Syllabus for
EGR 221/PHY 311—Mechanics I: Statics
3 Credit Hours
Fall 2001

I. COURSE DESCRIPTION

A study of statics of particles and rigid bodies, equilibrium of rigid bodies; concentrated and distributed force systems; shear and bending moment stresses in beams and other rigid bodies; force analysis of machines, frames, and trusses; force resultants using vectors in two and three dimensions; friction forces; center of gravity; moments of inertial.
Prerequisites: PHY 111 Lecture and Lab.
Course fee: $30.

II. COURSE GOALS

The course is designed to enable the student to do the following:

A. obtain a working knowledge of the theory and principles of engineering mechanics for static applications

B. gain a knowledge of vector methods for static applications.

C. use physics principles in the study of both concentrated and distributed force systems.

D. study static situations involving frictional forces.

E. apply learned principles to engineering practices such that the lifestyle of mankind will be enhanced, the engineers' goal.

III. COURSE OBJECTIVES

As a result of the successful completion of this course, the student will be able to do the following:

A. discuss the basic concepts and laws of statics as evidenced by the ability to identify a given description or formulation.

B. apply the terms, concepts, and laws by solving problems similar to those in the textbook as well as unfamiliar problems using familiar laws and concepts.

C. use mathematical methods to arrive at laws and principles of statics.

IV. TEXTBOOKS

Required Textbook

Hibbeler, R. C., Engineering Mechanics: Statics and Dynamics, New York, Macmillan, 8th Ed., 1997.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures
1. Attendance at each class or laboratory is mandatory at Oral Roberts University.
2. Double cuts will be assessed for absences immediately preceding or following holidays.
3. Excessive absences can reduce a student's grade or deny credit for the course.

4. Students taking a late exam because of an unauthorized absence will be charged a late exam fee.
5. Students and faculty at Oral Roberts University adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software.
6. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.

B. Course Policies and Procedures
1. Evaluation Procedures
   a. Three one-hour exams will be given during the semester. These will account for 60% of the final course grade.
   b. Homework will be assigned in each class and will be due at the beginning of the following class, unless indicated otherwise. This will count 20% of the final grade. No credit will be awarded for late homework.
   c. The final exam will account for 20% of the final course grade.
2. Other Information
   approach the learning of a subject in a consistent and disciplined manner, as evidenced by:
   a. attending class regularly.
   b. completing homework assignments on time.
   c. participating in class discussions.

VII. COURSE CALENDAR

Date	**Topic for Discussion**	**Reading Assignment Due**
8/17	Introduction to the Course	None
8/20	General Principles of Statics	Chapter 1
8/22	Vectors in Two-dimensional Space	2.1-2.4
8/24	Vectors in Three-dimensional Space	2.5-2.9
8/27	Equilibrium of a Particle	Chapter 3
8/29	Moment of a Force about a Point	4.1-4.4
8/31	Moment of a Force about an Axis	4.5
9/3	LABOR DAY (No Class!)	None
9/5	Moment of a Couple	4.6
9/7	Equivalent Force Systems and Resultants	4.7-4.9
9/10	Reduction of a Distributed Load	4.10
9/12	Review for Exam I	None
9/12	**Exam I: Chapters 1-4**	None
9/17	Rigid Body Equilibrium in Two-dimensional Space	5.1-5.2
9/19	Two and Three Force Members	5.3-5.4
9/21	Rigid Body Equilibrium in Three-dimensional Space	5.5-5.7
9/24	Truss Analysis by Method of Joints	6.1-6.3
9/26	Truss Analysis by Method of Sections	6.4
9/28	Truss Analysis in Three-dimensional Space	6.5
10/1	Analysis of Frames and Machines	6.6
10/3	Internal Forces in Structural Members	7.1
10/5	Shear and Moment Equations and Diagrams	7.2-7.3
10/8	Analysis of Systems Involving Cables	7.4
10/10	Review for Exam II	None

10/12	**Exam II: Chapters 5-7**	None
10/15	Fall Break (No class!)	None
10/17	Fall Break (No class!)	None
10/19	Fall Break (No class!)	None
10/22	Analysis of Problems Involving Dry Friction	8.1-8.2
10/24	Frictional Forces on Wedges and Screws	8.3-8.4
10/26	Frictional Forces on Flat Belts	8.5
10/29	Frictional Forces on Bearings and Disks	8.6-8.8
10/31	Center of Gravity, Center of Mass, and Centroid	9.1-9.2
11/2	Analysis of Composite Bodies	9.3
11/5	Theorems of Pappus and Guldinus	9.4
11/7	Resultant of a General Distributed Loading	9.5
11/9	Area Moments of Inertia	10.1-10.4
11/12	Moments of Inertia for Composite Areas	10.5
11/14	Products of Inertia for an Area	10.6
11/16	**Review for Exam III**	None
11/19	**Exam III: Chapters 8-10.6**	
11/21	**Thanksgiving (No class!)**	None
11/23	**Thanksgiving (No class!)**	None
11/26	Mass Moment of Inertia	10.9
11/28	Virtual Work for Particles and Rigid Bodies	11.1-11.2
11/30	Virtual Work for a System of Rigid Bodies	11.3
12/3	Conservative Forces	11.4
12/5	Potential Energy and Stability of Equilibrium	11.5-11.7
12/7	**Review for Final Exam**	None
	Final Exam	None

VII. ASSESSMENT SUMMARY

Dr. Dominic Halsmer Name of Instructor	EGR 221/PHY 311 Course No.	Mechanics 1: Statistics Title of Course	Engineering and Physics Name of Department
MISSION The lifestyle at ORU is rooted in the word "Wholeness." ORU seeks to educate the whole person, with balanced emphasis placed on the development of mind, spirit, and body. GENERAL OUTCOMES 1.Spiritual Development 2.Physical Development 3.Communication 4.Analysis 5.Problem Solving 6.Valuing in Decision-making 7.Social Interaction 8.Global Perspectives 9.Effective Citizenship 10.Aesthetic Responsiveness	MAJOR OUTCOMES **Analysis/Problem Solving:** Has the ability to analyze, design, and obtain effective solutions to real world engineering and physics problems. **Communication/Team Work:** Demonstrates the ability to work on teams and communicate effectively in written and oral forms. **Fundamental Knowledge Base:** Possesses fundamental knowledge of principles of engineering, physical sciences, and mathematics. **Christian Stewardship and Ethics:** Ethically applies engineering technology to the solution of human problems using Christian principles.	COURSE OUTCOMES Attain a working understanding of the theory and principles of engineering mechanics as applied to statics situations. Understand and use vector algebra. Understand the physical principles in the study of concentrated and distributed force systems. Understand frictional forces in a statics situation. Understand and use necessary mechanical techniques to solve problems in text, as well as unfamiliar problems.	ASSESSMENT OF COURSE GOALS STIMULI: Exams Reading assignments Class participation Homework questions and problems CRITERIA: See syllabus