IE 304 Production and Service Systems Planning and Design
Spring 2023-24

Instructor | Lecture | Classroom | Day/Time | Office Hour | Room |
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Bülent Çatay | Lec1 | FENS L045 | F 9:40–11:30 | W 15:00–16:00 | FENS 1058 |
| | Lec2 | FASS G018 | W 9:40–10:30 | or by appointment | |

TA | Recitation | Classroom | Day/Time | Office Hour | Room |
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Ezgi Şahinkaya | A | FENS L056 | M 16:40–17:30 | W 13:00–14:00 | FENS L068 |
Aksel Akmercan | B | FENS L062 | M 17:40–18:30 | T 15:00–16:00 | FENS L068 |
Emir Tiryaki | C | FENS L056 | M 18:40–19:30 | R 11:00–12:00 | FENS L068 |
Raci Berk İslim | | | R 9:00–10:00 | | FENS L068 |

Objectives:
This course is intended to introduce the students to the design and operation of manufacturing and service facilities. We will present a conceptual description and classification of modern production environments and address major issues faced during the planning and control of their operation. We will focus on the decomposition of the overall production planning and control problem to a number of subproblems, and the development of quantitative techniques and analytical tools for addressing the arising subproblems. The topics include (but are not limited to) assembly lines, sequencing and scheduling, flexible manufacturing systems, group technology and cellular manufacturing, and facilities planning and design. The students are expected to have a solid background in linear programming. GUROBI solver will be used with Python to model and solve the production planning problems.

Although the focus is on manufacturing systems, emphasis will be given to introduce the application of methodologies covered for manufacturing systems to service systems as well.

Learning Outcomes:
- Studying different production systems and assembly line balancing via modeling and heuristics
- Designing manufacturing cells by applying group technology
- Modeling and solving machine scheduling problems
- Modeling and solving facility layout and location problems

Recommended Textbooks:
Grading Policy:
40% Midterm + 60% Final (+ 10% Bonus Quizzes)

Exams:
- A midterm exam and a final exam will be given in class.
- The exams will be closed book/notes.
- A single comprehensive make-up exam will be offered to those who have missed the midterm/final exam and have a medical report issued or approved by the SU Health Center.
- The make-up exam will take place after the final exam.
- If you miss both exams, one of your grades will be “0” regardless of your excuse.
- There is no make-up for the make-up exam!

Quizzes:
- 4 pop-up quizzes will be given during lecture hours.
- The quizzes will be delivered online via SUCourse.
- You are required to be in the classroom during the quiz; otherwise, you will not get any bonus points. Attendance will be monitored.

Lecture Attendance Policy:
Attendance will be taken during the lectures and may positively influence your letter grade.

Tentative Course Outline:

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<th>Week</th>
<th>Topic</th>
<th>Reference</th>
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<tr>
<td>1</td>
<td>Introduction</td>
<td>Askin-Ch1</td>
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<td>1-2</td>
<td>Assembly Lines</td>
<td>Askin-Ch2, Nahmias Ch9</td>
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<td>3-4</td>
<td>Single Machine Scheduling</td>
<td>Askin-Ch4, Nahmias Ch9</td>
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<td>5-6</td>
<td>Flow Shop Scheduling</td>
<td>Askin-Ch4, Nahmias Ch9</td>
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<td>7-8</td>
<td>Job Shop Scheduling</td>
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<td>19 April</td>
<td>Midterm</td>
<td>Askin-Ch5</td>
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<td>9-10</td>
<td>Flexible Manufacturing Systems</td>
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<td>11-12</td>
<td>Group Technology and Cellular Manufacturing</td>
<td>Askin-Ch6, Heragu-Ch8</td>
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<td>13-14</td>
<td>Facility Layout</td>
<td>Askin-Ch7, Heragu-Ch1-4</td>
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Disclaimer:
The instructor reserves the right, when necessary, to alter the grading policy, change exam dates, and modify the syllabus and course content. Modifications will be announced in class and at the SUCourse+. Students are responsible for the announced changes.

Academic Integrity:
Students in this course are expected to honor the academic integrity principles according to the SU rules and procedures. Non-compliance to academic integrity principles through plagiarism, using or accomplishing another person's work, and/or submitting previously used work will be penalized.