

Academic Year: ( 2024 / 2025 )

Review date: 14-02-2022

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher:

Type: Compulsory ECTS Credits : 3.0

Year : 4 Semester : 2

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction:
  - a. What is a mobile manipulator?
  - b. Service robots: mobile manipulators, humanoid robots.
2. Kinematic and dynamic: mobile base -manipulator coordination. Control architectures.
3. Mobility.
  - a. Perception: vision, telemetry.
  - b. Environment modeling. The three-dimensional problem.
  - c. Planning, navigation and location of mobile manipulators.
4. Manipulation and interaction control
  - a. Perception: vision, force sensors.
  - b. Force control
  - c. Grasping
  - d. Perception and modeling of the objects to be manipulated
  - e. Perception-action integration
5. Human-robot interaction in navigation and manipulation
6. Real applications. Projects related to mobile manipulators

## 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

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

### FINAL EXAM.

Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation varies for each subject between 60% and 0%.

### 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.

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