

Academic Year: (2024 / 2025)

Review date: 04-04-2024

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: COPACI , DORIN SABIN

Type: Compulsory ECTS Credits : 3.0

Year : 3 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Introduction to Robotics
Electronic Instrumentation

OBJECTIVES

Upon successfully completing this course, students will be able to:

1. Have adequate knowledge of their engineering field, including cutting-edge knowledge of sensors and actuators for robotics and automation.
2. Apply their knowledge and understanding of robotics actuators and sensors to identify, formulate, and solve engineering problems using established methods in the field of robotics engineering.
3. Apply their knowledge to develop and carry out application designs for sensor and actuator integration that meet specific requirements.
4. Possess technical and laboratory skills for integrating sensors and actuators for robotics and automation.
5. Select and use appropriate equipment, tools, and methods such as sensors and actuators applied to robotics and automation.
6. Combine theory and practice to solve problems of robotic applications when selecting sensors and actuators.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to sensors for robotics and automation.
2. Applications of basic sensors in robotics and automation.
 - 2.1. Contact and proximity sensors.
 - 2.2. Position and velocity sensors.
 - 2.3. Force, pressure, and torque sensors.
 - 2.4. Temperature sensors.
 - 2.5. Current sensors.
3. Applications of advanced sensors in robotics and automation.
 - 3.1. Inertial sensors (IMU).
 - 3.2. 3D laser telemetry.
 - 3.3. Biomedical sensors: EMG, ECG, EEG.
4. Introduction to actuators in robotics:
 - 4.1. Electric actuators.
 - 4.2. Pneumatic actuators.
 - 4.3. Hydraulic actuators.
 - 4.4. Other actuators: SMA actuators, piezoelectric actuators.

LEARNING ACTIVITIES AND METHODOLOGY

THEORETICAL PRACTICAL CLASSES.

Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems.

TUTORING SESSIONS.

Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on- site attendance.

STUDENT INDIVIDUAL WORK OR GROUP WORK.

Subjects with 6 credits have 98 hours/0% on-site.

WORKSHOPS AND LABORATORY SESSIONS.

Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.

ASSESSMENT SYSTEM

% end-of-term-examination:	60
% of continuous assessment (assignments, laboratory, practicals...):	40

FINAL EXAM.

Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation varies for each subject between 40% and 60%.

CONTINUOUS EVALUATION.

Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course. The percentage of the evaluation varies for each subject between 40% and 100% of the final grade.