problem that can be studied. This problem should be relevant and should promise a contribution to the literature. This problem part is optional and will be considered as a *bonus* if submitted (will be evaluated out of 20pts in addition to the 100pts score for the report).

Note: The selected papers must be close enough in problem setting and research questions. Students may be inspired by a paper discussed in class. However, that paper is not counted in the 7 articles required in the project.

**Presentations:** Each week (for the last four/five weeks), two papers will be discussed. Each paper will be discussed by two students. Each paper presentation will last about 40 minutes. Presentation requirements will be determined based on the total class size.