Prerequisite: CE 4348 Steel Design or Equivalent; CE 4347 Reinforced Concrete Design or Equivalent

Instructor: Dr. Shih-Ho Chao

Office: NH 407
Phone: 817-272-2550
shchao@uta.edu

Lectures: From June 3 to August 10: Monday and Wednesday, 10:30 a.m. to 12:20 p.m. NH 109

Office Hrs: Tuesday and Thursday, 2:00-3:30 p.m.; or by appointment, NH 407

Scope and Outline:
This course will begin with inelastic moment-curvature relations of typical steel and reinforced concrete sections; followed by discussing methods of plastic analysis to determine the ultimate load capacity, and stepwise incremental methods for studying the behavior of steel structures beyond the elastic range up to collapse.

Both XTRACT® and PERFORM-2D® computer programs will be introduced. The former is used for obtaining moment-curvature curves of sections with any material and geometric shape; and the latter is used to perform inelastic pushover and dynamic analyses for structures subjected to extreme events such as earthquake loadings.

Methods of plastic design using AISC Specifications will be presented. Structural analysis and design include bridge girders, moment frames, concentrically braced frames, eccentrically braced frames, buckling-restrained braced frames, special truss moment frames, as well as some other framing systems will be discussed. Application to earthquake resistant design, especially a newly developed Performance-Based Plastic Design (PBPD) methodology will be included.

Examinations:
There will be one mid-term exam (in class/open book and notes) and a final examination (cumulative exam).

Scheduled exam dates are:
Mid-term: July 20 (Monday), 10:30 am to 12:30 pm
Final exam: August 12 (Wednesday), 10:30 am to 12:30 pm
Homework:

Homework problems will be assigned each Monday (or Wednesday) and are generally due the following Monday (or Wednesday). Homework will be collected at the beginning of class on the due date. Late homework loses 30% per day. No credit will be given for homework copied or if your homework has been copied. Students are encouraged to work together on homework, but copying is considered as academic dishonesty and completely unacceptable. Every homework assignment will be counted towards the final grade.

Term Project:

Topics of the term project and names in each group will be announced in mid-July. Final presentation of the term project is on Monday August 10 during lecture and the report is due on the same day. The written report is to be less than 20 pages.

Grading:

The course grade will be based on:

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Student Learning Outcomes:

After completion of the course, the student should be able to:

1. Recognize the difference between elastic and plastic behavior of structural members.
2. Determine the yield mechanisms and ultimate strength of structures.
3. Use computer programs to perform nonlinear static (pushover) and dynamic analyses of structures.
4. Design structures by plastic method.
5. Perform seismic design and analysis of structures by plastic methodology.

Textbook and References:

Textbook:

Other useful References:


Chao, S.-H. and Goel, S. C., Performance-Based Seismic Design of EBF Using Target Drift and Yield Mechanism as Performance Criteria, Report No. UMCEE 05-05, Department of Civil and Environmental Engineering, University of Michigan, Ann Arbor, MI., 2005.


**Americans with Disabilities Act:**

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of the Rehabilitation Act, there
is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at www.uta.edu/disability. Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

**Academic Integrity:**

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

"Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents’ Rules and Regulations, Series 50101, Section 2.2).

**Student Support Services Available:**

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

**Librarian to Contact:**

Barbara R. Howser (howser@uta.edu), Science & Engineering Librarian.

**E-Culture Policy:**

The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT-Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email. All students are assigned an email account and information about activating and using it is available at www.uta.edu/email. New students (first semester at UTA) are able to activate their email account 24 hours after registering for courses.
There is no additional charge to students for using this account, and it remains active as long as a student is enrolled at UT-Arlington. Students are responsible for checking their email regularly.

**Note:** I will be using email very often to send class handouts, homework assignments, and announcement; reply questions from students, etc. Please send me your preferred email address if you do not check UTA email.

**Make-up Exam Policy:** No make-up exam will be given.

**Final Review Week:**

A period of five class days prior to the first day of final examinations will be designated as FINAL REVIEW WEEK. The purpose of this week is to allow UT Arlington students sufficient time to prepare for final exams. During this week, there will be no schedule or required activities such as field trips, seminars, or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor will not give any exams constituting 10% or more of the final grade, except make-up tests and laboratory examinations. In addition, no instructor will give any portion of the final exam during Final Review Week.