NorthWest Arkansas Community College
Division of Science and Mathematics

Discipline Code
MEEG

Course Number
2003

Course Title
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. Class will meet four hours a week including lecture and drill.

Prerequisites
PHYS 2054 Advanced College Physics I or PHYS 2074 Advanced College Physics II.

Credit hours
3 credit hours

Contact hours
45 Lecture hours and 15 Drill hours

Load hours
3.67 load hours

Semesters Offered
Fall, Spring and Summer

ACTS Equivalent
MEEG 2003. Statics

Grade Mode
A-F

Student Learning Outcomes

Upon successfully completing this course, students will:

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

General education Outcomes Supported

- Students can achieve mathematical literacy.

Standard Practices

Topics

- Forces, units, dimensions, significant digits, conversion of units
- Newton's laws of motion, law of gravitation, parallelogram law
- Addition and resolution of forces in a plane
- Addition and resolution of forces in space
- Equilibrium of particles in a plane
- Equilibrium of particles in space
- Moments of forces, couples, Varignon's theorem Moments of forces using cross product, dot product, and scalar triple product
- Equilibrium of rigid bodies in a plane
- Equilibrium of rigid bodies in space
- Centroids of lines and areas
- Distributed loads and centroids of volumes
- Area moments of inertia, radii of gyration
- Parallel-axis theorem, composite areas
- Trusses: method of joints
- Trusses: method of sections
- Frames and machines
- Friction between rigid bodies
- Work of a force, work of a moment, displacement center

Learning activities

- Courses must, at a minimum, cover the core learning outcomes for each topic. Faculty may add to these outcomes, but may not omit any of them.
- Since developing student higher order thinking skills and information literacy are essential outcomes of this course, all instructors should include learning activities that develop these outcomes in their

courses and identify them in course syllabi. Instructors should describe how these activities will be evaluated in their course syllabi and/or reflected in their gradebooks.

Forms of Assessment

- 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.

Grading guidelines
- In class quizzes will constitute 5% of the students overall grade.
- Three proctored exams will constitute at least 80% of the final grade.
- Homework comprise the remaining grade.

Revised Fall 2022