Department of Civil Engineering
The University of Texas Arlington

CE 3341 - STRUCTURAL ANALYSIS
Fall 2014

Prerequisite: CE 2313 Mechanics of Material I or Equivalent

Instructor: Dr. Shih-Ho (Simon) Chao, Ph.D., P.E.

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Faculty Profile: https://www.uta.edu/profiles/shih-ho-chao.

Office Hours:

- Tuesdays and Thursdays, 11:00 AM-2:00PM
- Questions via e-mail
- Or by appointment

Section Information: CE 3341-001

Time and Place of Class Meetings: August 21 to December 2; Tuesdays and Thursdays, 9:30 AM-10:50 AM, NH 108

Course Content:

1. Introduction, Structural Analysis/Design Process, Structural Forms, and Basic Structural Elements
2. Loads, Reactions, Supports, Structural Idealization, and Free-Body Diagram
3. Statical Determinacy/Indeterminacy, Stability
4. Introduction of RISA-2D (and RISA-3D) Computer Program
5. Statically Determinate Trusses
6. Statically Determinate Beams and Frames
7. Shear and Moment Diagrams, Deflected Shape
8. Moving Loads, Influence Lines
9. Calculation of Deflections: Virtual Work Method
10. Analysis of Statically Indeterminate Beams, Truss, Frames, and Composite Structures; Moment Distribution Method (if time allows)

Teaching Assistant:

To be announced.

Tested Explicitly (TE) Component:

The Civil Engineering Department ABET procedure includes assessing the achievement of various departmental student learning outcomes (http://www.uta.edu/ce/abet-accreditation.php). The procedure includes explicit testing (TE) of the achievement of the departmental student learning outcomes. CE3341 Structural Analysis is designated as one of the TE courses and will have explicit testing of the outcomes (a) and (e) in the course. This will be achieved through explicit exam problems given to test student knowledge of the outcomes, reproduced below:

(a) An ability to apply knowledge of mathematics, science, and engineering

(e) An ability to identify, formulate, and solve engineering problems

One of the problems in each of the three exams (two mid-terms and final exam) will be designated as a TE problem for outcomes (a) and (e). The total grade of these three problems is 100. A minimum grade of 70 will be deemed to signify that a student has passed the TE examination. Note that these TE problems will also be counted towards the final grade for this course.

Student Learning Outcomes:

- Ability to apply knowledge of mathematics, science, and engineering
- Ability to analyze and interpret data
- Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- Ability to function on multi-disciplinary teams
- Ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility
- Ability to communicate effectively the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- Recognition of the need for, and an ability to engage in life-long learning
- Knowledge of contemporary issues
- Ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Computer Programs:

- *RISA-2D/3D will be introduced and used extensively for the homework problems. An educational version of RISA-2D (as well as its general reference and user manual) will be available for download.*

- *RISA-3D* (http://www.risatech.com/p_risa3d.html) is also available in the computer lab. The user's manual can be found in one of the folders.

- Please contact Lewis Crow (lcrow@uta.edu) if you have any problem in running this program.

Required Textbooks and Other Course Materials:

Fundamentals of Structural Analysis, fourth edition by Leet, Uang, and Gilbert, McGraw-Hill., 2011. (**Required**)

Major assignments and examinations:

Homework:

- Homework problems will be assigned each Tuesday (or Thursday) and are generally due on the following Tuesday (or Thursday). All homework will be counted towards the final grade.
- Homework will be collected at the beginning of class on the due date. A late homework loses 30% per day.
- Students are encouraged to see the TA and instructor about those assigned problems the student is having trouble with.
- Students are also encouraged to work in small groups to develop solutions to the problems but each student must write up his/her own homework. No credit will be given for homework copied or if your homework has been copied.

Term Project:

Project details will be announced sometime after the first mid-term exam. Final presentation of the term project is on Tuesday December 2nd during lecture and the report (both hardcopy and electronic copy) is due on the same date.

Examinations:

There will be two mid-term exams and a final examination (comprehensive exam). Open book and notes. All answers for the exam problems must be justified. It is important to have numerical answers within a reasonable accuracy (+ or -2%). Wrong numerical answers will not be assigned more than 80% of grade. **Seats will be assigned for all exams**.

Scheduled exam dates are:

First Mid-term: October (Thursday), 9:30 AM-10:50 AM, NH 108
Second Mid-term: November 20 (Thursday), 9:30 AM-10:50 AM, NH 108
Final exam (comprehensive exam): December 11 (Thursday), 8:00 AM-10:30 AM, NH 108

Make-up Exam Policy:

Makeup exams are given only in extreme circumstances; examples of extreme circumstances are serious illness of the student (doctor's note required) or death in the family. I must be contacted before the exam if such a circumstance applies to you.

Make-up Classes:

Will be announced later.

Attendance: required.

Grading: The course grade will be based on:

15% - Homework
40% - Two mid-term exams
15% - Term project
30% - Final exam

100%

Final exam will not be returned, but may be reviewed by students.

The grade assigned to the student's numerical average will be as follows:

(a)	90 to 100 average	=	A
(b)	80 to 89.9 average	=	B
(c)	70 to 79.9 average	=	C
(d)	60 to 69.9 average	=	D
(e)	< 60 average	=	F

Invited Talk:

"Plan Your Future Now" ***John Ho***, P.E., Vice President, Huitt-Zollars, Inc., Dallas TX. Date to be announced later.

"Introduction to Structural Diagnostics" ***Jacob Bice***, Ph.D., P.E. Senior Associate, Walter P Moore, Dallas, TX. Date to be announced later.

Drop Policy:

Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aao/fao/).

Americans with Disabilities Act:

The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of

a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX:

The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Academic Integrity:

Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

> *I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*
>
> *I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Student Support Services:

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Lab Safety Training:

[Required for laboratory courses in the Colleges of Engineering and Science] Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., through the following August) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

[As necessary, continue with specific course-based information regarding the module(s) required, etc.]

Electronic Communication:

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey:

At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

Final Review Week:

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips 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 shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures:

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located at the end of the hallway. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Librarian to Contact:

Sylvia George-williams (Sylvia@uta.edu), Science & Engineering Librarian.

Course Schedule:

"*As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.*

8/21-8/28 Introduction, Structural Analysis/Design Process, Structural Forms, and Basic Structural Elements
9/2-9/16 Loads, Reactions, Supports, Structural Idealization, and Free-Body Diagram
9/18-9/30 Statical Determinacy/Indeterminacy, Stability
10/2-10/7 Introduction of RISA-2D (and RISA-3D) Computer Program
10/9-10/16 Statically Determinate Trusses
10/21-10/30 Statically Determinate Beams and Frames
11/4-11/13 Shear and Moment Diagrams, Deflected Shape
11/18-11/20 Moving Loads, Influence Lines
11/25-11/27 Calculation of Deflections: Virtual Work Method
Analysis of Statically Indeterminate Beams, Truss, Frames, and Composite Structures; Moment Distribution Method (if time allows)

Library Home Page	http://www.uta.edu/library
Subject Guides.....	http://libguides.uta.edu
Subject Librarians	http://www.uta.edu/library/help/subject-librarians.php
Database List	http://www.uta.edu/library/databases/index.php
Course Reserves	http://pulse.uta.edu/vwebv/enterCourseReserve.do
Library Catalog.....	http://discover.uta.edu/
E-Journals.....	http://liblink.uta.edu/UTAlink/az
Library Tutorials	http://www.uta.edu/library/help/tutorials.php
Connecting from Off- Campus.....	http://libguides.uta.edu/offcampus
Ask A Librarian.....	http://ask.uta.edu