

Academic Year: ( 2022 / 2023 )

Review date: 11-05-2022

Department assigned to the subject: Department of Electronic Technology

Coordinating teacher: VERGAZ BENITO, RICARDO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 1

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Not applicable

## OBJECTIVES

### QUALIFICATIONS

#### BASIC QUALIFICATIONS

Have demonstrated knowledge and understanding that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.

Can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) context related to their field of study.

Have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.

Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialists and non-specialist audiences clearly and unambiguously

#### GENERAL QUALIFICATIONS

Have demonstrated the ability of understanding, making use and integrating of new technologies in electronic systems, to solve new problems or applications.

#### SPECIALIZED QUALIFICATIONS

Have the ability to be effective in looking for information, identifying the state of the art of a technological problem in the field of Electronics System Engineering and integrating this knowledge in future systems.

Have demonstrated the knowledge of current state of the art and future trends in disabled people aided systems.

Be able to practical and concept identification of the main scientific and technical challenges in different applications of electronic systems, in their integration and usage.

#### LEARNING RESULTS

Identify, from a practical and theoretical point of view, both scientific and technological main challenges in aided systems for disabled people, as well as their use and integration.

## DESCRIPTION OF CONTENTS: PROGRAMME

Chapter 1. Disabilities: a radiography.

- 1.1.- Disability in the world.
- 1.2.- State of the art and future challenges for disabilities.
- 1.3.-Regulations
- 1.4.- Rehabilitation technology and Technical Aids.

Chapter 2. Technical Aids in Vision.

- 2.1.- Vision disabilities: understanding problems.
- 2.2.- Traditional visual technical aids.
- 2.3.- Technological visual technical aids.
- 2.4.- Latest research: retinal implants and virtual and augmented reality systems.

Chapter 3. Mobility Technical Aids.

- 3.1.- Mobility disabilities: understanding problems.
- 3.2.- Traditional mobility technical aids.
- 3.3.- Technological mobility technical aids.
- 3.4.- Latest research: from exoskeletons to Brain Computer Interface.

Chapter 4. Technical Aids in Communication.

- 4.1.- Intellectual disabilities: understanding problems.
- 4.2.- Traditional communication technical aids.
- 4.3.- Technological communication technical aids: mobile platforms.
- 4.4.- Latest research: from eyetrackers to "reading the mind".
- 4.5.- Web and e-accessibility.

Chapter 5. Technical Aids in Hearing.

- 5.1.- Hearing disabilities: understanding problems.
- 5.2.- Traditional hearing technical aids.
- 5.3.- Latest research in hearing technical aids.

GDAF-UC3M Group contributions to assistive technologies.

Works presentation and debate.

## LEARNING ACTIVITIES AND METHODOLOGY

### LEARNING ACTIVITIES

Masterclass

Theoretical and practical class

Tutorials

Group work

Individual work of the student

### METHODOLOGY

Presentations in the classroom by the professor, with audiovisual support, in which the main concepts of the subject will be exposed, and the bibliography to support students learning will be presented.

Questioning reading of the professor recommended texts: press articles, manuals, papers, in order to discuss in the classroom or to increase and strengthen the acquired knowledge.

Aula Global debate forum.

Work and reports preparation, both held in group or individual format. Including the implementation of practical systems.

## ASSESSMENT SYSTEM

Following Bologna methodology, the students will construct their own knowledge. Thus, part of the assessment will be performed continuously throughout the course:

- contributions to Aula Global debate forums and learning constructions proposed in the web along the course, as well as the continuous discussion that we establish in every session (15 %).
- an individual work about a technical aid, a proposal for a new technical aid or the state-of-the-art research about the technology for a specific assistive technology, exposed by both a document and a presentation and debate in the classroom (45 %).

An end-of-term examination will be done, with a 40 % weight in the final mark.

Extraordinary exam:

the score could be obtained by the same procedure as in continuous assessment with the same weights, or by a final exam valued a 100% of the mark.

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

#### BASIC BIBLIOGRAPHY

- A. Mittal and S. Sofat Sensors and Displays for Electronic Travel Aids: A Survey, International Journal of Image Processing, 5, 1-14. , 2010
- Eds.: M. A. Hersh and M. Johnson Assistive Technology for Visually Impaired and Blind People, , Springer. ISBN 978-1-84628-867-8, 2008
- Eds.: W.Barfield and T.Caudell Fundamentals of Wearable Computers and Augmented Reality., Mahway, NJ, US.: Lawrence Erlbaum Associate, 2001
- Eds.:Maria Manuela Cruz-Cunha, Isabel Maria Miranda and Patricia Gonçalves Handbook of Research on ICTs for Human-Centered Healthcare and Social Care Services (2 Volumes) , DOI: 10.4018/978-1-4666-3986-7,ISBN13:9781466639867, ISBN10: 1466639865, EISBN13: 9781466639874, 2014
- Eds.:Maria Manuela Cruz-Cunha, Isabel Maria Miranda and Patricia Gonçalves Handbook of Research on ICTs for Human-Centered Healthcare and Social Care Services (2 Volumes) , DOI: 10.4018/978-1-4666-3986-7,ISBN13:9781466639867, ISBN10: 1466639865, EISBN13: 9781466639874, 2014
- Georgios Kouroupetroglou Assistive Technologies and Computer Access for Motor Disabilities, IGI Global. ISBN-10:\*1466644389\*ISBN-13:\*978-1466644380 , 2013
- Helal, Abdelsalam A. The engineering handbook of smart technology for aging, disability, and independence, Wiley, 2008
- Reiner Wichert, Birgid Eberhardt Ambient Assisted Living: 5. AAL-Kongress 2012 Berlin, Germany, January 24-25, 2012 , Springer. \*ISBN-10:\*3642440460\* ISBN-13:\*978-3642440465 , 2014

#### BASIC ELECTRONIC RESOURCES

- Alejandro Moledo, EDF Policy Coordinator. 2021 . EDF position on Assistive Technologies: <https://www.edf-feph.org/publications/at/>
- CENTAC . CENTAC 2013 report about the ICTs in accesibility market (2013).: [http://www.centac.es/sites/default/files/col\\_cen\\_v3.pdf](http://www.centac.es/sites/default/files/col_cen_v3.pdf)
- European Parliament Think Tank, 2018 . Assistive technologies for people with disabilities: [http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS\\_IDA%282018%29603218](http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_IDA%282018%29603218)
- European Union. . ICTs IN EDUCATION FOR PEOPLE WITH DISABILITIES Review of innovative practice. 2011.: <//www.european-agency.org/sites/default/files/ICTs-with-cover.pdf>
- Nick Solomon and Pardeep Bhandari . 2015 PATENT LANDSCAPE REPORT ON ASSISTIVE DEVICES AND TECHNOLOGIES FOR VISUALLY AND HEARING IMPAIRED PERSONS : [http://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_949\\_1.pdf](http://www.wipo.int/edocs/pubdocs/en/wipo_pub_949_1.pdf)
- UNESCO . The ICT OppOrtunity for a Disability-inclusive DevelOpment framework. 2013: [//unesco-ci.org/cmscore/files/ict\\_opportunity\\_disability\\_inclusive\\_framework.pdf](//unesco-ci.org/cmscore/files/ict_opportunity_disability_inclusive_framework.pdf)
- United Nations . Convention on the Rights of Persons with Disabilities (CRPD): <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>
- WHO . World Health Organization latest report on disabilities in the world (2011). Also in Spanish.: [//www.who.int/disabilities/world\\_report/2011/en/](//www.who.int/disabilities/world_report/2011/en/)
- WHO . World Health Organisation. 2011. Visual impairment and blindness: fact sheet no 282.: <//www.who.int/mediacentre/factsheets/fs282/en/index.html>.