Robotics

Academic Year: (2024 / 2025) **Review date: 25-04-2024**

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: CASTRO GONZALEZ, ALVARO

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming (Course: 1/ Semester: 1)
C++ will be used during the lab sessions. If you are not familiar with this programming language but you are willing to learn, we will provide learning resources.

SKILLS AND LEARNING OUTCOMES

Complement the basic, transversal and compulsory knowledge of the Degree according to the student's preferences.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to robotics
2. Perception in robotics
3. Actuation in robotics
4. Navigation
5. Processing elements
6. Decision-making in robotics
7. Human-Robot Interaction
8. Novel applications

LEARNING ACTIVITIES AND METHODOLOGY

· Theoretical lessons and doubts solving sessions, tutorial support sessions and student personal work; this is aimed at the acquisition of theoretical knowledge.
· Practical sessions, tutorial support sessions and student personal work; this is aimed at the acquisition of practical abilities.

ASSESSMENT SYSTEM

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

- Continuous assessment: 100%.
o First midterm exam (30%, if passed the content will be removed for the final exam).
o Second midterm exam (30%, if passed the content will be removed for the final exam)
o Final practical project: 30%.
o Class participation: 10%.

- Final exam:
o 0%: if the student follows the continuous assessment, this exam will be taken only with the part(s) not passed in the midterm(s).
o 100%: if the student has not followed the continuous assessment, he/she will take the final exam with all the content (including content of the lab sessions) and the final mark will be worth 60% of the mark obtained.

- Extraordinary exam: 100% with all the content (including content of the lab sessions).

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Mataric, M. J. The robotics primer, The MIT Press, 2007

- Mihelj, Bajd, Ude, Lenar¿i¿, Stanovnik, Munih, Rejc, ¿lajpah, Bajd, Tadej, Ude, Ale¿, Lenar¿i¿, Jadran, Stanovnik, Ale¿, Munih, Marko, Rejc, Jure, & ¿lajpah, Sebastjan Robotics (2nd edition), Springer, 2019

- Roland Siegwart, Illah Reza Nourbakhsh and Davide Scaramuzza Introduction to autonomous mobile robots, MIT Press, 2011

- Siciliano, B., & Khatib, O. Springer Handbook of Robotics (2nd ed.), Springer, 2016

ADDITIONAL BIBLIOGRAPHY

- A. Barrientos, C. Balaguer Bernaldo de Quiro¿s Fundamentos de robótica (2º ed.), McGraw-Hill Interamericana, 2007

- Craig, J. J. Robótica (3º ed.), Pearson Educación, 2006

- Kajita, Shuuji, Hirukawa, Hirohisa, Harada, Kensuke, & Yokoi, Kazuhito Introduction to Humanoid Robotics (2014th ed., Vol. 101), Springer, 2014

BASIC ELECTRONIC RESOURCES

- Cyberbotics . Documentation of Webots: https://cyberbotics.com/doc/guide/index

- Jason M. O¿Kane . A gentle introduction to ROS: https://cse.sc.edu/~jokane/agitr/agitr-letter.pdf

- R. Patrick Goebel . ROS by examples v2 Índigo: http://file.ncnynl.com/ros/ros_by_example_v2_indigo.pdf

- ROS.org . Official ROS website: https://www.ros.org