

**THE UNIVERSITY OF TEXAS AT AUSTIN**  
**Department of Aerospace Engineering and Engineering Mechanics**

**EM 306 Statics**  
**Fall 2009**

**SYLLABUS**

**UNIQUE NUMBERS:** 14045, 14050, 14055, 14060, 14065, 14070

**TIME:** MW 3:00 - 4:30 pm

**LOCATION:** ECJ 1.202

**INSTRUCTOR:** Rui Huang  
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Office Hours: MWF 1-2 pm (other time available by appointments)

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**DISCUSSION**

<b>SECTIONS:</b>	14045	TH 4-6	RLM 5.124
	14050	W 5-7	PHR 2.114
	14055	W 5-7	RLM 5.118
	14060	TH 5-7	RLM 6.124
	14065	W 6-8	RLM 6.124
	14070	TH 6-8	RLM 5.124

**CATALOG DESCRIPTION:**

Vector algebra, force systems, free-body diagrams; engineering applications of equilibrium, including frames, friction, distributed loads; centroids, moments of inertia. Three lecture hours and two discussion hours a week for one semester.

**LEARNING OBJECTIVES:**

To be able to analyze systems of forces and moments using free-body diagrams and to solve problems involving rigid bodies in equilibrium, including basic structure members such as trusses, frames, and beams.

**PREREQUISITES:**

Credit with a grade of at least C or registration for Mathematics 408D or 408L, and Physics 303K.

**KNOWLEDGE, SKILLS, AND ABILITIES STUDENTS SHOULD HAVE BEFORE ENTERING THIS COURSE:**

Basic trigonometry, and mechanics portion of college physics

**KNOWLEDGE, SKILLS, AND ABILITIES STUDENTS GAIN FROM THIS COURSE:**

Basic principles of equilibrium, analysis of forces and moments in statically determinate structures, free-body diagrams, distributed loads and friction, shear force and bending moment diagrams in beams.

**IMPACT ON SUBSEQUENT COURSES IN CURRICULUM:**

The topics of this course are basic engineering subjects that must be understood by anyone concerned with structures and materials. The course is an essential prerequisite for subsequent courses, EM 311 and EM 319.

**RELATIONSHIP OF COURSE TO PROGRAM OUTCOMES:**

This course contributes to the following ABET Criterion 3 outcomes and those specific to the EAC accredited program.

Outcome	√	Outcome	√
a. An ability to apply knowledge of mathematics, science, and engineering	√	g. An ability to communicate effectively	√
b. An ability to design and conduct experiments, as well as to analyze and interpret data		h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.		i. A recognition of the need for and an ability to engage in life-long learning	
d. An ability to function on multi-disciplinary teams		j. A knowledge of contemporary issues	
e. An ability to identify, formulate, and solve engineering problems	√	k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	√
f. An understanding of professional and ethical responsibility	√		

**ABET PROGRAM CRITERIA ACHIEVED:**

Program criteria are unique to each degree program and are to be compiled from the program criteria given for each degree program and listed in table format below. The faculty should check which of the program criteria are achieved in the course.

Criterion	√	Criterion	√	Criterion	√
A. Aerodynamics		G. Orbital Mechanics		M. Preliminary/Conceptual Design	
B. Aerospace Materials		H. Space Environment		N. Other Design Content	
C. Structures	√	I. Attitude Determination and Control		O. Professionalism	
D. Propulsion		J. Telecommunications		P. Computer Usage	
E. Flight Mechanics	√	K. Space Structures	√		
F. Stability and Control		L. Rocket Propulsion			

**TEXT:** Engineering Mechanics - STATICS by Bedford & Fowler, Prentice-Hall, fifth edition, 2008.

**TOPICS:**

1. Introduction to basic concepts and conventions (2 lectures)
2. Forces and moments (5)
3. Equilibrium (5)
4. Trusses and frames (5)
5. Center of mass and centroids (2)
6. Area moments of inertia (2)
7. Beams: distributed loads, shear forces and bending moments (5)
8. Friction (2)

**PROFESSIONALISM TOPICS:** None

**DESIGN ASSIGNMENTS:** none

## **CLASS FORMAT**

- Each week there will be two lectures (3 hours) and one discussion session (2 hours).
- The lectures will discuss concepts and demonstrate problem solving procedures by examples.
- Each discussion session, led by one of the TAs, will discuss more examples and answer questions asked by the students.

## **ATTENDANCE**

Attendance in all classes (including discussion sessions) is required.

## **ON DISCUSSION SESSIONS**

- Discussion sessions are regular classes, and they must be treated accordingly.
- You must attend only the discussion session for which you are registered.
- Discussion sessions can be changed only through regular registration processes.
- Discussion sessions are the best place to ask questions about homework problems.
- Every discussion session will have a quiz, except for the weeks of midterm exams.

## **HOMEWORK POLICY**

- Homework problems will be assigned at the end of each class.
- It is your responsibility to do the homework problems regularly.
- Homework will not be collected or graded.
- Some of the homework problems will appear in weekly quizzes at discussion sessions.
- Keeping your homework solutions intelligible and well organized will be very helpful when preparing for the midterm and final exams.

## **EXAMINATIONS**

- Weekly quizzes at the end of each discussion session
- Two in-class midterm exams
- The final exam will be comprehensive

## **EXAM POLICY**

- All exams (including weekly quizzes) will be closed books and notes.
- Use of regular calculators is allowed.
- Be prepared to present your student ID before or during the exam.
- No make-up quizzes or exams will be given.
- The lowest score of the quizzes (that includes zero for absentia) will be dropped.
- Quizzes will be graded and returned one week later at discussion sessions.
- The final exam will be conducted in accordance with the university schedule.

## **GRADING POLICY**

- All grading issues must be discussed with the professor only.
- Your quizzes and exams should be treated as professional reports. It is your responsibility to present your solutions in an intelligible and clear manner, including good handwriting. The graders are allowed to take away points for bad presentation, which will be non-negotiable.
- Attendance of classes and labs is required but not used for grading.
- Plus/minus grades will NOT be assigned for the final grade.

## **GRADING COMPONENTS**

- Weekly Quizzes: 25%
- Midterm exams: 40% (20% each)
- Final exam: 35%

## **GRADING SCALE**

- A: top 10% of the class or a total score above 90
- B: next 20% of the class or a total score between 80 and 90
- C: next 40% of the class or a score between 70 and 80
- D: next 20% of the class or a score between 60 and 70
- F: bottom 10% of the class and a score below 60

All grades will be posted online at **Blackboard** regularly as they become available.

## **IMPORTANT DATES**

August 26: first class  
September 11: last day to add or drop a course for possible refund  
September 23: last day to drop a course without academic penalty  
September 30: midterm exam 1  
October 21: last day to withdraw or drop a course with approval  
last day to apply for an undergraduate degree  
November 4: midterm exam 2  
December 2: last class  
December 15: final exam

## **SCHOLASTIC DISHONESTY**

Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent. You are expected to have read and understood the current issue of General Information Catalog, published by the Registrar's Office, for information about procedures and about what constitutes scholastic dishonesty.

## **SPECIAL NOTES:**

The University of Texas at Austin provides upon request appropriate academic adjustments for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TDD or the College of Engineering Director of Students with Disabilities at 471-4321.

## **EVALUATION:**

The Measurement and Evaluation Center forms for the College of Engineering will be used during the last week of class to evaluate the course and the instructor.

**Prepared by:** Rui Huang

**Date:** August 26, 2009