

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	School of Science		
<b>ACADEMIC UNIT</b>	Physics		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	<b>10YK202</b>	<b>SEMESTER</b>	<b>7</b>
<b>COURSE TITLE</b>	<b>Computer Systems Organization</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>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</i>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
Lectures (theory and exercises)	3		
Laboratory practice	1		
		6	
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Specialised knowledge		
<b>PREREQUISITE COURSES:</b>	No		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes, in the English language for Erasmus students		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uoa.gr/courses/PHYS292/">https://eclass.uoa.gr/courses/PHYS292/</a>		

## (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

In this course the student acquires the necessary knowledge for the understanding of digital computer architecture, organization and operation.

With the completion of the course the student is able to  
Describe the digital computer architecture and organization as well as basic data structures and algorithms.

Define computer operation and algorithmic complexity.

Design basic digital computing systems.

Produce data structures with software.

Organize data structures and algorithms that lead to the problem solving with computers.

Combine computers and algorithms for solving complex physics problems.

Evaluate the results of the computing implementations in solving physics problems.

### 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

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

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

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Others...

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The course aims at the following general competences

Search for, analysis and synthesis of data and information, with the use of the necessary technology

Working independently

Team work

Project planning and management

Production of free, creative and inductive thinking

Analytical and synthetic thinking

Critical thinking

Time management

Planning

Taking initiative/responsibility

New Technology skills

Learning C / Matlab programming language ...

Learning word/excel/ppt/ origin/spss

Creativity

Determination

Communication skills

Information management

Meeting Deadlines and Keeping Schedules

Flexibility / Adaptability

Problem solving

### **(3) SYLLABUS**

- Computer arithmetic: 1's and 2's complement, floating point representation, addition/subtraction, methods for 2's complement multiplication, non/restoring division, convergence division.
- Computer architecture, combinatorial circuits: de/multiplexers, decoders, adders/subtractors, array multipliers, sequential circuits: Registers, counters, finite state machines.
- Computer organization: CPU, memory and peripheral organization, addressing modes, machine language, subroutines and stack.
- Theory and implementation in C code of the following data structures and algorithms: Lists, stacks, binary trees, merge, quick, heap.

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<p><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face	
<p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Yes</p> <p>Electronic communication with the students using ICT (Information and Communications Technology) Computer-aided lectures, use of Overhead Projectors, eclass platform</p>	
<p><b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <i>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.</i></p> <p><i>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</i></p>	<p><b>Activity</b></p>	<p><b>Semester workload</b></p>
	Lectures/ exercises	40
	Individual Study/ Study and Analysis of bibliography / Preparation	60
	Laboratory practice	20
	Writing reports/ essays	30
	<b>Course Total</b>	<b>150</b>
<p><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Final written exams in Greek Mid-term written examination Writing essays Laboratory reports</p>	

## **(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

- Data Structures in C, N. Misirlis, NKUA Publications, 2017, Athens, Code: 77112308
- Notes