

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CE 321: Highway Engineering
Spring 2007

Course Objectives:

- To understand the significance and role of transportation in society and within the civil engineering profession.
- To provide the fundamentals necessary to solve highway engineering problems encountered on the Fundamentals of Engineering (FE) or Principles and Practice of Engineering (PE) exams in civil engineering.
- To introduce fundamentals of traffic engineering and transportation planning analysis
- To learn and use highway engineering software applications.

Lecture Hours:

T, Th 9:45 – 11:00 AM Sec 1, 2 and 3 62 Willard

Lab Lectures:

F 8:00 – 9:55 AM Sec 1 228 Sackett Building (CAD Lab)
 F 10:10 – 12:05 PM Sec 2 228 Sackett Building (CAD Lab)
 T 12:20 – 2:15 PM Sec 3 228 Sackett Building (CAD Lab)

Instructor and Teaching Assistant Contact Information:

Instructor & Teaching Assistant	Prof. Paul P. Jovanis	John Leo Caruano
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Office Hours	T, Th 3:30 – 5:00 PM Other times by appointment	Announced in lab

Required Text: Mannering, F. L., W. P. Kilareski, and S. S. Washburn. Principles of Highway Engineering and Traffic Analysis, Third Edition, John Wiley & Sons, Inc., 2005 (referred to as MKW text below).

Grading:	Semester Mid-term Exams (Exam 1- 15%; Exam 2- 20%)	=	35%
	Final Exam	=	25%
	Homework and laboratory assignments	=	40%
	Lab project		15%
	Lab and homework assignments		25%
Total			100%

There may be a maximum adjustment of 5 percentage points in the share of the grade for any of the components above, depending on the evolution of the class.

Students are responsible for all reading assignments prior to class meeting times. The enclosed course schedule will serve as a general guide for the topics covered during each scheduled period, however there may be minor adjustments required by progress on individual lectures. Class lectures are contained on the course Angel site which will also be used for communication between instructor and students.

There will be two exams given during the semester, and a final exam will be administered during the regular final exam period. The course content included on all exams will be announced by the instructor during regularly scheduled class periods prior to the exam date. Exams will contain both closed- and open-book portions in order to adequately evaluate student progress on computational as well as conceptual and definitional material. For open-book portions, students will be permitted to use the course textbook, notes, and homework solutions. Calculators will be needed for all exams.

All homework assigned during course and laboratory lectures are individual efforts. These assignments will be made by the course or laboratory instructor during regularly scheduled periods. All assignments will be graded and returned as soon as possible. Adequate time will be given to complete all assignments – late coursework will not be accepted unless given approval by the course instructor prior to the due date. Be sure to clearly state all assumptions for given problems; provide orderly problem calculations; and, clearly identify solutions (include units).

Class attendance is highly recommended. Active student participation during lecture and laboratory periods is encouraged. Example problems will be completed during class. Time will be provided during many lab periods to make progress on assignments and the lab project. This is an excellent opportunity to learn the design material required for this course and the FE while under the guidance of the TA.

University Academic Integrity Policy:

“Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.”

—From Penn State's *University Faculty Senate Policy 49-20*

The University Academic Integrity Policy applies to all assignments and exams conducted in this class.

CE 321: Highway Engineering			Spring 2007 Course Schedule
<u>Class #</u>	<u>Date</u>	<u>Reading</u>	<u>Lecture Topic</u>
1	T 1/16	MKW Ch. 1; Class #1 Notes	Class introduction/system trends
2	Th 1/18	Class #2 notes	Highway Users
3	F 1/19		Laboratory #1 (One lab section on Tuesday)
4	T 1/23		No class; work on Lab/Hmwk. assignment
5	Th 1/25	MKW 2.1 – 2.5 Class #5 Notes	Vehicle Performance and Resistance (Hmwk. #1 Due)
6	F 1/26		Laboratory #2
7	T 1/30	MKW 2.6 – 2.8 Class #7 Notes	Tractive Effort and Vehicle Acceleration
8	Th 2/1	MKW 2.9.1 – 2.9.4 Class #8 Notes	Vehicle Braking - theoretical (Hmwk #2 Due)
9	F 2/2		Laboratory #3
10	T 2/6	MKW 2.9.5 – 2.9.6 Class #10 Notes	Vehicle Braking - practical
11	Th 2/8	MKW 3.1 - 3.2 Class #11 Notes	Introduction to Geometric Design (Hmwk. #3 Due)
12	F 2/9		Laboratory #4 (Lab assignment #1 Due)
13	T 2/13	MKW 3.4 – 3.4.2 Class #13 Notes	Horizontal Alignment - I
14	Th 2/15	MKW 3.4.3 Class #14 Notes	Horizontal Alignment - II
15	F 2/16		Laboratory #5
16	T 2/20		Exam #1
17	Th 2/22		Horizontal Alignment - Review
18	F 2/23		Laboratory #6 (Lab assignment #2 due)
19	T 2/27	MKW 3.3 Class #19 Notes	Vertical Alignment - I (Hmwk #4 due)
20	Th 3/1	Class #20 Notes	Vertical Alignment - II
21	F 3/2		Laboratory #7 (Lab assignment #3 due)
22	T 3/6	Class #22 Notes	Cross Section Elements
23	Th 3/8	MKW 4.1 – 4.4 Class #23 Notes	Flexible Pavement Design (Hmwk. #5 Due)
24	F 3/9		Laboratory #8

Spring Break March 13-16; no class

<u>Class #</u>	<u>Date</u>	<u>Reading</u>	<u>Lecture Topic</u>
25	T 3/20	MKW 4.5 - 4.6 Class #25 Notes	Flex Pave. Examples; Rigid Pave. Design
26	Th 3/22	MKW 5.1 – 5.3 Class #26 Notes	Traffic Stream Parameters & Models (Hmwk #6 Due)
27	F 3/23		Laboratory #9
28	T 3/27	MKW 5.4 – 5.6 Class #28 Notes	Queuing Theory
29	Th 3/29		Traffic Stream Model Review
30	F 3/30		Laboratory #10
31	T 4/3	MKW 6.1 – 6.4 Class #31 Notes	Capacity and LOS: Freeways (Hmwk. #7 Due)
32	Th 4/5	MKW 6.5 Class #34 Notes	Capacity and LOS: Multi-lane Highways
33	F 4/6		Laboratory #11
34	T 4/10	Exam #2	
35	Th 4/12	MKW 6.6, 6.7 Class #35 Notes	Capacity and LOS: 2-lane Highways
36	F 4/13		Laboratory #12
37	T 4/17	MKW 7.1 – 7.3 Class #37	Signalized Intersection Operation (Hmwk. #8 Due)
38	Th 4/19	MKW 7.4 – 7.5 Class #38	Signal Timing
39	F 4/20		Laboratory #13 Lab Project Due
40	T 4/24	MKW 8.1 – 8.5 Class #40	Transportation Planning/Trip Generation
41	Th 4/26	Class # 41	Transportation Planning/Trip Generation
42	F 4/27		Lab #14
43	T 5/1	MKW 8.6 Class #43	Mode Choice/Traffic Assignment (Hmwk. #9 Due)
44	Th 5/3		Mode Choice/Traffic Assignment
45	F 5/4		Class wrap-up; evaluations
--	M 5/7 – F 5/11		FINAL EXAMS