

NorthWest Arkansas Community College
Division of Science and Mathematics

Course Number and Title

MEEG 2003 Statics

Catalog Description

This is an introductory course and will include topics such as equilibrium of particles and rigid bodies, moments of forces, centroids, moments of inertia, analysis of structures, friction, and resultants of force systems in a plane and in space. Students enrolling in this course must also enroll in MEEG 2001D during the same semester.

Prerequisites

PHYS 2054 Advanced College Physics I or PHYS 2074 Advanced College Physics II. Co-requisite: MEEG 2001D Statics Drill

Credit hours/Contact hours/Load hours

3 credit hours/ 3 contact hours/ 3load hours

Target Audience/Transferability

This course is designed for students who are transferring into an engineering program at a 4-year institution. It should transfer in as a 3 credit hour Statics course for those engineering areas requiring such a course.

Student Learning Outcomes

Upon successfully completing this course, students will:

1. Describe Newton's laws of motion and law of gravity.
2. Construct free-body diagrams and perform force balance calculations of static equilibrium for rigid bodies in a plane or in space.
3. Solve problems involving moments and internal forces.
4. Calculate centroids of lines, areas, and volumes, and compute moments of inertia.
5. Describe the forces in distributed loads.
6. Analyze trusses, frames, and machines.
7. Explain the laws of friction.

Topics

- 1) Forces, units, dimensions, significant digits, conversion of units
- 2) Newton's laws of motion, law of gravitation, parallelogram law
- 3) Addition and resolution of forces in a plane
- 4) Addition and resolution of forces in space
- 5) Equilibrium of particles in a plane
- 6) Equilibrium of particles in space
- 7) Moments of forces, couples, Varignon's theorem

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- 8) Moments of forces using cross product, dot product, and scalar triple product
- 9) Equilibrium of rigid bodies in a plane
- 10) Equilibrium of rigid bodies in space
- 11) Centroids of lines and areas
- 12) Distributed loads and centroids of volumes
- 13) Area moments of inertia, radii of gyration
- 14) Parallel-axis theorem, composite areas
- 15) Trusses: method of joints
- 16) Trusses: method of sections
- 17) Frames and machines
- 18) Friction between rigid bodies
- 19) Work of a force, work of a moment, displacement center

Forms of Assessment

- A. Each instructor will include a set of departmental questions on each exam and on the final exam. These questions will be in direct support of the Student Learning Outcomes. The questions will compose at least 10% of the students' overall grade in the course and will be graded according to a standard grading rubric. The results of these questions and overall student performance will be reported when final grades are turned in.
- B. In class quizzes: Each instructor will give students in class quizzes on regular basis. The questions in the quizzes will support students' learning outcomes. Quizzes will constitute 5% of the students overall grade. . The results of these quizzes and overall student performance will be reported when final grades are turned in.