

Course Syllabus – Spring 2010
ADVANCED CONCRETE DESIGN II
CE 6350 (section 001)
M, W, F 10:00AM - 10:50AM
111 Nedderman Hall

Instructor: Dr. Guillermo Ramirez, PE.

Office Number: 429 Nedderman Hall

Office Telephone Number: 817-272-2683

Email Address: willy@uta.edu

Office Hours:

- o Tuesday 9:30 AM – 11:30 PM at NH; 1:30 PM – 3:30 PM at CELB
- o Friday 1:00 PM – 4:00 PM

Course Content: Detailing of connections for ductility demands, modified compression field theory, strut and tie modeling of systems and areas, design of shear walls and hybrid construction; concrete folded plates and shells.

Student Learning Outcomes:

- o **Fundamental Knowledge**
 - The student will command advanced and applied knowledge in the area of material behavior and their mechanics and their applications in civil and general structural engineering.
- o **Independent Abilities**
 - As part of the coursework requirements, the student will conduct independent and original study ranging from gathering of information to proposing, creating, documenting the study, and its resolution and/or elucidation. Gain a Physical Feel for the Relationships between Mathematical Models and Actual Mechanical Structural Response.
- o **Critical Thinking**
 - The student will continue to develop the ability to critique and synthesize literature, review results and to apply this knowledge in developing new ideas; in designing and evaluating scientific investigations; and in assessing, interpreting and understanding data.
- o **Advanced Knowledge**
 - The student will demonstrate mastery of the subject matter at a deeper theoretical and applied level beyond the fundamental knowledge gained in the undergraduate courses.

- **Effective Communication**
 - The students will present scientific results in both written and oral format through the practice of performing class lectures, presentations, and reports.
- **Professional Development**
 - The student will acquire knowledge of topics associated with professional practices and methods presented during the lectures in the class.

Requirements: CE 5312 or equivalent Concrete Design Course

Required Textbooks: - Arthur H Nilson, Dolan, et al (14th Edition). Design of Concrete Structures, ©2010, ISBN-13 9780073293493; MHID 0073293490. McGraw-Hill

Code: ACI 318-05, (2005). Building Code and Commentary, American Concrete Institute, Detroit, MI.

Major assignments and examinations: Weekly homework assignments, two in-class mid-term exams and a comprehensive final exam. All homework assignments must be turned in at the start of the class or, no electronic submissions allowed, prior to the class period in which they are due. Failure to do so will constitute a grade of zero for the homework assignment in question. One week of advanced notice will be provided in scheduling the in-class mid-term exams. The final exam will be given according to the university's published final exams schedule. Note that failure to appear for an exam at the scheduled time will constitute a grade of zero in that exam.

Grading Policy:

Homework (5%),
 Mid-term exams (2 - 20% each),
 Class Project (20%),
 Final Exam (35%).

Final grades have the following guaranteed scale:

A	≥ 89.5
B	79.5 – 89.4
C	69.5 – 79.4
D	60.0 – 69.4
F	< 60.0

(For this course, 59.99 and below is **not** considered 60. The same criterion applies for the other averages). These are the guaranteed cutoff percentages for the grades. Actual cutoffs may be lower, but that will be to the discretion of the instructor.

Attendance Policy: Attendance is not mandatory; however, no special accommodations will be made for incomplete or missed assignments and exams due to unexcused absences.

Drop Policy: Please see university drop policy and deadlines.

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, and 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.

Final Review Week: A period of five class days prior to the first day of final examinations is designated as Final Review Week. During this week, no new assignments will be given; however, previously assigned work may have a completion date during this week. In addition, no portion of the final examination shall be administered during the Final Review Week. Classes are held as scheduled during this week and materials covered in lectures during this week may be included in the final examination.

Librarian to Contact: Barbara Howser, Science and Technology Library.

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.

Make-up Exam Policy: No make-up exams are given except for medical or other similar hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero in the exam.

Grade Grievance Policy: Grade grievances will be handled according to the policy described in the College of Engineering portion of the Catalog.

Tentative Course Outline: (Order of topics may change)

1. **Introduction** and qualitative review of reinforced concrete mechanical behavior
2. **Material Properties for Reinforced Concrete** - Stress-strain relationships for unconfined and confined concrete, effect of transverse reinforcement, effect of several deformation cycles, types of reinforcing steel, stress-strain relationships for steel, effect of cycling.
3. **Stiffness of Reinforced Concrete** - Curvature due to flexure, moment-curvature ($M-\phi$) relationship in reinforced concrete, computation of the $M-\phi$ relationship, longhand examples of computation of the $M-\phi$ relationship, approximations to the $M-\phi$ relationship, $M-\phi$ relationships for columns, influence of the various parameters, minimum reinforcement for flexure, plastification length, moment rotation relationships.
4. **Non-linear behavior of reinforced concrete** - Ductility, hysteretic behavior, energy absorption and dissipation, limit design of reinforced concrete structures, inelastic moment redistribution, inelastic analysis of concrete structures, limit analysis, push-over analysis, non-linear dynamic analysis.
5. **Shear walls** - Types of concrete walls according to function, general behavior of structures with walls, frame-wall interaction, flexural and shear experimental behavior of structural walls, structural analysis for buildings with walls, code requirements for walls, flexural design, shear design, boundary elements, coupling beams, economic aspects, foundation-structure interaction.
6. **Beam-column connections** - Monolithic joints, behavior in the inelastic range, shear effects, development of reinforcement effects, relative flexural strength of beams and columns.
7. **Shear and torsion in reinforced concrete members** - Equilibrium and compatibility torsion in building members. Background of ACI 318-99 design specifications and examples of application.

8. ***Strut and tie approach*** – Background and use of the new provisions for deep member designed based on the Strut-Tie Approach incorporated in Appendix A of the ACI 318 Building Code. Experimental evaluation of members designed using Appendix A of the ACI 318 code.

Important Dates:

Last day to drop courses	April 02
First Test	March 23
Second Test	April 16
Project Due	April 30
Last Day of Classes	May 07
Final Exam Week	May 10 to 14

2010 Academic Calendar

Notes:

JANUARY						
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31						

FEBRUARY						
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28						

MARCH						
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MAY						
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JUNE						
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CE 6350 Advanced Concrete Design II	
First Day of Classes	
Last Day of Classes	
Final Exams	
In-class Exams	
No class	