Course: Robotics — credits: 15

Course code	ELVB25ROB
Name	Robotics
Study year	2026-2027
ECTS credits	15
Language	English
Coordinator	F. Martins

Modes of delivery	Assignment Lecture Practical / Training
Assessments	Product realisation - Assignment Professional Skills - Assignment Robotics programming - Assignment Specialisation - Assignment

Learning outcomes

Design: The starting professional considers various solutions in order to arrive at a detailed and well-founded (electro)technical product/service/process based on the program of requirements, making use of appropriate design methods and taking social interests and engineering standards into account.

Realization: The starting professional realizes and validates a (prototype of a) product/service/process based on an (electrical) technical design and makes appropriate use of materials/techniques/instruments.

Management: The starting professional can professionally set-up, execute, plan, adjust and deliver a small-scale project on time.

Content

This course is focused on the simulation, assembly and control of robots to perform a predefined task.

Topics include: programming of a microcontroller board to implement the robot control, different sensors to measure internal and external variables (for example in robot localization, navigation and obstacle avoidance), mathematical modeling and simulation. Concepts of controllers (like PID) are reviewed and applied in the context of go-to-goal, path following, trajectory-tracking controllers for mobile robots. Different techniques to control mobile robots are discussed, like behavior-based robotics, behavior trees and/or finite state-machines.

Students will work in groups and may focus on specific topics depending on their major/specialization. They need to manage their own project work (for instance project plan/milestones/scrum, budget, role definition, presenting etc.), document their results (in English – B2 level) and demonstrate their working prototype.

Included in programme(s)

Electrical Engineering Major Mechatronics
Electrical Engineering Major Sensors & Smart Systems
Electrical Engineering Major Energy & Power Electronics

School(s)

Engineering, Life Sciences & ICT

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