

IE 469 INDUSTRIAL APPLICATIONS OF OPERATIONS RESEARCH

SPRING 2023

IMPORTANT NOTES

If you are showing any symptoms, WEAR A MASK!

This course requires **Microsoft Excel for Windows!** Make sure you read and understand the software requirement below!

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Course Web Page: <https://courses.ie.bilkent.edu.tr/ie469>

Course Objective: The students will learn how to tackle OR related problems using tools available in real life such as Microsoft Excel and VBA. Students are expected to solve OR related problems using Excel Solver and with heuristic algorithms written using VBA.

Software Requirements:

The software Microsoft Excel for Windows is absolutely required for this course!

- There are **free Excel alternatives** (like OpenOffice, LibreOffice) but I cannot guarantee these free alternatives will have all the functionality needed as per our coverage, especially in VBA.
- If you are a Mac user, **Microsoft Excel for Mac** is generally fine but it does not have User Forms in VBA. So, you will need a Windows computer for at least Userforms.
- If your **Excel display language is not English**, check Options>Language and install English as the display language. (This is required for the correct function names)

This means, Mac users or students with no Microsoft Excel should arrange a Windows computer with Microsoft Office. You are welcome to use the BCC Computer Labs.

Class Hours: Lectures and demos will be on Tuesdays at 15:30-16:20 at EE-211 and Case/Lab Studies will be on Fridays at 10:30-12:20 at B-201 and B-202. Note that in some weeks, there will be lectures and demos on Fridays.

Prerequisites: The formal prerequisite is IE 303. However, this is an IE Restricted Elective course and students must be comfortable with core IE courses:

- Simulation (IE 324)
- Stochastic Models (IE 325)
- Engineering Economy (IE 342)
- Statistics (MATH 260)
- Computer programming (CS 113 or CS 114 or CS 115 or equivalent)

Recommended Textbooks: We will not have a formal textbook in this course. However, the following texts might be beneficial:

- VBA for Modelers: Developing Decision Support Systems, 4th Edition, Author: S. Christian Albright (ISBN-10: 1133190871)

- Spreadsheet Modeling and Decision Analysis: A Practical Introduction to Business Analytics, 7th Edition, Author: Cliff Ragsdale, (ISBN-10: 1285418689)
- Developing Spreadsheet-Based Decision Support Systems, Authors: Sandra D. Eksioglu, Michelle M.H. Seref, Ravindra K. Ahuja, Wayne L. Winston (ISBN-10: 0975914685)

Project: You will be assigned a term project, which you will have approximately 4 weeks to work on. You will submit a report and will make a demo at the end of the semester.

Case Studies: You will be assigned six case studies assigned throughout the semester. These case studies will be done with a group of three students. You will have approximately one day to submit your work. If you submit before the lecture hour ends, your case will be graded on full credits. If you submit after the lecture hour ends but before 17:30 the next day, your case will be graded on 70% of the total credits.

Lab Studies: You will be assigned three VBA lab studies similar to the CS 113, 114, 115 labs throughout the semester. These lab studies will not be graded. However you are encouraged to work on these lab studies on your own to improve your VBA skills.

Moodle: Case/Lab Studies and Course Project will be uploaded on course Moodle page.

Group Policy: For the case studies and the project, you may work as a group of at most three students. Groups of one or two students are allowed but discouraged due to workload. **Also, no more than two students can be in the same group if they are also in the same group in IE 477 – IE 478 courses.**

FZ Policy: Students must submit their project in order to take the final exam. Failure to do so will result in an FZ grade.

Exams: All exams will be computer based and held at BCC computer labs. Final exam will be comprehensive.

Assessment:

- Midterm Exams: 30% (15% each)
- Final Exam: 30%
- Project: 25% (Groups of max 3 students)
- Case Studies: 15% (Totally 6, Minimum Dropped, 3% each)

Tentative Course Outline:

- Spreadsheet Essentials: Formulas, basic functions, pivot tables
- Solving OR Problems with Excel Solver
- Building Simulation Models with Excel
- Spreadsheet Programming: VBA
- Solving OR Problems with Heuristics
- Developing Decision Support Systems

Disclaimer: The instructor reserves right the change any part of this syllabus. Students will be notified about the changes.