

ARCHITECTURAL STRUCTURES I Course Brief

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Lecture MW
Recitation F
(times TBD)

GSIs:
TBD

Catalog Description

This course covers the basic principles of architectural structures, including the influence of geometric, sectional, and material properties related to flexure and shear in beam and framed systems; vector mechanics with application to analysis of trusses, catenaries, and arches; diagrammatic analysis of beams for bending moment, shear, and deflection as well as the study of structural framing systems for vertical and lateral loads.

Objectives

Students are introduced to the fundamentals of statics and mechanics, as well as the behavior of structural materials and simple elements and systems subjected to gravity and lateral loads. Diagramming of force distribution in beams as well as topics of stress, strain and stability are covered. Through classroom demonstrations as well as physical construction and testing, aspects of strength and stability of structural systems are examined.

Organization

The course is lecture based, and the concepts and procedures are taught in this context with additional homework problems solved by the students. Weekly recitations provide opportunity for small demonstration labs as well as student-instructor interaction in smaller groups. A group design and construction project (load testing of a bridge) offers a chance to test out concepts covered in the class. Computer facilities, including software, are available for supporting computations. A course web site is used to post all lectures, homework problems, as well as other information for the class (<http://www.structures1.tcaup.umich.edu/>). Weekly topic quizzes will also be posted on the course Canvas site.

Homework Problems

A set of online problems covering the primary aspects of the course is given to each student. Each student has a unique set of problems to solve. Students submit solutions to an online program for scoring. Late submissions are penalized 5%/day with a maximum of -35%. For detailed instructions – read the online FAQ.

Bridge Project

A group project to design, construct and test a trussed spanning structure will be assigned during the semester. It will be documented with both preliminary and final reports and tested to failure. Details can be found on the course website.

Textbook

The recommended text is *Statics and Strength of Materials for Architecture and Building Construction* by B. Onouye and K. Kane (any version). Example problems along with other resource material is available on the course website and on Canvas.

