Ph.D. programme in Civil Systems Engineering

Methods and tools for driving simulation

Prof. eng. Galante Francesco

Credits: 3 CFU
Number of hours: 18 frontal hours
Date: 9, 13, 16, 20, 23, 27 June 2025

Objectives: Driving simulation is now a key element in regional, national, and international research to investigate driver performance in various traffic, safety, weather and lighting conditions, to test the fitness to drive in subjects with performance declines (aging, impairment, sleep disturbances and effects of medications, drugs or alcohol), to evaluate the impact of alternative signs, signals, pavement markings and road layouts on drivers' behaviour or to assess the relative advantages and/or disadvantages of technologies being used or introduced into the vehicle (ADAS, CAVs, etc.). Today there are hundreds if not thousands of driving simulators spread around the globe. Governments and industry around the world are much more aggressively funding simulator research.
The course aims at providing the fundamental and comprehensive knowledge and skills necessary to guide the students in: a) the selection and validation of driving simulator technology for the request application; b) the design and the conduct of simulator studies, starting by the research hypotheses and including the subject recruitment, the road environment modelling and the selection of scenarios and c) the evaluation of results.

Teaching materials:
Slides.
Hichem A., Lamri N. (2013). Driving Simulation. Wiley-ISTE.

Assessment methods: Final interview

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Lectures Program

N	Date	Schedule	Duration	Topic / Teacher
1	09/06/25	10:30 - 13:30	3 hours	Driving simulation: *overview, main concepts, advantages and limitations, classifications and applications.*
2	13/06/25	10:30 - 13:30	3 hours	Design of driving simulator experiments: *hypotheses definition, subjects' selection, 3D roads modelling, scenario authoring, independent and dependent variables.*
3	16/06/25	10:30 - 13:30	3 hours	Lab Activities: *driving simulator experiment set-up, road environment modelling and scenario creation.*
4	20/06/25	10:30 - 13:30	3 hours	Lab Activities: *Experiment with DICEA compact driving simulator.*
5	23/06/25	10:30 - 13:30	3 hours	Analyses of data: *simulator data reduction, analytical tools, statistical concepts, qualitative interviews.*
6	27/06/25	10:30 - 13:30	3 hours	Lab activities: *experiment data analysis and results reporting.*

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