ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000882 - Assistive Products

DEGREE PROGRAMME

10AZ - Master Universitario En Innovación Digital

ACADEMIC YEAR & SEMESTER

2025/26 - Semester 1

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	103000882 - Assistive Products
No of credits	4.5 ECTS
Type	Optional/elective
Academic year ot the programme	Second year
Semester of tuition	Semester 3
Tuition period	September-January
Tuition languages	English
Degree programme	10AZ - Master Universitario en Innovación Digital
Centre	10 - E.T.S. De Ingenieros Informáticos
Academic year	2025-26

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Loic Antonio Martinez Normand (Subject coordinator)	3352	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	4307	joseluis.fuertes@upm.es	Tu - 17:00 - 20:00 W - 12:00 - 15:00 Please confirm appointment via email

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

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

- Hci: Introduction And Design Methods

- Programming Of User Interfaces

- Evaluation Of Interactive Systems

3.2. Other recommended learning outcomes

- This course should be taken at the same time as "Accessible Design"

4. Skills and learning outcomes *

4.1. Skills to be learned

CB06 - Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación

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

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

CB09 - Que los estudiantes sepan comunicar sus conclusiones y los conocimientos y razones últimas que las sustentan a públicos especializados y no especializados de un modo claro y sin ambigüedades

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

CG03 - La capacidad de usar la lengua inglesa de manera competente, es decir, con capacitación para tareas complejas de trabajo y estudio.

CG06 - Capacidad para gestionar la información.

4.2. Learning outcomes

RA26 - Evaluate and implement systems that use accessibility APIs

RA25 - Understand the APIs for interoperability between IT and Assistive Products

RA20 - Evaluate the usability and accessibility of prototypes

RA22 - Understand the concept and types of assistive products

* 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.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

An **assistive product** is any product (including devices, equipment, instruments and software), especially produced or generally available, used by or for persons with disability for participation; to protect, support, train, measure or substitute for body functions, structures and activities; or to prevent impairments, activity limitations or participation restrictions.

This course will first describe the assistive products that are normally used by persons with disabilities to use ICT products and services. It will then explain how ICT can interoperate with assistive products through the use of accessibility APIs of operating systems. The course will be graded based on practical work with several assignments through the semester.

5.2. Syllabus

1. Assistive products
   1.1. Assistive products: concept
   1.2. Assistive products: classification
2. Interoperability between information technology and assistive products
   2.1. Interoperability APIs
   2.2. Evaluation of the use of interoperability APIs
   2.3. Programming user interfaces with interoperability APIs

6. Schedule

6.1. Subject schedule*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	**Course presentation. Introduction to Assistive Products. Schedule of evaluation activities** Duration: 02:00 Lecture			
2	**Flipped classroom: classification of assistive products** Duration: 02:00 Cooperative activities			**Active participation in flipped classroom** Other assessment Progressive assessment Presential Duration: 02:00
3	**Workshop: using built-in mobile assistive products** Duration: 02:00 Additional activities			**Active participation in workshop** Other assessment Progressive assessment Presential Duration: 02:00
4	**Seminar: working on individual exercise on one assistive product** Duration: 02:00 Additional activities			
5	**Presentation of one Assistive Product** Duration: 02:00 Additional activities			**Presentation of one Assistive Product** Individual presentation Progressive assessment and Global Examination Presential Duration: 02:00
6	**Flipped classroom: IT-AT Interoperability (ISO 13066-1)** Duration: 02:00 Cooperative activities			**Active participation in flipped classroom** Other assessment Progressive assessment Presential Duration: 02:00
7	**Seminar: working on analysing one Accessibility API** Duration: 02:00 Additional activities			
8	**Seminar: working on analysing one Accessibility API** Duration: 02:00 Additional activities			
9	**Presentation of one Accessibility API** Duration: 02:00 Additional activities			**Presentation of one Accessibility API** Individual presentation Progressive assessment and Global Examination Presential Duration: 02:00

10	**Workshop: testing the use of Accessibility API** Duration: 02:00 Additional activities			**Active participation in workshop** Other assessment Progressive assessment Presential Duration: 02:00
11	**Seminar: working on exercise of testing use of Accessibility API** Duration: 02:00 Additional activities			
12	**Presentation of Testing the use of Accessibility API** Duration: 02:00 Additional activities			**Presentation of Testing the use of Accessibility API** Individual presentation Progressive assessment and Global Examination Presential Duration: 02:00
13	**Workshop: using one Accessibility API** Duration: 02:00 Additional activities			**Active participation in workshop** Other assessment Progressive assessment Presential Duration: 02:00
14	**Seminar: working on programming with Accessibility API** Duration: 02:00 Additional activities			
15	**Presentation of programming with Accessibility API** Duration: 02:00 Additional activities			**Presentation of programming with Accessibility API** Group presentation Progressive assessment Presential Duration: 02:00
16				
17				**Program developed using accessibility API** Group work Progressive assessment Not Presential Duration: 00:00 **Exam** Written test Global examination Presential Duration: 02:00

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.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
2	Active participation in flipped classroom	Other assessment	Face-to-face	02:00	5%	0 / 10	CB06 CG03 CG06 CE-DIPO03
3	Active participation in workshop	Other assessment	Face-to-face	02:00	5%	/ 10	CB06 CE-DIPO03
5	Presentation of one Assistive Product	Individual presentation	Face-to-face	02:00	15%	/ 10	CB09 CG03 CG06
6	Active participation in flipped classroom	Other assessment	Face-to-face	02:00	5%	0 / 10	CB06 CG03 CG06 CE-DIPO03
9	Presentation of one Accessibility API	Individual presentation	Face-to-face	02:00	15%	/ 10	CB06 CB08 CB09 CG03 CE-DIPO03
10	Active participation in workshop	Other assessment	Face-to-face	02:00	5%	/ 10	CB06
12	Presentation of Testing the use of Accessibility API	Individual presentation	Face-to-face	02:00	15%	/ 10	CB08 CB09 CG03 CE-DIPO02
13	Active participation in workshop	Other assessment	Face-to-face	02:00	5%	/ 10	CB06 CB07 CB08 CE-DIPO01 CE-DIPO02 CE-DIPO03
15	Presentation of programming with Accessibility API	Group presentation	Face-to-face	02:00	10%	/ 10	CB09 CG03 CG06

17	Program developed using accessibility API	Group work	No Presential	00:00	20%	/ 10	CB06 CB07 CB08 CE-DIPO01 CE-DIPO02 CE-DIPO03

7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
5	Presentation of one Assistive Product	Individual presentation	Face-to-face	02:00	15%	/ 10	CB09 CG03 CG06
9	Presentation of one Accessibility API	Individual presentation	Face-to-face	02:00	15%	/ 10	CB06 CB08 CB09 CG03 CE-DIPO03
12	Presentation of Testing the use of Accessibility API	Individual presentation	Face-to-face	02:00	15%	/ 10	CB08 CB09 CG03 CE-DIPO02
17	Exam	Written test	Face-to-face	02:00	55%	/ 10	CB06 CB07 CB08 CB09 CG03 CG06 CE-DIPO01 CE-DIPO02 CE-DIPO03

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Exam (extraordinary - July)	Written test	Face-to-face	02:00	100%	/ 10	CB06 CB07 CB08 CB09 CG03 CG06 CE-DIPO02

7.2. Assessment criteria

Progressive evaluation system

The evaluation of this course is based on a **progressive evaluation system** (continuous evaluation), that grades the active participation of the student during the semester in different types of activities: cooperative learning, inverted classroom, individual presentations and individual exercises. There is also a group activity consisting of applying using an accessibility API in the implementation of a prototype website. This continuous evaluation system implies attending all the sessions and submitting all the assignments

The evaluation activities and their weight in the grading are described in "Continuous evaluation" ("Evaluación progresiva") above.

Global evaluation process

Students that are unable to pass the course with the activities of the progressive evaluation system, have a second opportunity to pass the course, by doing the following activities in the official exam period (January)

- Re-submission of some of the assignments that were not successfully passed:
  - Presentation of one Assistive Product (15%)
  - Presentation of one Accessibility API (15%)
  - Presentation of Testing the use of Accessibility API (15%)
- A written exam that covers all the contents of the course and that replaces all the active participation grades, plus the final assignments (55%)

These activities are described in the "final evaluation" ("Evaluación global") section above.

Evaluation in the Extraordinary period (July)

Students that were unable to pass the course in the ordinary evaluation period (January), have the opportunity to pass the course in the extraordinary evaluation period (July). The extraordinary evaluation will consist of a written exam that covers all the contents of the course, with a 100% of the grade.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
ISO 9999:2022 Assistive products for persons with disability -- Classification and terminology	Bibliography	International Standard that defines assistive products and provides a classification (updated in 2022).
ISO/IEC 13066-1:2011 Information technology -- Interoperability with assistive technology (AT) -- Part 1: Requirements and recommendations for interoperability	Bibliography	International Standard defining the interoperability APIs between IT and Assitive Products
ISO/IEC TR 13066-2:2016 Information technology -- Interoperability with assistive technology (AT) -- Part 2: Windows accessibility application programming interface (API)	Bibliography	Technical Report describing the accessibility API of Microsoft Windows
ISO/IEC TR 13066-3:2012 Information technology -- Interoperability with assistive technology (AT) -- Part 3: IAccessible2 accessibility application programming interface (API)	Bibliography	Technical Report describing the iAccessible2 accessibility API

ISO/IEC TR 13066-4:2015 Information technology -- Interoperability with assistive technology (AT) -- Part 4: Linux/UNIX graphical environments accessibility API	Bibliography	Technical Report describing the accessibility API of Linux/UNIX
ISO/IEC TR 13066-6:2014 Information technology -- Interoperability with Assistive Technology (AT) -- Part 6: Java accessibility application programming interface (API)	Bibliography	Tecnical Report describing the Java accessibility API
Accessible Rich Internet Applications (WAI-ARIA) 1.2. 2023	Web resource	W3C Recommendation 6 June 2023 https://www.w3.org/TR/wai-aria/

9. Other information

9.1. Other information about the subject

Innovative teaching methods

This course applies the following innovative teaching methods (https://innovacioneducativa.upm.es/guias-pdi):

- **Flipped classroom**: for studying standards, the students must read them out of the classroom, and after that, their contents are discussed in a session.
- **Gamification**: during some of the sessions the Wooclap tool is used, as a motivational tool, and to facilitate debates during the sessions.
- **Research-based learning**: some assessment activities consist of assigning topics to the students, who must research them and present their findings in the classroom.
- **Learning by doing**: the final assignment consists of developing a small-size accessible website. The students apply what they have learnt on the use of user interface web toolkits, and how to make them compatible with assistive technologies.

Sustainable development goals (SDGs)

The goal of this course is to learn about assistive products, that enable 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:

- **Quality education** (Goal 4) - 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 disabilities.
- **Decent work and economy growth** (Goal 8) - 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.
- **Reduced inequalities** (Goal 10) - 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.