COURSE CALENDAR DESCRIPTION

Transportation is fundamental to the economic prosperity of our society. This course introduces civil engineering students to the fundamental elements of transportation engineering, traffic flow theory, highway capacity analysis, geometric design, traffic safety, road classification, transportation planning, and intelligent transportation systems. Prerequisites: SC/MATH 2930 3.00; LE/ESSE 2630 3.00.

INSTRUCTOR(S)

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<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tr>
<td>Gingerich, Kevin</td>
<td>Sec. M / LECT / W</td>
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ADDITIONAL INFORMATION

This course is designed to give upper-level civil engineering undergraduates a solid understanding of the major theories, principles and hands-on tools used in the field of transportation engineering. The following topics will be covered:

INTELLIGENT TRANSPORTATION SYSTEM
1. Autonomous Vehicle (Definition, Levels of Automation)
2. Potential Impact on Society
3. Potential Impact on Civil Engineering

TRAFFIC SAFETY
1. Basic Concepts (Safety Measures, Road Safety Management Process)
2. Safety Performance Functions
3. Crash Reduction Factors
4. Network Screening

TRAFFIC FLOW CHARACTERISTICS
1. Traffic Volume
2. Speeds (space mean speed, time mean speed, etc.)
3. Time and Distance Headways
4. Gaps, etc.

BASIC TRAFFIC FLOW THEORY
1. Speed-Density-Flow Models
2. Greenshield Linear Model

ROAD CLASSIFICATION HIGHWAY CAPACITY ANALYSIS
1. Measure of Effectiveness (MOE)
2. Level of Service (LOS)
3. LOS Analysis for Basic Freeway Sections
4. LOS Analysis for Ramp Roadways
5. LOS Analysis for Merge Sections
6. LOS Analysis for Diverge Sections

URBAN TRANSPORTATION PLANNING
1. Traffic Analysis Zone (TAZ)
2. Network Analysis
3. Trip Generation
4. Trip Distribution
5. Mode Choice
6. Trip Assignment

HIGHWAY DESIGN (Design Lab Component)
1. Single Line Sketches (SLS) and Interchange Type
2. Cross-Section Design
3. Horizontal Alignment Design
4. Vertical Alignment Design

LIST OF LEARNING OUTCOMES AND EXAMPLES OF

Upon the completion of this course, students are expected to learn and retain the following concepts and skills:
1. Demonstrate a fundamental knowledge of Intelligent Transportation System (ITS)
2. Demonstrate the impact of ITS to our society and civil engineering
3. Apply fundamental knowledge of road safety to select the appropriate safety performance measures
4. Demonstrate traffic flow characteristics
5. Apply and formulate highway capacity analysis to determine level of service for highway system
6. Apply highway design standard to design geometric alignment of highways

GRADED ASSESSMENT

Attendance/participation: 5%
Assignments: 10%
Design Lab Report: 15% Midterm Examination: 30%
Final Examination: 40%

ADDITIONAL INFORMATION
The course consists of three 1-hour lectures every week and a 2-hour design lab every other week.

ACADEMIC INTEGRITY LINKS
• Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
• Academic Integrity - http://lassonde.yorku.ca/academic-integrity

STUDENT LINKS
• Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
• Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
• Academic Accommodation for Students with Disabilities - http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/
Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.

Moodle @ York University