

The University of Utah
Department of Civil and Environmental Engineering

CVEEN 3520 Transportation Engineering
Syllabus for Fall 2019

Class: CVEEN 3520 Transportation Engineering

Time: M, W, F 10:45 a.m. – 11:35 a.m.

Location: GC 4700

Description: Virtually every aspect of modern economies, and the ways of life they support, can be tied directly or indirectly to transportation. Transportation engineering is definitely one of the most important subjects for modern society. This course introduces important concepts and fundamental knowledge in transportation engineering, including transportation planning and travel demand forecast methods, traffic flow concepts, level of service analysis, intelligent transportation systems, traffic signal control, vehicle dynamics, geometric design, and management of transportation systems. Recommendations for further study on specific areas are also provided.

Objectives: By the end of this course, students will be able to:

- Identify the role and significance of transportation engineering in society and within the civil engineering profession;
- Define theoretical concepts that underpin current highway and traffic engineering practice;
- Apply calculus, geometry, differential equations, physics, and probability and statistics to solve highway and traffic engineering problems; and
- Solve highway and traffic engineering problems similar in scope to problems encountered on the transportation portions of the Fundamentals of Engineering (FE) and Principles and Practice of Engineering (PE) exams.

Instructor: Cathy Liu, Ph.D., Associate Professor at Civil & Environmental Engineering

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Office hours: T, Th 10:00 AM – 12:00 PM or by appointment

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Textbook: Fred L. Mannering & Scott S. Washburn. Principles of Highway Engineering and Traffic Analysis, 6th Edition, 2016 or 5th Edition, 2013.

Grading Policy: Assignments: 25%
 Applied Problems: 10%
 Midterm Exam 1: 20%
 Midterm Exam 2: 20%
 Final Exam: 25%

Grading	93-100	A
	90-92	A-
	87-89	B+
	83-86	B
	80-82	B-
	77-79	C+
	70-76	C
	60-69	D
<60	E	

Course Schedule (Tentative) – Fall 2019

Week	Day	Date	Topics	Reading (6 th Ed)	Reading (5 th Ed)	Note
1	M	Aug. 19	Introduction to Transportation			
	W	Aug. 21	Four Step Model Overview	341-346	285-288	HW#1 out
	F	Aug. 23	Trip Generation	346-352	289-295	
2	M	Aug. 26	Trip Distribution			
	W	Aug. 28	Mode Choice	352-359	296-302	HW#1 due; HW#2 out
	F	Aug. 30	Trip Assignment	359-371	303-314	
3	M	Sept. 2	Labor Day (no class)			
	W	Sept. 4	Planning in Practice			HW#2 due; AP#1 and HW#3 out
	F	Sept. 6	Planning in Practice			
4	M	Sept. 9	Traffic Flow Theory: Introduction	165-171	135-141	
	W	Sept. 11	Traffic Flow Models	171-181	141-145	AP#1 due
	F	Sept. 13	Shockwaves			
5	M	Sept. 16	Queuing Theory	181-195	151-165	HW#3 due; HW#4 out
	W	Sept. 18	Queuing Theory			
	F	Sept. 20	Traffic Detection Systems			
6	M	Sept. 23	Intersection Traffic Signal Control	269-299	225-252	HW#4 due
	W	Sept. 25	Intersection Traffic Signal Control			
	F	Sept. 27	Midterm Exam #1 review			
7	M	Sept. 30	Midterm Exam #1: Part I			

	W	Oct. 2	Midterm Exam #1: Part II			
	F	Oct. 4	Signal Timing Design	299-320	254-285	
8	M	Oct. 7	Fall Break			
	W	Oct. 9	Fall Break			
	F	Oct. 11	Fall Break			
9	M	Oct. 14	Signal Timing Design			
	W	Oct. 16	Signalized Intersections: LOS Analysis			AP#2 and HW#5 out
	F	Oct. 18	Fancy Intersection and Roundabout			
10	M	Oct. 21	Highway Capacity and LOS: Concept	211-231	175-193	
	W	Oct. 23	LOS: Freeways and Highways			HW#5 due; HW#6 out
	F	Oct. 25	LOS: Freeways and Highways			
11	M	Oct. 28	LOS: Freeways and Highways	241-258	201-214	
	W	Oct. 30	FREEVAL Computational Engine			HW#6 due; HW#7 out
	F	Nov. 1	Principles of Braking	11-57	9-47	
12	M	Nov. 4	Theoretical & Practical Stopping Distance			AP#2 due
	W	Nov. 6	Midterm Exam #2: Part I			
	F	Nov. 8	Midterm Exam #2: Part II			
13	M	Nov. 11	Guest lecture			
	W	Nov. 13	Vertical Alignment: Crest Curve	59-88	47-58	
	F	Nov. 15	Vertical Alignment: Crest Curve			HW#7 due; HW#8 out
14	M	Nov. 18	Vertical Alignment: Sag Curve			AP#3 out
	W	Nov. 20	Vertical Alignment: Sag Curve			
	F	Nov. 22	Horizontal Alignment: Fundamentals	88-96	77-85	
15	M	Nov. 25	Horizontal Alignment: Design			HW#8 due
	W	Nov. 27	Horizontal Alignment: Design			
	F	Nov. 29	Thanksgiving (no class)			
16	M	Dec. 2	Intelligent transportation systems			
	W	Dec. 4	Final Review			AP#3 due
17	M	Dec. 9	Final Exam 10:30 – 12:30 pm			

Note: The syllabus is not a binding legal contract. The instructor may modify it when the student is given reasonable notice of the modification.

CVEEN 3520 Course Expectations and Policy

Expectations for Course Work

The work in this course consists of assigned reading, homework and applied problems. All of them are designed to help you achieving the course learning objectives and should be completed on time. In addition to the assignments, three exams, two midterms and one final, will be employed to evaluate your learning through the course.

Assigned Reading. Most lectures have assigned readings (please see the course schedule for details) that you need to finish *before* attending the classes. Though these assigned readings will not be directly evaluated, it will be greatly beneficial to complete reading them on time because they provide important information for you to better understand the class contents.

Homework and Applied Problems

Homework assignments and ‘applied problems’ are individual efforts as described in *CVEEN Homework Assignments: Process of Solution and Formatting Requirements* (effective 9/1/2004):

The completed homework assignments that you turn in for credit must be substantially your own work. It is permissible to discuss the basic concepts and how to solve the problem in a general sense with others prior to working on the assignment. Once you have started a problem, you may ask questions of other students, but the questions should be limited to specific aspects of a problem that you do not understand. It is not acceptable to work on the assignments with another person or in a group where the assignments are worked entirely together. You may get as much help from the Teaching Assistant and Professor for the class as they can legitimately give you during their regularly scheduled office hours or via e-mail (if the Teaching Assistant or Professor is willing to communicate via e-mail). It is not permissible to use either solution manuals or solutions from past classes for homework assignments that are turned in for credit. All assignments must have the following signed pledge at the front of the assignment:

On my honor as a student of the University of Utah, I have neither given nor received unauthorized aid on this assignment.

If the pledge is missing or is not signed, the assignment will not be graded.

Homework and applied problems are due by 5:00pm on the due date. Homework deliverables must follow the Departmental formatting and style requirements given in *CVEEN Homework Assignments: Process of Solution and Formatting Requirements* (saved on the Canvas site as **Homework Requirements.pdf**).

The course schedule shows approximate dates for homework assignments and applied problems. Exact assignment and due dates will be identified during the semester by the instructor and announced during the regularly scheduled classroom meetings.

Exams

The two midterm exams will be held during multiple, regularly scheduled classroom meetings. The final exam will be held during the university-designated time. Conflict exam requests must be made at least two weeks prior to the exam date and will be decided on a case-by-case basis. The course content included on the exams as well as the exam format will be announced by the instructor during regularly scheduled class periods prior to the exam date. Every class is different in terms of the pace of material coverage. The midterm exam dates on the course schedule are tentative and may be adjusted with ample notification.

College of Engineering Guideline

The College of Engineering Semester Guidelines contain important dates regarding adding, dropping and withdrawing from classes as well as the College Policy regarding repeating courses. Please refer to the details here: <https://www.coe.utah.edu/semester-guidelines>

Safety Statement

The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.

Accessibility

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. (www.hr.utah.edu/oeo/ada/guide/faculty/)

Professional Responsibilities:

Students should read the “Student Code” (Policy 6-400: Code of Student Rights and Responsibilities) carefully and know they are responsible for the content. The Policy is located at the following link:

<http://www.regulations.utah.edu/academics/6-400.html>

All students are expected to maintain professional behavior in the classroom setting.¹ Students have specific rights in the classroom, detailed in Section II of the Student Code. The Student Code also specifies academic misconduct, including, but not limited to, cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information. The process for resolving any violations of the Student Code, including academic sanctions, is also described.

¹ Discussion threads, e-mails, and chat rooms are all considered to be equivalent to classrooms, and student behavior within those environments shall conform to the Code.

Course Policy

Late Homework Turn-ins. You are required to turn in your homework on time. Late homework can be accepted within four days after the due date but will be discounted at 20% per day it is late. For example, if an assignment is due on May 10, and you turn it in on May 12, it would amount to a deduction of 40% for this two-day late assignment. If you turn in on May 15 or after, it will not be accepted and no credit will be given to this assignment of more than four days late.