
1: Instructor

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- Office: West Annex-108
- Hours: See Engineering Homepage

2: Required materials


3: Prerequisites

- Physics 2425 and credit for or concurrent enrollment in Mathematics 2314

4: Course Description

Basic theory of engineering mechanics, using calculus, involving the description of forces, moments, and couples acting on stationary engineering structures; equilibrium in two and three dimensions; free-body diagrams; friction; centroids; centers of gravity; and moments of inertia. Engineering mechanics, of which statics is a core course, literally is the foundation to some of the most exciting applications and fields of study within engineering. Within this course, we will explore not only the concepts themselves, but the reverberations of those throughout engineering and society.

5: Student Learning Outcomes

When you complete this course you should be able to:

1. Define and calculate magnitude and direction of forces and moments.
2. Represent and calculate the reduction and simplification of force and moment systems.
3. Draw free-body diagrams for two- and three-dimensional force systems.
4. Calculate forces and moments acting internally or externally on an object.
5. Determine the location of the centroid and the center of mass for a system of discrete particles and objects of arbitrary shape.
6. Calculate moments of inertia for lines, areas, and volumes.
7. Solve simple statics engineering problems using Newton’s laws.
8. Recognize current social, economic, and environmental issues where statics principles are important for the development of engineering solutions.

Course outcome mapping

The mapping of the course outcomes to the ABET Criterion 3 student outcomes is shown in Table 1.

Table 1: Course Outcome Mapping

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6: Course structure and communication

This course will contain a significant amount of lecture. However, I very much encourage questions and discussion during class. In addition, there will be occasions (some for credit, some not) where you will work in small groups or teams to address a particular aspect of the course material as an “in-class” team activity. You are expected to stay current in lecture and readings in the text.

6.1: Calculator policy

The use of a calculator is allowed in general, at the discretion of the instructor. Computers, tablets, smartphones, I-pads and similar electronics are not allowed on tests in general (instructor discretion). Calculators with graphing capabilities will be allowed in the course. Recommended calculators with these capabilities include the HP48, HP49, HP50, TI86, and TI89. However, only calculators currently allowed in the Fundamentals of Engineering (FE) and Professional Engineering (PE) exams will be allowed in exams and quizzes. Please refer to the National Council of Examiners for Engineering and Surveying (NCEES) calculator policy for the list of acceptable calculators (http://ncees.org/exams/calculator-policy/).

6.2: Professionalism

One of the goals of this course is to teach students about professionalism, including the standards and expected behavior of your chosen profession. With this in mind, students are expected to demonstrate a behavior consistent with the conduct of an individual practicing in the engineering profession. Students are expected to: (1) come prepared for class; (2) respect faculty and peers; (3) demonstrate responsibility and accountability for your own actions; (4) sensitivity and appreciation for diverse cultures, backgrounds, and life experiences; (5) offer and accept constructive criticism in a productive manner; (6) demonstrate an attitude that fosters professional behavior among peers and faculty; (7) be punctual to class meetings; (8) maintain a good work ethic and integrity; and (9) recognize the classroom as a professional workplace.

7: Graded Material

7.1: Homework

Homework will be due as specified by the instructor. Your lowest submittal grade will be dropped.

7.2: Grades: Weighting and Letter Grades

The following weighting system will be used in determining final grade for the course. Homework will account for 15% of the course grade. Exam One will account for 25% of the course grade. Exam Two will account for 25% of the course grade. The final Exam will account for 35% of the course grade. The instructor will determine letter grades for the course using his professional judgment.

The instructor will determine letter grades for the course using his professional judgment, and the following standards as described in the University Catalog:
8: Classroom and University Policies and Student Support

8.1: General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- Angelo State University Student Handbook
- Angelo State University Catalog

8.2: Student Conduct

Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Science and Engineering adheres to the Statement of Academic Integrity.

Plagiarism

Plagiarism is a serious topic covered in ASU’s Academic Integrity policy in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality via Turnitin. Resources to help you understand this policy better are available at the ASU Writing Center.

Copyright Policy

Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

8.3: Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 Grading Procedures for more information.

8.4: Student Disability Services

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA), and subsequent legislation.

The Office of Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability, and it is the student’s responsibility to initiate such a request by contacting:
Dallas Swafford, Director of Student Disability Services  
325-942-2047  
dallas.swafford@angelo.edu  
University Center, Room 112

8.5: Title IX

Angelo State University is committed to the safety and security of all students. If you or someone you know experience sexual harassment, sexual assault, domestic or dating violence, stalking, or discrimination, you may contact ASU’s Title IX Coordinator:

Michelle Boone, Director of Title IX Compliance  
325-486-6357  
michelle.boone@angelo.edu  
Mayer Administration Building, Room 204

8.6: Student Absence for Observance of Religious Holy Day

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day for more information.

9: Instructor Prerogative

This class does not operate under democratic principles. Your instructor may change policies, procedures, of this course when he deems it necessary. You will be notified of any such changes.
9 Course Outline

The course outline is presented in Table 1. Detailed reading and homework assignments along with updates to this schedule will be provided during the lecture sessions. Assignments are due the Wednesday following the stated week in Table 1 unless the instructor announces otherwise. As the semester progresses, fill in the “Assignment” column with the HW announced by the instructor during class and/or online. Please note that the first 1-3 minutes of each class session may be used to discuss broader topics of importance to engineers, scientists, and mathematicians. If a classroom discussion presents, this time may be extended.

Table 1: Course Lesson Outline

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<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Assignment</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan. 15-19</td>
<td>General Principles</td>
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<td>2</td>
<td>Jan. 22-26</td>
<td>Scalars, Vectors, Dot Product</td>
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<td></td>
<td>Jan. 29-Feb. 2</td>
<td>FBD and Equilibrium of a particle</td>
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<td>3</td>
<td>Feb. 5-9</td>
<td>Coplanar force systems, 3-D force systems</td>
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<td>4</td>
<td>Feb. 12-16</td>
<td>Moment of a force (scalar + vector formulation), cross product</td>
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<td>5</td>
<td>Feb. 19-23</td>
<td>Principle of Moments, moment about an axis, couple moments</td>
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<td>6</td>
<td>Feb. 26-Mar. 2</td>
<td>Simplification of force/couple system, distributed loading</td>
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<td>7</td>
<td>Mar. 5-9</td>
<td>Rigid body equilibrium conditions, FBD, Equations of equilibrium</td>
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<td>8</td>
<td>Mar. 12-16</td>
<td>Spring Break</td>
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<td>9</td>
<td>Mar. 19-23</td>
<td>Zero-, two-, and three-force members, statical determinacy</td>
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<td>10</td>
<td>Mar. 26-30</td>
<td>Method of Joints</td>
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<td>11</td>
<td>Apr. 2-6</td>
<td>Method of Sections</td>
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<td>12</td>
<td>Apr. 9-13</td>
<td>Frames and Machines</td>
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<td>13</td>
<td>Apr. 16-20</td>
<td>Internal Forces</td>
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<td>14</td>
<td>Apr. 23-27</td>
<td>Center of gravity and centroid</td>
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<td>15</td>
<td>Apr. 30-May 4</td>
<td>Moments of inertia</td>
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<td>16</td>
<td>May 7-11</td>
<td>Final Exams</td>
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