

Engineering Mechanics: Statics (MAE 211)

Instructor: Prof. Paul West

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Number of credits: 3 Credits, 3 lecture hours: **Prerequisites:** SCP 231, MAT 203 and MAE 101.

Please note: If you have not passed the prerequisites, you will be de-registered from the class!!!!

Text Book: “Vector Mechanics for Engineers: Statics and Dynamics,” by Beer, Johnston, and Eisenberg, McGraw-Hill, 13^h Edition.

Course Description: Topics to be covered include equivalent systems of forces, resultants and distributed forces, equilibrium of rigid bodies, centroids, centers of gravity, moments of inertia, shear and moment diagrams and friction. Analysis of frames and machines, forces in beams, internal stresses and stability will also be considered. Vector algebra will be used throughout.

Course Goals and Objectives: The Engineering Statics course provides the basic concepts and skills that form the foundation for structural and mechanical design. The class is a critical thinking, problem solving focused engineering science class that helps engineering students develop the ability to understand and analyze static forces on a variety of structures and engineering applications.

Expected Lecture Outcomes: After successfully completing this course the student should be able to:

1. Use both conceptual and numerical techniques to solve engineering problems.
2. Analyze and develop free-body diagrams for any system of forces in two and three dimensions.
3. Understand and use the general idea of equilibrium of a particle.
4. Understand and use the general ideas of force system resultants.
5. Determine the moment of a force about an arbitrary point and/or axis
6. Analyze the equilibrium of rigid bodies under any system of forces.
7. Analyze trusses, beams, frames, and machines.
8. Understand and use the general ideas of internal forces and draw shear and moment diagrams.
9. Apply friction forces and analyze their different applications.
10. Locate centroids and calculate moments of inertia.
11. Understand kinematics of particles: path variables, cylindrical coordinates and relative motion

Quizzes & Exams

- Quizzes will be similar to the assigned homework problems
- Two non-cumulative exams (Midterms)
- Two design/computer programming projects will be assigned
- One cumulative Final exam

To pass the course you must pass the Final Exam!!

Homework solutions should be neat and professional in appearance. Homework due dates will be as discussed in class. Students are expected to ask questions about problems that they don't understand. **Students who submit copied assignments will receive a grade of zero for that assignment!!**

Each student needs a calculator for all quizzes and exams. **The sharing of calculators during quizzes and exams will not be permitted!! (Not covid relevant)**

Grades: NO MAKE UP EXAMS WILL BE GIVEN

- Final Exam (~35%).
- One or two Midterms (~25%) (time depending)
- Design Projects (~30%)
- Class participation (10%)