The University of Texas at Tyler
Department of Civil Engineering

CENG 4412: Reinforced Concrete and Steel Design

Course Syllabus (Fall 2022)

Date: August 22, 2022. Updated: August 16, 2022.

Time & Venue	Lecture Times: MoWeFr, 9:05 a.m. – 10:00 a.m., HEC B210 If you miss a scheduled class, you are still responsible for the material
Instructor	Dr. Shariful Huq Office: HEC A204 Email: shuq@uttyler.edu Phone: (903) 566-6701 Office hours: TuTh 9:00 a.m. – 12:00 p.m. or By Appointment You are encouraged to seek additional instruction (office hours TuTh 9:00 AM-12:00 PM or by appointment). My goal is to be commonly available to you for assistance, so feel free to email me, my email address is shuq@uttyler.edu. The best way to contact me is via email
Teaching Assistant	None
Note to Student about a Syllabus	This syllabus is a statement of intent about how the course will be taught this semester. It outlines what we will cover, what you will need to do in the course, and it explains what and when you must do it to successfully complete the course and get a great final grade. This syllabus is intended to protect you from arbitrary or untimely changes in course requirements and due dates. But I reserve the right to make changes as necessary to the syllabus with announcement of changes. As we learned during 2020, there are many circumstances outside of our direct course control that may require changes to this syllabus in content and schedule. These will always be announced in advance and the syllabus will be updated on Canvas so all can be aware of the required changes.
Important Covid-19 Information for Classrooms and Laboratories	***It is important to take the necessary precautions to ensure a healthy and successful year****. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing and vaccinations, which have proven to be successful in slowing the spread of viruses.* ***Encourage those who don't feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is***

	important to reduce exposure *(CDC quarantine/isolation guidelines). Please work with your faculty members to maintain coursework and please consult existing campus resources for support.*
Recording of Class Sessions	Class sessions **may be** recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.
Course Website	Canvas will be used to manage the course material for the semester. There you will find homework assignments, HW/Quiz solutions, handouts, and other material pertaining to the class. **Please check canvas regularly.**
Course Objective	Welcome to CENG 4412, Concrete and Steel Design. This course consolidates the fundamentals of Statics (ENGR 2301), Mechanics of Materials (MENG 3306) and Structural Analysis (CENG 3325), and applies them to the design of reinforced concrete and steel structural members and connections. In this course you will learn to perform structural design as it is performed in engineering practice and you will be exposed to the engineering design process. In particular we will be focusing our efforts on using the American Institute of Steel Construction Manual of Steel Construction and the American Concrete Institute Building Code Requirements for Structural Concrete. You will be applying principles from previous math, physics, and mechanics courses throughout this course. You will work to maximize the use of your computer in support of your work. This course has 20 specific objectives (see Encl 1). They can be generally organized into two groups: (1) learning to internalize the engineering thought process by developing the ability to solve ill-defined, real-world problems in a rational, systematic, and creative manner and presenting your solution in a clear and concise way; and (2) developing a working knowledge of structural concrete and steel design and incorporating the Load and Resistance Factor Design (LRFD) philosophy to examine problems with realistic constraints. Bring study notes, **textbooks (AISC Manual or ACI Code)**, note-taking material, and calculator to every class. You may not borrow or exchange calculators during graded events. If your calculator fails during a graded exercise, I am not responsible to furnish a substitute. Class preparation is your individual responsibility

Prerequisite/Corequisite	1. Statics (ENGR 2301) 2. Mechanics of Materials (MENG 3306) 3. Structural Analysis (CENG 3325)
Required Text	i. AISC Manual of Steel Construction, 15th Edition, 2017 ii. ACI Building Code Requirements for Structural Concrete and Commentary 318-19 iii. ASCE Minimum Design Loads for Buildings and Other Structures, 7-10, 3rd printing The Loads textbook (number iii above) is not required – I will provide handouts when appropriate.
Optional Books	i. Steel Design by William T. Segui, 6th Edition ii. Steel Structures: Design and Behavior by Salmon & Johnson, 5th Edition iii. Design of Reinforced Concrete by Jack C McCormac and Russell H. Brown, 10th Edition iv. Reinforced Concrete: Mechanics and Design by James K Wight, 7th Edition
Grading	Contributions towards final grade (out of 100%) 10% Professional Practice* 30% Mid-term Exams (= 3 x 10%) 25% Final Examination (Comprehensive) 15% Homework / Quizzes 20% Project – Cardboard Canoe? *Professional Practice Grade Breakdown**:** Your professional practice grade will be computed based upon your attendance (35%) plus participation in the course (35%) plus participation in professional organizational activity (such as ASCE, AISC events). The remaining 30% percentage of the professional grade will go towards joining and attending a minimum of 3 professional organizational events and submission of one mini report describing the meeting contents. I will provide a document template and an example of what needs to be submitted. For attendance during class meetings, towards the end of the meeting students will be called by names, and marked absent if not in attendance. In grading the homework, assignments, tests, exams, etc., **no credit will be given to methods not covered in this class**, although these methods, tables, formulae may appear in the textbook. Errors or outdated material in the textbook should not be the reason for claiming full credit on work done. To protect your confidentiality, graded homework, assignments, and exams will not be placed at open area for collection. They will only be distributed by the instructor during class or office hours. Graded homework, assignments, and exams not collected after the final exam week will be disposed according to UT Tyler policy.

	Letter grades will be assigned based on the final course grade: A 90 and above B 80 to 89.99 C 70 to 79.99 D 60 to 69.99 F below 60 No letter grade will be released until it is official on PeopleSoft. If you earn less than 65% on all Exams or if you fail to earn at least 50% on the Final you **may fail** the course, **regardless of your course grade**. **NOTE:** There will be no makeup work or extra credit allowed/granted at the end of or during the semester unless allowed/granted to everyone by the instructor. All assignments must be turned in at the appropriate time to receive credit "If necessary, I reserve the right to adjust the grade scale at the end of the semester to your benefit"

Mid-term and Final Exams	Mid-term exams are given during class time. The dates for Mid-term exams are included in the course schedule. Official reasons for missing an exam are outlined in the "Student Handbook". There will be no exceptions. **The Final Exam is TBA (by University Admin.)** All material covered in the course will be tested.
General Exam Rules & Cheat Sheet	Mid-Term and the Final Exam are closed notes. The ONLY references for these exams are *your own personal* copies of the AISC Manual for Steel Construction, and ACI Building Code Requirements. You may not use another individual's AISC or ACI 318 manual. *You may (and must) tab your manual to aid in navigating this large document. You may NOT attach additional sheets to the manual*. You are only allowed to bring your writing instruments (pencils & pens), erasers, and NCEES approved calculators. Topics to be tested will be announced in class and on Canvas one week prior to the exam. The instructor will set questions from material taught in class. The meaning of "taught in class" includes verbal instructions or written notes on Canvas. It is very important that you attend the class activities and take additional notes.

	To discourage students from focusing narrowly on only a few questions, **no practice exam will be given**. There are enough self-practice problems as well in the textbook at the end of each chapter, which are not required as part of each homework assignment.
Re-schedule of Examination	There is **no make-up or rescheduling of the Final Examination**. Make-up for the mid-term Exams (Exam1, Exam2 and Exam 3) will only be arranged if you inform the instructor **prior** to or on the day **before** the exam, with a strong valid reason. Examples of strong valid reasons are official UT Tyler travel, accident, illness, child-birth, passing of an immediate family member, jury duty, or court appearance. These are not expected and cannot be rescheduled. You will be required to show documentary evidence for the valid reason (e.g., doctor's letter, police report, court letter). Events that can be pre-scheduled or rescheduled are not considered valid reasons. Examples of non-valid reasons are traffic, wedding, driving test, sending car for service, clash with another course schedule, etc. Job interviews will be considered on a case-by-case basis (again, with documentary evidence). If an emergency happens during the exam day, you should contact the instructor at the earliest possible time (or call the HEC Engineering office, or contact one of your classmates or TA who will then inform the instructor). Any make-up exam will be given on the **Study/Dead Day**. Each student is only allowed one (1) make-up exam. That is, he/she can only make-up Exam 1 or Exam 2 or Exam 3. To compensate for the fact that you may apply what you learn in the entire course when answering make-up Exams 1 or 2 or 3, **the make-up exam will be more difficult than the original exam**. Students who fail to show up for the make-up or final exam with an invalid reason will be given 0 points for that exam; or for a valid reason an incomplete "I" grade. He/she must take the exam the next time this course is being offered to have the "I" grade changed to a letter grade. All assessment components and marks will be retained for the calculation of the final letter grade. The letter grade will be benchmarked against the same class for the semester in which the exam had been missed.

Calculators	The use of any electronic device, except an approved calculator, is not permitted during exams. Your exam will be collected and your grade will be a zero if you are caught using a non-approved electronic device (Laptops, PDAs, MP3 players, cell phones, smart watches) / calculator. In line with the Civil Engineering Department's policy, only calculators permitted by NCEES for use in the current semester's FE exam are permitted to be used in the CENG 4412 examinations. No other model of calculator will be allowed. Models allowed by NCEES in the past but are no longer valid for the current FE exam are prohibited in the CENG 4412 exams. For a complete listing of permitted calculator models please check, https://ncees.org/exams/calculator/. **It is the student's responsibility** to check the validity of his/her calculator model, purchase, and be familiar with the functions of the permitted calculators prior to the exam. If an unapproved calculator is found during any exam, it will be taken away immediately and only be returned to the student after the exam.
Field Trip	To be announced/decided.
Engineering Design Problem	This course includes a semester long design problem with a series of submissions along the way. When submissions are complete you will have executed a complete design for a structural system. More information will be provided.
Collection of Student Work	Throughout the semester I **may collect** student work (best, average, and worst) for the ABET course and outcomes notebooks. This will require me to make a copy of your work, keep your original and return a copy of the graded work to you. I will not draw attention as to what level of work you accomplished.
Embedded Indicators of Accomplishment of Program Outcomes	At times throughout the semester, portions of student work will be analyzed to determine if our program is accomplishing stated program outcomes based on established metrics. **If your work is below the minimum established metric, you will be required to repeat the assignment or that portion of the assignment until you achieve the minimum acceptable standard based on the metric**
Homework	**All homework is mandatory and becomes part of your grade, failure to submit any required homework on time will result in a grade of zero**. As an engineer your goal is to make a clear, logical, and professional presentation of your work, which is both accurate and correct. As such both your presentation and the accuracy of your work is important, and both will be graded. It is critical that you show all of your work and leave "foot prints" so that it can be easily followed. No guess work should be required to see what you did. **All submissions are due**

	on the due date via Canvas, no email submission will be accepted. Additional guidance: Problem Sets (PS) 1) Include a title sheet. 2) **Use engineering paper or full-page printouts from Mathcad, Excel, etc.** You may neatly tape or glue short computer printouts onto engineering paper at the appropriate place in the logical flow of the problem. Only use one side of a page. Clearly present **a brief problem statement and a sketch** with your solution. Clearly and concisely explain each step. For narratives of more than a line or two, use your word processor or the text capability if you are using MathCAD or Excel. If you are writing out a paragraph or more, you must type it. 3) All homework in this course must be properly documented. As you are having your work reviewed it is likely that you might receive help from your classmates, just simply document it. Information from the course textbooks (equations and outlines of procedures), class notes, or me is considered immediately available to all students and need not be acknowledged or documented with one exception. If an equation from your AISC Manual is used, place the [equation no. and page no.] in brackets as shown here beside the equation when it is first used. This will help you as you study from your homework at a later date. **YOU ARE REQUIRED TO ACKNOWLEDGE AND DOCUMENT ALL OTHER ASSISTANCE AND REFERENCES USED.** Documentation will be accomplished in accordance with any manual for writing, footnote or endnote, for papers, but for written homework, just place the documentation right at the point you received help using "Who and what" assistance
Assigned Readings	Doing the assigned reading prior to class will help you understand the material presented during class instruction and will fill in gaps for things that we do not cover (***I may not be able to cover everything***) due to time limit. It will also make you more familiar with terms and concepts to be covered. To help motivate you to do the reading there may be quizzes that you are required to complete prior to class on many readings, and/or announced and unannounced quizzes during class

UT Tyler Honor Code	Every member of the UT Tyler community joins together to embrace: Honor and Integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.
Student Standards of Academic Conduct	Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but 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. (i) "Cheating" includes, but is not limited to: a. copying from another student's test paper; b. using, during a test, materials not authorized by the person giving the test; c. failure to comply with instructions given by the person administering the test; d. possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test; e. using, buying, stealing, transporting, or soliciting in whole or part the contents of an un-administered test, test key, homework solution, or computer program; f. collaborating with or seeking aid from another student during a test or other assignment without authority; g. discussing the contents of an examination with another student who will take the examination; h. divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student; i. substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment; j. paying or offering money or other valuable thing to, or coercing another person to obtain an un-administered test, test key, homework solution, or computer program or information about an un-administered test, test key, home solution or computer program;

	k. falsifying research data, laboratory reports, and/or other academic work offered for credit; l. taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and m. misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially. (ii) "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit. (iii) "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty. All written work that is submitted will be subject to review by plagiarism software.
UT Tyler Resources for Students	• UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu • UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu • The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses. • UT Tyler Counseling Center (903.566.7254)
Students Rights and Responsibilities	To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/StudentRightsandResponsibilities.html
State-Mandated Course Drop Policy	Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Grade Replacement / Forgiveness and Census Date Polices:	Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract. The Census Date is the deadline for many forms and enrollment actions that students need to be aware of. These include: • Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit. • Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date) • Schedule adjustments (section changes, adding a new class, dropping without a "W" grade) • Being reinstated or re-enrolled in classes after being dropped for non-payment Completing the process for tuition exemptions or waivers through Financial Aid
Disability/Accessibility Services	In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA), and the ADA Amendments Act (ADAAA), the University of Tyler at Texas offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible a diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit: https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The **Student Accessibility and Resources** (SAR) office will contact you when your application has been submitted and an appointment with an Accessibility Case Manager. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Student Absence due to Religious Observance	Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second-class meeting of the semester
Student Absence for University-Sponsored Events and Activities	If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.
Social Security and FERPA Statement	It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically
Emergency Exits and Evacuation	Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do Not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services
UT Tyler a Tobacco-Free University	Beginning August 15, 2016, all forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quit lines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.
Campus Carry	We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at: http://www.uttyler.edu/about/campus-carry/index.php.

Encls 1) Course Objectives

Sincerely,
Shariful Huq

CENG 4412 Concrete & Steel Design - Course Objectives

1. Given a set of functional requirements and an architectural concept, design a low-rise structural steel or concrete building.
2. Describe the characteristics and behavior of structural steel.
3. Describe the advantages and disadvantages of using structural steel as a building material.
4. Describe the advantages and disadvantages of using reinforced concrete as a building material.
5. Explain and apply the stages/phases of the engineering design process model.
6. Perform a load analysis using ASCE 7-10 for dead load, live load, snow load, roof live load, and wind load.
7. Use the LRFD load case combination equations to develop load case combinations for structural analysis.
8. Apply the LRFD methodology: $\phi R_n \geq \Sigma \gamma_i Q_i$
9. Model braced and rigid frames as lateral load-resisting systems.
10. Reduce a real-world 3-dimensional frame to a 2 dimensional model, accounting for the applied loads, connected members, and out of plane behavior.
11. Analyze and design a structural steel tension member assembly (tension member and connecting element).
12. Analyze and design a structural steel compression member.
13. Analyze and design a structural steel beam and girder.
14. Analyze and design a structural steel beam-column.
15. Analyze and design a reinforced concrete beam.
16. Analyze and design a reinforced concrete column.
17. Analyze and design a reinforced concrete beam-column.
18. Analyze and design a reinforced concrete slab.
19. Use modern engineering software to solve problems.
20. Function effectively as a member of a design team.