ANNEX 2.2

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

Course: CONTROL ORIENTED MODELS FOR VEHICLES DYNAMICS	**Teaching Language:** English
SSD (Subject Areas): ING-IND/13	**CREDITS:** 6
Course year: I	**Type of Educational Activity:** B

Teaching Methods:

In-person

Contents extracted from the SSD declaratory consistent with the training objectives of the course:

Systemic approach for the design of a mechanical system: mechatronic system; passive, semi-active and active controls; feedforward and feedback controls

Modelling of mechanical systems: d'Alembert and Newton approaches, Lagrange approach, linear time-invariant mechanical systems, nonlinearities in mechanical systems, linearization technique

State-space modelling, input-output modelling, transfer function, Laplace domain, Laplace transform, stability analysis

Control of mechanical systems in terms of vibrational characteristics

Objectives:

The course aims to provide the fundamental knowledges for the synthesis of physical-mathematical models of mechanical systems according to an approach that is functional to the design of the model-based controllers. The methodologies for modelling, the main sources of mechanical nonlinearities, as well as local linearization based tools are described, starting from the typical features of the mechanical systems, with particular reference to vehicle dynamics.

Propaedeuticities:

None

Is a propaedeuticity for:

None

Types of examinations and other tests:

Oral