

TRSS 415: Highway Engineering

Fall 2014, T Th 10:00 – 11:20 AM, CBEIS 251

Instructor	Dr. Celeste Chavis	Office Hours	Monday: 1:00-2:00, 3:30-4:30
Office	CBEIS – Room 241		Tuesday: 2:30-4:30
Phone	443-885-5061		Wednesday: 1:00-2:00,3:30-4:30
Email	celeste.chavis@morgan.edu		Thursday: 2:30-4:30

Course Description

This course presents general background and context of highway engineering as a profession, introduce basic principles, processes, and methodologies that are fundamental in highway design. By completion of this course, students will gain general knowledge of highway alignment, earthwork, intersection design, construction surveys, drainage design, highway materials, design of asphalt mixtures, and pavement thickness design.

Course Objectives

At the conclusion of this course, students should be able to: define the profession and the functional areas of highway engineering, understand principles of highway design, apply the fundamentals of horizontal and vertical alignments, design at-grade intersections, understand the highway drainage systems, understand basic properties of soil for highway design, know how to design flexible and rigid pavements, and identify critical elements to design the pavement.

Learning Outcomes

- Familiarity with challenges facing transportation professionals and engage in life-long learning
- Ability to apply mathematics, science, applied science, technological tools, and principles of engineering, planning and management to solve transportation-related problems
- Ability to communicate effectively and function on multi-disciplinary teams
- Ability to design and conduct experiments as well as to analyze and interpret data

Teaching Method

This course involves mostly lectures, class discussion, field exercises and some computer applications. Guest speakers may also be invited.

Course Requirements and Student Evaluation

Successful completion of the class will depend on regular class attendance, timely completion of assignments and labs, in-class participation, and exams. Note: some exams may be worth more than others but in total exams equate to 40% of grade. Likewise, laboratory assignments will be worth more than homework assignments.

- Tests 40%
- Labs & Assignments 50%
- **Attendance/Participation 10%**

The grade distribution is as follows:

- A 90 – 100%
- B 75 – 89%
- C 65 – 74%
- F Below 65%

Academic Honesty

Students *currently* taking this class can work together to conceptualize general approaches to assignments. However, unless otherwise specified for a particular assignment, the work you submit should be done completely on your own. This includes text, numerical calculations, mathematical derivations, diagrams, graphs, computer programs and output.

Plagiarism, according to the policy of Morgan State University, is not tolerated and students will be disciplined. The exact words or approximate words, or ideas of another person must be quoted and attributed. Students who fail to observe this rule will receive an “F” for the course.

Courtesy

Please silence cell phones and restrict use during class. Computers are available as a class aide and thus use outside of class related activities should be kept to a minimal. Do not bring food into the classroom.

Accommodations

Please seek the instructor immediately if special accommodations are necessary. These include but are not limited to disabilities and personal emergencies.

Reference Material

1. **Garber, N. J. and L. A. Hoel. *Traffic and Highway Engineering (Fourth Edition)*. Brookes/Cole Publisher, 2009.**
2. Mannering, F.L., Kilareski, W.P., and S.S. Washburn. *Principles of Highway Engineering and Traffic Analysis* (Third Edition). John Wiley and Sons, Inc., 2005.
3. *A Policy on Geometric Design of Highways and Streets*, 6th edition, 2011, American Association of State Highway & Transportation Officials (AASHTO), Washington, DC.
4. *Roadside Design Guide*, 4th edition, 2011, American Association of State Highway & Transportation Officials (AASHTO), Washington, DC.
5. *The Asphalt Handbook (MS-4)*, 7th edition, 2007, Asphalt Institute, Lexington, KY.

6. *Hydraulic Design of Highway Culverts*, Hydraulic Design Series Number 5, Publicaiton No. FHWA-HIF-12-026, 3rd edition, April 2012, US Department of Transportation - Federal Highway Administration, Washington, DC

Tentative Course Schedule

Week	Date	Topics	Readings
Part I: Location & Geometrics			
1	8/26 8/28	Introduction Highway Surveys and Location	Ch. 14
2	9/2 9/4	Highway Surveys and Location, con't Geometric Design of Highway Facilities	Ch. 14 Ch. 15
3	9/9 9/11	Geometric Design of Highway Facilities, cont.	Ch. 15
4	9/16 9/18	<i>Lab</i> Practice/Review, Work on Lab	
5	9/23	TEST 1	
Part II: Intersection Design			
5	9/25	Intersection Design	Ch. 7
6	9/30 10/2	Intersection Design, cont	Ch. 7
7	10/7 10/9	<i>Guest speaker: Designing bike facilities</i> <i>Lab</i>	
8	10/14 10/16	Practice/Review, Work on lab TEST 2	
Part II: Hydraulics & Soil			
9	10/21 10/23	Highway Drainage	Ch. 16
10	10/28 10/30	Highway Drainage Soil Engineering (could do a soil classification lab)	Ch. 16 Ch. 17
11	11/4 11/6	Soil Engineering Practice/Review	Ch. 17
12	11/11	TEST 3	
Part IV: Materials and Pavements			
12	11/13	Bituminous Materials	Ch. 18
13	11/18 11/20	Bituminous Materials Design of Flexible Pavements, HW 5 due	Ch. 18 Ch. 19
14	11/25 11/27	Design of Flexible Pavements, cont NO CLASS - THANKSGIVING	Ch. 19
15	12/2 12/4	Design of Rigid Pavements	Ch. 20
16	12/9- 12/16	Test 4 (Date TBD)	