

# MS 309

## Manufacturing Processes I – Fall 2022

### Class Time:

Tuesdays 13:40-15:30 at **UCG 030**

Wednesdays 16:40-17:30 at **FASS G062**

**Instructor:** Bahattin Koç, Ph.D.

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### Teaching Assistants:

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**Textbook (required):** Manufacturing Processes for Engineering Materials by S. Kalpakjian and S.R. Schmid, 5<sup>th</sup> Edition, Prentice Hall, 2008. (in reserve and available to purchase at the bookstore )

### Supplementary References:

- Introduction to Manufacturing Processes by J.A. Schey, McGraw-Hill,
- Manufacturing Processes and Systems by P. Oswald, J. Munoz, John Wiley and Sons.
- Manufacturing Processes and Equipment by J. Tlusty, Prentice Hall, 2000.
- Fundamentals of Modern Manufacturing: Materials, processes, and systems by Groover, M., John Wiley, 1999.
- Materials and Processes in Manufacturing by E. P. DeGarmo, J.T. Black, Ronald A. Kohser, Wiley, 2003.

### Catalog Description:

Overview of modern manufacturing technology; introduction to manufacturing processes, inspection methods and quality; materials and their manufacturing characteristics; description of various conventional and nonconventional 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.

**Objective of the course:** At the conclusion of this course, you should be able to:

- Describe, select and analyze different manufacturing processes and their equipment,
- Analyze characteristics of different processes in terms of quality, cost, lead time, volume,
- Identify and select manufacturing processes and their parameters for a given industrial part/design.
- Identify various rapid product development methodologies in producing mass-customized prototypes/parts.
- Work effectively in a team to analyze a product to identify and explain production stages and manufacturing processes.

### **Policies and Procedures:**

- **Homepage:** <https://sucourse.sabanciuniv.edu/> . The outline of lecture notes, assignments, projects, and other course material will be posted at the SUCourse site.
- **Exams:** There will be two midterm exams (progressive) during the semester. There will be a comprehensive final exam during the final exam week. The exam dates are as follows: **Midterm I: November 15 from 13:40-14:30 and Midterm II: December 20, 2022 from 13:40-14:30 (in-class).**
- **Assignments:** Homework assignments will be assigned regularly. However, they will NOT BE GRADED. Instead, the problems from the assignments and similar questions will be solved during recitation hours.
- **There will not be any extra-credit questions or homework assignments other than what is assigned.**
- **Missed Exams:** No excuses for missed exams will be accepted other than certified medical excuses from the campus health center or prior instructor's approval. **A single comprehensive make-up exam** will be offered after the **final exam** for those who missed a midterm or a final exam.
- **Projects:** There will be a semester-project and groups of four will be formed to work on the projects. The details of the project will be provided in coming weeks.
- **Individual effort:** Any academic dishonesty (i.e. cheating, plagiarism...) shall be resolved according to the University's Academic Integrity Policy. **Any academic dishonesty such as cheating, plagiarism or unauthorized sharing will result in an "F" Grade in the course and/or disciplinary actions.**
- **Team effort:** Teams will periodically be asked to submit individual effort assessment with completed assignments. These assessments will be incorporated into assignment grades. Teams having problem working together should make every effort to resolve them by themselves. If that doesn't work, see the instructor for a help.
- **Objections to grading:** If there is any objection to grading, the student must inform this to the instructor in a written statement no later than **one week after** grades given. The student must clearly explain why he/she deserves the missed-credit(s).
- **Attendance:** Formal roll may be held on an occasional basis. If your final grade is in a "gray area", your attendance, returned homework assignments and performance in the class might increase your final grade.

- **Course grade:** A weighted-average grade will be calculated and letter grades will be assigned to the overall grades.

**Grade Distribution for the course is as follows:**

Exam 1.....	20%
Exam 2.....	20%
Project.....	20%
Final Exam .....	40%
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Total.....	100 %

**Tentative Schedule**

Week	Topic	Reading
1	Introduction	Syllabus/Chp. 1
	Fundamentals of Mechanical Behavior of Materials	Chp. 2
2	Casting processes and equipment	Chp. 5
	Casting processes and equipment	Chp. 5
3	Casting processes and equipment	Chp. 5
	Casting processes and equipment	Chp. 5
4	Bulk deformation processes	Chp. 6
	Bulk deformation processes	Chp. 6
5	Bulk deformation processes	Chp. 6
	Metal forming processes	Chp. 7
6	Metal forming processes	Chp. 7
	Metal forming processes	Chp. 7
7	Material Removal processes	Chp. 8
	Material Removal processes	Chp. 8
8	Material Removal processes	Chp. 8
	Material Removal processes	Chp. 8
9	Material Removal processes	Chp. 8
	Abrasive Processes	Chp. 9
10	Abrasive Processes	Chp. 9
	Non-traditional manufacturing processes	Chp. 9

11	Non-traditional manufacturing processes	Chp. 9
	Joining	Chp. 12
12	Polymer processing, rapid prototyping, metal powders	Chp. 10
	Polymer processing, rapid prototyping, metal powders	Chp. 10
13	Polymer processing, rapid prototyping, metal powders	Chp. 10
	Polymer processing, rapid prototyping, metal powders	Chp. 10
14	Polymer processing, rapid prototyping, metal powders	Chp. 13
	Fabrication of microelectronic and micromechanical microelectromechanical devices; nano-manufacturing	Chp. 13