

1 Course Number and Name

- a. **ENGR 2301:** Engineering Mechanics—Statics, Spring 2022
- b. Lecture: Sec 010 2:00 pm - 3:15 pm, Tuesday and Thursday
Lab: Sec 01Z 2:00 pm - 2:50 pm, Monday

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:** Soyoon Kum
- b. **Instructor:** Soyoon Kum, 325-486-5508, soyoon.kum@angelo.edu. Office: VIN 282. 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 text.

I will respond to email or text 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.

The information of Face-to-face office hour is in [faculty homepage](#). Office hour and advising may be arranged with the assistance of Collaborate, Zoom, or another web meeting platform if necessary.

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.

Missing more than 50% of pre-class quizzes results in one grade down from the final grade of module competency tests.

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. To confirm your grade from module competency tests, you have to complete and submit more than 50% of homework.

Makeup Two Module Competency Tests: Submit all homework and scores of more than 80% of homework are above 50% of the full score

Makeup one Module Competency Tests: Submit 80% homework and scores of more than 80% submitted homework is above 50% of the full score

No homework submission: provide one grade down from the final grade of module competency tests.

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	Prerequisite
D1	Vector Addition	None
D2	FBD Single Body	None
D3	FBD Concurrent Forces	Completed D2
D4	Particle Equilibrium (concurrent forces)	Completed D3
D5	Moment calculations	Completed D3
D6	Equilibrium of rigid bodies	Completed D3
C1	FBD connected bodies	Completed D3
C2	Trusses method of joints	Completed D6
C3	Trusses method of sections	Completed D6
C4	Frames	Completed D6 & C1
B1	Beams/internal reactions	Completed all D-series & C1
B2/B3	Centroids & moments	Completed all D-series & C1
B4	Course Project	None
A1	Friction	Completed all C-series
A2/A3	3D Vectors	Completed all C-series

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

Module	Week	Lesson	Date	Day	Topic	Text	
1	1	Hol	1/17	Mon			
		Lect 1	1/18	Tue	Introduction, Basic quantities, Units, Vector Intro	1.1 - 1.6, 2.1	
		Lect 2	1/20	Thr	Vectors, Operations, Coplanar Force Addition	2.1 - 2.4	
	2	Lab 1	1/24	Mon	Coplanar Vectors		
		Lect 3	1/25	Tue	Force along a line	2.5 & 2.6	
		Lect 4	1/27	Thr	2D Dot Product, Force projection	2.8 & 2.9	
	3	Lab 2	1/31	Mon	2D Dot Product and force projection		
	2		Lect 5	2/1	Tue	Particle Equilibrium	3.1 - 3.3
			Lect 6	2/3	Thr	Moments of coplanar forces & Couples	4.1-4.4, 4.6
4		Lab 3	2/7	Mon	Free body diagram (FBD)		
		Lect 7	2/8	Tue	Force-Couple systems	4.7	
		Lect 8	2/10	Thr	Rigid Body FBD (point loads and couples only)	5.1-5.2	
5		Lab 4	2/14	Mon	Moment computations & Centroids		
		Lect 9	2/15	Tue	Centroids, 1st moment of an area	9.1	
		Lect 10	2/17	Thr	Composite bodies	9.2	
6		Lab 5	2/21	Mon	Distributed load		
		Lect 11	2/22	Tue	2D Equilibrium & equivalent loads	4.9, 5.3-5.4	
3			Lect 12	2/24	Thr	Trusses-method of joints, zero force members	6.1-6.3
	Lab 6		2/28	Mon	Frame FBD		
		Lect 13	3/1	Tue	Trusses-method of sections	6.4	
		Lect 14	3/3	Thr	Frames	6.6	
	8	Lab 7	3/7	Mon	Truss and Frames		
		Lect 15	3/8	Tue	Machines	6.6	
		Lect 16	3/10	Thr	Frame and machine problems		
	Holiday	3/14	Mon	Spring Break			
	Holiday	3/15	Tue	Spring Break			
	Holiday	3/17	Thr	Spring Break			
4	9	Lab 8	3/21	Mon	No Lab		
		Lect 17	3/22	Tue	Internal forces and moments	7.1	
		Lect 18	3/24	Thr	V & M Diagrams	7.2	
	10	Lab 9	3/28	Mon	Internal Forces		
		Lect 19	3/29	Tue	Relations among w, V & M	7.3	
5		Lect 20	3/31	Thr	Moment of inertia, second moment of an area, Radius of gyration, & Parallel axis theorem	10.1 - 10.2	
	11	Lab 10	4/4	Mon	Shear & moment diagrams lab		
6		Lect 21	4/5	Tue	Moment of inertia of Composite bodies	10.3-10.4	
		Lect 22	4/7	Thr	Dry Friction Intro	8.1	
	12	Lab 11	4/11	Mon	Friction		
		Lect 23	4/12	Tue	Dry Friction problem formulation	8.2	
		Lect 24	4/14	Thr	Dry Friction problems		
	13	Lab 12	4/18	Mon	Problem solving for mastery test		
7		Lect 25	4/19	Tue	3D Forces	2.5-2.7, 3.4	
		Lect 26	4/21	Thr	3D Moments	4.2-4.5	
	14	Lab 13	4/25	Mon	3D Vectors		
		Lect 27	4/26	Tue	3D Equilibrium	5.5-5.7	
		Lect 28	4/28	Thr	3D Equilibrium problems		
	15	Lab 14	5/2	Mon	No Lab		
8		Lect 29	5/3	Tue	Project Presentations		
		Lect 30	5/5	Thr	Project Presentations		

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