

JAMESTOWN COMMUNITY COLLEGE
State University of New York

INSTITUTIONAL COURSE SYLLABUS

Course Title: Mechanics of Materials

Course Abbreviation and Number: MCT 2230

Credit Hours: 4

Course Type: Lecture/Lab

Course Description: Students will learn stress, strain, and the mechanical properties of materials, tension, compression, torsion, and beams. Topics such as columns, welded and riveted connections, combined stress, stress concentrations, thermal stresses, and pressure vessels are discussed.

Prerequisites: MCT 1250, Eligibility MAT1600.

Student Learning Outcomes:

Students who demonstrate understanding can:

1. Determine the internal reactions of rigid, static members in two dimensions.
 2. Identify and determine normal, shear, and bearing stresses from direct loadings on a member.
 3. Understand and use the relationships of stress, strain, elastic modulus, Poisson's Ratio, material strengths and factors of safety to analyze and design simple members.
 4. Determine thermal expansion/contraction and/or thermal stresses when analyzing and designing members.
 5. Apply principles of stress and strain to applications including torsion shafts, pressure vessels, beams, columns, and fasteners.
 6. Draw shear and moment diagrams.
 7. Use Mohr's Circle to determine orientations of the principle stress element and the maximum shear stress element.
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Topics Covered:

- Introduction to stress and strain
 - Elasticity and plasticity: Hooke's Law-E
 - Stress-strain diagram; material properties
 - Tension, compression
 - Stress-normal, shear, bearing
 - Design of tension members
 - Torsion Stress
 - Angle of Rotation, Hooke's Law-G
 - Transmission of Power
 - Design of torsion members
 - Beams – shear & bending moment diagram
 - Bending stress
 - Horizontal shear stress
 - Beam design
 - Deflection of beams by integration
 - Mohr's circle
 - Pressure vessels
 - Thermal stress
 - Stress concentrations
 - Columns
 - Fatigue
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Information for Students

- Expectations of Students
 - [Civility Statement](#)
 - [Student Responsibility Statement](#)
 - [Academic Integrity Statement](#)
- [Accessibility Services](#)
Students who require accommodations to complete the requirements and expectations of this course because of a disability must make their accommodation requests to the Accessibility Services Coordinator.
- [Get Help: JCC & Community Resources](#)
- [Emergency Closing Procedures](#)
- Course grade is determined by the instructor based on a combination of factors, including but not limited to, homework, quizzes, exams, projects, and participation. Final course grade can be translated into a grade point value according to the following:

A=4.0	B+=3.5	B=3	C+=2.5	C=2	D+=1.5	D=1	F=0
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- Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, VA appointments) are welcome and encouraged to communicate these to the instructor.
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Effective Date: Fall 2023