

University of Virginia
School of Engineering and Applied Science
Department of Civil & Environmental Engineering
Fall 2013

CE 4400 / 6400 Traffic Operations

Tuesday and Thursday, 2:00 – 3:15 PM, THN 222

Instructor:

Dr. Byungkyu “Brian” Park

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Office Hours:

Monday and Wednesday 1:00 – 2:00 PM or other time by appointment

Teaching Assistant:

TBA?

Course Objectives:

The purpose of this course is to provide students with the knowledge of traffic operations including traffic data collection, safety and crash studies, traffic flow theory, highway capacity analysis, signalized intersection design and analysis, simulation modeling, and sustainable transportation system. At the end of this course, the student should be able to understand basic traffic flow theory, to conduct traffic data collection and analysis, and to apply capacity analysis methods for both highway and signalized intersections.

Required Textbook:

- Nicholas J. Garber and Lester A. Hoel, Traffic & Highway Engineering, 4th edition, CENGAGE Learning, 2008.

Reference Textbooks:

- Roger P. Roess, Elena S. Prassas, and William R. McShane, Traffic Engineering, 3rd Edition, Prentice Hall, 2004.
- Jon D. Fricker and Robert K. Whitford, Fundamentals of Transportation Engineering: A Multimodal Systems Approach, Prentice Hall, 2004.
- TRB SR 209, Highway Capacity Manual. TRB, 2000 (or 2010).

Late Assignment:

Each assignment will be due at the beginning of the class time as noted. Late assignment **will not** be accepted. However, the lowest score of the homework assignments will be dropped.

Mini Projects:

Two mini group projects will be assigned up to four individuals depending on the class size. Detail information will be given during the semester.

Grading:

The overall course average will be determined as follows:

	CE 4400	CE 6400
Class participation	5%	5%
Assignments	20%	20%
Two Exams	40%	35%
Two Mini Projects	35%	30%
Synthesis Paper		10%

CE 6400 Graduate Students:

Students taking CE 6400 should submit a single-spaced synthesis paper focusing on advanced technology applications in traffic operations. The topic of paper should be relevant to the material covered in this class. A list of potential topics will be given later but students may pick his or her own topic with instructor's approval.

Course Outline:

Date	Topic	Chapters	Note
8/27	Introduction – Transportation Challenges		FB “Traffic Operations” page!
8/29	Connected Vehicles & Project #1 Descriptions		Connected Vehicle technology
9/3	Traffic Engineering Study – Speed	Ch 4	
9/5	Statistics	Slides	Hypothesis testing!
9/10	Traffic Engineering Study – Volume	Ch 4	
9/12	Traffic Engineering Study – Travel Time & Parking	Ch 4	
9/17	Safety – Crash Report & Analysis	Ch 5	
9/19	Safety – Crash Analysis & Countermeasures	Ch 5	
9/24	Highway Safety Manual	Slides	Guest Lecture!
9/26	Beyond the HSM (Surrogate Safety Measures)	Slides	
10/1	No Class – Project workday!		Out of town!
10/3	Project #1 – In Class Presentations		
10/8	Crash Triggers & Surrogate Safety Model	Slides	Journal Papers
10/10	Traffic Signal Operation – basic principles	STM	Signal Timing Manual
10/15	Traffic Signal Operation – Actuated Signal		Reference
10/17	No class – Reading day		
10/22	Introduction to Synchro/HCS & Project #2		Software
10/24	Exam #1 (through 10/151 class)		Out of town!
10/29	Introduction to Vissim/Vistro		Software
10/31	Traffic Signal Operation – Adaptive Signal	Slides	Papers
11/5	Transit Signal Priority	Slides	Papers
11/7	Traffic Signal Warrants	Ch 8	
11/12	Traffic flow theory	Ch 6	
11/14	Traffic flow theory	Ch 6	
11/19	Two-lane Rural Highways	Ch 9	
11/21	Sustainable Transportation	Slides	CE 6400 Synthesis Paper due
11/26	Simulation Modeling – Calibration	Slides	Handbook & Papers
11/28	No class – Thanksgiving		
12/3	Project #2 – In Class Presentations		
12/5	Exam #2 (Cumulative)		

Note: The schedule might be updated with an advanced notice!