WHY TO ENROLL ?

Designing, developing and testing systems for autonomous vehicle

Surface, air and marine transport is today in a phase of profound transformation in order to include elements of greater autonomy. These elements of autonomy range from simple forms of enhanced control of a single vehicle to the complete execution of the mission, also in coordination with others, without any intervention by the human pilot.
The design of autonomous vehicles requires knowledge in different cultural areas, namely: modern industrial engineering and recent advances in information &communication technology.
Master of Science (LaureaMagistrale) in Autonomous Vehicle Engineering (**MOVE**) aims to train engineers with intercultural skills, who master themes such as:

- Design and management of autonomous land, air and seatransport systems
- Fusion of information to make decisions in real time
- Sensors and algorithms for driving, navigation and control with high autonomy level
- Integration of the autonomous vehicle in complex environments.

A lot of applications

Links

General Info for International student mobility
www.international.unina.it/welcome-message/

School "Politecnica e delle Scienze di Base"
www.scuolapsb.unina.it

Department of Industrial Engineering
www.dii.unina.it

Master's studies in Autonomous Vehicle Engineering
move.dii.unina.it

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UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
SCUOLA POLITECNICA E DELLE SCIENZE DI BASE

ENGINEERING

MASTER'S DEGREE IN **AUTONOMOUS VEHICLE ENGINEERING / MOVE**

DIPARTIMENTO DI INGEGNERIA INDUSTRIALE

updated to July 2020

LEARNING OUTCOMES

The LM **MOVE** is a highly interdisciplinary study course, because in order to operate in the autonomous vehicle world it is necessary to master information technology subjects, such as: control, machine learning, big data, data analytics, computer vision, internet of things, integrated transport, smart road, etc., as well as their applications to vehicles. To this end an adequate knowledge of vehicles design and operation is also needed. The profile of the engineer will therefore be that of an integrator of systems and technologies, able to operate in two fields of engineering: one more mechanical, namely transportation system dynamics and control, and the other more information technology oriented, in the sense of hardware and software requirement definition and integration for autonomous guidance and navigation.

The LM **MOVE** offers extensive experimental activities in the various engineering laboratories of the University and many industry stage opportunities.

Tests on prototypes

For enrollment in the Laurea Magistrale in Autonomous Vehicle Engineering possession of a three-years degree in industrial engineering (Italian L-9 class) or information engineering (Italian L-8 class) is required. In the case of other three-years degree in scientific or technological classes, applicant qualification will be evaluated by the study course Didactical Committee. Teaching is provided in English and at least a B2 First certificate is required for enrollment.

TRAINING PLAN

First Year	**Credits**
Control Oriented Models for Vehicles Dynamics	6
Digital modelling of interactive systems and interfaces	6
Sensor Data Fusion and Measurement Uncertainty Management	12
Guidance and navigation	6
Control Architectures for Autonomous Driving	12
Machine Learning and Big data	9
Image and Video processing for autonomous driving	6

Second year	
Laboratory of Autonomous Vehicle Design and Development	12
Traineeship	12
Thesis	15

Second year of the LM MOVE includes three more characterized study plans (tracks):

- self-driving cars,
- autonomous aerial systems,
- autonomous marine vehicles,

for each of them a design course is offered in which the acquired skills are integrated.

The student collects 24 ECTS with courses in the following list:

Power and Propulsion Systems for UV	9
Smart Roads and cooperative driving	6
Testing and validation of automated road vehicles	9
Systems for autonomous aircraft	6
Design of autonomous aircraft	9
Unmanned Marine Plants	6
Design of Autonomous Marine Vehicles	9

The students will operate in industry-like groups, interacting on the various parts of the autonomous vehicle design, also with a view to enhancing team working capabilities and soft skills.

JOB AND CAREER OPPORTUNITIES

The automotive, aviation and space, and shipbuilding industries will increasingly need to set up interdisciplinary teams to integrate skills from different areas to cope with the future of vehicle engineering. The **MOVE** graduates will be able to play a role of hinge in contexts aiming at more autonomous vehicles. In addition to employment in large, medium and small industries and in the research laboratories and spin offs operating in the autonomous vehicle engineering, thanks to the interdisciplinary profile of the LM MOVE, graduates will have good job opportunities in the 4.0 industry world, because capability to integrate different disciplines with an intercultural approach, capability to master application of information and communication technologies to manufacturing and operation of mechanical systems will become an increasingly indispensable requirement.

CAMPUS AREA

Teaching activities in classes and labs are carried-out in Naples both in Fuorigrotta (close to the San Paolo stadium) and in the new Campus in San Giovanni a Teduccio.