

FLORIDA STATE COLLEGE AT JACKSONVILLE  
COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: EGN 2311

COURSE TITLE: Statics

PREREQUISITE(S): PHY 2048C and MAC 2312

COREQUISITE(S): None

CREDIT HOURS: 3

CONTACT HOURS/WEEK: 3

CONTACT HOUR BREAKDOWN:

    Lecture/Discussion: 3

    Laboratory:

    Other \_\_\_\_\_:

FACULTY WORKLOAD POINTS: 3

STANDARDIZED CLASS SIZE ALLOCATION: 24

CATALOG COURSE DESCRIPTION:

This course covers the analysis of two and three dimensional force systems by vector algebra. Application of the principle of equilibrium to particles, rigid bodies, and simple structures are included. Friction, distributed forces, center of gravity, centroids, and moment of inertia are introduced. U.S. engineering and metric systems of units and applications are used.

SUGGESTED TEXT(S): Hibbeler, Engineering Mechanics - Engineering.  
Ninth Edition

IMPLEMENTATION DATE: Fall Term, 2004

REVIEW OR MODIFICATION DATE: Fall Term, 2008 (20091) - Outline Review 2007

COURSE TOPICS	<u>CONTACT HOURS PER TOPIC</u>
I. <i>General Principles</i>	2
II. <i>Force Vectors</i>	6
III. <i>Equilibrium of a Particle</i>	4
IV. <i>Force System Resultants</i>	7
V. <i>Equilibrium of a Rigid Body</i>	5
VI. <i>Structural Analysis</i>	6
VII. <i>Internal Forces</i>	4
VIII. <i>Friction</i>	4
IX. <i>Center of Gravity and Centroid</i>	4
X. <i>Moment of Inertia</i>	3

## Course Objectives:

1. Introduce concepts of friction, center of gravity, centroids and moment of inertia.
2. Application of the principle of equilibrium to particles, rigid bodies and simple structures.
3. Analysis of 2D and 3D force systems.

## Learning Outcomes:

### The student will:

- a. utilize given formulas and procedures to solve specific problems.
- b. Comprehend the principles for applying the SI system of units.
- c. Demonstrate how to add forces and resolve them into components using the Parallelogram Law.
- d. Be able to express force and position in Cartesian vector form and determine the vector's magnitude and direction
- e. Determine the angle between two vectors or the projection of one vector onto another by introducing the dot product.
- f. Explain the concept of the free-body diagram for a particle.
- g. Solve particle equilibrium problems using the equations of equilibrium.
- h. Understand the concept of moment of a force and calculate it in two and three dimensions.
- i. Demonstrate the method for determining the resultants of nonconcurrent force systems.
- j. Reduce a simple distributed loading to a resultant force having a specified location.
- k. Apply the equations for a rigid body.
- l. Comprehend the concept of the free-body diagram for a rigid body.
- m. Solve rigid body equilibrium problems using the equations of equilibrium.
- n. Determine the forces in the members of a truss using the method of joints and the methods of sections.
- o. Analyze and explain the forces acting on the members of frames and machines composed of pin-connected members.
- p. Use the method of sections to determine the internal loading of a member.
- q. Formulate equations that can be plotted so that they describe the internal shear and moment throughout a member.
- r. Analyze and explain the forces and geometry of cables supporting a load.
- s. Analyze and explain the equilibrium of rigid bodies subjected to dry friction.
- t. Demonstrate specific applications of frictional force analysis on wedges, screw, belt, and bearings.
- u. Understand the concept of rolling resistance.
- v. Recognize the concepts of center of gravity, center of mass, and the centroid.
- w. Determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary shape.
- x. Use the theorems of Pappus and Guildinus to find the area and volume for a surface of revolution.
- y. Find the resultant of a general distributed loading and show how it applies to finding the resultant of a fluid.
- z. Determine the moment of inertia for an area.
- aa. Determine the maximum and minimum moments of inertia of an area.
- bb. Comprehend the mass moment of inertia.



NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.

<i>Section 1</i>	
COURSE PREFIX AND NUMBER: <b>EGN 2311</b>	SEMESTER CREDIT HOURS: <b>3</b>
COURSE TITLE: <b>Statics</b>	
<i>Section 2</i>	
TYPE OF COURSE: (Click on the box to check all that apply)	
<input checked="" type="checkbox"/> <b>AA Elective</b>	<input type="checkbox"/> <b>AS Required Professional Course</b>
<input type="checkbox"/> <b>AS Professional Elective</b>	<input type="checkbox"/> <b>AAS Required Professional Course</b>
<input type="checkbox"/> <b>Other</b> _____	<input type="checkbox"/> <b>College Prep</b>
<input type="checkbox"/> <b>General Education: (For General Education courses, you must also complete Section 3 and Section 7)</b>	<input type="checkbox"/> <b>Technical Certificate</b>
<i>Section 3 (If applicable)</i>	
INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:	
<input type="checkbox"/> <b>Communication</b>	<input type="checkbox"/> <b>Social &amp; Behavioral Sciences</b>
<input checked="" type="checkbox"/> <b>Natural Sciences</b>	<input type="checkbox"/> <b>Humanities</b>
<input type="checkbox"/> <b>Mathematics</b>	
<i>Section 4</i>	
INTELLECTUAL COMPETENCIES:	
<input checked="" type="checkbox"/> <b>Reading</b>	<input checked="" type="checkbox"/> <b>Speaking</b>
<input checked="" type="checkbox"/> <b>Critical Analysis</b>	<input checked="" type="checkbox"/> <b>Quantitative Skills</b>
<input checked="" type="checkbox"/> <b>Writing</b>	<input checked="" type="checkbox"/> <b>Listening</b>
<input checked="" type="checkbox"/> <b>Information Literacy</b>	<input checked="" type="checkbox"/> <b>Ethical Judgment</b>
<input checked="" type="checkbox"/> <b>Scientific Method of Inquiry</b>	<input checked="" type="checkbox"/> <b>Working Collaboratively</b>
<i>Section 5</i>	
<b>LEARNING OUTCOMES</b>	<b>METHOD OF ASSESSMENT</b>
Utilize given formulas and procedures to solve specific problems	
Comprehend the principles for applying the SI system of units	
Demonstrate how to add forces and resolve them into components using the Parallelogram Law	
Express force and position in Cartesian vector form and determine the vector's magnitude and direction	
Determine the angle between two vectors or the projection of one vector onto another by introducing the dot product	
Explain the concept of the free-body diagram for a particle	
Solve particle equilibrium problems using the equations of equilibrium	
Understand the concept of moment of a force and calculate it in two and three dimensions	
Demonstrate the method for determining the resultants of nonconcurrent force systems	
Reduce a simple distributed loading to a resultant force having a specific location	
Comprehend the concept of the free-body diagram for a rigid body.	Testing
Solve rigid body equilibrium problems using the equations of equilibrium.	Testing
Determine the forces in the members of a truss using the method of joints and the methods of sections.	Testing

Analyze and explain the forces acting on the members of frames and machines composed of pin-connected members.	Testing/Lab
Use the method of sections to determine the internal loading of a member.	Testing
Formulate equations that can be plotted so that they describe the internal shear and moment throughout a member.	Testing
Analyze and explain the forces and geometry of cables supporting a load.	Testing/Lab
Analyze and explain the equilibrium of rigid bodies subjected to dry friction.	Testing
Demonstrate specific applications of frictional force analysis on wedges, screw, belt, and bearings.	Lab
Understand the concept of rolling resistance.	Testing/Lab
Recognize the concepts of center of gravity, center of mass, and the centroid.	Testing/Lab
Determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary shape.	Testing/Lab
Use the theorems of Pappus and Guldinus to find the area and volume for a surface of revolution.	Testing
Find the resultant of a general distributed loading and show how it applies to finding the resultant of a fluid.	Testing/Lab
Determine the moment of inertia for an area.	Testing
Determine the maximum and minimum moments of inertia of an area.	Testing
Comprehend the mass moment of inertia.	Testing/Lab
<b>Section 6</b>	
Name of Person Completing This Form: <u>Joe Davcis, Dean of Liberal Arts &amp; Sciences/North</u>	

**SECTION 7 MUST BE COMPLETED FOR ALL GENERAL EDUCATION COURSES.**

<i>Section 7</i>	<i>Primary</i>	<i>Secondary</i>	<i>N/A</i>		<i>Primary</i>	<i>Secondary</i>	<i>N/A</i>
KNOWLEDGE				VALUE			
A. Global and Historical Knowledge & Understanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Intellectual honesty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends a general knowledge of the nature, origins and contributions of major civilizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Curiosity and openness to new ideas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends the workings and interrelations of personal, business and government economies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Recognition of one's own creative potential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends political, social and economic systems and their effects upon society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Acceptance of and respect for differences among people and cultures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cultural and Aesthetic Knowledge and Understanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the contributions of the arts and humanities to the human experience on a personal, national or global level	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Civic Engagement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends the historical development of the arts and sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lifelong Learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Comprehends religious and cultural systems and their effects upon society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
C. Human Awareness and Understanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the dynamics of human behavior and the process of increasing self-awareness, growth and development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the stages of human development and the dynamics of human relationships in diverse cultures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the factors that promote physical, mental and social well-being	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
D. Mathematics, Science and Technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the basic concepts and investigative processes of the natural sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the breadth, significance and development of the mathematical sciences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
• Comprehends the ways science and technology have shaped and continue to reshape human cultures and the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				