JOHN CABOT UNIVERSITY

COURSE CODE: ENGR 210
COURSE NAME: Statics
Summer Session Sample Syllabus

TOTAL NO. OF CONTACT HOURS:
CREDITS:
PREREQUISITES: MA 198 Calculus I

COURSE DESCRIPTION:

This course provides an introduction to statics, the branch of mechanics that is concerned with the analysis of loads (force and torque, or "moment") on physical systems in static equilibrium, that is, in a state where the relative positions of subsystems do not vary over time, or where components and structures are at a constant velocity. When in static equilibrium, the system is either at rest, or its center of mass moves at constant velocity. Course content includes vector algebra, forces, couples, moments, resultants of force couple systems; friction, equilibrium analysis of particles and finite bodies, centroids; and applications.

SUMMARY OF COURSE CONTENT:
For the purpose of transfer credit, refer to the course description (above) and the topical schedule (below). This course includes all Statics topics tested on the Fundamentals of Engineering Exam and was designed by an engineering faculty who was the principal author for two ABET self-studies in 2017-2018. This is a rigorous course that prepares students for success in subsequent coursework, such as *Mechanics of Materials*, *Solid Mechanics*, *Strengths of Materials*, and *Dynamics*. Small class sizes (generally 10-20 students) and daily office hours enable exceptional levels of student learning.

LEARNING OUTCOMES:

By the end of this course, students will be able to:

1. Apply vector addition, vector multiplication, and trigonometry to Statics problems.
2. Construct free-body diagrams of a body or system in static equilibrium.
3. Depict the effects of springs, pulleys, cables, pin connections, roller connections, and fixed connections with vectors.
4. Calculate the moment of a force in 2D and 3D notation.
5. Use the equations of equilibrium to solve for reactions in simple systems (particle equilibrium, beams, frames, and trusses.)
6. Solve for the internal shear force, normal force, and bending moment in a structural or mechanical member; express these concepts in the form of an equation; and graphically construct shear and moment diagrams.
7. Analyze simple friction problems.

8. Compute centroids through direct integration and composite area methods; compute moments of inertia through direct integration and via the parallel axis theorem; and calculate principal moments of inertia with Mohr's Circle.
9. Additionally, this course has been structured to provide opportunities for students to develop certain skillsets that are critically important to the professional practice of engineering:
10. Students take responsibility for their own learning.
11. Students apply a careful, slow, and methodological approach to engineering problem-solving.
12. Students communicate their work effectively by combining succinct and comprehensible mathematical calculations, precise and scaled free body diagrams, and written commentary.
13. Students recognize the value of reliable, accurate computations.
14. Students recognize the importance of checking their own work.
15. Students build their engineering intuition and judgment by connecting abstract theories to practical applications

TEXTBOOK: Engineering Statics, Carnegie Mellon University OLI. This is a high-quality, open source, no-cost, online textbook. https://oli.cmu.edu/courses/engineering-statics-open-free

ASSESSMENT METHODS:

Assignment	Guidelines	Weight
Homework	Homework assignments will be graded: the average grade weighs 10 percent of the final grade.	10%
Attendance	Full credit for attendance will be given to students with three or fewer unexcused absences. Four or more absences will result in a proportional reduction of the grade.	10%
Quizzes	Every week, starting from the second week, students will be asked to solve and hand in a simple, fifteen-to-twenty-minute quiz. The average quiz score weighs fifteen percent of the final grade.	15%
Mid-term exam		25%
Final exam (comprehensive)		40%

-ASSESSMENT CRITERIA:

A Work of this quality directly addresses the question or problem raised and provides a coherent argument displaying an extensive knowledge of relevant information or content. This type of work demonstrates the ability to critically evaluate concepts and theory and has an element of novelty and originality. There is clear evidence of a significant amount of reading beyond that required for the course.
B This is highly competent level of performance and directly addresses the question or problem raised. There is a demonstration of some ability to critically evaluate theory and concepts and relate them to

practice. Discussions reflect the student's own arguments and are not simply a repetition of standard lecture and reference material. The work does not suffer from any major errors or omissions and provides evidence of reading beyond the required assignments.
C This is an acceptable level of performance and provides answers that are clear but limited, reflecting the information offered in the lectures and reference readings.
D This level of performances demonstrates that the student lacks a coherent grasp of the material. Important information is omitted and irrelevant points included. In effect, the student has barely done enough to persuade the instructor that s/he should not fail.
F This work fails to show any knowledge or understanding of the issues raised in the question. Most of the material in the answer is irrelevant.

ATTENDANCE REQUIREMENTS:

Full credit for attendance will be given to students with three or fewer unexcused absences. Four or more absences will result in a proportional reduction of the grade. Coming late to class or leaving early will be possible only with permission of the instructor.
Missed exams may not be made up.

Please refer to the university catalog for the attendance and absence policy.

ACADEMIC HONESTY

As stated in the university catalog, any student who commits an act of academic dishonesty will receive a failing grade on the work in which the dishonesty occurred. In addition, acts of academic dishonesty, irrespective of the weight of the assignment, may result in the student receiving a failing grade in the course. Instances of academic dishonesty will be reported to the Dean of Academic Affairs. A student who is reported twice for academic dishonesty is subject to summary dismissal from the University. In such a case, the Academic Council will then make a recommendation to the President, who will make the final decision.

STUDENTS WITH LEARNING OR OTHER DISABILITIES

John Cabot University does not discriminate on the basis of disability or handicap. Students with approved accommodations must inform their professors at the beginning of the term. Please see the website for the complete policy.

BRIEF LIST OF TOPICS COVERED

General Principles, Force Vectors, Equilibrium of a Particle, 3D Equilibrium, Force-Couple System, Rigid Body Equilibrium, Equilibrium in Two Dimensions, Equilibrium in Three Dimensions, Forces in Trusses: Method of Joints, Forces in Trusses: Method of Sections, Space Trusses, Forces in Frames and Machines, Frictional Forces, Tipping and Impending Motion, Problems Involving Friction, Center of Gravity Using Integration, Center of Gravity of Composite Sections, Moment of Inertia using Integration, Moment of Inertia of Composite Sections, Mass Moment of Inertia.