COURSE DATA

DATA SUBJECT

Code: 34887
Name: Operating systems
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1403 - Degree in Telematics Engineering	Escola Tècnica Superior d'Enginyeria	2	Second quarter
1935 - Double Degree Program in Mathematics-Telematics Engineering	Facultat de Ciències Matemàtiques	3	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1403 - Degree in Telematics Engineering	Programming	COMPULSORY
1935 - Double Degree Program in Mathematics-Telematics Engineering	Tercer curso	COMPULSORY

COORDINATION

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SUMMARY

The course "Operating Systems" is a compulsory 6 ECTS, taught in the second quarter of second-degree course in Informatics Engineering and Telematics Engineering. In the degree in Telematics is part of the matter "Programming"

The course covers the operating systems from three complementary viewpoints:

- The operating system as an interface for developing and running applications. From this point of view we consider the basic abstractions provided by the operating system (processes, memory, files and input / output) and the services related to them.
- The operating system as a control system that manages the use of computer resources and

relies on the hardware (hardware) to ensure the proper functioning of the system.
- The OS as a program. Therefore it also takes into account aspects such as its internal structure, and the data structures and algorithms used to perform their functions.

Overall Objectives

- Show what an operating system is and what services it offers, providing an overview of the functioning of today's computers and, specifically, the roles played by the operating system.
- Show basic abstractions provided by the operating system and what operations can be done with them, emphasizing the role of the operating system as a platform for developing and running applications.
- Show the correspondence between these basic abstractions and the physical components of a computer, illustrating how the operating system requires hardware support to provide these abstractions. And how operating systems manage the physical resources available, with special emphasis on the efficiency and cost of the different solutions.
- Analyze current concepts and relate them to older ones, highlighting the benefits of new solutions and why they were introduced.
- To enable the student as a user and as a programmer in the operating system environment.
- To initiate the student in the administration of operating systems and its security.

Contents

- Introduction
- Processes and threads
- Processor scheduling
- Memory Management
- Process communication and synchronization
- Input/ouput management
- Filesystems
- Security
- Virtualization

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

It is recommended to have completed the following courses: Computer Science and Advances in Computer

Science.

COMPETENCES / LEARNING OUTCOMES

1403 - Degree in Telematics Engineering

E6 - Ability to design networks and telematic services architectures.

E7 - Ability to programme networked and distributed telematic services and applications.

G3 - Acquisition of the knowledge of the basic and technological subjects that allows students to learn new methods and theories and endows them with the versatility to adapt to new situations.

G4 - Ability to solve problems with initiative, decision-making and creativity, and to communicate and transmit knowledge, abilities and skills, understanding the ethical and professional responsibility of the activity of a telecommunications technical engineer.

R1 - Ability for self-learning of new knowledge and techniques appropriate for the conception, development and exploitation of telecommunications systems and services.

R2 - Ability to use communication and computer applications (offimatics, databases, advanced calculation, project management, visualization, etc.) to support the development and exploitation of telecommunications and electronics networks, services and applications.

R3 - Ability to use computer tools to find bibliographic resources and information related to telecommunications and electronics.

DESCRIPTION OF CONTENTS

1. Introduction

- Concept of operating system and basic abstractions
- General operation of operating systems
- Authentication
- The shell
- System administration
- Virtualization

2. Processes and threads

- Process concept
- Operations with processes
- Multi-threaded processes

3. Scheduling

- Monoprocessor scheduling
- Multiprocessor scheduling
- POSIX scheduling

4. Communication and synchronization

- Concept of Concurrency
- Communication and synchronization models
- Concurrent programming

5. Memory

- Management models
- Pagination
- Virtual memory

6. Files

- Filesystem concept
- Logical description, permissions and access control
- Physical description
- Advanced filesystems

7. Input/output

- Requirements and general structure
- Device drivers
- Device independent I/O software

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	20,00
Classroom practices	10,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	0,00
Preparation of lessons	65,00
Preparation for assessment activities	10,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

Theoretical classroom activities will be used to introduce the main points of the subject, providing a global and inclusive vision, analyzing in detail key issues, encouraging student participation. These activities are complemented by practical activities in order to apply the basics and expand the knowledge and experience. They include the following types of classroom activities:

- Problem-solving sessions. (Individually and in groups). (R1, R2, R3, G3, G4)
- Labs. (In couples). (R1, R2, R3, G3, G4)
- Evaluation tests. (R1, R2, R3, G3, G4)

In addition to classroom activities, students must perform personal homework (directed bibliographic research, questions, problems, preparation of classroom activities, study). These tasks will be primarily on an individual basis, in order to promote autonomous work, but they will also include work requiring the participation of small groups of students (2-4) to build team work skills. (R1, R2, R3, G3, G4)

The e-learning platform of the University of Valencia will be used to support communication with students. This platform will provide access to course materials.

EVALUATION

The subject may be evaluated in two ways, one giving greater weight to classroom activities and a another one giving greater weight to the final exam. All students will have as final score the higher of the two.

The evaluation of the course will take place in the first call by:

- Evaluation of theory and problems (TP).

This part will count 70% of the final grade and it will be necessary to obtain 4,5 out of 10.

Continuous assessment (CA), based on the participation and degree of involvement in the teachinglearning process, taking into account regular attendance and participation. This part can not be recovered.

Tests, which consist of both theoretical and practical questions. The tests will be carried out in the first half

of the semester (T1), during the second half of the semester (T2) and in the testing period (T3).

Each of these tests will cover all course content covered until then.

The TP grade will be computed as follows:

TP = 0.15 * CA + 0.15 * T1 + 0.25 * T2 + 0.45 * T3

- Laboratory activities (L) will be assessed based on the achievement of objectives in the laboratory sessions.

Activities will be performed in pairs, their weight being 30% of the final mark. All laboratory sessions will have the same weight on the final grade.

It will be necessary to get 4,5 out of 10 in this part. (Both in the first and second calls).

If unable to attend a session, the student will have to show its work to the professor in person during attendance hours. Students must be prepared to answer questions about the conduct of the practice and to perform parts of it at the moment (with minor changes). This type of delivery has to be done before any laboratory session has taken place and will be penalized with 20%.

The mark will be formed in the case of following the continuous assessment as the sum of the previous parts as follows:

- If TP is less than 4,5 or 4,5 is less than 4,5:

Final_grade = Minimum (TP, TL)

- Otherwise:

Final_grade = 0.7 * TP + 0.3 * L

In case of not passing the subject by following the continuous assessment model (or if the grade calculated in this second way is more favorable to the student), the T3 assessment test will be the final course exam and TP will be calculated as follows:

TP = 0.15 * CA + 0.85 * T3

The final grade is computed in the same way as with continuous assessment.

In the second call the course will be assessed in the same way as in the first call, with the following exceptions:

- A delivery period for submitting lab assignments will be open, with a 30% penalty. The assignments will not be conducted in the laboratory and must be submitted in person during the laboratory instructor's office hours. The deadline for submission is the last day of the laboratory instructor's office hours before the second call. Students must be prepared to answer questions about the assignment and complete parts of it on the spot (with minor changes).

- The second call test replaces the T3 test.

- The CA mark will be the same than in the first call.

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

Anyway, the evaluation system is managed by what is written in the "Reglament d'Avaluació i Qualificació de la Universitat de València per a Graus i Màsters" (https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?accion=inicio&idEdictoSeleccionado=5639)

REFERENCES

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- Silberschatz, Abraham, et al. Operating System Concepts Essentials. 1st edition, John Wiley & Sons Inc, 2011.
- Carretero Pérez, Jesús, et al. Sistemas operativos: una visión aplicada. Tercera edición, CreateSpace Independent Publishing Platform, 2020.
- Nemeth, Evi, et al. UNIX and Linux System Administration Handbook. Fifth edition, Addison-Wesley, 2018.
- Calcatinge, Alexandru, and Julian Balog. Mastering Linux Administration: Take Your Sysadmin Skills to the Next Level by Configuring and Maintaining Linux Systems. Second edition., Packt Publishing, 2024.