Medical and Health Robotics

Academic Year: (2022 / 2023) **Review date: 10-01-2023**

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: OÑA SIMBAÑA, EDWIN DANIEL

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Have knowledge of basic industrial robotics.

OBJECTIVES

The aim of the subject is to provide the students with knowledge about medical and assistive robotics. In the section of medical robotics, surgical robots, body exploration, radiological medicine, medical training and the full cycle of automation of all medical processes will be studied, from the identification of patalogy phase to recovery one. Special attention will be given to robotic rehabilitation, both physical and cognitive: exoskeletons, dexterity test, task banks, serious games, etc.

The assistance robot part will focus on assisting people with special needs (the elderly, congenital or acquired patalogies, other types of help). The robotization will focus on the application to the tasks of DLA (Daily Life Aactivities): personal hygiene, food, manipulation of objects, etc. The technologies that will be taught will be multiple: mobile robots, mobile manipulators, climbing robots, member support systems, sensorial system, planning and decison taken, etc. The lessons will focus on learning at the end user level.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to medical and healthcare robotics
2. Medical robotics:
2.1 Surgical robots
2.2 Scanning robots of the human body
2.3 Radiation therapy robots
2.4 Medical training robots
3. Rehabilitation robotics
3.1 Exoskeletons
3.2 Dexterity tests
3.3 Serious games
4. Assistive robots
4.1 DLAs and their environment
4.2 Platforms of assistance robots
4.4 Control of the sensory system
4.5 Decision-making systems

LEARNING ACTIVITIES AND METHODOLOGY

The activities will be divided as follows:

- Theoretical classes in the classroom
- Practical classes in the classroom
- Laboratory classes

In addition, students will have to do and present a work related to the contents of the subject.

The tutoring schedules will be public.

ASSESSMENT SYSTEM

The evaluation system will be:
- 20% for class attendance (with 80% minimum)
- 40% class work

- 40% exam

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

BASIC BIBLIOGRAPHY

- Varios Proceedings IEEE(RSJ IROS, IEEE, Varios

BASIC ELECTRONIC RESOURCES

- Carlos Balaguer . Robotica médica y asistencial: http://Aula Global UC3M