

**Machine Design**  
MECH 3230  
Department of Mechanical Engineering  
Auburn University  
Spring 2009

Instructor: Professor Robert L. Jackson  
Office: 103 Ross  
Phone: 844-3340  
Office Hours: Tuesday 2:00-3:00 pm  
Wednesday 9:00-10:00 am

TA: ?  
Office: ?  
Office #: ?

Text: Shigley's Mechanical Engineering Design (8<sup>th</sup> Edition), R. G. Budynas and J. K. Nisbett, McGraw Hill, 2008.

References: Fundamentals of Machine Component Design (4th Edition), R. C. Juvinell and K. M. Marshek, Wiley & Sons, 2006.

Machine Design (3<sup>rd</sup> Edition), R. L. Norton.

Homework: Homework will usually be due one week after it is assigned. Solutions will be posted the following day. Homework will be checked for satisfactory completion on a ten point scale. Late homework will be deducted three points. Students are encouraged to work in groups, but are strongly encouraged to work individual problems themselves.

FEM Projects: Two finite element projects will be assigned during the semester. The goal is to reinforce FEM techniques that were taught in prerequisite courses. They will be performed using the commercial FEM software ANSYS. They will each be graded on a ten point scale (similar to the homework assignments).

Quizzes: Throughout the semester short 10-15 minute unannounced Quizzes will be given at the end of class. They will cover material presented in prior classes and homework already turned in.

Prerequisite Exam: An exam will be given on the second day class which covers all material from courses previous to MECH 3230 (including physics and math).

Grading:	Homework	10%	Grading Scale:		
	Quizzes	15%		87.5% to 100%	A
	FEM Projects	10%		75% to 87.5%	B
	Prereq. Exam	5%		62.5% to 75%	C
	Exam #1	15%		50% to 62.5%	D
	Exam #2	15%		Less than 50%	F
	Final Exam	30%			

Quizzes, Exams: All are open book and notes. Tests will cover all material covered in class up to that point.

## **ME 3230 Other Class Info**

Prerequisites: MECH 2210, ME 3130, ME 3220

Web: <http://www.eng.auburn.edu/~jacksr7/>

Description: Design of systems containing a variety of mechanical elements.

Class Objectives: To learn how to design and implement various individual mechanical components into the design of mechanical systems (machines). To learn about methods and components of design which result in mechanical systems with long operating lives and high reliability. To be able to predict the life and reliability of an existing mechanical component or system.

Make-up Policy: Unless there are dire circumstances, students are expected to inform the instructor of an expected absence prior to the absence. If you miss an exam and have a written authorization (such as a doctor's note) then please inform me as soon as possible after the absence. Unless there are extenuating circumstances, if I am not informed after one week I will no longer give a make-up exam. Make-up exams will also be different (but near the same level of difficulty) from the test given to the rest of the class.

Cheating: All portions of the **Auburn University Student Academic Honesty Code**, as found in the *Tiger Cub* and defined in the SGA Code of Laws, Title XII, will apply in this class. Cheating or academic misconduct on Exams will not be tolerated and will be reported to the Academic Honesty Committee. This includes sharing answers and information during exams.

Plagiarism: Plagiarism is considered the same as cheating and will be reported. All students must be the authors of their own work. If another's work is used, credit must be given in the form of a citation or reference. This pertains to all assignments in the course.

Students who need accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by E-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with The Program for Students with Disabilities, 1244 Haley Center, 844-2096 (V/TT).

### ***Tentative Class Schedule***

Chapter and Sections	Subject
1	Introduction
	Prereq. Exam (1 hour)
2	Materials
3.1-3.5	Stress and Strain
3.6-3.18	Bending, Torsion, Mohr's Circle, Stress Concentrations
3.19	Stresses in Contact
4.10	Statically Indeterminate Problems
5.1-5.11, 19	Failure Theories (FEM Project #1)
6.1-6.4, 6.7-6.15	Fatigue
6.16	Surface Fatigue + Wear
7	Shaft Design
8	Screws and Fasteners
	Exam #1
9	Rivets, Welding and Bonding
10	Springs
11	Rolling Element Bearings
12	Lubrication and Bearings
13	Intro to Gears
14	Spur and Helical Gears (FEM Project #2)
	Exam #2
15	Bevel and Worm Gears
16	Clutches and Brakes
17	Other Machine Components
18 + Review	Machine Component Inter-relationships
Final Exam	