

1 Course Number and Name

- a. **ENGR 2301:** Engineering Mechanics—Statics, Fall 2021
- b. Lecture: Sec 010 3:00 pm - 4:15 pm, Monday and Wednesday
Lab: Sec 01Z 3:00 pm - 3:50 pm, Thursday

2 Credits and Contact Hours

- a. **Credits:** 3
- b. **Contact Hours:** 3 hours/week (Classroom) 1 hour/week (Lab)

3 Instructor Information

- a. **Course Coordinator:** William Kitch
- b. **Instructor:** William Kitch, 325-486-5501, William.Kitch@angelo.edu, Office: VIN 268. For office hours see [faculty homepage](#).

4 Required Course Materials

- a. **Textbook:** *Engineering Mechanics: Statics, 14th Ed.*, Hibbeler, Pearson 2011, Hardcover (ISBN 9780133918922) Other editions are acceptable.
- b. Other supplemental materials posted on Blackboard® Learning Management System

5 Technology Requirements

This course requires internet access and the ability to use the following online tools: Blackboard, Gradescope, Blackboard Collaborate, Adobe Acrobat (or another pdf maker), YouTube. Access to some exams or quizzes will be through Respondus Lockdown Browser and will be video recorded via Respondus Monitor. Respondus requires a desktop computer or laptop and a webcam. For best results, use an ethernet cable to connect to your Internet source instead of relying on Wi-Fi. Refer to the Blackboard course for Respondus installation instructions.

6 Specific Course Information

- a. **Catalog 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.
- c. **Prerequisites:** PHYS 2325/2125 and credit for or concurrent enrollment in MATH 2414
- b. **Required or Elective Course:** Required

7 Specific Goals for the Course

- a. Course Learning Outcomes:
 1. Calculate resultant force vectors in two and three dimensions.
 2. Construct accurate free body diagrams and identify the loads/support conditions acting on structural systems.
 3. Apply equilibrium equations to particles and rigid bodies.
 4. Analyze internal forces in trusses and beams.
 5. Analyze impending motion of rigid bodies including the effect of friction.
 6. Determine the centroid and moment of inertia of member cross sections.
- b. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

Table 1: Course Learning Outcomes mapped to ABET Student Outcomes

ABET Student Outcomes	1	2	3	4	5	6
1. Solve Problems	X	X	X	X	X	X
2. Design						
3. Communication						
4. Ethics & Professionalism						
5. Teamwork						
6. Experimentation						
7. Acquire New Knowledge						

8 Topics Covered

1. General Principles of Mechanics
2. Force Vectors in 2D
3. Equilibrium of a Particle
4. Force System Resultants
5. Equilibrium of a Rigid Body in 2D
6. Structural Analysis
7. Internal Forces
8. Center of Gravity and Centroid
9. Moments of Inertia
10. Dry Friction
11. Forces and equilibrium in 3D

9 Course Delivery and Communications

9.1 Delivery Method

This is a face-to-face course with learning resources and supplemental materials posted in [Blackboard](#)¹. Accommodations will be made for students who are in quarantine or isolation and are unable to attend.

9.2 Communications

You may communicate with me via Blackboard discussion board, email, phone, or via GroupMe text. See Figure 1 for QR code to join the course GroupMe.

I will respond to email or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

Written communication via email: All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

Office hours or advising may be arranged with the assistance of Collaborate, Zoom, or another web meeting platform.



Figure 1: Course GroupMe QR Code

10 Professionalism

Professional engineering standards apply in this class. You are expected to demonstrate a behavior consistent with the conduct of an individual practicing in the engineering profession. You are expected to: (1) come prepared for class; (2) respect faculty and peers; (3) demonstrate responsibility and accountability for your own actions; (4) demonstrate 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.

11 Graded Material

11.1 Class Attendance, Participation, and Timeliness

You are expected to meet every class meeting on time and prepared. Attendance will be taken. Should you find it necessary to miss a class for any reason, you are expected to notify your instructor as early as the absence is known—preferably before the absence.

Your online assignments will be due at the time specified on Blackboard. Assignments submitted in hard copy are due at the beginning of class on the due date. Your instructor may assess penalties for late work.

11.2 Pre-class Quizzes

Before nearly every lecture there will be an online pre-class quiz. These quizzes will be designed to test your knowledge of the material before class and to help your instructor know what concepts students are having difficulty with. These quizzes will be graded primarily on completeness rather than correctness.

11.3 Homework

Homework will generally be due weekly and will be based on the previous week's lecture topics. Check Blackboard for specific due dates. Your lowest submittal grade will be dropped.

11.4 Module Competency Tests

This course will not have traditional tests. Instead, there will be a mastery test for each module of the course. Each competency test will be designed to require approximately 30 minutes to complete. Competency test will be administered on-line at specified common times outside of scheduled class time. You will have multiple opportunities to pass each of the mastery tests.

11.5 Course project

Each student will complete a course project in teams of 3 to 5. Details of course project requirements will be posted in Blackboard.

11.6 Grades: Weighting and Letter Grades

Grades will be determined based on the number of mastery tests completed as outlined in Table 2.

Table 2: Grade Weighting

Grade Level	Topic	Grade Requirement
D1	Vector results	Must Pass all D level tests to earn a grade of D.
D2	Free body diagrams, single body	
D3	Equilibrium, concurrent force systems	
D4	Moment calculations, 2D	
D5	Free body diagrams, connected bodies	
D6	Equilibrium or rigid bodies, 2D	
C1	Trusses, method of joints	Must Pass all D and C level tests to earn a grade of C.
C2	Trusses, method of slices	
C3	Frames/machines	
B1	Beams, internal reactions	Must Pass all D, C, and B level tests and complete project to earn a grade of B.
B2/B3	Centroids & moment of inertia (combined test)	
B4	Course project	
A1	Friction	Must Pass all D, C, B and A level tests and complete project to earn a grade of A.
A2/A3	3D Vectors and equilibrium (combined test)	

Homework will be graded and used to adjust grades.

11.7 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](#)² for more information.

12 Classroom and University Policies and Student Support

12.1 General Policies

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)³ and [Angelo State University Catalog](#)⁴.

12.2 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.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the [Student Disability Services website](#)⁵. The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

12.3 Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Incident Reporting Form](#)⁶
Face to Face: Mayer Administration Building, Room 210
Phone: 325-942-2022
Email: michelle.miller@angelo.edu

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about

an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit the [Title IX website](#).⁷

12.4 Student Absence for Observance of Religious Holy Days

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](#)⁸ for more information.

12.5 Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)⁹ web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

12.6 Student Conduct Policies

12.6.1 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.

12.6.2 Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)¹⁰ 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 or SafeAssign. Resources to help you understand this policy better are available at the [ASU Writing Center](#)¹¹.

12.6.3 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.

13 Course Outline

The lecture lesson outline is presented in Table 3. Detailed reading and homework assignments along with updates to this schedule will be provided via Bb. The schedules may be modified as the semester progresses.

Table 3: Lecture Lesson Outline

Lsn	Date	Topic
Lect 1	Mon, 23/08	Introduction, Basic quantities, Units, Vector Intro
Lect 2	Wed, 25/08	Vectors, Operations, Coplanar Force Addition
Lab 1	Thr, 26/08	Coplanar Vector worksheet
Lect 3	Mon, 30/08	Force along a line
Lect 4	Wed, 01/09	2D Dot Product, Force projection
Lab 2	Thr, 02/09	2D Dot Product and force projection
Holiday	Mon, 06/09	
Lect 5	Wed, 08/09	Particle Equilibrium
Lab 3	Thr, 09/09	2D Equilibrium lab
Lect 6	Mon, 13/09	Moments of coplanar forces & Couples
Lect 7	Wed, 15/09	Force-Couple systems & equivalent loads
Lab 4	Thr, 16/09	Moment lab
Lect 8	Mon, 20/09	Rigid Body FBD
Lect 9	Wed, 22/09	2D Equilibrium
Lab 5	Thr, 23/09	2D Equilibrium Lab
Lect 10	Mon, 27/09	Trusses-method of joints, zero force members
Lect 11	Wed, 29/09	Trusses-method of sections
Lab 6	Thr, 30/09	Trusses Lab
Lect 12	Mon, 04/10	Frames
Lect 13	Wed, 06/10	Machines
Lab 7	Thr, 07/10	Frames & Machine Lab
Lect 14	Mon, 11/10	Internal forces and moments
Lect 15	Wed, 13/10	Shear & moment diagrams
Lab 8	Thr, 14/10	Internal forces lab
Lect 16	Mon, 18/10	Relations among load, Shear & moment
Lect 17	Wed, 20/10	Centroids, 1st moment of an area
Lab 9	Thr, 21/10	Shear & moment diagrams lab
Lect 18	Mon, 25/10	Composite bodies
Lect 19	Wed, 27/10	Moment of inertia, second moment of an area
Lab 10	Thr, 28/10	Centroids lab
Lect 20	Mon, 01/11	Parallel axis theorem & radius of gyration
Lect 21	Wed, 03/11	Composite bodies
Lab 11	Thr, 04/11	Moment of inertia lab
Lect 22	Mon, 08/11	Dry Friction
Lect 23	Wed, 10/11	Dry Friction
Lab 12	Thr, 11/11	Friction lab
Lect 24	Mon, 15/11	3D Forces
Lect 25	Wed, 17/11	3D Moments
Lab 13	Thr, 18/11	3D Moments Lab
Lect 26	Mon, 22/11	3D Equilibrium
Lect 27	Mon, 29/11	3D Equilibrium
Lect 28	Wed, 01/12	3D Equilibrium
Lab 14	Thr, 02/12	Final review

End Notes

¹ angelo.blackboard.com

² <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

³ <http://www.angelo.edu/student-handbook/>

⁴ <http://www.angelo.edu/catalogs/>

⁵ <http://www.angelo.edu/services/disability-services/>

⁶ <https://www.angelo.edu/incident-form>

⁷ <https://www.angelo.edu/title-ix>

⁸ <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

⁹ <https://www.angelo.edu/covid-19/>

¹⁰ <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

¹¹ http://www.angelo.edu/dept/writing_center/academic_honesty.php