



COURSE DETAILS

" TESTING AND VALIDATION OF AUTOMATED ROAD VEHICLES "

SSD ICAR/05

DEGREE PROGRAMME: TRANSPORTATION ENGINEERING AND MOBILITY

ACADEMIC YEAR 2022-2023

GENERAL INFORMATION – TEACHER REFERENCES

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GENERAL INFORMATION ABOUT THE COURSE

YEAR OF THE DEGREE PROGRAMME: I/II

SEMESTER: I

CFU: 9

REQUIRED PRELIMINARY COURSES

None.

PREREQUISITES

None.

LEARNING GOALS

The course provides students with theoretical and technical skills for the validation of automated vehicles in simulation environments.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

Students acquire knowledge of techniques for incorporating traffic factors into the validation process of automated vehicles and understand the effect of traffic laws on vehicle performance and safety in assisted and automated driving contexts. Co-simulation techniques are adopted and transferred and students apply the acquired knowledge to practical case studies.

Applying knowledge and understanding

The acquired knowledge enables students to further understand the methodological and operational principles of traffic co-simulation in model-in-the-loop and hardware-in-the-loop validation environments.

COURSE CONTENT/SYLLABUS

Definition of testing and validation scenarios

Automation levels, use cases and operational design domain

Traffic modelling

- *Static vs adaptive/responsive approaches*
- *Traffic micro-simulation, integration of detailed vehicle logics and nano-simulation approaches*
- *Integration of adaptive/responsive traffic models in complex vehicle-simulation environments*

Adoption of vehicle-automation logic and integration in the modelling framework

- *Model-in-the-loop framework*
- *Integration with traffic operator services*
- *Integration with driving simulation environments*

Testing strategies

- *Use case vs continuous testing*
- *Sensitivity analysis*

Experiences and experiments

READINGS/BIBLIOGRAPHY

Slides, lecture notes, technical papers, lab activities, learning-by-doing, and challenge-based learning.

TEACHING METHODS

Lectures, interactive tutorials, laboratory activities and case studies, project developing, learning-by-doing, challenge-based learning.

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

Exam type	
written and oral	
only written	
only oral	X
project discussion	
other	

b) Evaluation pattern:

N.A.