Aerospace applications of robotics

Academic Year: (2023 / 2024) **Review date: 28-04-2023**

Department assigned to the subject: Aerospace Engineering Department

Coordinating teacher: MARCOS ESTEBAN, ANDRES

Type: Electives ECTS Credits : 3.0

Year : 4 Semester : 2

OBJECTIVES

1. Introduction to the space environment (physical and developments)
2. Robot needs in space
3. Historical and technological evolution of space robotics
4. Teleoperation versus autonomy
5. Teleoperation systems and technology
6. Main applications of robots in space
7. Practical example of autonomous control application
8. Practical example of a teleoperated control application
9. Future applications of space robotics

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to the space environment (physical and developments)
2. Robot needs in space
3. Historical and technological evolution of space robotics
4. Teleoperation versus autonomy
5. Teleoperation systems and technology
6. Main applications of robots in space (rovers, amanipulators)
7. Practical example of autonomous control application
8. Practical example of a teleoperated control application
9. Future applications of space robotics

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

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.

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

BASIC BIBLIOGRAPHY

- Antonio Barrientos, Luis Felipe Peñin, Carlos Balaguer, Rafael Aracil Santoja FUNDAMENTOS DE ROBOTICA, McGraw-Hill, 2 ED. 23 febrero 2007