

CE 329 – Structural Analysis

Unique Number: 15335

Fall Semester 2006

Instructor: Loukas F. Kallivokas
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Office hours: W 2:00-4:00pm
and anytime I am in my office with the door wide open

Lecture meeting times: **WF 1:00pm-2:00pm**
Lecture meeting place: **ECJ 5.410**

Discussion-session meeting times: **W 1:00pm-3:00pm**
Discussion-session location: **ECJ 5.410**

TA: Mr Chanseok Jeong – ECJ 4.602

COURSE OBJECTIVES

The course presents the classical methods of structural analysis needed to analyze statically determinate and indeterminate structures. It aims at providing the necessary analysis foundation for the design courses (reinforced concrete, steel, etc) that typically follow this course in the traditional civil or architectural engineering curriculum. It also aims at preparing you for more advanced analysis courses.

COURSE CONTENT OVERVIEW

CE 329 is an introductory course in the classical methods of structural analysis. In professional practice most structural analysis needs for complex structures are typically satisfied through the use of appropriate software. The methods implemented in the software are typically either matrix methods of structural analysis, or advanced numerical methods such as finite elements, neither of which are covered in this course. It is imperative however that the practicing engineer has a solid comprehension of the fundamental concepts of structural analysis in order to, at a minimum, be able to intelligently evaluate the numerical results obtained via the software. Furthermore, for simple designs, the practicing engineer ought to be able to analyze the structure via simple hand calculations that are based on the classical methods of analysis.

COURSE SCHEDULE

The following is a tentative outline of the topics to be covered. Depending on the pace of the class, additional topics will be covered.

- Idealization of structures and loads (including support types in 2D and 3D)

- Modeling using free-body diagrams
- Determinacy, indeterminacy, and kinematic stability of structures
- Analysis methods
 - Determinate structures
 - Internal actions
 - Trusses (Computation of internal actions (Equilibrium, method of joints, method of sections)
 - Beams and Frames (moment, shear and axial force diagrams)
 - Displacements
 - Analytical (e.g. integration)
 - Geometric methods (moment-area theorem)
 - Energy methods (Principle of virtual work, Castigliano's theorem)
 - Indeterminate structures
 - Force/flexibility method
 - Displacement methods (moment-slope eqs)
 - Direct-stiffness method

COURSE REFERENCE

Textbook:

“Fundamentals of Structural Analysis,” K. M. Leet and C.-M. Uang, McGraw Hill, 2nd ed, 2005

COURSE WEBSITE

Information about the course, such as the syllabus, homework assignments, handouts, and homework solutions, will be posted regularly on the Blackboard website (<http://courses.utexas.edu>). You will also be able to monitor your progress in the course by reviewing your assignment/quiz grades and compare them against those of the rest of the class.

An electronic class roster is a component of this site. Students who do not want their names included in the electronic class roster must restrict their directory information in the Office of the Registrar, Main Building, Room 1. For information on restricting directory information, see the General Information Catalog or go to: <http://www.utexas.edu/student/registrar/catalogs/gi06-07/app/appc09.html>

COURSE LOGISTICS

Prerequisites: The prerequisites for CE 329 are:

EM 319

CE 311K (credit or registration)

Homework and class format: I intend to use all 4 hours allocated to the course for lectures, which, however, will include, on occasion, the in-class solution of example problems. Assignments will be given, on average, every week. Assignments are due at the beginning of the lecture on the date marked on the assignment sheet, unless modified by me. *Late assignments will not be accepted.* Students are strongly encouraged to discuss course and homework topics among themselves, since such discussions are an important part of the learning process. However, each student must carry out assignments independently. Working on assignments constitutes possibly the best way

for digesting the material and learning the concepts (roughly speaking, most of us learn by *doing*, rather than by listening or reading). It is thus, in my opinion, imperative that appropriate care is taken to consistently complete the assignments throughout the semester.

Your assignments should be clearly and cleanly written. I expect all to adhere to a *reasonable person's* presentation standards without anyone having to describe or define these standards for you.

Exams: There will be at least three exams, two two-hour examinations (to be held during the Monday session, with dates to be announced) and one final. Alternative dates for the two two-hour examinations will be arranged only for students with documented medical emergencies. The final exam, as per the University's schedule has been set for Monday, December 18, 2006 (9:00am-12:00noon). All exams will be conducted with closed books and closed notes, unless otherwise stated prior to the exam. I reserve the right to schedule quizzes additional to the aforementioned ones; an advance notice of at least one week will be given on such occasions.

Grading system: Homework assignments (H) carry a 20% weight; the two mid-course exams (Q1 and Q2) carry a 25% weight each, and the final exam (F) a 30% weight. Thus, the final grade will be $G=0.20H+0.25Q1+0.25Q2+0.30F$. My intent is to assign letter grades based on the following scale:

A for $G > 90$,
B for $80 < G \leq 90$,
C for $70 < G \leq 80$,
D for $60 < G \leq 70$,
F for $G \leq 60$.

The above represent minimum bounds; I reserve the right to adjust the grading scale to your benefit, based on the class performance.

Course/Instructor evaluation: At the end of the course a standard MEC (Measurement and Evaluation Center) evaluation form will be distributed to all students, who are strongly encouraged to complete it.

Course add/drop policy: As per the College of Engineering policy:
From the 1st through the 12th class day, an undergraduate student can drop a course via the web and receive a refund if eligible. From the 13th through the 20th class day, an automatic Q is assigned, no refund; approval from the Dean and departmental advisor is required. From the 21st class day through the mid-semester deadline, approval is required from the Dean, instructor of the course and departmental advisor.

Scholastic dishonesty: The University's policy and procedures will be followed in cases of suspected scholastic dishonesty. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, visit the Student Judicial Services web site <http://deanofstudents.utexas.edu/sjs/>.

Other matters: The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. Any student with a documented disability (physical or cognitive) who requires academic accommodations should contact the Services for Students with Disabilities area of the Office of the Dean of Students at 471-6259 as soon as possible to request an official letter outlining authorized accommodations. For more information, contact that Office at 471-6259, TTY at 471-4641, or the College of Engineering Director of Students with Disabilities at 471-4321.

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