**CIV E 411 SYLLABUS**

COURSE NAME: Transportation Engineering II- CIV E 411
DETAILS: 3 hour lectures, 3/2 hour Lab
TERM: Fall

COURSE DESCRIPTION

\*3.8 (fi 8) (first term, 3-0-3/2) Traffic operations and network analysis, traffic stream flow and roadway

analysis, weaving and interchange ramp analysis, intersection traffic control measures and control design,

progressive signal system design, traffic flow prediction, road network simulation and assignment

algorithms, motor vehicle accident analysis; and field data collection method.

Students are expected to acquire a more in-depth understanding of traffic operations and transportation planning concepts and methods. These include: Traffic flow fundamentals and

characteristics; Operations of surface roadway networks and controls (intersections); Freeways and related facilities; Capacity analysis of various transportation facilities; Travel demand analysis; data collection methods.

REQUIRED MATERIAL

**Mandatory**

1. [HCM] Highway Capacity Manual 2010.

At: U of A Libraries, through Knovel. Search “Highway Capacity Manual” and click the 7th result of the

search. It should be listed as: 7. Highway capacity manual 2010. Volumes 1-4: including 2014 Errata, Fifth

edition.

2. [CCGSI] Canadian Capacity Guide for Signalized Intersections, 3rd Edition.

http://tac-atc.ca/sites/tac-atc.ca/files/site/doc/resources/report-capacityguide.pdf

**Recommended**

3. [GH] Traffic and Highway Engineering by Garber, N.J. and Hoel, L.A. 4th Edition, Cengage Learning.

4. [MKW] Principles of Highway Engineering and Traffic Analysis by Mannering, Kilareski, and Washburn.

4th Edition, Wiley.

LECTURE CONTENT

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| Week | Date | Topic | Readings1 | Labs & Assignments2 |
| 1 | 09/03 | Course introduction & overview |  |  |
| 09/05 | Introduction to urban transport engineering & planning | [GH] 11 |  |
| 2 | 09/10 | Traffic flow fundamentals | [GH] 6.1-2 |  |
| 09/12 | Shockwaves | [GH] 6.3, 6.5 |  |
| 3 | 09/17 | Shockwaves | “” | *Assignment 1 due* |
| 09/19 | Shockwaves | “” | Saturation Flow (1) |
| 4 | 09/24 | Quality, LOS, and capacity concepts | [HCM] 5, [CCGSI] 3.1-2, 5.2-3 |  |
| 09/26 | Capacity and LOS concepts | [GH] 9, [HCM] TBA |  |
| 5 | 10/01 | Capacity and LOS concepts | [HCM] TBA | *Assignment 2 due* |
| 10/03 | Interrupted flow facilities & gaps | [GH] 6.4 | Highway Capacity Analysis (2) |
| 6 | 10/08 | Signalized intersections | [GH] 7.1, 8.1-3 |  |
| 10/10 | Signalized intersection analysis | [GH] 8.3.5, 8.4, 10.2, [CCGSI]3.3, 4.1-8 |  |
| 7 | 10/15 | Signalized intersection analysis/control | [GH] 8.4, [CCGSI] 3.3, 4.1-8 | *Assignment 3 due*  |
| 10/17 | Signalized intersection control | [CCGSI] 3.3, 4.1-7 | Signal Design, Synchro (3) |
| 8 | 10/22 | Signalized intersection control | [CCGSI] 3.3, 4.1-7 |  |
| 10/24 | Midterm review / catch up |  |  |
| 9 | 10/29 | MIDTERM EXAM |  |  |
| 10/31 | Urban transportation planning issues | [GH] 11, TBA |  |
| 10 | 11/05 | Complete Streets | TBA | *Assignment 4 due* |
| 11/07 | *Cycling network analysis & traveller characteristics (Guest Lecture)* | TBA | Complete Streets (4) |
| *11*  | *11/12* | *Reading week!*  |  |  |
| *11/14* |  |  |
| 12 | 11/19 | Travel demand analysis; 4-step model: Trip Generation (1/4) | [GH] 12.1-2 |  |
| 11/21 | 4-step model: Trip Distribution (2/4) | [GH] 12.3 | *Assignment 5 due*  |
| 13 | 11/26 | 4-step model: Mode Choice (3/4) | [GH] 12.4 |  |
| 11/28 | 4-step model: Traffic Assignment (4/4) | [GH] 12.5 | Model Estimation; Urban Network Planning (5) |
| 14 | 12/03 | Urban network planning considerations | TBA |  |
| 12/05 | Review |  | *Assignment 6 due*  |

1. Readings in **bold** are **required**. Other readings are optional. Any additional readings will be identified in lectures.
2. Assignment due dates may be subject to change; please always refer to due dates listed on each assignment, and announcements in class and email.

LAB CONTENT

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| **Lab Topic** | **Date** |
| Lab 1: Saturation flow | 2019-09-19 |
| Lab 2: Highway capacity analysis | 2019-10-03 |
| Lab 3: Signal design, Synchro | 2019-10-17 |
| Lab 4: Complete Streets | 2019-11-07 |
| Lab 5: Model Estimation; Urban Network Planning | 2019-11-28 |