



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Structural Engineering Principles

CIVILEN 3310

Credit Hours:

3.00 - 3.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lecture

Course Description:

Structural forms and loads, statically determinate structures, and trusses, internal loadings developed, influence lines for statically determinate structures, cables and arches, elastic beam deflections, energy methods.

Prerequisites and Co-requisites:

Prereq: MechEng 2020, and enrollment in CivilEn major. Prereq or concur: 2050 or Stat 3450, 3460, or 3470; or permission of instructor.

Course Goals / Objectives:

- Be skilled in assessing whether structures are stable and whether they are statically determinate
 - Be skilled in analyzing statically determinate trusses
 - Be skilled in analyzing the internal forces in determinate beams and frames
 - Be skilled in analyzing the forces in cables and arches
 - Be skilled in drawing influence lines for determinate beams
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Course Topics:

- Types of structures and loads; External stability of structures, adequate constraints; Determinacy – adequacy of reactions, equivalent loads, determinacy of multi-rigid body structures, conditions, internal determinacy.
 - Internal forces – normal forces, shear, moments, sign conventions for internal forces, calculating internal forces in beams, calculating internal forces in frames; Shear and moment diagrams for beams and frames
 - Analysis of statically determinate trusses – zero force components, forces in components by inspection, method of joints, methods of sections; compound trusses
 - Cables and Arches – forces in cables with straight sections, forces in uniformly loaded cables, arches, three-hinged arches
 - Influence lines for structures– basic concepts, uniform and distributed loads, influence lines for trusses, for beams, for frames, and for floor girders. Maximum influence due to series of loads, Absolute maximum for shear and moments.
 - Deflections-elastic beam theory, double integration method; Deflections using energy methods-external work and strain energy, principle of work and energy
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Designation:

Required