



POLITÉCNICA

INTERNATIONAL
CAMPUS OF
EXCELLENCE

COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001



E.T.S. de Ingenieros de
Telecomunicacion

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

93000981 - Assistive Technologies

DEGREE PROGRAMME

09AU - Master Universitario En Ingenieria Biomedica

ACADEMIC YEAR & SEMESTER

2020/21 - Semester 2

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1. Description

1.1. Subject details

Name of the subject	93000981 - Assistive Technologies
No of credits	3 ECTS
Type	Optional
Academic year of the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
Tuition languages	English
Degree programme	09AU - Master Universitario en Ingenieria Biomedica
Centre	09 - Escuela Tecnica Superior De Ingenieros De Telecomunicacion
Academic year	2020-21

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Enrique Javier Gomez Aguilera		enriquejavier.gomez@upm.es	Sin horario.
Santiago Aguilera Navarro (Subject coordinator)		santiago.aguilera@upm.es	- -
Maria Teresa Arredondo Waldmeyer		mt.arredondo@upm.es	Sin horario.

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Skills and learning outcomes *

3.1. Skills to be learned

CB07 - Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio

CG-MIB05 - Utilizar técnicas de expresión oral y escrita para comunicar trabajos y conclusiones a comunidades de iguales o divulgación científica, elaboración de artículos, manuales de estilo y herramientas de edición para fomentar la capacidad de comunicación y diseminación de resultados

3.2. Learning outcomes

RA126 - Application of Information technology to Assistive Technology

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

4. Brief description of the subject and syllabus

4.1. Brief description of the subject

The objective of this subject is to highlight the problem of disabled people to have an independent life.

The big difference between having accessible and not accessible means.

And the technical aids, orthosis and prosthesis that allow to overcome the gap between the environment difficulties and the people abilities.

4.2. Syllabus

1. Introduction to assistive technologies
 - 1.1. Disabled and elderly people problematic for the development of daily life activities.
 - 1.2. Basic concepts: accessibility, impairment, disability, handicap, orthosis, prosthesis
 - 1.3. Legislation and regulations on disabled and elderly people
 - 1.4. ISO 9999 standard for the classification of support products.
 - 1.5. Review of some support products databases: CEAPAT, EAISTIN, ABLEDATA
2. Alternative and augmentative communication
 - 2.1. Textual and pictographic systems
 - 2.2. Selection methods.
 - 2.3. Voice synthesis systems.
 - 2.4. Word Prediction; statistical and grammatical models.
 - 2.5. Brain-computer interface
3. Mobility and prosthesis
 - 3.1. Basic concepts: bionics, artificial organs, prostheses
 - 3.2. Lower limb prosthesis
 - 3.3. Upper limb prosthesis
4. Design for all, accessibility, usability
 - 4.1. Design for all concept, accessibility and usability
 - 4.2. Design for All principles or Universal Design
 - 4.3. Accessible design guides
 - 4.4. Human factors
 - 4.5. User-centered design methodologies
 - 4.6. Usability principles
 - 4.7. Participative design: involving users from the early stages of the systems development process
5. Technology for independent living, teleassistance and AAL
 - 5.1. Teleassistance, introduction and current status
 - 5.2. Introduction to AAL

- 5.3. Technologies, platforms and services for AAL
- 6. Support technologies for visual impaired people
 - 6.1. Problematic of visual impaired people.
 - 6.2. Aids for the development in the home.
 - 6.3. Aids for access to the information.
 - 6.4. Aids for navigation and orientation.
 - 6.5. Visual prostheses.
 - 6.6. Problematic of the deaf-blind people.
- 7. Support technologies for hearing impaired people
 - 7.1. Problematic of hearing impaired people.
 - 7.2. Headphones.
 - 7.3. Cochlear implants
 - 7.4. Magnetic loops
 - 7.5. Diagnostic systems: Audiometries, logaudiometries, impedanciometries.
- 8. Technologies for cognitive and functional neurorehabilitation
 - 8.1. Introduction to Neurorehabilitation
 - 8.2. Cognitive rehabilitation: technology and applications
 - 8.3. Functional rehabilitation: technology and applications
 - 8.4. Telerehabilitation

5. Schedule

5.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Distant / On-line	Assessment activities
1	<p>Subject presentation. Chapter 1: Introduction to assistive technologies. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
2	<p>Chapter 1: Introduction to assistive technologies. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
3	<p>Chapter 2: Alternative and augmentative communication. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
4	<p>Chapter 3: Mobility and prosthesis. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
5	<p>Chapter 4: Design for all, accessibility, usability. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
6	<p>Chapter 4: Design for all, accessibility, usability. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			

7	<p>Chapter 5: Technology for independent living, teleassistance and AAL. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
8	<p>Chapter 6: Support technology for visual impaired people. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
9	<p>Chapter 7: Support technology for hearing impaired people. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
10	<p>Chapter 8: Technology for cognitive and functional neurorehabilitation. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
11	<p>Chapter 8: Technology for cognitive and functional neurorehabilitation. Duration: 02:00 Lecture</p> <p>debate about the class taught that week Duration: 00:30 Cooperative activities</p>			
12			<p>Attendance to the other students works presentations, and later debate. Duration: 08:00 Additional activities</p>	<p>Students work presentation Individual presentation Continuous assessment and final examination Presential Duration: 01:00</p>
13				<p>written evaluation Written test Continuous assessment and final examination Presential Duration: 02:00</p>
14				
15				

16				
17				

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.

6. Activities and assessment criteria

6.1. Assessment activities

6.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
12	Students work presentation	Individual presentation	Face-to-face	01:00	40%	/ 10	CG-MIB05
13	writtend evaluation	Written test	Face-to-face	02:00	60%	/ 10	CB07

6.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
12	Students work presentation	Individual presentation	Face-to-face	01:00	40%	/ 10	CG-MIB05
13	writtend evaluation	Written test	Face-to-face	02:00	60%	/ 10	CB07

6.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Students work presentation	Individual work	Face-to-face	01:00	40%	/ 10	CG-MIB05
Writtend evaluation	Written test	Face-to-face	00:00	60%	/ 10	CB07

6.2. Assessment criteria

Students will be evaluated, by default, through continuous evaluation. The student who wishes to avoid the continuous evaluation and opt for the final evaluation (formed by one or more evaluation activities of the subject), must communicate it in writing, through email, to the coordinator of the subject before week 3 of the semester.

The evaluation by means of final test will use the same types of evaluation techniques that are used in the continuous evaluation (EX, ET, TG, etc.), and will be done in the dates and hours of final evaluation approved by the School Board for the present course and semester, except for those activities that evaluate learning outcomes that are difficult to score in a final test. In this case, these evaluation activities may be carried out throughout the course

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
Universal Design Handbook ISBN 0-07-137605-4. Coordinador: Robert Ivy, Editorial: McGraw Hill 2002	Bibliography	
HandBook of Augmentative and Alternative Communication ISBN 1-56593-684-1 Sharon L. Glemnen and Denise C De Coste Editorial: Singular Publishing Group 1998	Bibliography	
http://www.utdallas.edu/~loizou/cimplants/tutorial/ Página web sobre implantes cocleares de la Universidad de Dallas.	Web resource	

<p>The Engineering handbook of smart technology for aging, disability and independence ISBN 978-0-471-71155-1. Editor Sumi Helal, John Wiley–Sons</p>	<p>Bibliography</p>	
<p>Guías de diseño accesible Tiresias http://www.tiresias.org</p>	<p>Web resource</p>	
<p>Government of Canada. ?Accessible Procurement Toolkit (APT)? http://www.apr.gc.ca/</p>	<p>Web resource</p>	
<p>General Concepts, Universal Design Principles and Guidelines http://trace.wisc.edu/world/gen_ud.html</p>	<p>Web resource</p>	
<p>Principios del Diseño Universal. Center for Universal Design. http://design.ncsu.edu/cud</p>	<p>Web resource</p>	
<p>Poulson D., Ashby M., Richardson S. ?USERFIT A practical Handbook on user centred design for assistive technology. Handbook produced within the European Commission TIDE programme USER project?. HUSAT Research Institute, Loughborough, Leicestershire, 1996.</p>	<p>Bibliography</p>	
<p>ISO 13407:1999 . Human-centred design processes for interactive systems. ISO, Geneva, Switzerland.</p>	<p>Others</p>	
<p>Shneiderman B, Plaisant C. ?Designing the User Interface: Strategies for Effective Human-Computer Interaction? (4th Edition). Addison Wesley4 ed. 2004.</p>	<p>Bibliography</p>	

Cooper A, Reimann R, Cronin D. ?About Face 3: The Essentials of Interaction Design?. Indianapolis, IN: Wiley3 ed. 2007.	Bibliography	
Jakob?s Nielsen website on usability and web design. http://www.useit.com	Web resource	
Villalba Mora, E. ?Holistic interaction model for people living with a chronic disease?. Tesis (Doctoral), E.T.S.I. Telecomunicación (UPM), 2008.	Bibliography	
"Ambient Assisted Living" (AAL) is the name for a new European technology and innovation funding programme. http://www.aal169.org/	Web resource	
Proyecto PERSONA http://www.aal-persona.org/	Web resource	
Cooper, R.A. et al, ?Rehabilitation engineering: an overview?, Wiley Encyclopedia of Biomedical Engineering, John Wiley&Sons, 2006.	Bibliography	
Limitaciones metodológicas en los estudios de eficacia en rehabilitación neuropsicológica. Tecnologías Aplicadas al Proceso Neurorrehabilitador: Estrategias para valorar su eficacia. Badalona: Fundació , Institut Guttmann, 2008, pp. 240-244.	Others	
Tormos et al, Tecnologías aplicadas al proceso neurorrehabilitador, Institut Guttmann, Badalona, 2008.	Bibliography	