

CEE 476/576: Transportation Operations Applications

Spring 2010, 3 credits, Wed 5:45 PM-8:15 PM

Instructors:

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COURSE DESCRIPTION

This course is an introduction to transportation operations and it informs students about transportation operations methods. The course will help students apply analytical methods in specific transportation contexts and help them conduct case-studies. We begin by examining transportation goals such as reduction in traffic congestion and environmental improvement. Next, the principles of transportation operations are discussed. The methodologies used to evaluate transportation system performance and the impacts of alternative actions will be discussed. Students will develop an understanding of transportation problems, their potential solutions and using the state-of-the-art transportation operations methods/software to evaluate impacts. Specific topics to be covered in the course include:

- Traffic engineering studies
- Capacity analysis
- Intersection control
- Signal warrant analysis
- Safety analysis
- Case studies related to traffic management, access management, and traffic calming

Students: This course is primarily for students in Engineering; other students interested in transportation may also enroll.

Prerequisites: Transportation experience or CEE 470/570 or equivalent.

Credits and format: This is 3-credit course. Most of the course will consist of lectures. In addition, there will be class discussions. The course will be taught by instructors who bring a wealth of diverse experiences to the course and it will balance theory with practice. Students will have an opportunity to hear about some of the transportation issues faced by the localities and the Hampton Roads region. Dr. Guzin Akan, City Transportation Engineer for Norfolk, and Dr. Camelia Ravanbakht will be providing practical examples of traffic management, access management, traffic calming, and regional operations management.

Readings: To facilitate systematic introduction of transportation operations, we will use the following:

- Papacostas C., and P. Prevedouros, Transportation Engineering and Planning, 3rd Ed., NJ: Prentice-Hall, 2000.
- Highway Capacity Manual, Transportation Research Board, National Research Council, Washington, D.C., 2000. Code: HCM2KE ISBN#: 0-309-06746-4 Price: \$100.00
<http://trb.org/trb/bookstore/>
- Web-resource: Highway Capacity Manual Applications Guide <http://hcmguide.com>
- ITE Traffic Engineering Handbook, 5th ed., 2000, Washington, DC. (Publ. No. TB-010A).

In addition we will use:

- R. Roess, E. Prassas, W. McShane, Traffic Engineering, Prentice Hall, Englewood Cliffs, N.J., 3rd Edition, 2004.
- Traffic Flow Theory, A monograph (Web Document: www.tfhrc.gov/its/tft/tft.htm)
- Materials from the Federal Highway Administration Operations website (<http://ops.fhwa.dot.gov/index.asp>).
- Garber N. and L. Hoel, Traffic and Highway Engineering, 2nd Edition, PWS Publishing Co. 1997.
- Mannering F., W. Kilareski and S. Washburn, Principles of Highway Engineering and Traffic Analysis, John Wiley & Sons, New York, NY, 2005.
- U.S., Dept. of Transportation, FHWA, Flexibility in Highway Design. (<http://www.fhwa.dot.gov/Environment/flex/>).

There are additional background readings that are of interest and will be posted on the Blackboard website.

Course Requirements

The requirements for this course include:

- Assignments (60% of the grade).
 - The assignments will cover the topics discussed in class.
 - Approximately 4 assignments will be given during the course.
 - Assignments will be typically due back in one week.
 - Late assignments will not be accepted. (If there are extenuating circumstances, please talk to me *before* the assignment is due.)
- Active class participation (5% of the grade).
- Class project (35% of the grade; includes 5% for class presentation). In the class project you will form a group and will work on operations impacts of truck restrictions in Norfolk. We will provide further details regarding the specific tasks involved.

Course Registration

Students must register for CEE 471/571. Students with special registration problems should see the instructor.

Class Meeting Schedule changes

The dates of classes as planned are shown in this handout. The class is scheduled to meet generally at the regularly scheduled time. If it is necessary to reschedule a class, every effort will be made to accommodate the needs of as many students as possible. If you miss a class, please be sure to check on the Blackboard for any changes in schedule.

Office Hours

The schedule of office hours will be announced in class. On Wednesdays, Dr. Khattak plans to be on campus. However, the easiest way to meet me is to either fix an appointment by sending me an email or calling me in the office (683-6701). You can also fix an appointment with other instructors. Please feel free to contact us if you have any questions, problems with the readings, or ideas that you wish to discuss.

COURSE READINGS (subject to revision)

Additional readings will be assigned and posted on the course Blackboard website.

SCHEDULE

No.	DATE	TOPIC	COMMENT	INSTRUCTOR	READINGS
	14-Jan	Transportation Research Board-TRB	No class-try to attend	--	None
	14-Jan	Annual Meeting	No class-try to attend	--	None
1	21-Jan	Introduction to course		Khattak	
2	21-Jan	Transportation & HCM		Khattak	P&P Pp. 1-12 HCM Chapters 1-8
3	28-Jan	Capacity-Urban streets (arterial analysis)	Assignment 1 GIVEN	Ravanbakht	HCM Chapter 15
4	28-Jan	Capacity-signalized intersections (planning and operational analysis)		Ravanbakht	P&P Pp. 179-203 & HCM Chapter 16
5	4-Feb	Capacity-unsignalized intersections	Assignment 1 DUE	Ravanbakht	P&P Pp. 207-218
6	4-Feb	Capacity-ped/bike and transit modes		Khattak	P&P Pp. 133-147
7	11-Feb	Multi-lane highways & two-lane roads		Ravanbakht	HCM Chapter 20, 21
8	11-Feb	Freeways-segments, ramps, weaving		Ravanbakht	P&P Pp. 147-157, HCM Chapter 22, 23
9	18-Feb	Data collection methods-speed studies	Assignment 2 DUE	Akan	P&P Pp. 203-207
10	18-Feb	Case-studies: Traffic management		Akan	ITE Hndbk Pp. 590-640
11	25-Feb	Traffic impact studies		Khattak	P&P Pp. 456-469
12	25-Feb	Parking studies		Khattak	P&P Pp. 479-492
13	4-March	Traffic software & applications: HCS	Assignment 3 DUE	Ravanbakht/Nichols	P&P Pp. 626-650
14	4-March	Traffic software & applications: Other		Ravanbakht/Nichols	P&P Pp. 626-650
	11-March	Spring break		--	
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15	18-March	Air pollution		Khattak	P&P Pp. 499-504
16	18-March	Noise and energy consumption		Khattak	P&P Pp. 506-523
17	25-March	Evaluation & Choice	Assignment 4 DUE	Khattak	P&P Pp. 529-542
18	25-March	Evaluation and Choice	Class project disc.	Khattak	P&P Pp. 543-553
19	1-April	Case studies: Access mgt		Akan	ITE Hndbk 306-347
20	1-April	Case studies: Regs. & traffic calming		Akan	ITE Hndbk 257-305
21	8-April	Transportation safety studies		Khattak	Garber & Hoel: sfty
22	8-April	Transportation safety studies		Khattak	Garber & Hoel: sfty
23	15-April	Case studies: Signs and markings		Akan	ITE Hndbk Ch: 12
24	15-April	Review and wrap-up		Khattak	
25	22-April	Student presentations		--	
26	22-April	Student presentations		--	
	29-April		Class project due		