

**Department of Civil Engineering  
University of Texas at Arlington**

**CE 4347 Reinforced Concrete Design  
Course Syllabus**

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**Office Hours:** TuTh 1:00 pm– 4:00 pm

**Lecture:** WH 210

(Questions via email or by appointment)

Teaching Assistant: TBA

**Prerequisite:** CE 3341 C or better.

**Class Reference Material (highly recommended):**

Structural Concrete: Theory and Design, by M. Nadim Hassoun, Akthem Al-Manaseer, John Wiley & Sons, 2015, ISBN: 1118767810

Building Code Requirements for Structural Concrete, ACI 318-14, American Concrete Institute, Farmington Hills, MI, 2014.

Dr. Azzawi lecture notes: available on Blackboard, (<http://www.uta.edu/blackboard>)

**Additional Optional Reference Material:**

Design of Reinforced Concrete, 10th Edition, By Jack C. McCormac and Russell H. Brown, Wiley, ISBN: 978-1-118-87910-8.

**Course Content:**

An analysis, design and synthesis course for concrete structures, emphasizing strength design method. Topics include strength and serviceability requirements, design of one way slabs, rectangular beams, flanged sections and columns, for strength, shear, bond, bearing, and serviceability. Building codes, American Concrete Institute (ACI-318-14) specifications, material specifications, test methods, and recommended practice documents are involved. Prerequisite: Grade of C or better in CE 3341.

Day	Date	Syllabus
TuTh	June 5-7	Course Syllabus, Introduction: Reinforced concrete (RC), building and design codes, service and ultimate loads, the ACI analysis and design process, structural safety, types of RC structures, loads.
TuTh	June 12-14	Beam Design for Flexure: Service conditions, compressive stress block, flexural strength, load and capacity factors, strength design and analysis, reinforcement limits, steel choice and placement, open ended design, flexural Analysis of R.C Beams (Rectangular Section with compression reinforcement )
TuTh	June 19-21	Flanged beams: Effective flange width, steel limits, effect of moment reversal, continuous spans.

TuTh	June 26-27	Shear Design: shear failure in reinforced concrete beams, shear steel and limits, shear strength of concrete, stirrup placement
Tu	July 3	Serviceability: deflections, short and long term effects, equivalent Moment of Inertia, deflection limits, crack control
Th	July 05	<b>Midterm I Exam</b>
TuTh	July 10-12	One-way slabs: two-way vs. one-way construction, moment coefficients, steel limits and placement, temperature and shrinkage steel.
TuTh	July 17	Guest Lecture: Bond and Anchorage: Bond stress, development length of steel, cutoff points and anchorage.
Tu	July 19-24	Columns: Fundamentals of column behavior, beam-columns, short column strength, interaction diagrams.
Tu	July 31	<b>Midterm II Exam</b>
Th	August 09	<b>Term Project Presentation</b>
	August	<b>Final Exam (comprehensive) TBD</b>

### Tentative Course Outline:

- 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. Dr.Raad Azzawi

### Student Learning Outcomes:

This course will focus on the following student educational outcomes:

An ability to apply knowledge of mathematics, science, and engineering TI

An ability to design a system, component, or process to meet desired needs TI

An ability to identify, formulate and solve engineering problems TI

An understanding of professional and ethical responsibility CI

The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context CI

A recognition of the need for, and an ability to engage in life-long learning CI

A knowledge of contemporary issues CI

An ability to use the techniques, skills and modern engineering tools necessary for engineering practice TI

Covered Implicitly (C<sub>I</sub>): The outcome is implicitly covered

Covered Explicitly (C<sub>E</sub>): The outcome is explicitly covered

Tested Implicitly (T<sub>I</sub>): The outcome is covered and implicitly assessed for by one or more means (assignments, test questions, essay questions, presentation evaluations, lab reports, etc.)

### Students Learning Objectives:

The Civil Engineering Department ABET procedure includes assessing the achievement of various departmental student learning outcomes. CE 4347 is designated as a "Design" course for the CE Department, through which the following outcomes will be assessed:

- CE Department Outcome "c": An 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.
- ABET CE Program Outcome: An ability to design a system, component or process in more than one civil engineering context.

The following process will be followed in this course towards assessing the outcomes:

1. There will be a design term project, including both analysis and synthesis requiring at least three weeks of effort.
2. The project must have some iterative components. Students will be encouraged to define the design problem, including scope and design objectives.

3. The course project will be open-ended, with at least a few alternate solutions.
4. The course project or assignment should include any applicable codes and regulations, and also a minimum of two realistic design constraints from the following list: economic, environmental, social, political, ethical, health and safety, constructability, and sustainability.
5. A design summary report must be completed by students at the semester end including a documented analysis of alternatives and constraints consideration.
6. The minimum passing grade in the project is 70.
7. The project grade will also count towards your overall course grade.

**Homework:**

A number of relevant homework problems, grouped into one or more problem sets will be assigned on the class blackboard or given in class at the end of lecture. For homework assigned on blackboard, student will be required to upload the assignments solution into blackboard before the due date. Late submission will NOT be accepted unless arrangement has been made in advance with the instructor.

For homework given in class, assignments will be collected in class at the beginning of a lecture in hard copy at the specified due date. Late Homework will NOT be accepted unless arrangement has been made in advance with the instructor. Homework are suggested to be in a standard format. This includes: (a) statement of the problem (with a sketch); (b) quantities with given values; (c) quantities to be found; and (d) solution of the problem.

Work MUST be done in pencil and must be neat and readable. Draw a box around the answer(s). DO NOT WRITE IN THE BACK OF THE PAGE.

**Make-up Exams Policy:**

Makeup examinations are not given. If an examination is missed as a result of an illness or because of a University Authorized Absence, the weight of the missed examination will be added to the weight of the final examination when the class grade is determined. It is the responsibility of the student to provide acceptable, written documentation for absences that occur on the day of an examination. [http://web.uta.edu/catalog/content/general/academic\\_regulations.aspx#5](http://web.uta.edu/catalog/content/general/academic_regulations.aspx#5) in the UTA catalog at discusses University Authorized Absence. If arrangements are made well in advance, an examination can usually be taken before the scheduled time and a more lenient excuse policy is applied.

**Make-up Classes:**

Will be announced later.

**Grades Criteria :**

Students will be required to accumulate points from the following:

Assignments	7.5%
Midterm Exam I	27.5%
Midterm Exam II	27.5%
Term-Project & Presentation	7.5%
Final Exam	30%
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Total	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

Distance learning students need to take the exams (midterms and final ) at the same day with the regular class. It is the responsibility of distance learning students to contact the distance learning office in UTA and register their testing centers at the beginning of the semester and coordinate with their testing center

to schedule their exams. Electronic Devices/e-books are not allowed in exams and the final exam is comprehensive.

**Policies:**

In general, the class will be conducted in accordance with the policies given below. However, it is impossible to anticipate every possible circumstance. The instructor reserves the right to modify the given policies or to deviate from them in unforeseen or unusual circumstances. If there is a policy that you anticipate will affect you in a way that seems unfair, please bring it to the attention of the instructor before the end of the second week of class. After that, the reason for a student-initiated change in policy must be compelling.

**Dropping the Course:**

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. For Engineering students, added classes must be on the list approved by the academic advisor. 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. Contact the Financial Aid Office for more information.

**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. According to the UT System Regents' Rule 50101, §2.2, "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."

The College of Engineering has a "Statement on Ethics, Professionalism, and Conduct for Engineering Students" which may be downloaded from [www.uta.edu/engineering/coees.doc](http://www.uta.edu/engineering/coees.doc). Each student is responsible for understanding and acting in accordance with this document.

**Grade Grievances:** The university policy regarding "Student Grievance Procedures Related to Grades" is explained in item 6 at [http://web.uta.edu/catalog/content/general/academic\\_regulations.aspx#10](http://web.uta.edu/catalog/content/general/academic_regulations.aspx#10).

**Electronic Communication Policy:**

The University of Texas at Arlington has adopted the University "MavMail" address as the sole official means of communication with students. MavMail is used to remind students of important deadlines, advertise events and activities, and permit the University to conduct official transactions exclusively by electronic means. For example, important information concerning registration, financial aid, payment of bills, and graduation are now sent to students through the MavMail system. All students are assigned a MavMail account. **Students are responsible for checking their MavMail regularly.** Information about activating and using MavMail is available at <http://www.uta.edu/oit/email/>. There is no additional charge to students for using this account, and it remains active even after they graduate from UT Arlington.

**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:** Sylvia George-Williams, [sylvia@uta.edu](mailto:sylvia@uta.edu), Science & Engineering Librarian.

**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](http://www.uta.edu/disability) or by calling the Office for Students with Disabilities at (817) 272-3364.

**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.