



ANNEX 2.8
DEGREE PROGRAM DIDACTIC REGULATIONS
AUTONOMOUS VEHICLE ENGINEERING
CLASS LM-33

School: Polytechnic School of Engineering and Basic Sciences

Department: Industrial Engineering

Didactic Regulations in force since the academic year 2024-2025

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| Course: LABORATORY OF AUTONOMOUS VEHICLES DESIGN AND DEVELOPMENT | | Teaching Language: English | |
| SSD (Subject Areas): ING-IND/13 – ING-IND/15 | | CREDITS: 12 | |
| Course year: II | | Type of Educational Activity: B | |
| Teaching Methods: In-person | | | |
| Contents extracted from the SSD declaratory consistent with the training objectives of the course: The SSD ING-IND/13 includes the cultural and professional aspects inherent in the study of mechanical systems through the methodologies of theoretical mechanics. The typology of the machines studied is completely general; however, extensive reference is made to driving and operating machines, mechanical devices, automatic machines and robots, vehicles and biomechanical systems. In particular, both the analysis and the synthesis of the mechanical behaviour of the machines and systems indicated above are studied. The analysis is articulated in the modelling, simulation, regulation and control of the same; the synthesis is aimed at their functional design. Particular emphasis is placed on the study of vibratory and tribological phenomena of machines. The SSD ING-IND/15 studies methods and tools for developing a technically valid design in industrial engineering. It is the reasoned and innovative choice of technical solutions that can be perfected through the systematic use of rational methods for designing and optimising machines; therefore, it is a fundamental expression of technical creativity. | | | |
| Objectives: Concerning AVSET, the course is intended to provide the student with the fundamentals of motion planning and control strategies of mechanical systems to develop a system with autonomous guidance. The module covers advanced topics of modelling that represent the starting point to develop autonomous vehicle prototypes, by means of laboratory experiences of simulations and experimental tests. Concerning CDNV, the course deals with the concept design of new autonomous vehicles, covering advanced topics from new ideas to functional simulation. The module aims to provide students with methods and tools for requirements engineering, system architecture definition, concept generation, and concept selection. Starting from the design needs, the students will acquire the ability to: define functional and non-functional requirements; develop SysML diagrams; define the requirements list; develop functional and logical architectures; define and trace relationships among requirements and architectures; test and verify model performances against requirements; generate product concepts; select the most promising product concept; design a concept for a new and innovative vehicle. | | | |



Propaedeutivities:

None

Is a propaedeuticity for:

None

Types of examinations and other tests:

The oral examination for both modules focuses on the presentation of a project. In addition, the oral exam also aims to assess the knowledge of all the concepts and contents given during the course lectures. The final mark of the course Laboratory of Autonomous Vehicle Design and Development will be calculated by the Examination Committee as the average of the marks of the two modules, which have equal weight.