

CIVE 614: Traffic Operation and Control

2025 Fall Semester (3 Units)

Monday 2:00 PM - 4:50 PM, NREF 2-122

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[Course Description]

The primary objective of this course is to introduce students to traffic engineering principles for streets and highways with emphasis on the safe and efficient operation of roadway system. Over 42,800 people are killed each year on United States roadways, many at signalized and unsignalized intersections. In addition, increasing traffic demand on our roadway system has led to congestion requiring improved vehicle movement efficiency at arterial and freeway roadway.

Fundamental principles of traffic flow and intersection traffic operations including traffic data collection methods, traffic data processing methods, statistical analysis techniques, traffic control devices, traffic signal design, and traffic control strategy design. Emphasizes quantitative and computerized techniques for designing and optimizing intersection signalization and freeway operation. Several traffic engineering software packages will be used, and the software packages include but are not limited to HCS, SYNCHRO, PASSER II, PASSER III and SIDRA. State-of-the-art computer applications and current research findings will be presented throughout.

[Text and References]

1. [RR] [Required for Assignment Sets] Roess, Roger P., Elena S. Prassas, and William R. McShane. Traffic Engineering. Fourth Edition, Prentice Hall, New Jersey, 2010.
2. [HCM] Highway Capacity Manual (HCM). Transportation Research Board (TRB), Washington D.C., 2010. Available from the Library at University of Alberta.
3. [MUTCD] Manual on Uniform Traffic Control Devices. FHWA, U.S. Department of Transportation, Washington, D.C., 2009 Edition with Revision No. 1 and 2 incorporated.
Web site: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm.
4. [CCG] Canadian Capacity Guide for Signalized Intersections. Canadian ITE, Feb 2008, Web site: [Canadian Capacity Guide for Signalized Intersections - 3rd Edition \(2008\) - ITE Canada](#)

* Several necessary handouts will be distributed in class.

[Grade]

Assignment –	10%
Mid-term exam –	20%
Term project –	30%
Final exam –	40%
Bonus (review) –	[5%]

[Course Schedule - tentative]

Week	Date	Lecture Topic	Readings	Assignment
1	Sep 8	Course Introduction, Human Factors Traffic Control Devices	RR 1,2 RR 4,5	
2	Sep 15	Signal Warrants, Principals of Signalized Intersections	RR 18,20	Set 1 out
3	Sep 22	Project Data Collection (On field)	RR 8,9,10	
4	Sep 29	HCS/Synchro Software Introduction		Set 1 due
5	Oct 6	Critical Lane, Delay, Signal Timing Signal Optimization	RR 20,21	Set 2 out
6	Oct 13	Thanksgiving Day (No class)		
7	Oct 20	Signal Coordination Actuated Traffic Control	RR 22,26,27	Set 2 due
8	Oct 27	Unsignalized Intersection Multi-Modal Traffic	RR 13, 14	Set 3 out
9	Nov 3	Mid-term Exam (in class)		
10	Nov 10	Fall Term Reading Week (No class)		
11	Nov 17	Active Traffic Management Ramp Metering	RR 25, 28	Set 3 due Set 4 out
12	Nov 24	Traffic Detection Technology Performance Measurement	Handout	
13	Dec 1	Student Project Presentation		Set 4 due
14	Dec 8	Final Exam (tentative)		