**Course Syllabus – Spring 2013**

**CE 5332: Highway Design**

**MWF 10-10:50**

**Room: 111 Nedderman Hall**

**Instructor:** Sia Ardekani

**Office Number:** 434 Nedderman Hall

**Office Telephone Number:** 817-272-3762

**Email Address:** Ardekani@uta.edu

**Office Hours:** TTh 8:30 AM-12 Noon; or by appointment

**Course Content:** The planning and geometric design concepts necessary for city streets and highways. The customary surveys and plan preparations along with a review of drainage practices, right-of-way considerations, and road construction materials.

**Student Learning Outcomes:**

* Ability to apply knowledge of mathematics, science, and engineering
* 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 identify, formulate, and solve engineering problems
* 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

**Requirements:** CE 3302 or Equivalent

**Required Textbooks:** A Policy on Geometric Design of Highways and Streets, AASHTO, 6th Edition, 2011 (ISBN:978-1-56051-508-1).

**Major Assignments and Examinations:** Homework assignments, two mid-term exams, one design project, and a comprehensive final exam. All homework assignments must be turned in at the start of the class. 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 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 (15%), Midterm Exams (20% each), Design project (15%), Final Exam (30%).

**Attendance Policy:** Attendance is not mandatory; however, no special accommodations will be made for incomplete or missed assignments and exams due to 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, 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:**  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](http://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.

**References:**

1. Geometric Design Projects for Highways, I.C. Schoon, 1999 (Library call# TE145 .S36 2000).

2. Route Surveying & Design, C.F. Meyer & D.W.Gibson, 5th Ed., 1980 (Call# 209 .M48 1980).

3. Fundamentals of Transportation Engineering – A Multimodal Systems Approach, Fricker and Whitford, 1st Edition, 2004.

4. Highway Capacity Manual, National Research Council, Transportation Research Board, 2000 (Call #HE336.H48 H45 2000).

5. Residential Street Design and Traffic Control, W. Hamburger, et al, 1989 (Call# HE335 .R47 1989).

6. Transportation and Land Development, V.G. Stover & F. Koepke, 1988 (Call# HE335 .S76 1988).

7. Highway Engineering, P.H. Wright, 7th Ed. 2004 (Call# TE145 .W74 2004).

8. Freeway and Interchange Geometric Design Handbook, J.P. Leisch & J.M. Mason, Jr., ITE Publication No. TB-017, 2005 (Call# TE176.L45 2005).

|  |  |  |
| --- | --- | --- |
| **Tentative Date** | **TOPIC** | **Pages to be Read** |
| M 1/14 | Introduction | Handout |
| W 1/16 | Legislative History  | Handout |
| F 1/18 | Highway Financing | Handout |
| **M 1/21** | **MLK Holiday** |  |
| W 1/23 | Functional Classification of Roads | 1-1:1-13 |
| F 1/25 | Vehicle Characteristics | 2-1: 2-36 |
| M 1/28 | Vehicle Characteristics | 2-1: 2-36 |
| W 1/30 | Driver Characteristics | 2-36: 2-46 |
| F 2/1 | Driver Characteristics | 2-36 :2-46 |
| M 2/4 | Pedestrian and Cyclist Characteristics | 2-78: 2-82 |
| W 2/6 | Traffic Characteristics | 2-46: 2-59 |
| F 2/8 | Capacity & Design Levels of Service | 2-60:2-77 |
| M 2/11 | Stopping Sight Distance | 3-1: 3-6 |
| W 2/13 | Decision Sight Distance & Passing Sight Distance | 3-6: 3-14 |
| F 2/15 | Sight Distance on Multilane Highways | 3-14:3-18 |
| M 2/18 | Horizontal Alignment - Design Considerations | 3-18:3-52 |
| **W 2/20** | **EXAM I** |  |
| F 2/22 | Horizontal Alignment - Low Design Speeds | 3-52:3-58 & 3-85:3-90 |
| M 2/25 | Horizontal Alignment - Transition Curves | 3-59:3-84 |
| W 2/27 | Horizontal Alignment - Transition Curves | 3-59:3-84 |
| F 3/1 | Horizontal Alignment - Sight Distance Requirements | 3-106:3-112 |
| M 3/4 | Horizontal Alignment - Layout | Ref. 2 & Handout |
| W 3/6 | Vertical Alignment - Crest Curves | 3-149:3-157 |
| F 3/8 | Vertical Alignment - Sag Curves | 3-157:3-163 |
| 3/11-3/15 | SPRING BREAK |  |
| M 3/18 | Vertical Alignment - General Considerations | 3-163:3-167 |
| W 3/20 | Vertical Alignment - Layout | Ref. 2 & Handout |
| F 3/22 | Vertical Alignment - Layout | Ref. 2 & Handout |
| M 3/25 | Vertical Alignment - Grade Requirements | 3-113:3-125 |
| W 3/27 | Vertical Alignment - Climbing Lanes | 3-125:3-135 |
| **F 3/29** | **EXAM II (Last Day to Drop)** |  |
| M 4/1 | Roadway Cross-Section: Rural  | 4-1:4-16 & 7-1:7-26 |
| W 4/3 | Roadway Cross-Section: Urban | 7-26:7-42 |
| F 4/5 | Roadway Cross-Section: Curbs & Drainage | 4-16:4-29 |
| M 4/8 | Roadway Cross-Section: Medians & Crash Barriers | 4-29:4-36 |
| W 4/10 | Pavement Types & Design Variables | Handout |
| F 4/12 | At-Grade Intersections – Design Controls | 9-1:9-8 |
| M 4/15 | At-Grade Intersections - Channelization | 9-8:9-25 & 9-92:9-99 |
| W 4/17 | At-Grade Intersections - Sight Distance Triangle | 9-28:9-54 |
| F 4/19 | At-Grade Intersections - Sight Distance Triangle | 9-28:9-54 |
| M 4/22 | Grade Separation - Interchange Types | 10-1:10-59 & Handout |
| W 4/24 | Grade Separation – Lane Balance Principles | 10-72:10-87 |
| F 4/26 | Grade Separation – Ramp Types & Design Standards | 10-87:10-101 |
| M 4/29 | Grade Separation – Ramp Types & Design Standards | 10-87:10-101 |
| W 5/1 | Grade Separation – Speed Change Lanes | 10-107:10-116 |
| F 5/3 | Course Review **– Design Projects Due** |  |
| **M 5/6** | **FINAL EXAM (8 - 10:30AM)** |  |