COURSE OUTLINE

1. GENERAL

SCHOOL	SCHOOL OF ENGINEERING, UNIVERSITY OF PATRAS		
DEPARTMENT	DEPARTMENT OF COMPUTER ENGINEERING AND INFORMATICS		
LEVEL OF COURSE	UNDERGRADUATE, COMPULSORY		
COURSE CODE	CEID_24Y330	**SEMESTER OF STUDIES**	WINTER (5H)
COURSE TITLE	OPERATING SYSTEMS		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for thewhole of the course, give the weekly teaching hours and the total credits*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	3
Recitation sections	1	1
Laboratory Exercises	2	2
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background, specialised knowledge
PREREQUISITE COURSES:	There are no prerequisite courses. It is however recommended that students have at least a basic knowledge of Data Structures (CEID_23Y233), Algorithms (CEID_23Y205) and Programming (CEID_22Y103, CEID_23Y106).
TEACHING AND ASSESSMENT LANGUAGE:	Greek. Instruction may be given in English if foreign students attend the course.
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBPAGE (URL)	https://eclass.upatras.gr/courses/CEID1135/

2. LEARNING OUTCOMES

Leraning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

At the end of this course the student will:

1. have understood the basic concepts of Operating Systems and data management and will have understand the issues that are specific to the efficient implementation of such systems.
2. have understood the basic concepts of processes, threads, interprocess communication and scheduling.
3. have understood the technique and algorithms of memory management.
4. have understood the various storage strategies and access methods in file systems

Competences

At the end of the course the student will have further developed the following skills/competences:

1. ability to understand the various concepts and basic principles of operating systems and how they are related to the performance of working systems.full-fledged working software system.

2. ability to work cooperatively in order to solve problems that arise during the development of a full-fledged working operating system.
3. ability to work cooperatively in order to solve problems that arise during the development of a full-fledged working operating system.
4. studying abilities that are needed for continuous professional development.

General Abilities

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
situations
Decision-making
Working independently
Team work
Working in an international environment
interdisciplinary environment .....
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism Adapting to new
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking Working in an
Others…

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Decision-making
Working independently
Team work
Project planning and management
Criticism and self-criticism
Production of free, creative and inductive thinking

3. COURSE CONTENT

Definitions of operating systems, their historical evolution, their main parts. Processes, threads, process states, process control block, interrupt handling. Interprocess communication, critical areas, mutual exclusion, primitives of mutual exclusion, the algorithm of Dekker, the algorithm of Peterson, the bakery algorithm (Lamport), hardware solutions, test-and-set instructions. Semaphores, implementation of semaphores, counting semaphore, binary semaphores, conditional critical areas, event queues, monitors, implementation of message buffers, readers and writers, producer-consumer systems. Scheduling of processes, scheduling of threads. Distributed synchronization. Memory management: (a) Real memory: organization, memory allocation continuous or not, fixed partitioning method, swapping. (b) Virtual Memory: paging, segmentation, combination of techniques, average page length, average number of holes, 50% rule, page replacement methods, locality, working set, demand paging, program behavior. Scheduling CPU and Disks. Deadlock Theory. Examples of modern operating systems and principles of developing them.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	We use Information and Communications Technology in communication with students. We use e_class, e_mail.
TEACHING ORGANIZATION *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning*	

Δραστηριότητα	***Φόρτος Εργασίας Εξαμήνου***
Lectures	90
Laboratory Practise	60
Recitation	30
Total number of hours for the Course	180

activity are given as well as the hours of non-directed study according to the principles of the ECTS	
STUDENT ASSESSEMNT *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	(1) Written examination (50% of the final grade) (2) Laboratory exercises (50% of the final grade)

5. RECOMMENDED LITERATURE

1. Andrew Tanenbaum, Herber Bos, Modern Operating Systems, 5η/2022, Pearson education

2. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts 10th Edition, 2018, Wiley

3. William Stallings, Operating Systems: Internals and Design Principles (8th Edition) Pearson 2014

4. Μάργαρης Αθανάσιος, Linux, Εκδόσεις Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., 1η/2021