JOHN CABOT UNIVERSITY

COURSE CODE: ENGR 212
COURSE NAME: **"Mechanics and Machines"**
SEMESTER & YEAR:

SYLLABUS

INSTRUCTOR:
EMAIL:
HOURS:
TOTAL NO. OF CONTACT HOURS:
CREDITS: 3
PREREQUISITES: MA299 Calculus II, Principles of Physics I (with Laboratory)
OFFICE HOURS:

COURSE AIMS:

This course provides a foundation in vector mechanics, statics, and axial, torsional, and bending stresses. Deflections of axial and torsional members are also emphasized. Some machine elements are introduced.

SUMMARY OF COURSE CONTENT:

Vector algebra; free body diagrams; static analysis of particles, rigid bodies, trusses, frames, and machines; static friction; internal forces; centroids; moments of inertia; shear force and bending moment diagrams; stresses, strains, and deflections in axially loaded, torsional, and bending members; buckling.

LEARNING OUTCOMES:

Upon successful completion of this course, students will

1. learn to accurately draw free body diagrams and use them as tools to solve statics and solid mechanics problems;
2. learn to determine stresses, strains, and elongations for axial, torsional, and bending loading conditions;
3. enhance previously learned skills in vector algebra and will learn new applications for each of those skills and gain new skills in solving systems of linear equations using matrices;
4. begin to learn to solve open-ended problems;
5. be familiar with some basic machine elements.

TEXTBOOK: Statics and Mechanics of Materials with 2 Semester Connect Access Card, 2nd Edition, Ferdinand Beer, 2017.

GRADING POLICY

A strong emphasis is placed on student preparation for class. Students are required to read the chapter prior to class and complete some basic problems so we can focus on group problems, sample problems and those areas in which students are struggling in class.

Students are graded primarily on exams and quizzes. Each is an opportunity for the student to demonstrate their skills. Exams and quizzes are an essential means for the student to demonstrate his/her ability to solve problems independently.

Homework is essential to the learning of all engineering material and therefore must be completed even though it is a relatively small percentage of the final grade. In addition, homework problems are often more challenging than those on exams. Connect homework will be completed before a topic is discussed in class. Students are welcome to ask questions in office hours or via e-mail.

The below weighting of grades only applies if students have a minimum 60% average in each of the homework, quiz and exam categories. If a student does not achieve the 60% minimum grade in each of these categories, a sub-C grade will be received for the course regardless of performance in the other categories.

-ASSESSMENT METHODS:

Assignment	Weight
Five quizzes	12% each
Homework Individual (Connect)	5%
Homework Learn Smart Reading	5%
Final Exam	30%

-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. The only mistakes are arithmetic errors.

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:

Attendance is expected at all class meetings. 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.

SCHEDULE			
Session	**Session Focus**	**Reading / Other Assignment**	**Meeting Place/Exam Dates**
Week 1	Vectors in two and three dimensions, including addition, scalar product, and dot product. Systems of forces and moments	Chapters 1 - 3	Quiz Thursday, July 11
Week 2	Equilibrium of particles and rigid bodies in two and three dimensions, Centroids, first moments of area, and second moments of area	Chapters 4, 5 and 7	Quiz Monday, July 15
Week 3	Analysis of trusses, frames, and machines, Concept of stress and strain, material properties, Stresses and deformation of axially loaded members, linear elasticity	Chapters 6, 8.1 and 8.4, 9.1, 9.4, 9.6, 9.8 and 9.9	Quiz Monday, July 22
Week 4	Stresses and deformation of members subjected to torsion, Shear and moment diagrams	Chapter 10.1 and 10.2, 12.1 and 12.2	Quiz Monday, July 29
Week 5	Normal and transverse shear stresses in beams, Buckling of slender columns, Friction acting on rigid bodies: tip or slip conditions. Friction on simple machine elements	Chapter 11.1, 11.2, 13.1	Quiz Monday, Aug. 5 Comprehensive Final Exam Aug. 9