COURSE OUTLINE

(1) GENERAL

SCHOOL	ECONOMICS AND POLITICAL STUDIES		
ACADEMIC UNIT	DEPARTMENT OF ECONOMICS		
LEVEL OF STUDIES	UNDERGRADUATE STUDIES PROGRAM		
COURSE CODE	**CSC202**	**SEMESTER**	**3rd**
COURSE TITLE	Computer Systems Organization and Function		

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 the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	4
Laboratory courses	3	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	6	7

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background
PREREQUISITE COURSES:	CSC201 - Introduction to Computer Science and Information Processing
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/ECON570/

(2) LEARNING OUTCOMES

Learning 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*

After successfully completing the course, the students will be able to:

- **Know how a computer system works**
- **become familiar with the operation of computers as well as with the concepts related to computer networks and new technologies**
- **Know the basic structure of the computer, computer architecture issues, organization of main and secondary memory, central processing unit, the internal architecture of a simple processor, cache memory issues, input/output devices and their operating principles, the coordinating role of the operating system, operating system security issues**
- **Know basic concepts about parallel and multi-core architectures as well as**

issues related to the capabilities and limitations of computing resources

- **Know and be able to compare modern operating systems**
- **Knows and can use basic Linux and Windows commands**

General Competences

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

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Scientific way of thinking and expression
Working independently
Production of new research ideas
Production of free, creative and inductive thinking

(3) SYLLABUS

1. Definition of Computer Science
2. What constitutes a computer system
3. Computer systems models
    a. Turing Machine
    b. Jon von Neumann architecture
4. Brief historical review
    a. Computing machines and computer generations
    b. Scientists who influenced scientific and technological developments
    c. Impact on science and everyday life
    d. Computer systems categories
5. Digital Computer
    a. What a Typical Computer Contains
    b. Computer Architecture
    c. Central Processing Unit
    d. CPU Organization
        1. Arithmetic and Logic Unit, Control Unit
        2. Registers
        3. Program Execution and Instruction Cycle
        4. Performance Measurement
    e. Memory
        1. Primary and Secondary
        2. Characteristics
        3. Memory hierarchy
        4. Registers
        5. Cache memory
        6. Main memory and main memory types
        7. ROM
        8. Virtual memory
        9. Auxiliary memory
        10. Cloud storage
    f. Motherboard

g. Data/address/system buses
h. Input/output units and peripherals
i. Data representation
    i. text (ASCII, UNICODE, EBCDIC)
    ii. numbers
    iii. images
    iv. sound
    v. video

5. Introduction to Operating Systems (OS)
    a. Role and purpose of OS
    b. main functions of a typical OS
    c. Time categories (batch processing, multiprogramming, timesharing, personal single-user systems, multiprocessor, network - distributed, embedded - real-time)
    d. OS architecture (Monolithic, layered, micro-kernel models, hybrids, virtual machines)
    e. Security and protection
    f. Διαχείριση μνήμης (partitioning, paging segmentation, virtual memory)
    g. I/O Device Management - I/O Scheduling
    h. File System
        i. File extensions
        ii. operations (create, delete, read, search, open, close, write)
        iii. file protection
    i. directories
    j. storing a file on disk
    k. User interface (batch interface, CLI, GUI)
    l. Operating System examples: Android, OS X, iOS, Windows, Unix and Linux
    m. Introduction to parallel processing
6. Introduction to computer networks
7. Internet:
    a. Web 1.0, 2.0. 3.0, X.0
    b. Internet services
    c. Online transactions
    d. Cloud applications - Cloud service models
    e. Internet of Things

Laboratory courses:

a. Useful cloud services- applications
b. Creating a blog
c. Data: Introduction to SQL, big query
d. Well known Operating Systems: basic Windows command line commands and the corresponding basic Linux commands

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	**Use of a projector for Powerpoint presentations in teaching.** **Use of e-class platform for posting learning material and announcements.** **Use of e-mail for communication with students.** **Familiarity with popular operating systems (windows, windows command line, linux) through laboratory courses**
TEACHING METHODS *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 activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	*Semester workload*
Lectures	39
Workshops and laboratory exercises	50
Literature study and analysis	86
Course total	***175***

STUDENT PERFORMANCE EVALUATION *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.*	The course evaluation is in Greek. 1. Final written exam (80%) which includes a combination of questions: - short answer - problem solving - multiple choice - knowledge organization and synthesis 2. Laboratory exercises 20% The possibility of writing a written assignment is provided, which contributes 30% to the final grade of the course. The evaluation criteria are made known in the first lecture and are posted on the course's e-class.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Εισαγωγή στην Πληροφορική και τους Υπολογιστές, Μποζάνης Παναγιώτης Δ. Εκδ: Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε.
2. ΣΤΟΙΧΕΙΑ ΥΠΟΛΟΓΙΣΤΙΚΩΝ ΣΥΣΤΗΜΑΤΩΝ, ΠΑΠΑΘΑΝΑΣΙΟΥ ΕΛΕΥΘΕΡΙΟΣ. Εκδ: ΕΥΓΕΝΙΑ ΑΣΤ.ΜΠΕΝΟΥ
3. Andrew S. Tanenbaum. Η Αρχιτεκτονική των Υπολογιστών (Μια δομημένη προσέγγιση). Εκδ.: Κλειδάριθμος, 2002.
4. David A. Patterson - John L. Hennessy. Οργάνωση και Σχεδίαση Υπολογιστών (Η διασύνδεση υλικού και λογισμικού) . Εκδ.: Κλειδάριθμος, 2010.
5. William Stallings. Οργάνωση και Αρχιτεκτονική των Υπολογιστών . Εκδ.: Τζιόλα, 2011.

- Related academic journals:

Computer Architecture, IEEE
Operating systems, IEEE