**COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001**

**INTERNATIONAL
CAMPUS OF
EXCELLENCE**

POLITÉCNICA

**E.T.S. de Ingenieros
Informaticos**

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000877 - Challenges For Accessible Computing For People With Functional Diversity

DEGREE PROGRAMME

10AZ - Master Universitario En Innovación Digital

ACADEMIC YEAR & SEMESTER

2023/24 - Semester 1

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Learning guide

1. Description

1.1. Subject details

Name of the subject	103000877 - Challenges For Accessible Computing For People With Functional Diversity
No of credits	4 ECTS
Type	Optional
Academic year ot the programme	First year
Semester of tuition	Semester 1
Tuition period	September-January
Tuition languages	English
Degree programme	10AZ - Master Universitario en Innovación Digital
Centre	10 - Escuela Tecnica Superior De Ingenieros Informaticos
Academic year	2023-24

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
M. Carmen Suarez De Figueroa Baonza	D-2201	mdelcarmen.suarezdefigueroa@upm.es	M - 10:00 - 12:00 W - 10:00 - 12:00 F - 12:00 - 14:00
Loic Antonio Martinez Normand	D3352	loic.mnormand@upm.es	Tu - 13:00 - 15:00 Th - 13:00 - 15:00 F - 13:00 - 15:00 Please confirm appointment via email

Jose Luis Fuertes Castro (Subject coordinator)	D4307	joseluis.fuertes@upm.es	Tu - 17:00 - 20:00 W - 12:00 - 15:00

* 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

CB08 - Que los estudiantes sean capaces de integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre las responsabilidades sociales y éticas vinculadas a la aplicación de sus conocimientos y juicios

CE-DIPO01 - Capacidad para conceptualizar, diseñar y desarrollar la interacción persona-ordenador de productos y servicios innovadores

CE-DIPO02 - Capacidad para evaluar la interacción persona-ordenador de productos y servicios de alto valor innovador

CE-DIPO03 - Habilidad para hacer conexiones entre los deseos y necesidades del consumidor o cliente y lo que la tecnología puede ofrecer

CE-DIPO04 - Capacidad para analizar las necesidades de información que se plantean en un entorno y llevar a cabo en todas sus etapas el proceso de diseño centrado en el usuario

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CG02 - Que los estudiantes desarrollen la autonomía suficiente para participar en proyectos de investigación y colaboraciones científicas o tecnológicas dentro su ámbito temático explorando y generando nuevas ideas sistemáticamente, en contextos interdisciplinares y, en su caso, con una alta componente de transferencia del conocimiento.

3.2. Learning outcomes

RA22 - Understand the concept and types of assistive products

RA7 - Understand how to design an interactive system using a user-centred approach

RA20 - Evaluate the usability and accessibility of prototypes

RA36 - Understand the diversity of user requirements and the characteristics of accessibility

* 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

This course provides a specialization about the accessibility of information and communication technologies (ICT) for persons with functional diversity (disability). It is mainly focused on current research issues in the field.

The course deals with an introduction to ICT accessibility concepts: functional diversity, design for all, user centred design, standards and the assessment of the accessibility degree of ICT products and services, cognitive accessibility and future trends in ICT accessibility.

After that, the students will work on current challenges in the field.

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4.2. Syllabus

1. Functional diversity, accessibility and design for all

    1.1. Introduction

    1.2. Functional diversity

    1.3. Assistive products for ICT

    1.4. Principles of accessible design

    1.5. Introduction to Human-centred design

2. ICT accessibility standards

    2.1. Introduction to standards

    2.2. Relevant ICT accessibility standards

    2.3. Deeper study of one accessibility standard

    2.4. Conformity assessment

3. State of the art in ICT accessibility

    3.1. State of the art and future trends

4. Cognitive Accessibility

    4.1. Introduction to the Easy-to-Read Methodology

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5. Schedule

5.1. Subject schedule*

Week	Classroom activities	Laboratory activities	Distant / On-line	Assessment activities
1	**Course introduction** Duration: 00:20 Lecture **Chapter 1: 1.1- Introduction** Duration: 01:10 Lecture **Chapter 1: 1.2- Functional diversity** Duration: 00:30 Lecture			
2	**Chapter 1: 1.2- Functional diversity** Duration: 02:00 Lecture			**Individual presentation of personas** Individual presentation Continuous assessment Presential Duration: 00:20 **Personas evaluation** Other assessment Continuous assessment Presential Duration: 00:10
3	**Chapter 1: 1.3- Assistive products** Duration: 02:00 Lecture			
4	**Chapter 1: 1.4- Principles of accessible design** Duration: 01:00 Cooperative activities **Chapter 1: 1.5- Introduction to human-centred design** Duration: 00:30 Lecture **Chapter 2: 2.1- Introduction to standards** Duration: 00:30 Lecture			**Individual presentation of principles of Design for All** Individual presentation Continuous assessment Presential Duration: 00:30 **Desgin for All evaluation** Other assessment Continuous assessment Presential Duration: 00:10
5	**Standards overview discussion** Duration: 00:30 Cooperative activities **Chapter 2: 2.2- Relevant ICT standards** Duration: 00:45 Cooperative activities **Chapter 2: 2.3- Deeper study of one accessibility standard** Duration: 00:30 Lecture			**Standard overview evaluation** Other assessment Continuous assessment Presential Duration: 00:15 **Test 1** Written test Continuous assessment Not Presential Duration: 00:30

	Explanation of exercise 1 Duration: 00:15 Lecture			
6	**Chapter 2: 2.3- Deeper study of one accessibility standard** Duration: 02:00 Cooperative activities			**One accessibility standard evaluation (discussion)** Individual presentation Continuous assessment and final examination Presential Duration: 00:30
7	**Chapter 2: 2.3- Deeper study of one accessibility standard** Duration: 01:40 Cooperative activities **Explanation of exercise 2** Duration: 00:20 Lecture			**One accessibility standard evaluation (discussion)** Individual presentation Continuous assessment and final examination Presential Duration: 00:30 **Delivery of exercise 1** Group work Continuous assessment Not Presential Duration: 00:00
8	**Chapter 2: 2.4- Conformity assesment** Duration: 01:45 Lecture **Classroom tutoring. Exercise 2** Duration: 00:15 Additional activities			**Conformity assesment evaluation** Other assessment Continuous assessment Presential Duration: 00:15
9	**Chapter 3: 3.1- State of the art and future trends** Duration: 01:45 Lecture **Explanation of exercise 3** Duration: 00:15 Lecture			**Delivery of exercise 2** Group presentation Continuous assessment Not Presential Duration: 00:00 **State of the art in ICT accessibility evaluation** Other assessment Continuous assessment Presential Duration: 00:10
10	**Collective revision of exercise 2** Duration: 02:00 Cooperative activities			**Participation in evaluation of exercise 2** Individual presentation Continuous assessment Not Presential Duration: 02:00
11	**Chapter 4: Cognitive Accessibility** Duration: 01:45 Lecture **Explanation of exercise 4** Duration: 00:15 Lecture			**Cognitive accessibility evaluation** Other assessment Continuous assessment Presential Duration: 00:15

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12	**Chapter 4: Cognitive Accessibility** Duration: 02:00 Lecture			**Cognitive accessibility evaluation** Other assessment Continuous assessment Presential Duration: 00:15
13				
14				**Delivery of exercise 4** Group work Continuous assessment Not Presential Duration: 00:00 **Presentation of exercise 3** Group presentation Continuous assessment and final examination Presential Duration: 02:00
15				**Presentation of exercise 3** Group presentation Continuous assessment and final examination Presential Duration: 02:00
16				**Delivery of exercise 3** Group work Continuous assessment Not Presential Duration: 00:00
17				**Test 1** Written test Final examination Not Presential Duration: 00:30 **Test 2** Written test Continuous assessment and final examination Not Presential Duration: 00:30 **Delivery of exercise 1** Group work Final examination Not Presential Duration: 00:00 **Delivery of exercise 2** Group work Final examination Not Presential Duration: 00:00 **Delivery of exercise 3** Group work Final examination Presential Duration: 00:00 **Delivery of exercise 4** Group work

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				Final examination
				Not Presential
				Duration: 00:00

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.

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6. Activities and assessment criteria

6.1. Assessment activities

6.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
2	Individual presentation of personas	Individual presentation	Face-to-face	00:20	1%	/ 10	CE-DIPO03 CB08
2	Personas evaluation	Other assessment	Face-to-face	00:10	1%	/ 10	CE-DIPO03 CB08
4	Individual presentation of principles of Design for All	Individual presentation	Face-to-face	00:30	2%	/ 10	CE-DIPO01 CB08
4	Desgin for All evaluation	Other assessment	Face-to-face	00:10	1%	/ 10	CE-DIPO01 CB08
5	Standard overview evaluation	Other assessment	Face-to-face	00:15	1%	/ 10	CE-DIPO02 CB08
5	Test 1	Written test	No Presential	00:30	10%	/ 10	CE-DIPO01 CE-DIPO02 CE-DIPO03 CB08
6	One accessibility standard evaluation (discussion)	Individual presentation	Face-to-face	00:30	5%	/ 10	CG02 CE-DIPO02
7	One accessibility standard evaluation (discussion)	Individual presentation	Face-to-face	00:30	5%	/ 10	CE-DIPO02 CG02
7	Delivery of exercise 1	Group work	No Presential	00:00	10%	/ 10	CE-DIPO02 CB08
8	Conformity assesment evaluation	Other assessment	Face-to-face	00:15	1%	/ 10	CE-DIPO02 CG02
9	Delivery of exercise 2	Group presentation	No Presential	00:00	15%	/ 10	CB08 CE-DIPO02
9	State of the art in ICT accessibility evaluation	Other assessment	Face-to-face	00:10	1%	/ 10	CE-DIPO02 CE-DIPO03 CG02
10	Participation in evaluation of exercise 2	Individual presentation	No Presential	02:00	5%	/ 10	CB08 CG02
11	Cognitive accessibility evaluation	Other assessment	Face-to-face	00:15	1%	/ 10	CE-DIPO04 CB08

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12	Cognitive accessibility evaluation	Other assessment	Face-to-face	00:15	1%	/ 10	CE-DIPO04 CB08
14	Delivery of exercise 4	Group work	No Presential	00:00	10%	/ 10	CE-DIPO02 CE-DIPO03 CB08
14	Presentation of exercise 3	Group presentation	Face-to-face	02:00	5%	/ 10	CE-DIPO02 CE-DIPO03 CB08 CG02
15	Presentation of exercise 3	Group presentation	Face-to-face	02:00	5%	/ 10	CE-DIPO02 CE-DIPO03 CB08 CG02
16	Delivery of exercise 3	Group work	No Presential	00:00	10%	/ 10	CB08 CG02 CE-DIPO02 CE-DIPO03
17	Test 2	Written test	No Presential	00:30	10%	/ 10	CE-DIPO02 CE-DIPO03 CE-DIPO04 CB08

6.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
6	One accessibility standard evaluation (discussion)	Individual presentation	Face-to-face	00:30	5%	/ 10	CG02 CE-DIPO02
7	One accessibility standard evaluation (discussion)	Individual presentation	Face-to-face	00:30	5%	/ 10	CE-DIPO02 CG02
14	Presentation of exercise 3	Group presentation	Face-to-face	02:00	5%	/ 10	CE-DIPO02 CE-DIPO03 CB08 CG02
15	Presentation of exercise 3	Group presentation	Face-to-face	02:00	5%	/ 10	CE-DIPO02 CE-DIPO03 CB08 CG02
17	Test 1	Written test	No Presential	00:30	10%	/ 10	CE-DIPO01 CE-DIPO02 CE-DIPO03 CB08
17	Test 2	Written test	No Presential	00:30	10%	/ 10	CE-DIPO02 CE-DIPO03 CE-DIPO04 CB08

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17	Delivery of exercise 1	Group work	No Presential	00:00	10%	/ 10	CE-DIPO02 CB08
17	Delivery of exercise 2	Group work	No Presential	00:00	20%	/ 10	CB08 CE-DIPO02
17	Delivery of exercise 3	Group work	Face-to-face	00:00	15%	/ 10	CE-DIPO02 CE-DIPO03 CB08 CG02
17	Delivery of exercise 4	Group work	No Presential	00:00	15%	/ 10	CE-DIPO03 CB08 CE-DIPO02

6.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Test 1	Written test	Face-to-face	01:00	10%	/ 10	CE-DIPO01 CE-DIPO02 CE-DIPO03 CB08
Test 2	Written test	Face-to-face	01:00	10%	/ 10	CE-DIPO02 CE-DIPO03 CE-DIPO04 CB08
Delivery of exercise 1	Individual work	Face-to-face	00:00	15%	/ 10	CE-DIPO02 CB08
Delivery of exercise 2	Individual work	Face-to-face	00:00	20%	/ 10	CE-DIPO02 CB08
Delivery of exercise 3	Individual work	Face-to-face	00:00	20%	/ 10	CE-DIPO02 CE-DIPO03 CB08 CG02
Presentation of exercise 3	Individual presentation	Face-to-face	02:00	10%	/ 10	CE-DIPO02 CE-DIPO03 CG02
Delivery of exercise 4	Group work	Face-to-face	00:00	15%	/ 10	CE-DIPO02 CE-DIPO03 CB08

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6.2. Assessment criteria

The assessment of this module is divided into two parts: theory and practice. Both parts have to be passed in order to pass the module. The grades obtained in theory and practice are combined as described in the section on evaluation activities.

Theory

The theoretical part of the module contains different assessments: there will be two test-based assessments and there is going to be an assessment of the performance of the collaborative learning sessions that will be part of the study of accessibility standards ("One accessibility standard evaluation", that is not recoverable); there will be also short in-class evaluations during the semester.

Practical work

The practical work consists of 4 exercises:

- Exercise 1: a document containing change proposals for an accessibility standard.
- Exercise 2: an accessibility assessment of an ICT product, using the standard studied during collaborative learning.
- Exercise 3: state of the art on one topic related to ICT accessibility. Students will make a short presentation (divided into two sessions) and deliver a report.
- Exercise 4: checking cognitive accessibility

Assessment procedure

The module will be assessed in a scale of 10 points, divided into theory and practical exercises. To pass the complete module it will be necessary to obtain a minimum of 3/10 point in theory and 3/10 points in the exercises.

a) Term evaluation

All the practical exercises are mandatory and will be graded according to the section on evaluation activities.

In addition, attendance, class participation and in-class activities will be graded for term evaluation.

b) Final evaluation

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At the end of the term, there is the final evaluation. There will be two theory exams (the first one can be done by students having failed the first one). The four exercises have to be delivered in the same time period as the one defined for term evaluation, but they could be delivered again if not passed. The student will also have to attend the two collaborative sessions ("One accessibility standard evaluation") described that are not recoverable in the final evaluation. The exercise 3 presentations cannot be recoverables.

c) Extraordinary evaluation period

In the extraordinary evaluation period the theory tests not passed will be repeated and the pending exercises can be delivered again.

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
Don't make me think!: Revisited. A Common Sense Approach to Web Usability. 2014	Bibliography	Krug, S. New Riders, 3rd edition ISBN: 978-0321965516
The Principles of Universal Design. 1997	Bibliography	Connell, B.R.; Jones, M.; Mace, R.; Mueller, J.; Mullick, A.; Ostroff, E.; Sanford, J.; Steinfeld, E.; Story, M.; Vanderheiden, G. Version 2.0. North Carolina State University. http://www.ncsu.edu/ncsu/design/cud/about_ud/udprinciples.htm
Information technology -- User interface accessibility -- Part 1: User accessibility needs	Bibliography	International Organization for Standardization (ISO), International Electrotechnical Commission (IEC). ISO/IEC 29138-1:2018. (Technical report ISO/IEC TR 29138-1, 2009, can be accessed at http://jtc1access.org/TR29138.htm)

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El modelo de la diversidad. La Bioética y los Derechos Humanos como herramientas para alcanzar la plena dignidad en la diversidad funcional. 2007	Bibliography	Palacios, A.; Romañach, J. Ediciones Diversitas, ISBN: 8496474402,
A Web for Everyone. Designing accessible user experiences. 2014	Bibliography	Horton, S.; Quesenbery, W. Rosenfeld
SIDAR	Web resource	Fundación Sidar - Acceso Universal: http://www.sidar.org, España
Accessibility Requirements for ICT products and services. V3.2.1. March 2021	Bibliography	EN 301 549. https://www.etsi.org/deliver/etsi _en/301500_301599/301549/03.02.01_60/en _301549v030201p.pdf

8. Other information

8.1. Other information about the subject

Exercises cannot been done just copying from other sources. Personal writing and analysis work by the student should be included (not third party or automatically generated reports are allowed). Failing to do this, implies plagiarism, which is not allowed at this University and will lead to not passing the exercise involved (grade will be 0).

Sustainable development goals (SDGs)

The goal of this course is to learn about enabling access of persons with disabilities to ICT, increasing their inclusion possibilities. Taking this into account, and considering the recommendations from the United Nations on the relationship between the SDGs and accessibility, this course is related to the following sustainable development goals:

- Goal 4 quality education - to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. In today's education, interactive learning systems are essential, and they need to be accessible and to be compatible with assistive products to enable the education of persons with

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disabilities.

- Goal 8 decent work and economy growth - to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. Today there are many job-related activities that rely on information and communication technology. This technology needs to be accessible and compatible with assistive products to enable inclusion in the workplace.

- Goal 10 reduced inequalities - to reduce inequality within and among countries. To increase inclusion of all persons in society, all interactive systems designed for citizen participation need to be accessible and be compatible with assistive products.