

JAMESTOWN COMMUNITY COLLEGE
State University of New York

INSTITUTIONAL COURSE SYLLABUS

Course Title: Strength of Materials

Course Abbreviation and Number: ENR 2580

Credit Hours: 4

Course Type: Lecture/Lab

Course Description: Students will be able to explain the concepts of stress and strain and the relationships between them in the solution of problems such as beams, columns, torsional members, connections and combined loading (Mohr's circle). Stress concentrations, thin-walled pressure vessels, and beam deflections are covered. Laboratory experiences include standard tests to determine properties of various materials when subjected to normal stress, bending, shear impact, and torsion loading. Hardness tests and non-destructive testing procedures are used.

Prerequisites: ENR 2550.

Student Learning Outcomes:

Students who demonstrate understanding can:

1. Determine the internal reactions of rigid, static members in two and three 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:

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| • Introduction to Stress and Strain | • Bending Stress |
| • Elasticity and Plasticity; Hooke's Law-E | • Horizontal Shear Stress |
| • Stress-strain Diagram; Material Properties | • Beam Design |
| • Tension, Compression | • Deflection of Beams by Integration |
| • Stress – Normal, Shear, Bearing | • Mohr's Circle |
| • Design of Tension Members | • Pressure Vessels |
| • Torsion Stress | • Thermal Stress |
| • Angle of Rotation, Hooke's Law-G | • Stress Concentrations |
| • Transmission of Power | • Columns |
| • Design of Torsion Members | • Fatigue |
| • Beams – Shear & Bending Moment
Diagram Review | |
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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