Civil Engineering (CE) 554
Driving Simulation – 3 credits
Winter 2015

Instructor:
Dr. David S. Hurwitz
Room: 305 Owen Hall
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Class Website:
http://myoregonstate.edu/   (This is the Blackboard Login Site)

Lecture Schedule:
Tuesday & Thursday
2:00 pm - 3:20 pm
Room 202, Kearney Hall

Office Hours:
Mondays: 2:00 pm – 3:00 pm
Wednesday: 2:00 pm – 3:00 pm, or by appointment via email

Email:
Every student must have ENGR and ONID accounts. Read email daily. Note: a class email distribution list will be generated from ENGR accounts. You can "forward" ENGR or ONID to any account.

Course Description:
Relationships between the functional elements of driving simulation (simulation computer processing, sensory feedback generation, sensory display devices, & the human operator) are examined in detail. The role of driving simulation in transportation engineering research and practice is also considered in depth. Students will design experiments, analyze and interpret data, and extrapolate simulator results to real world scenarios.

Course Prerequisite:
None Required
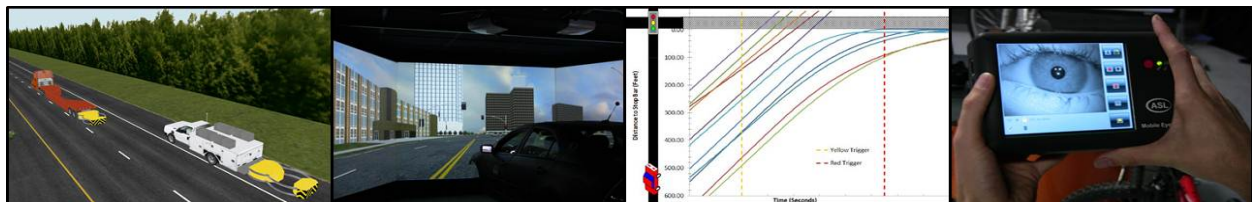
Course Learning Outcomes:

By the end of the course, you will be able to:
1. Describe the relationships between simulation computer processing, sensory feedback generation, sensory display devices and the human operator;
2. Describe the potential uses of driving simulation in transportation engineering and other related fields such as medicine and psychology;
3. Design static and dynamic objects that can be rendered in a simulator operating system;
4. Design experiments evaluating the operational and safety performance of traffic control devices, including the selection independent and dependent variables and variable levels for such experiments;
5. Analyze and interpret driving simulator outputs such as vehicle trajectory, vehicle position, driver visual search patterns, and perception reaction time;
6. Evaluate alternative solutions to a variety of traffic engineering problems through the application of driving simulation.

Required Textbook:

1.   *Handbook of Driving Simulation for Engineering, Medicine, and Psychology.* Donald Fisher, Matthew Rison, Jeff Caird, & John Lee. CRC Press Taylor & Francis Group, Boca Raton, FL, 2011.

Supplemental Resources:

2.   *Human Factors in Traffic Safety 2ⁿᵈ Edition.* Robert Dewer & Paul Olsen. Lawyers & Judges Publishing Company, Tucson, Az, 2007.
3.   *Human Factors of Visual and Cognitive Performance in Driving.* Candida Castro. CRC Press Taylor & Francis Group, Boca Raton, FL, 2009.
4.   *Driver Distraction Theory, Effects, and Mitigation.* Michael Regan, John Lee, and Kristie Young. CRC Press Taylor & Francis Group, Boca Raton, FL, 2009.

Homework:

Homework is instrumental in helping you grasp fundamental concepts and in exposing you to techniques and skills for applying these principles to real-life situations. You may discuss homework problems with your classmates (NOT COPY THEIR SOLUTIONS), but please try all homework on your own initially. Additionally solutions must be developed and submitted independently. For homework activities that require the use of a computer software package, the student may be required to submit his or her input files. It is not appropriate to copy a computer file prepared by someone else and administrative actions will be taken in the event this occurs.

Use the following guidelines for homework preparation:
- Use clean, 8.5 x 11 inch paper. Engineering paper is also acceptable; neatness is important and appreciated.
- Write on only one side of the paper, and start a new problem on a new sheet of paper unless otherwise directed.
- Write your name and course number in the upper right corner of each page.

- Securely staple all pages.
- Show all of your work and state any assumptions clearly. Draw a block or a cloud around your final answer(s).
- For graphical solutions, use graph paper or computer generated plots. Label the axes of your graph and include units.
- When drawing sketches, use a straight edge.
- Write your name on the outside of the folded homework.

Late homework **is not accepted** unless specific arrangements are made with Dr. Hurwitz **prior** to the deadline.

Exams:

There will be at least one exam during the quarter plus one final exam. The exams must be taken as scheduled. If you MUST miss an exam for an emergency situation, please let Dr. Hurwitz know as soon as possible (prior to the exam). If you oversleep or skip an exam you will not have an opportunity to make it up. If you have a valid (according to Dr. Hurwitz) time conflict and you let him know in advance, there is the possibility of taking an exam at an alternate time.

Class Attendance:

You are expected to attend every class and participate in discussion. If you are not able to make class, notify the instructor before class. If you do miss class, it is your responsibility to find out what was covered and any administrative information that was presented.

Statement of Disruptive Behavior:

In an academic community, students, faculty and staff each have responsibility for maintaining an appropriate environment conducive to learning. Students, faculty and staff have the responsibility to treat each other with understanding, dignity and respect.

OSU's policy on disruptive behavior may be found at:
http://oregonstate.edu/studentconduct/disruptive-behavior

The following specific behavior is never allowed:
- No cell phones or pagers in class.
- No use of Laptops or other electronic devices for activity outside of its use in THIS class.
- No reading the Barometer during class.

Statement of Expectations for Student Conduct:

OSU's policy on academic honesty may be found at:
http://oregonstate.edu/studentconduct/http:/%252Foregonstate.edu/studentconduct/code/index.php

Statement Regarding Students with Disabilities:

"Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for

contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098."

Class Schedule:

Week:	Weekday:	Date:	Content / Topic:	Reading:
1	Tuesday	1/8	Class Overview & Syllabus Evolution of Driving Sim	Handbook: Chp. 1 & Chp. 2
	Thursday	1/10	Tour of OSU Sim	
2	Tuesday	1/15	Human Subjects Testing	Human Subjects Testing: CITI & NIH websites Handbook: Chp. 2 & 15
	Thursday	1/17	Independent & Dependent Variables	
3	Tuesday	1/22	Variable Interaction & Validation of Results	Handbook: Chp. 12 Handbook: Chp. 14
	Thursday	1/24	Simulator Sickness	Handbook: Chp. 14
4	Tuesday	1/29	Traffic Signals	Handbook: Chp. 35
	Thursday	1/31	*Exam I*	No Reading
5	Tuesday	2/5	Introduction of Class Projects	No Reading
	Thursday	2/7	Signs & Pavement Markings	Handbook: Chp. 36
6	Tuesday	2/12	In Vehicle Technologies	Handbook: Chp. 40 & 41
	Thursday	2/14	Driver Behavior	Handbook: Chp. 42
7	Tuesday	2/19	Situational Awareness in Driving	Chapter 19
	Thursday	2/21	Tour: Ergoneers Driving Sim	No Reading
8	Tuesday	2/26	Visual Search Tasks & Eye-tracking	Chapter 18
	Thursday	2/28	*Exam I*	No Reading
9	Tuesday	3/5	Applications in Psychology & Medicine	Handbook: Chp. 24, 25, 44 & 45
	Thursday	3/7	Future of Driving Simulation & 3D Design	No Reading
10	Tuesday	3/12	Project Presentations	No Reading
	Thursday	3/14	Class Summary & Review	

Note: This outline is flexible and subject to change.

Course Evaluation:

Criteria:	Percent of Final Grade:
Participation	5%
Average of Homework	25%
Project Grade	20%
Average of Mid Term Exams	20%
Final Exam	30%
Total	**100%**

Grading Scheme:

92.0 - 100.0	➔	A
90.0 – 91.9	➔	A-
88.0 – 89.9	➔	B+
82.0 - 88.0	➔	B
80.0 – 81.9	➔	B-
78.0 – 79.9	➔	C+
72.0 - 78.0	➔	C
70.0 – 71.9	➔	C-
60.0 - 69.9	➔	D
59.9 or lower	➔	F