



THE UNIVERSITY OF BRITISH COLUMBIA
DEPARTMENT OF CIVIL ENGINEERING

CIVL 231 Solid Mechanics II
COURSE OUTLINE

Instructor:	Dr. S.F. Stiemer, Room 2028, CEME Bldg., signi.all@gmail.com
Teaching Assistants:	Mr. Armin Bebamzadeh < armin@civil.ubc.ca > Ms. Shahrzad Talachian < talas@interchange.ubc.ca >
Lectures:	Tue & Thu 11:00 - 12:30
Tutorials:	Fr 11:00 - 13:00
Text:	Gere, J.M., Mechanics of Materials, Pearson / Prentice Hall.

Deflection of Beams: Moment-Curvature Relationships; Governing Differential Equation for a Beam; Deflection by Successive Integrations; Singularity Functions; Non-Prismatic Members; Method of Superposition; Statically Indeterminate Beams.

Buckling (Stability): Stable, neutral and unstable equilibrium; Euler buckling load; other support conditions; column strength curves (theoretical and experimental).

Principal Axes and Principal Moments of Inertia: Product of inertia; rotation of axes; Mohr's Circle for the calculation of principal axes and principal moments of inertia.

Combined Axial Load and Bending Moment: Normal stress due to axial load; normal stress due to bending: centroid, moment of inertia, parallel axis theorem; centroidal axis versus neutral axis; application to prestressed concrete beams.

Beam-Columns: Geometrical non-linearity; Secant Formula for beam-columns.

Inelastic Bending: Review of elastic bending: elastic section modulus; plastic section modulus; shape factor; plastic section centroid; plastic analysis of structures; theorems of plasticity: lower-bound (static) theorem; upper-bound (kinematic) theorem.

Biaxial Stress and Strain: Introduction to Mohr's Circle; calculating stress on an arbitrary plane using Mohr's circle; stress transformation equations; maximum normal (principal) stresses; maximum shear stress; principal stresses in beams; biaxial strains; strain gauges.

NOTE:

- The final mark for the course will be based on the following distribution:

Weekly Assignments	15%
Weekly Tests (Quiz)	30%
Final Exam	55%
 - You must pass the final examination in order to pass the course.
 - According to the departmental policy, there will be no supplemental examination in this course.
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