Universidad Zaragoza
1542

Year : 2018/19

30261 - Robotics

Syllabus Information

Academic Year:	2018/19
Subject:	30261 - Robotics
Faculty / School:	110 -
Degree:	439 - Bachelor's Degree in Informatics Engineering
ECTS:	6.0
Year:	4
Semester:	Second semester
Subject Type:	
Module:	---

General information

Aims of the course

Context and importance of this course in the degree

Recommendations to take this course

Learning goals

Competences

Learning goals

Importance of learning goals

Assessment (1st and 2nd call)

Assessment tasks (description of tasks, marking system and assessment criteria)

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process that is designed for this subject is based on the following: The teaching process will involve three main activities: theoretical classes, problems and laboratory practices, with increasing level of student participation. - In the theoretical classes the teachers will present the theoretical bases autonomous robots, illustrated with examples. - In the classes of problems the students will develop problems and exercices previously stated. - Tests for monitoring the student learning at the end of each block of topics will be held. - Lab practices will be developed in small groups where students will develop their robot and the software for controlling the robot.

Learning tasks

The program offered to help you achieve the expected results includes the following activities:
Class work: 2.4 ECTS (60 hours) 1) Presential class (type T1) (30 hours). Lectures of theoretical and practical content. The concepts and fundamentals of autonomous robots are presented, illustrated with real examples.Sstudent participation through questions, exercises and brief discussions will be encouraged. **2) Classes of problems and resolution of cases (type T2) (12 hours).** Exercises and case studies involving students, coordinated at all times with the theoretical contents will be developed. Students are encouraged to work the problems previously. Some of these hours may engage in learning activities assessable as specified in each course. **3) Lab (type T3) (18 hours).**
Non-contact work: 3.6 ECTS (90 hours) **4) Practical works (T6 type) (50 hours).** Activities that the student will perform in groups and that the teacher will propose throughout the teaching period. In this course each student will perform practical work in groups, and several evaluable activities. **5) Study (type T7) (35 hours).** Personal work of the student theoretical part, conducting exercises, preparation of oral presentations, and development of practical group work. The ongoing work of the student will be encouraged by the homogeneous distribution throughout the semester of the various learning activities. This includes tutorials, as a direct student care, identification of learning problems, orientation in the subject, and in proposed exercices. exercises. **6) Evaluation tests (T8) (5 hours).** In addition to the qualifying function, evaluation by me

Syllabus

Programme
1. Introduction
2. Mobile robots
3. Spatial ocalization
4. Kinematic modeling
5. Odometry
6. Concurrent programming robots and processes
7. Motion control
8. Computer Vision Robotics
9. Sensing systems
10. Navigation planning
11. Localization and maps
12. Robotic Projects

Laboratory practices:
1. Robot design, implementation of sensors and actuators, introduction to the robot programming environment
2. Calibration and programming of basic functions. Toolpath generation and movements 3. Vision tracking of objects 4. Planning and obstacle avoidance 5. Integration of software modules and hardware tuning

Course planning and calendar

Scheduling of sessions and presentation of works. - Lectures and problem classes and practice sessions are held in the laboratory according to scheduling established by the center (schedules available on their website) . Each teacher will inform its hours of tutoring. - The other activities will be planned depending on the number of students and will be announced in time. It will be available on http://moodle.unizar.es

Bibliography and recommended resources

[BB: Basic Bibliography / BC: Complementary Bibliography]

- [BB] Siegwart, Roland. Introduction to autonomous mobile robots / Roland Siegwart, Illah R. Nourbakhsh and Davide Scaramuzza . - 2nd ed. Cambridge (Massachusetts) ; London : The MIT Press, cop. 2011
- [BC] Dudek, Gregory. Computational principles of mobile robotics / Gregory Dudek, Michael Jenkin . - 2nd ed. New York : Cambridge University Press, 2010

URL (moodle2):

- Slides of the course. Programming and robot construction manuals. Exercices and practice guides. [http://moodle2.unizar.es]