



COURSE DETAILS

" SMART ROADS AND COOPERATIVE DRIVING "

SSD ICAR/05

DEGREE PROGRAMME: AUTONOMOUS VEHICLE ENGINEERING (MOVE)

ACADEMIC YEAR 2022-2023

GENERAL INFORMATION – TEACHER REFERENCES

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GENERAL INFORMATION ABOUT THE COURSE

YEAR OF THE DEGREE PROGRAMME: II

SEMESTER: II

CFU: 6

REQUIRED PRELIMINARY COURSES

None.

PREREQUISITES

None.

LEARNING GOALS

The course provides students with a clear and deep understanding of the technical and functional requirements to be satisfied for vehicle/road interaction in connected and automated driving scenarios.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

Students acquire knowledge in the area of digital road transformation, understanding the potential of new technologies for solving road and traffic flow problems. Students understand how to deal with V2-X communication systems and C-ITS services in a context in which roads are equipped with traffic sensors. Students acquire the interpretative basis for further understanding, also in the working environment, of the methodological and operational principles of modern traffic control centres.

Applying knowledge and understanding

Students can apply their acquired knowledge as highly qualified technicians in the field of smart roads, working for road management companies, but also in the automotive sector, developing and testing connected vehicles in interoperable vehicle-infrastructure environments

COURSE CONTENT/SYLLABUS

General Principles

- Autonomous driving and cooperative driving
- From autonomous driving to automated driving
- Historical overview of autonomous/automated driving development for surface vehicles and state of the art

Cooperative-Intelligent Transportation Systems platforms and services

- Opportunities, criticalities, regulation and technical/functional requirements
- Road-side implementation of cooperative driving
- On-board implementation of cooperative driving
- European C-ITS platform and services
- Day 1 services and further services
- Overview of specific (cyber)security issues

Impacts on vehicular traffic

- Automated, connected and mixed traffic
- Interaction of connected vehicles and automated vehicles with existing transportation systems
- Interaction and synergies with Mobility-as-a-service solutions

Design of cooperative-driving solutions and mobility solutions in a simulation environment

READINGS/BIBLIOGRAPHY

Slides, lecture notes, technical papers, regulation documents.

TEACHING METHODS

Lectures, laboratory activities and exercises. The proposition of practical applications for the learned concepts receives particular attention: to this aim, the course also hosts lectures and seminars with experts from the field of road and traffic operators and authorities. Simulation tools are learned and employed.

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

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

b) Evaluation pattern:

N.A.