South Plains College
Common Course Syllabus: ENGR 2302
Revised December 2019

Department: Mathematics, Engineering, and Computer Science

Discipline: Engineering

Course Number: ENGR 2302

Course Title: Engineering Mechanics - Dynamics

Available Formats: conventional

Campuses: Reese Center

Course Description: Basic theory of engineering mechanics, using calculus, involving the motion of particles, rigid bodies, and systems of particles; Newton's Laws; work and energy relationships; principles of impulse and momentum; application of kinetics and kinematics to the solution of engineering problems.

Prerequisite: Successful completion of 'C' or better in ENGR 2301

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. Express dynamic quantities as vectors in terms of Cartesian components, polar coordinates, and normal-tangential coordinates.
2. Compute mass moments of inertia for systems of particles and rigid bodies.
3. Solve kinematic problems involving rectilinear and curvilinear motion of particles.
4. Solve kinetic problems involving a system of particles using Newton's Second Law.
5. Apply the principles of work and energy, conservation of energy, impulse and momentum, and conservation of momentum to the solution of engineering problems involving particles and systems of particles.
6. Solve kinematic problems involving the translation and rotation of a rigid body.
7. Solve kinetic problems involving planar translation and rotation of rigid bodies.
8. Apply the principles of work and energy, conservation of energy, impulse and momentum, and conservation of momentum to the solution of engineering problems involving rigid bodies in planar motion.

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

Course Evaluation: There will be departmental final exam questions given by all instructors.

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.

SOUTH PLAINS COLLEGE
MATHEMATICS, ENGINEERING & COMPUTER SCIENCE

Engineering 2302 – Engineering Mechanics: Dynamics
Section 201: Tuesday/Thursday 2:30 PM – 4:15 PM
Room: Building 2, 226, Reese Campus

Instructor Information

Contact Information

Instructor: Evan Vargas

Phone: (806) 716-4673

Email: evargas@southplainscollege.edu

Office Hours Agriculture Building, AG107, Levelland Campus

Monday/Wednesday:	10:40 AM – 10:55 AM @ TA209, Levelland 12:55 PM – 2:25 PM @ AG107, Levelland
Tuesday/Thursday:	10:40 AM – 10:55 AM @ TA209, Levelland 2:15 PM – 2:30 PM @ Building 2, 226, Reese
Friday:	8:30 AM – 12:00 PM @ AG107, Levelland

Course Information

Textbook Engineering Mechanics: Dynamics, 14th Edition by Hibbeler, 2016, Pearson
ISBN: 9780133915389

Mastering Engineering

Materials Pencils, erasers, paper, and calculator.

Grading Policy

Grading Scale:			**Weights:**		
	90-100	**A**		Homework	10%
	80-89	**B**		Quiz	10%
	70-79	**C**		Exams (4)	15% each
	60-69	**D**		Final Exam	20%
	0-59	**F**		**Total**	**100%**

Online Homework Assignments
Homework will be assigned daily/weekly via Mastering Engineering. It is the students' responsibility to obtain a code to use the online homework. Additionally, physical workout/step-by-step homework is required to be submitted at the beginning of class when announced.

In-class Quizzes
Quizzes will be given randomly throughout the semester and will contain material pertaining to Homework Assignments and previous lecture material. No make-up quizzes will be allowed for any reason.

In-class Examinations
Exams will cover material from Homework, Quizzes, and Lectures as indicated by the course itinerary. Examinations will be a combination of open answer, fill in the box, and/or multiple choice. Students need only bring pencils, lead, erasers, and a calculator. No other material will be required unless stated in class. **The use of pens are not allowed.** If an exam is missed due to *any reason,* the Final Examination will replace **one (1)** exam score.

Cell phones, smart watches, tablets, computers, etc. **are not allowed** and students will be asked to remove their device(s) or leave the class. Students seen with and using unapproved devices will receive an automatic 0 for the exam and potentially be dropped from the course.

Final Examination
A **comprehensive** final exam will be given at the end of the semester. Failure to attempt the final exam will result in a failing grade for the course. The final exam will be given on **Tuesday, May 5th, 2020 at 1:00 PM – 3:00 PM.** Conflicting test schedules must be worked out with instructors. All grades are rounded from the tenths place, e.g. 80.5 = 81 and 80.49 = 80, upon the submission of grades at the end of the semester. **ALL GRADES ARE FINAL**

Returning Grades
The instructor will attempt to return any graded assignment by the next class meeting or as soon as possible. Any discrepancies with a particular grade must be contested to the instructor within **two weeks.** If the student does not contest their grade they will forfeit the right for amendments.

Classroom Policies

Class Cancellation Policy
In the event of class being canceled by the school/instructor, the student will be responsible for the lecture material missed. The class will continue on the following class day. All information will be available to the student on Blackboard and/or sent via email.

South Plains College Email Policy
The instructor will only acknowledge, respond, and send emails to your assigned South Plains College email. This ensures the intended recipient receives all correspondence from the instructor. It is the students' responsibility to have their email set up and ready to use by the end of the first week of class.

Withdrawal Policy
To withdraw from this class, the student will need to go to the Admissions and Records office either on the Levelland campus or the Reese Center campus, and fill out a drop notification form. If the student does not initiate the drop on their behalf the instructor will do instead.

Course Itinerary

Week 1	Jan. 14	**12. Introduction**: **Particle Kinematics** Rectilinear Kinematics – Continuous/Erratic Motion. Curvilinear Motion; Rectangular Component
	Jan. 16	Projectile Motion. Curvilinear Motion – Normal & Tangential and Cylindrical Components.
Week 2	*Jan. 21*	Absolute Dependent Motion Analysis and Relative-Motion of Two Particles.
	Jan. 23	**13. Particle Kinetics: Force/Acceleration** Newton's 2nd Law of Motion. The Equation of Motion.
Week 3	*Jan. 28*	Equations of Motion: System of Particles and Rectangular Coordinates.
	Jan. 30	Equations of Motion: Normal & Tangential, and Cylindrical Coordinates.
Week 4	**Feb. 4**	**Examination 1**
	Feb. 6	**14. Particle Kinetics: Work and Energy** The Work of Force. Principle of Work and Energy.
Week 5	Feb. 11	Principle of Work and Energy: System of Particles. Power and Efficiency.
	Feb. 13	Conservative Forces and Potential Energy. Conservation of Energy.
Week 6	Feb. 18	**15. Particle Kinetics: Impulse and Momentum** Principle of Linear Impulse and Momentum and of Systems of Particles.
	Feb. 20	Conservation of Linear Impulse and Momentum: System of Particles. Impact.
Week 7	Feb. 25	Angular Momentum. Principle of Angular Impulse and Momentum.
	Feb. 27	**Examination 2**
Week 8	Mar. 3	**16. Rigid Body Kinematics** Planar Rigid-Body Motion, Translation. Rotation about fixed Axis.
	Mar. 5	Absolute Motion Analysis. Relative-Motion: Velocity. Instantaneous Center of Zero Velocity.
Week 9	*Mar. 10*	Relative-Motion: Acceleration. Relative-Motion; Rotating Axes.
	Mar. 12	**17. Rigid Body Kinetics: Force/Acceleration** Mass Moment of Inertia. Planar Kinetic equations of Motion.
Week 10	*Mar. 24*	Equations of Motion: Translation and Rotation about a Fixed Axis.
	Mar. 26	Equations of Motion: General Plane Motion.
Week 11	**Mar. 31**	**Examination 3**
	Apr. 2	**18. Rigid Body Kinetics: Work/Energy** Kinetic Energy. The Work of Force.
Week 12	Apr. 7	The Work of a Couple Moment. Principle of Work and Energy
	Apr. 9	Conservation of Energy
Week 13	Apr. 14	**19. Rigid Body Kinetics: Impulse/Momentum** Linear and Angular Momentum. Principle of Impulse and Momentum.
	Apr. 15	Conservation of Momentum. Eccentric Impact.
Week 14	Apr. 21	**20. Three-Dimensional Kinematics of a Rigid Body** Rotation About a Fixed Point. General Motion.
	Apr. 23	**Examination 4**
Week 15	Apr. 28	**22. Vibrations**: Undamped Free Vibration. Energy Methods. Forced Vibration. Electrical Circuit Analogs.
	Apr. 30	**Final Examination Review**
Week 16	**May 5**	**Final Exam 1:00 PM – 3:00 PM**