CIVL 2120 Mechanics of Materials
Spring 2016/17

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Lecture & Tutorial Schedule:

<table>
<thead>
<tr>
<th>LEC.</th>
<th>Wed</th>
<th>16:30-17:50</th>
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<tr>
<td>Fri</td>
<td>16:30-17:50</td>
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<tr>
<td>T1</td>
<td>Tue</td>
<td>18:00-18:50</td>
<td>Room 4619</td>
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<tr>
<td>T2</td>
<td>Mon</td>
<td>18:00-18:50</td>
<td>Room 2464</td>
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Course Vector and Credits: [3-1-0:3]

Course Description:
Analysis of stress, strain and deformation; linear and non-linear material behavior; strain energy; bending of beams, deflection; stability and buckling of compression members; shear and torsional stresses.

Course Prerequisite: CIVL 2110 Statics

Grading:
Assignments (20%) + Mid-term exam (25%) + Final exam (55%) = 100%

Textbook:

Course Syllabus

Chapter 1
Concept of Stress
- Introduction to mechanic of materials
- Stresses in the members of a structure
- Normal stress, shearing stress, and bear stress
- Stress under general loading conditions
- Allowable stresses and allowable loads

Chapter 2
Axial Loading
- Normal strain under axial loading
- Stress-strain diagram
- Hooke’s law and modulus of elasticity
- Poisson’s ratio
Chapter 3
Torsion
- Torsional deformations of a circular shaft
- Stresses in the elastic range
- Angle of twist in the elastic range
- Thin-walled hollow shafts

Chapter 4 & 5
Pure Bending
- Symmetric member in pure bending
- Deformations of a symmetric member
- Relations among load, shear, and bending moment
- Shear and bending-diagrams
- Design of beams for bending

Chapter 6
Shearing stresses in Beams
- Shear on the face of a beam element
- Shearing stresses in a beam
- Longitudinal shear on a beam element of arbitrary shape
- Shearing stresses in thin-walled members

Chapter 7 & 8
Analysis of Stress and Strain
- Transformation of plane stress
- Principal stresses and maximum shear stresses
- Mohr circle for plane stress
- Stresses in thin-walled pressure vessels
- Hooke’s law for plane stress
- Stresses under combined loadings

Chapter 9
Deflections of Beams
- Differential equations of the deflection curve
- Deflections by integration
- Method of superposition
- Moment-area method
- Bending-moment diagrams by parts
- Maximum deflection