

ME 355

Introduction to Manufacturing Processes

Spring 2011

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Office Hours: M W F 10:30-11:30 am (or by appointment)

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Laboratory Instructor: Kevin Soderlund
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Lectures: MWF 8:30-9:20 am, MEB 248

Labs:

AB: Tuesday,	1:30-4:20 pm
AA: Wednesday,	1:30-4:20 pm
AD: Thursday,	1:30-4:20 pm
AC: Friday,	1:30-4:20 pm

Textbook: 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 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 number of manufacturing processes*. There will not be a large amount of detail on any specific topic. Instead, the principle behind the processes will be discussed with the intent of providing a working knowledge of a broad range of manufacturing processes. Some hands-on experience will be gained from the machine shop in which the students will build a fan driven by a Stirling engine.

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

Homework: Assigned weekly in class and due right before class on the due date. Solutions will be posted after the due date.

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

Fan Fabrication Project: You will make a 10 in 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 end of week 9. *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 Kevin Soderlund, **in advance**, that you will be missing the lab.

Grading: This course is a heavy course and I hope that everybody will work hard so that the mean of your grades can be set higher relative to other courses at the same level.

Homework:	20%
Fan Project:	25%
Midterm Exams 1 and 2:	15% each
Final Exam:	25%. (Cumulative)

All exams will be closed book and closed notes.

Email List: Your emails will be used by your instructors and TA to communicate with you. If you don't have an email address, contact CRC, 102 Suzzalo (543-0681).

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 and give an honest attempt to get interested in the subject – even if it is boring. The fact is that there are a lot of things that are boring that build together to make some pretty cool stuff. Don't miss out on the cool stuff because you don't bother to listen to the boring stuff.
- 2) Think big picture. Try to understand the principles and the details will follow. Don't make things complicated. Even complex things are usually a composite of individual simple items. If you are faced with a seemingly difficult challenge, go back to the principles and try to break it down to its simple components.
- 3) Please read the chapters in advance if possible. I know that many classes ask for this, and few people do it. The reason for this is simple. Class time is free and most effective study time. If you have a clue going in, you will get much more out of class. You will more likely need to study less and still get better grades.
- 4) Make an honest attempt at everything. For example, if you are taking a test and have no idea on a specific problem, break it down to its simple components. Write down what your engineering gut feeling is and how you would go about solving the problem. You will get more points telling me how you would solve the problem than attempting to solve it with randomly recalled equations.

Tentative Course Schedule

Week	Date	Topics	Reading	Laboratory
1	3/28 3/30 4/1	Course Overview Introduction to Manufacturing Processes Fundamentals of Material Properties	Ch. 1 Ch. 2	Lab Safety
2	4/4 4/6 4/8	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	4/11 4/13 4/15	Tribology: Friction, Wear and Lubrication Tribology: Friction, Wear and Lubrication Tribology: Friction, Wear and Lubrication	Ch. 4	Intro to Fan Project Team Assignment Process Plan
4	4/18 4/20 4/22	Metal Casting Review Mid-term Exam 1	Ch. 5	Waterjet Demo Fan Project
5	4/25 4/27 4/29	Casting Bulk Deformation Bulk Deformation	Ch. 5 Ch. 8 Ch. 8	3-axes Mill Demo Fan Project
6	5/2 5/4 5/6	Composites Mfg: Guest lecture- Dr John Weller UW Mfg Research: Composites Machining: Guest lecture- Alex Oconnor, ME PhD Candidate Structure and Properties of Polymers	Ch. 8 Ch. 10 Ch. 10	Welding and Brazing Demo Fan Project
7	5/9 5/11 5/13	Processing of Polymers and Plastics Review Mid-term Exam 2	Ch. 10	Rapid Prototyping Demo Fan Project
8	5/16 5/18 5/20	UW Mfg, Research: Kumar: Microcellular Foams Machining Machining	Ch. 8 Ch. 8	Injection Molding Demo Fan Project
9	5/23 5/25 5/27	Joining UW Mfg. Research: Prof. Junlan Wang: Thin Films Non-Traditional Machining Processes	Ch. 12 Ch 9	Fan Project
10	5/30 6/1 6/3	Memorial Day: HOLIDAY Fan Project Demonstration Course Review		
11	6/7	Final Exam 8:30-10:20am, MEB 248		