



GENERAL INFORMATION

Data of the subject	
Subject name	Foundations of Information Systems
Subject code	DTC-IMAT-215
Main program	Bachelor's Degree in Mathematical Engineering and Artificial Intelligence
Involved programs	Grado en Ingeniería Matemática e Inteligencia Artificial [Second year]
Credits	6,0 ECTS
Type	Obligatoria (Grado)
Department	Department of Telematics and Computer Sciences
Coordinator	Pablo Sánchez Pérez
Schedule	Morning schedule
Office hours	To be arranged directly with the professor.

Teacher Information	
Teacher	
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DESCRIPTION OF THE SUBJECT

Contextualization of the subject
Prerequisites
Python programming.



Basic computer skills.

Course contents

Contents

The course is divided into 6 main topics: General Introduction to Computer Systems, Introduction to the Linux Operating System, Networking and Environments, Process and Thread Management, Virtual Machines, Memory Management and I/O Management and File Systems.

Block 1. General introduction

General Introduction

Basic elements of a computer.

Functions and general structure of an operating system.

Block 2. Introduction to the Linux operating system, Network, and environments.

Introduction to the Linux operating system, Network, and environments.

GNU/Linux Operating System.

Network protocols.

Python dependencies.

Block 3: Process management

Process management

Processes and threads. Characteristics and implementation in Python.

Process scheduling.

Concurrency, mutual exclusion, semaphores.

Block 4. Virtual machines

Virtual machines

Virtualisation and Virtual Machines

Basic introduction to Docker

Block 5. Memory management

Memory management

Memory requirements and partitioning.

Memory allocation schemes.

Virtual memory.



Block 6. Input/output management and file systems

Input/output management and file systems

Principles, input/output techniques.

File systems: files and directories

File system implementation.

EVALUATION AND CRITERIA

Evaluation activities	Evaluation criteria	Weight
Intersemester exam: 20% Final exam: 50%	Intersemester exam (20%): exam oriented to understand the theoretical concepts of the fundamentals of operating systems (including the basic architecture of a computer), Linux commands, process management and process scheduling (if possible). Final exam (50%): exam containing the topics of the intersemester exam and extending it with additional concepts related to process management, virtualisation, memory and file management.	70 %
Final project: 15%	Final project (15%): In addition to functionality, the design used in the project, the cleanliness and style of the code, and the application of the course syllabus will be evaluated.	15
Weekly assignments (15%):	Weekly assignments (15%): The lab assignments will be oriented to learn more in depth the concepts explored in the theory classes by solving exercises individually. In addition to functionality, the style of code used in the lab assignments and the quality of the reports requested will also be assessed.	15 %

Grading

There are two calls. Ordinary call in December/January and Extraordinary call in June.

Ordinary call

The grade for the Ordinary call (CO) will be as follows:

- 50% for the final exam (EX_F).
- 20% the inter-semester exam (EX_I)



- 15% for the project (PROY)
- 15% the weekly assignments (PRACT).

In other words:

$$CO = 0.5 * EX_F + 0.2 EX_I + 0.15 * PROY + 0.15 * PRACT$$

$CO \geq 5$ will be necessary to pass the course and the following conditions must be fulfilled:

- It will be mandatory that $EX_F \geq 5$. That is, the grade of the final exam of the subject must be equal to or higher than 5.
- It will be mandatory that $(PROY + PRACT) / 2 \geq 5$. That is, a grade greater than or equal to 5 must be obtained in the average obtained between the project and the weekly assignments in both extraordinary and ordinary calls in order to pass the course. If this minimum grade is not reached in the ordinary call, both the project and the assignments can be handed in again in the extraordinary call. If this condition is not met, $CO = (PROY + PRACT) / 2$. The grade of the exam in the ordinary call will be kept for the extraordinary call if it is passed.
- It will be necessary to obtain a grade of at least 4 in both the project and the average of the assignments in order to pass the course. In other words, $PROY \geq 4$ and $PRACT \geq 4$. If this restriction is not met, $CO = \text{MIN}(PRACT, PROY)$. The grade for the exam in the ordinary call is saved for the extraordinary call if the student passes.

GENERAL CONSIDERATIONS:

- If the student fails to attend 15% or more of the classroom hours of this subject, the student will not be allowed to take the final exam in both the ordinary and extraordinary calls.
- The lab assignments/project handed in 24h after the deadline will have a penalty of 50% of the grade. After 24h after the deadline, the grade of the lab assignments/project will be 0.

Extraordinary call

The grade for the Extraordinary call (CE) will be as follows:

- 70% for the final exam of the course (EX_F , the inter-semester exam is not taken into account).
- 15% for the project (PROY)
- 15% for the weekly assignments (PRACT).

In other words:

$$CE = 0.7 * EX_F + 0.15 * PROJ + 0.15 * PRACT$$

$CE \geq 5$ will be necessary to pass the course and the following restrictions must be met:

- It will be mandatory that $EX_F \geq 5$. That is to say, the mark of the final exam in the extraordinary call of the subject must be equal to or higher than 5.
- It is compulsory that $(PROY + PRACT) / 2 \geq 5$. That is, a grade greater than or equal to 5 must be obtained in the average obtained between the project and the weekly assignments. If this minimum grade is not reached, then $CE = (PROY + PRACT) / 2$.
- It will be necessary to obtain a grade of at least 4 in both the project and the average of the assignments in order to pass the



course. In other words, $PROY \geq 4$ and $PRACT \geq 4$. If this condition is not met, $CE = \min(PRACT, PROY)$.

GENERAL CONSIDERATIONS:

- If the student fails to attend 15% or more of the classroom hours of this subject, the student will not be allowed to take the final exam in both the ordinary and extraordinary calls.
- The lab assignments/project handed in 24h after the deadline will have a penalty of 50% of the grade. After 24h after the deadline, the grade of the lab assignments/project will be 0.

WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Reading and study of the theoretical contents, notes and code provided by the teacher.	After and before each class	
Final Project	At least 1 month before the end of the course	Last week of classes
Exams realisation	October, December/January, and June	
Weekly assignments realisation	Before, during and after the lab class	1 week after publication in moodle
Block 1. General introduction	At the beginning of the course	About a week and a half
Block 2. Introduction to the Linux operating system, Network, and environments.	After Block 1. During the month of September	Approximately 2.5 weeks
Block 3. Process management	After Block 2. End of September. October	Approximately 4 weeks
Block 4. Virtual machines	After Block 3. November	Approximately 1 week
Block 5. Memory management.	After Block 4. Second half of November	Approximately 2.5 weeks
Block 6. Input/output management and file systems.	After finishing Block 5. December.	Approximately 1 week

BIBLIOGRAPHY AND RESOURCES

Basic References

Moodle (teacher's manuals and slides).

Contact the teacher for specific books to further learning.



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Syllabus
2024 - 2025

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<https://servicios.upcomillas.es/sedelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792>