CIVL 2120 – Mechanics of Materials

School:	**School of Engineering**
Subject Area:	**Civil and Environmental Engineering**
Course Credit:	**3**
Instructor:	**HU Thomas**
Pre-requisite/co-requisite:	**Details Here**

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

CIVL 2120 Mechanics of Materials
Spring 2023/24

Course Instructor: Prof. Tim K.T. TSE (email: timkttse@ust.hk)
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Teaching Assistants:

RAZIZADEH, Omid (orazizadeh@connect.ust.hk)	Week 2 – 8 Tutorials
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Lecture & Tutorial Schedule:

LEC.	Monday Wednesday	10:30 – 11:50	LTJ
T1	Monday	14:00 – 14:50	Rm 2407
T2	Tuesday	17:00 – 17:50	LTG

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 <u>Prerequisite</u>: CIVL 2110 Statics

Grading:
Assignments (20%) + Midterm Exam (20%) + Final Exam (60%) = 100%

Textbook:
"Mechanics of Materials" (7th Edition; SI) by *Beer et al.*, McGrawHill. ISBN: 9780073398235
"Mechanics of Materials" (8th Edition; SI) by *Beer et al.*, McGrawHill. ISBN: 9781260403862

Course Syllabus
Chapter 1
<u>Concept of Stress</u>
- 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
<u>Axial Loading</u>
- 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