

ME 355

Introduction to Manufacturing Processes

Course Description: Introduction to manufacturing processes, including interrelationships between the properties of the material, the manufacturing process and the design of components.
Prerequisite: ME 354.

Course Objectives: This course is designed to provide students with *an overview of a wide variety of manufacturing processes*. The fundamental principles behind the processes will be discussed with the intent of providing a working knowledge of a broad range of manufacturing processes. Lab section has been designed to provide valuable hands-on experience in machining as well as working in teams. Students will fabricate a fan driven by a stirling engine.

Instructor: Professor Junlan Wang
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Phone: 206-543-4601
Office: MEB 208
Office Hours: M W F 11:00am - 12:00 pm (or by appointment)

Teaching Assistants:

Kevin Kadooka
Email: kkado@u.washington.edu
Office hours: T & Th 4:00-5:30 pm, MEB 236 (TA conference room)

Zhou (Joe) Yang
Email: yangz3@u.washington.edu
Office hours: W & F 5:00-6:30pm, MEB 236 (TA conference room)

Laboratory Instructor: Eamon McQuaide
Office: Engineering Annex 116A
Phone: 206-543-5548
Email: eamonm@u.washington.edu

Lectures: MWF 1:30pm-2:20 pm, MEB 238

Labs: All labs in Engineering Annex 116.
AA: Tuesday, 1:30-4:20 pm
AB: Wednesday, 2:30-5:20 pm
AC: Thursday, 9:30am-12:20 pm
AD: Friday, 2:30-5:20 pm

Textbook: Required. Serope Kalpakjian and Steven R. Schmid, Manufacturing Processes for Engineering Materials, Pearson Prentice Hall, 5th Edition (2008)

Course Web Site: <http://courses.washington.edu/me355b>.

Course Format: Lectures: 3 fifty-minute lectures per week

Homework: Assigned weekly, and due in hw box located in MEB office at 1pm on the due date. Homework will be graded on a 20 pts scale:

- 10 points for completion of all assigned problems.
- 10 points for correct solution of the graded problems.

Answer keys for the numerical problems will be provided at time of assignment. Upon due date, partial solutions to the short answer questions and proof problems will be posted. Students are urged to get any questions clarified during TA office hours.

Labs: We will start with the first lab devoted to safety issues in the machine shop.

Fan Fabrication Project: You will make a 10 inch fan powered by a Stirling engine. You will work in groups to develop a process plan, fabricate the components, and assemble and test the final product. A final presentation will be required at the 9th week. *It is estimated that this project will take every individual approximately ten hours of out of class time to finish. So put in time early to avoid crisis at the end.*

Special Concerns on Labs: Safety First! You are responsible for your safety and the safety of the people around you.

You will be divided into teams of 2-4 people, each of which will be responsible for (a) completing a weekly lab exercise, and (b) fabricating various components for the course fan project.

When you miss a lab, it is your responsibility to make the lab up during a different section's time. Be sure to notify **Eamon McQuaide** and your lab partner, in advance, that you will be missing the lab.

Grading:

Fan Project:	25%
Homework:	15%
Midterm Exams:	20% each (×3)
Final Exam:	no final exam
Bonus:	5% (pop quiz, classroom participation, ad hoc activities)

All exams will be closed book and closed notes with one page cheat sheet.

Email List: Your emails will be used by your instructors and TA to communicate with you.

Disability Accommodation: Contact Disabled Student Service, 448 Schmitz Hall, 543-8924 (V/TTY) and discuss with your instructor.

Tips for Success:

- 1) Come to class. *Stay awake in class.* Ask questions.
- 2) Review previous lecture and read the new chapters in advance if possible.

Tentative Course Schedule

Week	Date	Topics	Reading	Laboratory
1	1/5 1/7 1/9	Course Overview Introduction to Manufacturing Processes Fundamentals of Mechanical Behavior	Ch. 1 Ch. 2	Lab Safety
2	1/12 1/14 1/16	Structure and Manufacturing Properties of Metals Structure and Manufacturing Properties of Metals Surface Properties	Ch. 3 Ch. 3 Ch. 4	Intro to lathes and milling machines
3	1/19 1/21 1/23	Holiday – Martin Luther King Day Tribology: Friction, Wear and Lubrication Metal Casting	Ch. 4 Ch. 5	Intro to Fan Project Team Assignment Process Plan
4	1/26 1/28 1/30	Metal Casting and Midterm 1 Review Mid-term Exam 1 Bulk Deformation	Ch. 5 Ch. 6	Waterjet Demo Fan Project
5	2/2 2/4 2/6	Bulk Deformation Machining Machining	Ch. 6 Ch. 8 Ch. 8	3-axes Mill Demo Fan Project
6	2/9 2/11 2/13	Machining Properties of Polymers and Plastics Processing of Polymers and Plastics	Ch. 8 Ch. 10 Ch. 10	Welding and Brazing Demo Fan Project
7	2/16 2/18 2/20	Holiday - President's Day Review Mid-term Exam 2		Casting Lab Fan Project
8	2/23 2/25 2/27	Polymer-Matrix-Reinforced Plastics Joining Joining	Ch. 10 Ch. 12 Ch. 12	Fan Project
9	3/2 3/4 3/6	Non-traditional Machining Processes Boeing Manuf. Technologies: Sanders: Ti alloys Fan Project Demonstration	Ch. 9	Fan Project Demo
10	3/19 3/11 3/13	Catch up Course Review Mid-term exam 3		
11	3/16	No traditional final exam is scheduled		