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# MIDDLESEX COUNTY COLLEGE

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## COURSE SYLLABUS

<b>Department:</b>	Engineering Technologies
<b>Program:</b>	Civil Engineering Technology Mechanical Engineering Technology
<b>Course Number:</b>	CIT 203
<b>Title of Course:</b>	Strength of Materials
<b>Curriculum Coordinator:</b>	Daniel Grek
<b>Designation:</b>	Required Course

### Course Description:

The study of classical strength of materials with emphasis on practical applications. Topics include: axial stress and strain, material properties, torsional stress and strain, beam shear and moment diagrams, bending moments and stresses, shear loads and stresses, beam selection, selection of columns based on theory and industry codes, analysis of connections and Mohr's circle. Laboratory experiments and formal written reports are used to reinforce the lecture material.

### Prerequisite:

CIT 105 Statics for Technicians

**Co-requisite:** None

### Textbooks and /or other required material:

Applied Statics and Strength of Materials by Spiegel, Pearson, 6<sup>th</sup> Ed

### Course Learning Outcomes and their relationships to Student Outcomes:

1. Describe the mechanical properties of different materials.
2. Draw axial, shear and bending moment diagrams.
3. Analyze and design members in tension.
4. Analyze and design members in compression.
5. Analyze and design members in torsion.
6. Analyze and design members in bending. **(SOE e)**
7. Calculate the deflections in tension, torsion and bending members.
8. Analyze members in combined loading. **(SOE e)**
9. Working in teams, collect experimental data on various structures under load and prepare formal reports documenting your experimental work. **(SO c, k)**

**Lecture Topics Covered:**

- Axial stress and strain
- Relationship between stress and strain (Hooke's Law)
- Material properties (elasticity, Poisson's ratio, thermal effects)
- Torsional stresses and strains
- Shear and moment loading on beams
- Beam shear and moment diagrams
- Stresses due to shear and moment loading
- Beam deflections
- Beam selection
- Axially loaded columns
- Eccentric loads and combined stresses
- Combined stresses due to axial and bending loads and eccentric loads

**Laboratory Topics Covered:**

- Measurement of shear and moment in beams
- Behavior of metals under compressive loads
- Behavior of wood under compressive loads
- Stress and strain due to torsional loads
- Behavior of metals under torsional loads
- Behavior of wood under bending loads
- Behavior of metals under axial loads
- Failure of a truss by buckling
- Failure of columns due to buckling
- Deflection of metal beams

**Class/Laboratory schedule: Number of sessions each week and duration of each session:**

3 hours of lecture per week for 14 weeks

3 hours of laboratory work per week for 14 weeks

**Criterion 5 Contribution: Technical Content**

<b>Prepared By:</b>	A. C. Stickler	<b>Date:</b>	8/26/08
<b>Updated By:</b>	Thom Sabol	<b>Rev 1</b>	February 13. 2009
<b>Updated By</b>	ACS	<b>Rev 2</b>	9/23/10
Dropped bolted and welded connections as a CLO			
<b>Updated By:</b>	ACS	<b>Rev 3</b>	<b>1/21/11</b>
<b>Broke LO #2 into two Los, reworded Los 7 &amp; 8 for clarity</b>			
<b>Updated By</b>	Sabol Update mapping for new ABET student outcomes	<b>Rev 4</b>	4/4/14
<b>Rev 5:</b>	General Update	<b>Date</b>	3/15/21