Department of Civil Engineering
The University of Texas Arlington

CE 5314 – ADVANCED STEEL DESIGN II (Steel Connection Design)
Fall 2018

Prerequisite: CE 4348 or CE 5306 Structural Steel Design or Equivalent

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

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Email Address: shchao@uta.edu

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

Office Hours:

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

Section Information: CE 5314-001; CE 5314-101

Time and Place of Class Meetings: August 23 to December 4; Tuesdays and Thursdays, 9:30 AM-10:50 AM, SH 315

Course Content:

1. Steel Connection Overview; Connection elements subject to Tension
2. Bolted Connections
   - Introduction
   - Eccentrically Loaded Bolts: Shear
   - Eccentrically Loaded Bolts: Bolts in Shear and Tension
   - Prying Action: Bolts in Tension
3. Welded Connections
   - Introduction
   - Fillet Welds
   - Plug and Slot Welds
   - Full-Penetration and Partial-Penetration Groove Welds
   - Eccentrically Loaded Welds: Shear Only
   - Eccentrically Loaded Welds: Shear Plus Tension
4. Moment Connections:
   - Partially Restrained and Flexible
   - Fully Restrained
   - Beam Splices
5. Column Stiffeners for Continuous Beam-to-Column Connections and Splices

6. Design of Gusset Plates in Vertical Bracing and Truss Connections; Whitmore Effective Width; Uniform Force Method (UFM)
7. Seismic Design of Connections (if time allows)

GTA:

Missagh Shamshiri seyedmissagh.shamshiriguilva@mavs.uta.edu

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

- Please contact Dan Tatum (daniel.tatum@uta.edu) if you have any problem in running this program.

Attendance:

At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, [insert your attendance policy and/or expectations, e.g. "I will take attendance sporadically" or "I have established the following attendance policy: …"] However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

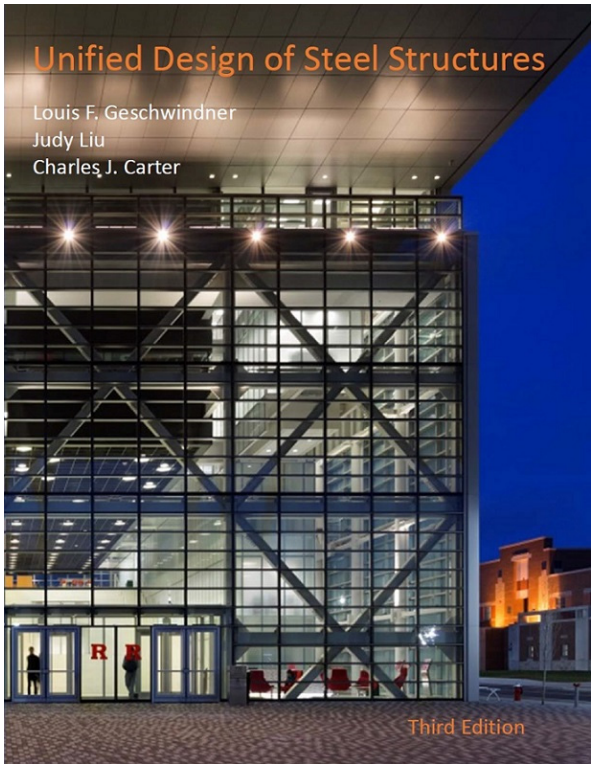
Make-up Classes:

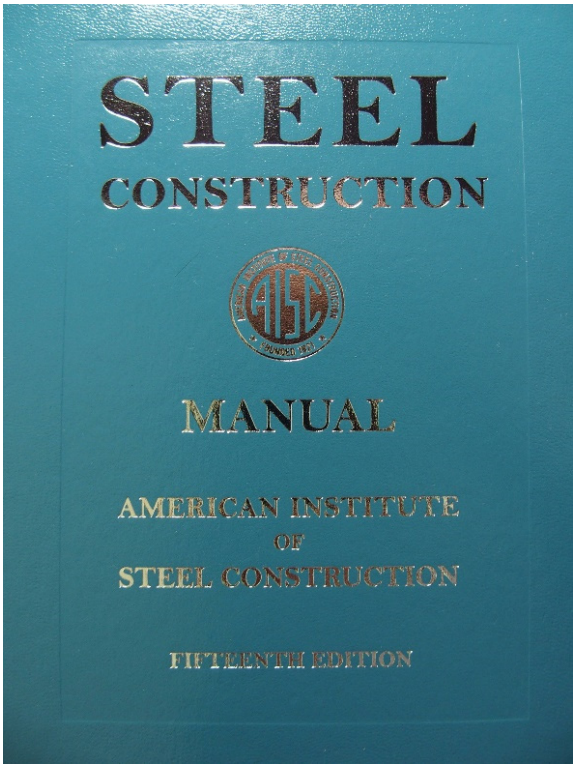
Will be announced later.

Recommended Course Materials:

1. *Steel Construction Manual, American Institute of Steel Construction, 15th Edition, 2016.*

2. *Unified Design of Steel Structures by Louis F. Geschwindner, Judy Liu, Charles J. Carter, Third Edition, CreateSpace Independent Publishing Platform, 2017.*





Other Useful References:

1. *AISC Design Guide 17: High Strength Bolts—A Primer for Structural Engineers.*
2. *AISC Design Guide 21: Welded Connections—A Primer for Engineers, 2nd edition. 2017*
3. *Detailing for Steel Construction, American Institute of Steel Construction, 3rd Edition.*

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 GTA 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 4 during lecture and the report (both hardcopy and electronic copy, as well as the PowerPoint presentation) is due on the same date.

Examinations:

There will be two mid-term exams (in class: including Distance Learning students) and a final examination (comprehensive exam). Open book, notes, and homework.

Scheduled exam dates are:

First Mid-term: October 11 (Thursday), 9:30 AM-10:50 AM, SH 315
Second Mid-term: November 20 (Tuesday), 9:30 AM-10:50 AM, SH 315
Final exam (comprehensive exam): December 11 (Tuesday), 8:00 AM-10:30 AM, SH 315

If you decide to take another class that is at the same time or overlapping with this class, you need to make a plan for your other class. You need to take the exam at the same time with all the other students in this class.

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.

Grading: The course grade will be based on:

20% - Homework
40% - Two mid-term exams
20% - Term project
20% - 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

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/).

Disability Accommodations:

UT 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), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* 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 disability. Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** www.uta.edu/disability or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy:

The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX Policy:

The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits

sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit* www.uta.edu/titleIX or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@uta.edu

Academic Integrity: Students enrolled all UT Arlington courses 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 in their courses by 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. Additional information is available at https://www.uta.edu/conduct/. Faculty are encouraged to discuss plagiarism and share the following library tutorials http://libguides.uta.edu/copyright/plagiarism and http://library.uta.edu/plagiarism/.

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.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit http://www.uta.edu/news/info/campus-carry/

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.

Students are also encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at https://mavalert.uta.edu/ or https://mavalert.uta.edu/register.php

Student Support Services: [Required for all undergraduate courses] 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 http://www.uta.edu/universitycollege/resources/index.php.

University Tutorial & Supplemental Instruction (Ransom Hall 205): UTSI offers a variety of academic support services for undergraduate students, including: 60 minute one-on-one tutoring sessions, Start Strong Freshman tutoring program, and Supplemental Instruction. Office hours are Monday-Friday 8:00am-5:00pm. For more information visit www.uta.edu/utsi or call 817-272-2617.

The IDEAS Center (2nd Floor of Central Library) offers **FREE** tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in, or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

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.

8/23-8/30: Steel Connection Overview; Connection elements subject to Tension
9/4-10/4: Bolted Connections
- Introduction
- Eccentrically Loaded Bolts: Shear
- Eccentrically Loaded Bolts: Bolts in Shear and Tension
- Prying Action: Bolts in Tension

10/4-11/8: Welded Connections
- Introduction
- Fillet Welds
- Plug and Slot Welds
- Full-Penetration and Partial-Penetration Groove Welds
- Eccentrically Loaded Welds: Shear Only
- Eccentrically Loaded Welds: Shear Plus Tension

11/13-11/20: Moment Connections:
- Partially Restrained and Flexible
- Fully Restrained
- Beam Splices

11/22-11/27: Column Stiffeners and Splices
11/29:Design of Gusset Plates in Vertical Bracing and Truss Connections; Whitmore Effective Width; Uniform Force Method (UFM)
Seismic Design of Connections (if time allows)

Emergency Phone Numbers:] In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381

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

Library Home Page library.uta.edu

Resources for Students
Academic Help
Academic Plaza Consultation Services library.uta.edu/academic-plaza
Ask Us ask.uta.edu/
Library Tutorials library.uta.edu/how-to
Subject and Course Research Guides libguides.uta.edu
Subject Librarians library.uta.edu/subject-librarians
Resources
A to Z List of Library Databases libguides.uta.edu/az.php

Course Reserves pulse.uta.edu/vwebv/enterCourseReserve.do
FabLab fablab.uta.edu/
Special Collections library.uta.edu/special-collections
Study Room Reservations openroom.uta.edu/

Teaching & Learning Services for Faculty

Copyright Consultation library-sc@listserv.uta.edu
Course Research Guide Development, Andy Herzog amherzog@uta.edu or your subject librarian
Data Visualization Instruction, Peace Ossom-Williamson peace@uta.edu
Digital Humanities Instruction, Rafia Mirza rafia@uta.edu
Graduate Student Research Skills Instruction, Andy Herzog amherzog@uta.edu or your subject librarian
Project or Problem-Based Instruction, Gretchen Trkay gtrkay@uta.edu
Undergraduate Research Skills Instruction, Gretchen Trkay gtrkay@uta.edu or your subject librarian.

OTHER RESOURCES

Environmental Health & Safety (http://www.uta.edu/ehsafety)