ENGR 2301 - STATICS
South Plains College
Common Course Syllabus
Revised December 2019

Department: Mathematics, Engineering, and Computer Science

Discipline: Engineering

Course Number: ENGR 2301

Course Title: Engineering Mechanics - Statics

Available Formats: conventional

Campuses: Levelland

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.

Prerequisite/Corequisite: Successful completion of 'C' or better in PHYS 2425 and enrollment in MATH 2414

Credit: 3 **Lecture:** 3 **Lab:** 1

Textbook:

Supplies: Please see the instructor's course information sheet for specific supplies.

This course partially satisfies a Core Curriculum Requirement: None

Core Curriculum Objectives addressed:
- **Communications skills**—to include effective written, oral and visual communication
- **Critical thinking skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **Empirical and quantitative competency skills**—to manipulate and analyze numerical data or observable facts resulting in informed conclusions

Student Learning Outcomes: Upon completion of this course and receiving a passing grade, the student will be able to:

1. State the fundamental principles used in the study of mechanics.
2. Define magnitude and directions of forces and moments and identify associated scalar and vector products.
3. Draw free body diagrams for two- and three-dimensional force systems.
4. Solve problems using the equations of static equilibrium.
5. Compute the moment of force about a specified point or line.
6. Replace a system of forces by an equivalent simplified system.
7. Analyze the forces and couples acting on a variety of objects.
8. Determine unknown forces and couples acting on objects in equilibrium.
9. Analyze simple trusses using the method of joints or the method of sections.

10. Determine the location of the centroid and the center of mass for a system of discrete particles and for objects of arbitrary shape.
11. Analyze structures with a distributed load.
12. Calculate moments of inertia for lines, areas, and volumes.
13. Apply the parallel axis theorem to compute moments of inertia for composite regions.
14. Solve problems involving equilibrium of rigid bodies subjected to a system of forces and moments that include friction.
15. Solve problems involving dry sliding friction, including problems with wedges and belts.

Student Learning Outcomes Assessment: A pre- and post-test questions will be used to determine the extent of improvement that the students have gained during the semester.

Attendance Policy: Attendance and effort are the most important activities for success in this course. Records of your attendance are maintained throughout the semester. Five (5) absences, *for any reason*, are allotted to the student for the semester. Tardies count as one-half (1/2) of an absence. Tardies will be applied for consistently being late to class, as deemed by the instructor and leaving class early. If this number is exceeded, the instructor has the right to drop you with a grade of F or an X, depending on their discretion.

Plagiarism violations include, but are not limited to, the following:
1. Turning in a paper that has been purchased, borrowed, or downloaded from another student, an online term paper site, or a mail order term paper mill;
2. Cutting and pasting together information from books, articles, other papers, or online sites without providing proper documentation;
3. Using direct quotations (three or more words) from a source without showing them to be direct quotations and citing them; or
4. Missing in-text citations.

Cheating violations include, but are not limited to, the following:
1. Obtaining an examination by stealing or collusion;
2. Discovering the content of an examination before it is given;
3. Using an unauthorized source of information (notes, textbook, text messaging, internet, apps) during an examination, quiz, or homework assignment;
4. Entering an office or building to obtain an unfair advantage;
5. Taking an examination for another;
6. Altering grade records;
7. Copying another's work during an examination or on a homework assignment;
8. Rewriting another student's work in Peer Editing so that the writing is no longer the original student's;
9. Taking pictures of a test, test answers, or someone else's paper.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, aggressive, or demeaning**.** Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

Diversity Statement: In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about

ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

Disability Statement: Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

Nondiscrimination Policy: South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

Title IX Pregnancy Accommodations Statement: If you are pregnant, or have given birth within six months, Under Title IX you have a right to reasonable accommodations to help continue your education. To activate accommodations you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Director of Health and Wellness. Once approved, notification will be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact the Director of Health and Wellness at 806-716-2362 or email cgilster@southplainscollege.edu for assistance.

Campus Concealed Carry: Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and South Plains College policy, license holders may not carry a concealed handgun in restricted locations. For a list of locations and Frequently Asked Questions, please refer to the Campus Carry page at: http://www.southplainscollege.edu/campuscarry.php
Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716-2396 or 9-1-1.

SPC Bookstore Price Match Guarantee Policy: If you find a lower price on a textbook, the South Plains College bookstore will match that price. The difference will be given to the student on a bookstore gift certificate! The gift certificate can be spent on anything in the store.

If students have already purchased textbooks and then find a better price later, the South Plains College bookstore will price match through the first week of the semester.   The student must have a copy of the receipt and the book has to be in stock at the competition at the time of the price match.

The South Plains College bookstore will happily price match BN.com & books on Amazon

noted as *ships from and sold by Amazon.com*. Online marketplaces such as *Other Sellers* on Amazon, Amazon's Warehouse Deals, *fulfilled by* Amazon, BN.com Marketplace, and peer-to-peer pricing are not eligible. They will price match the exact textbook, in the same edition and format, including all accompanying materials, like workbooks and CDs.

A textbook is only eligible for price match if it is in stock on a competitor's website at time of the price match request. Additional membership discounts and offers cannot be applied to the student's refund.

Price matching is only available on in-store purchases.   Digital books, access codes sold via publisher sites, rentals and special orders are not eligible. Only one price match per title per customer is allowed.

Note: The instructor reserves the right to modify the course syllabus and policies, as well as notify students of any changes, at any point during the semester.

Professor: Dr. Ramesh Krishnan   (alias: Krams)

Office: AG 108   **PHONE:** (806) 894-9611 **x** 2698   **Email:** rkrishnan@southplainscollege.edu

Office Hours: **MW:** 9:50 – 11:00, 12:15 – 1:00, **F:** 8:00 – 10:30
                              TTh: 12:00 – 1:00 pm
The Faculty will be at his office at AG108 only on Mondays and Tuesdays.
The rest of the days will be virtual office hours. For contacting the faculty during virtual office hours please email the faculty.

Class Times: **The class will meet at the scheduled time FACE TO FACE on Tue. The class will meet online through BLACKBOARD COLLABORATE ULTRA on Thursday**
                              Detailed instructions will be given to students during the first day of class on how to access the classes online.
                              Should the students miss the class due to COVID, the lecture recordings will be made available via blackboard. On the course session look for the hamburger menu to get your recordings.

Textbook: Vector Mechanics for Engineers - STATICS, (12th edn.): by Beer & Johnston

GRADING: Grades in the course will be based on the following components:
- 3 exams   (60%) $A \geq 90$
- Quizzes   (10%) $80 \leq B < 90$
- Homework   (10%) $70 \leq C < 80$
- Final exam   (20%) $60 \leq D < 70$
                                                                                        $F < 60$
                              TOTAL   **100%**

PS: **NO MAKE-UP** exams will be given. If you miss **one**, the final exam will count twice.
      NO MAKE-UP Quizzes will ever be given. If you miss, you missed it for the course!

COURSE OBJECTIVES

The primary objective of this course is to develop a thorough understanding of the action of forces on objects at rest. The knowledge that you gain in this course will be important in many areas of engineering, particularly in structural engineering. By the end of the semester, you should be able to draw free body diagrams; determine the point of action, direction, and magnitude of all external forces on a wide variety of physical objects and structures; determine the resultant force necessary to maintain the object in equilibrium; and calculate the internal forces on a wide variety of structural objects, including trusses, frames, machines, and beams. Calculate centroids, centers of mass, and mass moments of inertia. A second and equally important objective of this course is to develop broad engineering skills. Engineering requires the mastery of complex concepts and development of critical thinking and problem solving skills. While these skills come naturally to some people, most of you will need to learn, develop, and practice techniques to enhance your ability to learn and apply engineering concepts. The skills that you develop and sharpen in this course may improve your performance in future engineering courses and determine your eventual success as a practicing engineer.

HOMEWORK: Done online at
https://connect.mheducation.com/class/krams-spring2021

		Course Outline
		This schedule is tentative and subjective to change. Changes will be announced in class.
Week	**Date**	**Topics and Sections Covered**
1	1/18, Tue	Introduction, Chapter 1
	1/20 Thu	Chapter 2
2	1/25, Tue	Chapter 2
	1/27, Thu	Chapter 2
3	2/2, Tue	Chapter 2
	2/4, Thu	Chapter 2
4	2/9, Tue	Chapter 2
	2/11, Thu	Exam #1
5	2/ 16, Tue	Chapter 3
	2/18, Thu	Chapter 3
6	2/23, Tue	Chapter 3
	2/25, Thu	Chapter 3
7	3/2, Tue	Chapter 3
	3/4, Thurs	Chapter 3
8	3/9, Tue	Chapter 3
	3/11, Thurs	Exam #2
	3/15 - 3/19	*Spring Break*
9	3/16, Tue	Chapter 4
	3/18, Thu	Chapter 4
10	3/23, Tue	Chapter 4
	3/25, Thu	Chapter 4
11	3/30, Tue	Chapter 5
	4/1, Thu	Chapter 5

Schedule shown above is only a tentative schedule and subject to change as discussed in class.

12	4/6, Tue	Chapter 5
	4/8, Thu	Exam #3
13	4/13, Tue	Chapter 6
	4/15, Thu	Chapter 6
14	4/20, Tues	Chapter 6
	4/22, Thu	Chapter 7
15	4/27, 4,30	Chapter 7
16	5/4, Tue	Chapter 7
	5/6, Thu	Review for Finals
Finals	5/11, Tue	Finals

Note: The calendar above is tentative. Purpose of the calendar is to give the student an idea of how the course will be progressing through the semester.