

# MIE1414H Human Factors in Transportation

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## Instructor

Maurice Masliah

## Course Time & Location

Wednesday, 6-9pm  
BA B025

## Email

m.masliah@utoronto.ca

## Office Location

TBD

## Office Hours

By Appointment

## Course Overview

The course will cover a wide range of human factors topics related to road transportation, in particular motor vehicle safety. The course provides an understanding of road user characteristics and limitations and how these affect the design of traffic control devices and the roadway. The course topics include: history and scope of human factors in transportation; vision and information processing in the context of driving; driver adaptation; driver education, driver licensing and regulation; traffic control devices; crash types, causes, and countermeasures; alcohol, drug, and fatigue effects; road safety audits; and forensic human factors.

The course will be taught in the form of lectures followed by relevant case studies involving practical application of knowledge gained. Case studies, and related assigned readings, will involve human factors in relation to crash pattern analysis and countermeasure selection, highway and traffic control design issues, driver regulation policy issues, and forensic investigation. The assignments will include both individual and group assignments. Students will be asked to make presentations on these projects and be expected to participate in class discussions.

## Optional Text

Much of the course was originally based upon the following text: *Human Factors in Traffic Safety*, Third Edition, Edited by Alison Smiley, Lawyers & Judges Publishing Company, Inc. 2016.

## Course Schedule – *Subject to Change*

Week	Title	Content
Week 1 – Jan 10, 2024	Introduction	History and scope of human factors in transportation, application to traffic safety
Week 2 – Jan 17, 2024	Vision	Pre-class Reading: Chapter 2 of the <i>Highway Safety Manual</i> and Chapter 3 of <i>NCHRP Report 600</i> Within the context of driving: function of the eye, visual acuity, contrast sensitivity, colour vision, adaptation, perception of closing velocity
Week 3 – Jan 24, 2024		Pre-class Reading: <i>How Long Does It Take to Stop?</i> ” <i>Methodological Analysis of Driver Perception-Brake Times</i> by Marc Green. <i>Transportation Human Factors</i> , 2(3), 195–216. 2000.

Week	Title	Content
	Information Processing	Within the context of driving: attention, information processing capacity, expectancy, mental workload, driver visual search, information processing exercises
Week 4 – Jan 31, 2024		Pre-class Reading: Chapter 13 in the <i>Handbook of Human Factors in Litigation</i> , edited by Y. Ian Noy
	Forensic Human Factors	Human factors cases involving visibility, perception of closing speed, driver expectancy, perception-reaction time
Week 5 – Feb 7, 2024		Pre-class Reading: The back-and-forth papers by Wilde and Evans 1. <i>The Theory of Risk Homeostasis: Implications for Safety and Health</i> , 2. <i>Risk Homeostasis Theory and Traffic Accident Data</i> , 3. <i>Notes on the Interpretation of Traffic Accident Data and of Risk Homeostasis Theory: A Reply to L. Evans</i> , 4. <i>Comments on Wilde’s Notes on “Risk Homeostasis and Traffic Accident Data”</i>
	Human Nature and Ecological Optics	Marc Green - Guest Lecturer
	Driver Adaptation	Perceptual cues for speed, adaptation of speed, visual search, attention, adaptation to road safety interventions.
Week 6 – Feb 14, 2024		Pre-class Reading: 1. <i>Crash Causation and Prevention</i> , 2. <i>On the Relationship Between Road Safety Research and the Practice of Road Design and Operation</i> , 3. <i>Engineering Judgment and Road Safety</i> , all by Ezra Hauer
	Intersection Collisions	Driver tasks in intersections, countermeasures to improve detection, visual search, dilemma zone decisions, countermeasures to improve detection
Week 7 – Feb 21, 2024	Winter Reading Week - no classes	
Week 8 – Feb 28, 2024	Road Departure Collisions	Pre-class Reading: <u><i>Special Crash Investigations: On-Site Reported Cruise Control Malfunction Crash Investigation; Vehicle: 2017 GMC Acadia; Location: Pennsylvania; Crash Date: July 2018</i></u> Driver behavior in curves, inattention and fatigue, expectancy, overtaking issues, countermeasures: curve design shoulders and clear zone, rumble strips, collision pattern exercise
	Bicycle Collisions	Tom Smahel - Guest Lecturer

<b>Week</b>	<b>Title</b>	<b>Content</b>
Week 9 – Mar 6, 2024	Mock Trial Forensics Human Factors	Expert Report Presentation
Week 10 – Mar 13, 2024		Pre-class Reading: <i><u>FHWA Pedestrian and Bicyclist Road Safety Audit (RSA) Guide and Prompt List</u></i>
	Guest Lecture Forensic Human Factors in Surface Transportation	Hannah Van Staveren – Guest Lecturer
	Motorcycle Collisions	Collision statistics, Haddon matrix, motorcycle conspicuity and countermeasures
Week 11 – Mar 20, 2024		Pre-class Reading: Chapter 14: Fatigue and Driving in <i>Traffic Safety and Human Behavior</i> , by David Shinar
	Young & Old Drivers	Collision rates, graduated licensing, cognitive functions and aging, older driver adaptation, senior driver assessments
	Fatigue	Long hours, time of day, short sleep, fatigue management programs
Week 12 – Mar 27, 2024		Pre-class Reading: <i><u>FHWA Road Safety Audit Guidelines</u></i>
	Distraction, Impaired Driving	Sources of distraction, effects on performance, collision rate, impact of alcohol on perception and driving performance
	Road Safety Audits	Application of human factors to road safety audits.
Week 13 – Apr 3, 2024		Pre-class Reading: Compare the forecasts from this 2014 to the current situation: <i><u>Underwood, S. (2014) Automated, Connected, and Electric Vehicle Systems: Expert Forecast and Roadmap for Sustainable Transportation.</u></i>
	Driverless Vehicles	Human factors challenges

## Assignments Schedule

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### Week

### Subject

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Week 4 – Jan 31, 2024

Assignment 1 Literature Review (25%)

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Week 8 – Feb 28, 2024

Assignment 2A Group Written Expert Report (20%)

Week 9 – Mar 6, 2024

Assignment 2B Mock Trial Presentation Expert & Lawyer (8%)

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Week 12 – Mar 27, 2024

Assignment 3 Expert Rebuttal Report (25%)

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Week 13 – Apr 3, 2024

Assignment 4 Critical Reading Assignment (10%)

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Class Participation (12%) – Participation in discussions

Class attendance/participation grade is by attendance. Each missed class is a 1% penalty. If you are sick and/or cannot attend class, prepare a short presentation on the pre-class reading for the missed class. Make your presentation to the class to get your 1% back for the missed class.

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