

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

593000507 - Intelligent Applications Using Iot Devices

DEGREE PROGRAMME

59AH - Master Universitario En Internet Of Things (IoT)

ACADEMIC YEAR & SEMESTER

2024/25 - Semester 2

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1. Description

1.1. Subject details

Name of the subject	593000507 - Intelligent Applications Using Iot Devices
No of credits	4.5 ECTS
Type	Compulsory
Academic year of the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
Tuition languages	English
Degree programme	59AH - Master Universitario en Internet Of Things (Iot)
Centre	59 - Escuela Técnica Superior De Ingeniería Y Sistemas De Telecomunicación
Academic year	2024-25

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Fernando Pescador Del Oso (Subject coordinator)		fernando.pescador@upm.es	- -

* 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

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

CB10 - Que los estudiantes posean las habilidades de aprendizaje que les permitan continuar estudiando de un modo que habrá de ser en gran medida autodirigido o autónomo.

CE.08 - Diseñar y desarrollar soluciones tecnológicas para implementar servicios IoT capaces de interactuar con diferentes fuentes de información y dispositivos distribuidos incluyendo el diseño de estructuras de intercambio de información eficientes

CE.13 - Analizar el uso de dispositivos y servicios IoT en dominios de aplicación específicos y seleccionar los dispositivos más adecuados para el ecosistema IoT

CG04 - Los alumnos tendrán la capacidad de aplicar criterios de eficiencia, escalabilidad, fiabilidad y seguridad en distintos ámbitos de aplicaciones inteligentes y sistemas ciberfísicos, tales como Smart Living, Smart Cities o eHealth

CT.01 - Capacidad de uso de la lengua inglesa para el trabajo en contextos internacionales

CT.03 - Creatividad, iniciativa y capacidad emprendedora

CT.04 - Capacidad para la elaboración, planificación, coordinación y gestión técnica y económica de proyectos siguiendo criterios éticos, de calidad y medioambientales

3.2. Learning outcomes

RA42 - To learn and understand the bussiness models used in each intelligent application

RA40 - To identify new application domains for IoT.

RA41 - To identify the requeriments and the technological solutions that allow to develop intelligent applications supported by IoT devices. Some examples are Smart- Cities, Smart Environment, Smart Grid, Smart Water, Smart Agriculture, Smart Animal Farming, Domotic& Home Automation, e-health, etc.

* 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 is focused in applications that currently are deployed in the IoT framework. The bussines models and the technologies used in each use case are explained and analyzed. Some examples are SmartCities, eHealth, Robotic, etc.

The course is splitted in two parts:

- 1) Technical seminars presented by different companies. These seminars are focused on the description of real deployed use cases, alternative technologies and some aspects (innovation, new devices, regulation...) not included in the other courses
- 2) Develop a complete innovative IoT project including aspects as bussiness models, enviromental impact, economic impact, innovation, etc.

4.2. Syllabus

1. Technical Seminars
2. IoT Project Development
 - 2.1. Description of the proposal
 - 2.2. Contextualization of the project
 - 2.2.1. Objectives
 - 2.2.2. State of the Art and Innovation
 - 2.2.3. Competitors
 - 2.3. Implementation
 - 2.3.1. Work Plan
 - 2.3.2. Resources and Budget

5. Schedule

5.1. Subject schedule*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	Seminar 1. Company Presentation/Workshop Duration: 02:00 Lecture Presentation and Group Assignment Duration: 01:30 Lecture			
2	Application Selection and SoA analysis Duration: 01:30 Additional activities Seminar 2. Company Presentation/Workshop Duration: 02:00 Lecture			
3	Team work Duration: 01:30 Laboratory assignments Seminar 3. Seminar 2. Company Presentation/Workshop Duration: 02:00 Lecture			
4	Team work Duration: 01:30 Laboratory assignments Seminar 4. Company Presentation/Workshop Duration: 02:00 Lecture			
5	Seminar 5. Company Presentation/Workshop Duration: 01:00 Lecture Initiatives presentation2 Duration: 02:30 Additional activities			Proposal Presentation Group presentation Progressive assessment Presential Duration: 02:30
6	Project development Duration: 01:30 Laboratory assignments Seminar 6. Company Presentation/Workshop Duration: 02:00 Lecture			

7	Project and documentation development Duration: 01:30 Laboratory assignments Seminar 7. Company Presentation/Workshop Duration: 02:00 Lecture			
8	Seminar 8. Company Presentation/Workshop Duration: 01:00 Lecture State of the art and competitors presentation Duration: 02:30 Additional activities			State of the art and competitors (presentation) Group presentation Progressive assessment Presential Duration: 02:30
9	Project and documentation development Duration: 01:30 Laboratory assignments Seminar 9. Company Presentation/Workshop Duration: 02:00 Lecture			
10	Seminar 10. Company Presentation/Workshop Duration: 01:00 Lecture Technical Challenges and final document Duration: 02:30 Additional activities			Technical challenges (presentation and document) Group presentation Progressive assessment Presential Duration: 02:30 Reports of the companies seminars (uploaded each week) Individual work Progressive assessment Presential Duration: 00:00
11				Project presentation Individual presentation Global examination Presential Duration: 03:30
12				
13				
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. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
5	Proposal Presentation	Group presentation	Face-to-face	02:30	10%	5 / 10	CB07 CB08 CB10 CG04 CT.01 CT.03 CE.13
8	State of the art and competitors (presentation)	Group presentation	Face-to-face	02:30	20%	5 / 10	CB06 CB07 CB08 CG04 CT.01 CT.04 CE.08 CE.13
10	Technical challenges (presentation and document)	Group presentation	Face-to-face	02:30	30%	5 / 10	CB06 CB07 CB08 CG04 CT.01 CT.04 CE.08 CE.13
10	Reports of the companies seminars (uploaded each week)	Individual work	Face-to-face	00:00	40%	5 / 10	CB06 CB07 CB08 CG04

6.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
11	Project presentation	Individual presentation	Face-to-face	03:30	100%	5 / 10	CB06 CB07 CB08 CB10 CG04 CT.01 CT.03 CT.04

							CE.08
							CE.13

6.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Project Presentation	Individual presentation	Face-to-face	02:00	100%	5 / 10	CB06 CB07 CB08 CB10 CG04 CT.01 CT.03 CT.04 CE.08 CE.13

6.2. Assessment criteria

Course evaluation on regular period.

The students must follow the seminars scheduled during the sessions. They must write a summary of each presentation. The evaluation of these reports allow the student to obtain 40% of the final mark

The students must propose an innovative IoT project . During the development the students must schedule 3 milestones.

* Milestone 1: 10%. The students presents the project they want to develop. They receive a feedback from the professors

* Milestone 2: 20%. The students present the state of the art and competitors (written document and presentation)

* Milestone 3: 30%. Technical challenges and budget (written document and presentation)

Final Evaluation System and Extra exam

Each student individually must develop a complete project, write the proposal and present the project to professors.
The weight is 100%

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
Computers	Equipment	Computers allocated into the lab
Slices of the seminars	Web resource	Documents related with the companies presentations
Moodle	Equipment	Academic platform selected by UPM. All the resources will be available at Moodle

8. Other information

8.1. Other information about the subject

The calendar that appears in the guide is indicative since it does not include holidays. The specific dates will be published in the Moodle of the subject.

The subject is related to SDG4 "Ensure inclusive, equitable and quality education and promote lifelong learning opportunities for all". Specifically, with the goal "4.4 By 2030, considerably increase the number of young people and adults who have the necessary skills, in particular technical and professional, to access employment, decent work and entrepreneurship".

The subject is related to SDG9 "Build resilient infrastructure, promote sustainable industrialization and foster innovation". Specifically, with part of the target "9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in the least developed countries by 2030.