

IE 243 - MANUFACTURING PROCESSES (2 2 3)
2011-2012 Summer
Course Syllabus

Instructors	Assistant:
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Lecture Hours	Laboratory Hours
Monday 12:40 – 14:30, 15:40 – 17:30 in LB05	Tuesday 12:40 – 14:30, 15:40 – 17:30 in H335
Office Hours	Web site:
To be announced later. Appointments are accepted.	http://ie243.cankaya.edu.tr

Course Description: This course covers fundamental manufacturing processes under the classification of processing operations and the assembly operations, and the basic parameters involved in these processes.

Course Objective: This course aims the students acquaint with the basics of the manufacturing processes involved in industrial activities. While most of the manufacturing processes are to be covered during the course, more emphasis will be given on those processes which are more common, namely material removal processes, casting, and forming. However, this course does not only aim to develop verbal understanding of the issues. Additionally, mathematical models describing the processes are to be covered briefly in order to understand the relations between the parameters involved in the processes.

In addition to theoretical knowledge, students are expected to gain practical experience by manufacturing sample parts in the Flexible Manufacturing Laboratory of the department. Each student is expected to produce one part using the CNC milling machine, and one part using the CNC Lathe. Thus, the students are also expected to learn basics of computer numerical controlled machining and part programming (G codes).

In addition to in-class works, teams of students are required to prepare a term project. The project will be the analysis of manufacturing of a given part, including design, material selection, and process selection. Detailed information and the detailed schedule will be posted on the course web site.

Course Material: Text book and a list of reference books are listed in the next page. Books are available in reserve collection of the library. Additionally lecture notes will be posted on the web site of the course as pdf files. These files will include PowerPoint slides presented in the class. However it is strongly recommended that the student review the topics from text book and reference books listed below for complete understanding of the subjects. Some reading assignments are to be given after completion of each chapter for student's benefit.

Examinations: There will be 2 mid-term and 1 final examinations. The exams are closed book type and may include problems, short answered review questions, true-false type questions, definition matching questions. Any formulas (except for the very basic ones, such as the volume of a cylinder) and tables that are to be used in the solutions of the problems will be given in the exams.

Laboratory work: During first weeks of the summer school, last four hours of the course are appointed for the recitation of the work done in the lecture hours. However, in the remaining weeks, the students are equipped for manufacturing of samples using CNC milling machine and CNC lathe. This period will be composed of sessions for learning part programming on computer (G-codes), writing the part specific codes, and manufacturing of the samples. Since, each student will produce two parts individually; laboratory groups of 5 or 6 students will be formed according to the timetables. These groups will conduct their laboratory works during the hours assigned to them, in the last weeks of the summer school.

The samples are required to be specific to the student. Thus, the student is free to produce any part that is possible to machine using our utilities. For the selection of the sample parts, the students should submit related engineering drawings and make it approved. Note that the drawings must be prepared by the student himself/herself. Deadlines for the submission of the engineering drawings are stated in the tentative weekly schedule.

Attendance: According to the university regulations, students must attend at least 70 % of the lecture hours and 80 % of the recitation/laboratory hours. Otherwise, the student gets NA (Not attended) from the course. Valid excuses are not counted in computation of these percentages.

Apart from the university regulations, it is of student's benefit to attend the lecture and recitation/laboratory hours. In fact, the students are expected to attend 100 % of the laboratory sessions, since the sessions follow a series of applications.

Late-coming to laboratory sessions (especially to the laboratory sessions) is strictly forbidden. If the student comes late and has a valid excuse, he/she should wait until the end of the session and may request a make-up for the session from the assistant, instead of interrupting the lecture/lab.

Grading: Assuming each grading item has 100 points of weight, final grades over 100 will be computed according to the following rule

$$\begin{aligned}
 &20\% \times \text{MT-1 exam grade} \\
 &20\% \times \text{MT-2 exam grade} \\
 &10\% \times \text{Term project} \\
 &20\% \times \text{Laboratory work} \\
 &+ 30\% \times \text{Final exam grade} \\
 &\text{Final grade over 100}
 \end{aligned}$$

Text Book:

1. Introduction to Manufacturing Processes, Mikell P. Groover, John Wiley & Sons Inc., 2011 (TS183 G76 2012)

Reference Books

1. Principles of modern manufacturing, Mikell P. Groover, John Wiley & Sons Inc., 2011 (TS183 G76 2011)
2. Fundamentals of Modern Manufacturing Materials, Processes and Systems- Third Edition, Mikell P. Groover, John Wiley & Sons Inc., 2007 (TS183 G76 2002)
3. Manufacturing Engineering and Technology (Fourth Edition), Serope Kalpakjian and Steven R. Schmid, Prentice-Hall, Inc., 2001 (TS176.K14 2001)
4. Manufacturing Processes for Technology, William O.Fellers, William W. Hunt, Prentice-Hall Inc., 2001 (TS183 F45 2001)
5. Materials and Processes in Manufacturing, E.Paul DeGarmo, J.T. Black, and Ronald A. Kohser, John Wiley & Sons Inc., 1999 (TS183 D44 1999)
6. Introduction to Manufacturing Processes-Third Edition, John A. Schey, McGraw-Hill, 2000
7. Manufacturing Processes and Equipment, George Tlusty, Prentice-Hall, Inc.2000 (TS183 T58 2000)
8. Manufacturing Processes and Systems, Phillip F. Oswald and Jairo MuFoz, John Wiley & Sons, 1977
9. Applied Manufacturing Process and Planning With Emphasis on Metal Forming and Machining, Donald H. Nelson-George Schneider, Jr, Prentice-Hall, Inc.2001
10. Manufacturing Processes-Seventh Edition, B.H. Amstead-Phillip F. Oswald-Myron L.Begeman, John Wiley & Sons, 1979
11. Principles of Engineering Manufacture-Third Edition, Stewart C.Black-Vic Chiles-A.J.Lissaman-S.J.Martin- V Chiles, SC Black and Arnold, 1996

Tentative Course Schedule

week	Lecture Topic	Laboratory / Recitation Topic
1	Introduction to Manufacturing Systems Solidification Processes	Introduction of the FMS Lab. and the machine tools. Examples on Solidification Processes
	<i>Formation of project groups</i>	
2	Solidification Processes	Examples on Solidification Processes
	<i>Assignment of project titles</i>	
3	Powder Metallurgy (P/M)	Examples on P/M processes
	<i>Mid-term examination 1</i>	
4	Forming	Examples on forming processes
5	Forming Material Removal Processes	Introduction to part programming
	<i>Submission of engineering drawings of parts</i>	
	<i>Mid-term examination 2</i>	
6	Material Removal Processes	Part programming of individual designs
7	Joining	Manufacturing of parts
	<i>Submission of project reports</i>	