ME 324: Manufacturing Engineering

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LECTURES

All sections, Monday, Wednesday and Friday
Howe Hall 1140, 10:00 – 10:50 am

LABS

All sections meet in Black 1051 and move to respective shop areas. Don't be late!

Section 1: Tue 8:00 – 9:50 am
Section 2: Tue 10:00 – 11:50 am
Section 3: Thu 10:00 – 11:50 am
Section 4: Tue 1:10 – 3:00 pm
Section 5: Thu 1:10 – 3:00 pm
Section 6: Tue 3:10 – 5:00 pm
Section 7: Thu 3:10 – 5:00 pm

OFFICE HOURS:

Wednesday 2:30 – 3:30 pm (TA: Jordan Herrema, Black 2070)
Friday 1:00 – 2:00 pm (TA: Can Zhu, Nuclear Bldg. #113)

PREREQUISITES: ME 270, Mat E 273, EM 324.

TEXTBOOK:

Kalpakjian, S.and Schmidt, S. R., 5th, 2008, "Manufacturing Processes for Engineering Materials", Prentice Hall, Upper Saddle River, NJ.

Other Reference Materials and Books:
Groover, M.P., 4th, 2010, "Fundamentals of Modern Manufacturing, Materials, Processes, and Systems", John Wiley & Sons, Inc.

COURSE TOPICS:

- Mechanical Behavior of Materials: mechanical properties of metallic materials using tensile, hardness, surface roughness and dimensional measurements.
- Machining: orthogonal cutting and chip formation mechanism, tool wear and life, abrasive and non-traditional machining processes.
- Casting: solidification of metals and cast structures, various casting processes and their selection, design considerations for casting

- Welding: fusion and solid state welding processes, weldability of different materials, microstructure and mechanical properties of weld, weld distortion and residual stresses
- Metal forming: bulk and sheet metal deformation processes, work hardening and its effect on mechanical properties, analysis of bulk deformation processes, and principles of sheet metal operation.

COURSE OUTCOMES:

After taking this course you will be able to:

1. Understand the principles and applications of the four basic manufacturing processes, which include machining, forming, casting and welding;
2. Understand the influence of a part design on selection and application of manufacturing processes;
3. Appreciate the use of modern tools such as measurement instruments and engineering software in understanding, identifying and solving manufacturing challenges; and
4. Stay abreast with current topics in manufacturing and their impact on society.

GRADING:

Quiz (~ 8 sets, each 5–10%)		55%
Project	15%	
Progress report (3%)		
Final report (12%)		
Peer evaluation (lab + lecture)	10%	
Project (5%)		
Lab (5%)		
Lab	20%	
Homework (self-study guide)	0%	

A letter grade will be assigned based on the performance of the individual and the overall performance of the class: A, A-, B+, B, B-, C+, C, D and F. A **"tentative scale"** for the assignment of the letter grades is listed as follows: (Class average is assigned B.)

	A (93 – 100)	A- (90 – 93)
B+ (87 – 90)	B (84 – 87)	B- (80 – 84)
C+ (77 – 80)	C (74 – 77)	
	D (70 – 74)	
	F (below 70)	

The class will be divided into groups containing no more than 5 students (preferably 4) within your selected sections. Each group will work together on labs and class project. Listed below is the breakdown by category between the group and individual assignments.

Group Assignments
Project
Labs
(Homework)

Individual Assignments
Quizzes
Peer evaluation

COURSE POLICIES

Blackboard course webpage (*not WebCT*)

- The course will be administered through Blackboard.
- All the lecture slides, handouts, selected homework solutions, and grades will be posted on the course webpage on Blackboard.
- No printed handouts will be distributed during the class.

Quiz policies

- All quizzes will be administered online through Blackboard.
- Open notes and books, but the expectation is to study the material beforehand. You will run out of time if you don't study prior to the quiz.
- Quiz times may vary from 50 minutes (for class time quizzes) to 2 hours (for take home quizzes).
- Neither make-up exams nor work for extra-credits will be provided.

Homework policies

- Homework is voluntary assignment to assist in understanding of lecture contents and to guide you with quizzes.
- Selected solutions to homework problems will be posted on the course webpage.

Note: *Please discuss any special needs or special accommodations with me at the beginning of the semester or as soon as you become aware of your needs. Those seeking accommodations based on disabilities should obtain a Student Academic Accommodation Request (SAAR) form from the Disability Resources (DR) office (515-294-7220). DR is located on the main floor of the Student Services Building, Room 1076.*