Teaching Plan

University	Sabanci University
Year	2020-21 (Fall)
Course	IE309 Manufacturing Processes I
Instructor	Adnan Kefal **(adnankefal@sabanciuniv.edu)**
Teaching Asst.	Pouya Zoghipour **(pouyazoghipour@sabanciuniv.edu)** Maryam Ghasemzadeh **(mghasemzadeh@sabanciuniv.edu)** Abdullah Kendibilir **(kendibilir@sabanciuniv.edu)** Amin Abdollahzadeh **(abdollahzadeh@sabanciuniv.edu)** Aryan Kheyabani **(aryankheyabani@sabanciuniv.edu)** Naqib Rahimi **(rahimi@sabanciuniv.edu)**
Course Schedule	**IE309 (Courses will be conducted online (live) via zoom sessions)** Tuesday at 4:40 pm – 5:30 pm **(Adnan Kefal)** Wednesday at 2:40 pm – 4:30 pm **(Adnan Kefal)** **IE309R (Recitation sessions will start from second week onwards)** Monday 8:40 am – 10:30 am **(Pouya Zoghipour)** Monday 10:40 am – 12:30 pm **(Maryam Ghasemzadeh, Abdullah Kendibilir)** Monday 1:40 am – 3:30 pm **(Amin Abdollahzadeh)** Thursday 8.40 am – 10:30 **(Naqib Rahimi)** Friday 5.40 pm – 7.30 pm **(Aryan Kheyabani**)
Credits	3 SU Credit / 6.00 ECTS
Teaching Hours	42

Course Outlines

Overview of modern manufacturing technology; introduction to manufacturing processes, inspection methods and quality; materials and their manufacturing characteristics; description of various conventional and applications in industry: casting, metal forming, forging, extrusion, rolling, joining and welding, EDM, ECM, laser machining, abrasive flow processes; machining processes: turning, milling, drilling, broaching etc., abrasive machining processes. Lab demonstrations and plant tours.

Objectives

Introduce principles of manufacturing processes and equipment, and examine characteristics of different processes in terms of quality, cost, lead-time, volume etc. Development of basic background for process selection and analysis.

Learning Outcomes

At the conclusion of this course, students should be able to:

(i) Describe, select and analyze different manufacturing processes and their equipment.

(ii) Analyze characteristics of different processes in terms of quality, cost, lead-time, volume.

(iii) Identify and select manufacturing processes and their parameters for a given industrial part/design.

(iv) Work effectively in a team to analyze a product to identify and explain production stages and manufacturing processes.

<table>
<tr><th colspan="2">Course Syllabus</th></tr>
<tr><th>Week (Each lecture is 3 hours)</th><th>Topic</th></tr>
<tr><td>Lecture 1 – 05.10.2020 – 09.10.2020</td><td rowspan="2">Introduction
Manufacturing Properties and Mechanical Behavior of Materials</td></tr>
<tr><td>Lecture 2 – 12.10.2020 – 16.10.2020</td></tr>
<tr><td>Lecture 3 – 19.10.2020 – 23.10.2020
(Deadline for the project group formation)</td><td rowspan="2">Metal Casting Processes</td></tr>
<tr><td>Lecture 4 – 26.10.2020 – 30.10.2020</td></tr>
<tr><td>Lecture 5 – 02.11.2020 – 06.11.2020
(Deadline for the approval of project title)</td><td rowspan="3">Forming and Shaping Processes
Bulk Forming processes: Forging, Rolling, Extrusion, Drawing
Sheet Forming processes: Shearing, Bending, Deep Drawing, etc.</td></tr>
<tr><td>Lecture 6 – 09.11.2020 – 13.11.2020
(Deadline for the project proposal)</td></tr>
<tr><td>Lecture 7 – 16.11.2020 – 20.11.2020
(Midterm Exam – I)</td></tr>
<tr><td>Lecture 8 – 23.11.2020 – 27.11.2020</td><td rowspan="4">Machining Processes
Fundamentals of machining, Turning, Milling
Abrasive Machining (Grinding), Advanced Machining</td></tr>
<tr><td>Lecture 9 – 30.11.2020 – 04.12.2020</td></tr>
<tr><td>Lecture 10 – 07.12.2020 – 11.12.2020
(Deadline for the progress report)</td></tr>
<tr><td>Lecture 11 – 14.12.2020 – 18.12.2020</td></tr>
<tr><td>Lecture 12 – 21.12.2020 – 25.12.2020</td><td>Joining Processes and Surface Technology</td></tr>
<tr><td>Lecture 13 – 28.12.2020 – 01.01.2021
(Midterm Exam – II)</td><td rowspan="2">Properties and Processing of Polymers and Reinforced Plastics, Rapid Prototyping, Additive Manufacturing</td></tr>
<tr><td>Lecture 14 – 04.01.2021 – 08.01.2021
(Deadline for the final report)</td></tr>
<tr><td>Exam Week – 09.01.2021 – 21.01.2021</td><td>Final Exam</td></tr>
<tr><th colspan="2">Books and References</th></tr>
<tr><td colspan="2">1. S. Kalpakjian and S.R. Schmid, Manufacturing Processes for Engineering Materials, Prentice Hall, 2008.
2. J.A. Schey, Introduction to Manufacturing Processes, McGraw-Hill, 2000.
3. P. Oswald, J. Munoz, Manufacturing Processes and Systems, John Wiley and Sons, 1997.
4. Groover, M., Fundamentals of Modern Manufacturing: Materials, processes, and systems, John Wiley, 1999.
5. E. P. DeGarmo, J.T. Black, Ronald A. Kohser, Materials and Processes in Manufacturing, Wiley, 1999.</td></tr>
<tr><th colspan="2">Assessment Criteria</th></tr>
<tr><td colspan="2">Group Project (20%), Midterm Exam I-II (2×20%), Final Exam (40%)
▸ There will be a semester-project and groups of four will be formed to work on the projects.</td></tr>
<tr><th colspan="2">Course Material</th></tr>
<tr><td colspan="2">The outline of lecture notes, project guidelines, and other course-related material will be posted at the SUCourse site (https://sucourse.sabanciuniv.edu/).</td></tr>
</table>