COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	Informatics and Computer Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ICE1-4006	**SEMESTER**	4th
COURSE TITLE	Signals and 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 the whole of the course, give the weekly teaching hours and the total credits		**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures		2	
Tutorial and problems solving		1	
Computer Laboratory		1	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		**4**	**5**
COURSE TYPE general background, special background, specialised general knowledge, skills development	Specialised general knowledge (special background)		
PREREQUISITE COURSES:	Mathematical Analysis		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)		
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/CS205/		

(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

Upon successful completion of the course, the student must:

- describe a signal in a mathematical way
- categorize signals and describe their properties
- analyze, design and manage signals on the computer
- analyze and classify systems based on their properties (linearity, time invariance, causality, memory, stability, reversibility)
- represent linear time-invariant (LTI) systems with equations, with block diagrams, with their impulse response or with their transfer function and understand the equivalence of these representations
- explain the operation of convolution and appreciate its importance in the analysis of LTI systems
- understand the relationship between the time and frequency domains and appreciate the importance of Fourier analysis
- understand the convolution theorem and the basic properties of Fourier Transform
- be familiar with Laplace Transform and its use for solving differential equations and analyzing LTI systems
- be able to utilize the MATLAB environment and the signal processing toolbox

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
- Decision-making
- Team work
- Production of free, creative and inductive thinking

(3) SYLLABUS

Introduction. Signals and systems: fundamental concepts. Linear Time-Invariant (LTI) Systems. Impulse response. Convolution. Correlation. Block diagrams. Representation of systems with differential equations. Fourier series – Line spectra. Fourier transform – Spectral density. Frequency Response. Fourier transform applications - Filtering. Laplace transform. Transfer function. Solution of differential equations with Fourier and Laplace transforms.

Lab in MATLAB environment using the Signal Processing toolbox.

(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 web-based asynchronous elearning systems to support the educational material (notes, powerpoint presentations, self assignments, past exams etc.) and examinations. Use of email and announcements in elearning system to communicate and inform students.
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	
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure	I. Final written exam (70%) which contains : - Short-answer questions - Problem solving

Activity	Semester workload
Lectures	26
Tutorials	13
Computer Laboratory	13
Written assignments	21
Self study	52
Course total	125

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.	II. Computer laboratory assignments and final laboratory examination (30%) The exam material and the assessment process are made known to students in the lecture hall, the laboratory and the e-learning platform of the course.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Παλαμίδης Αλ., Βελώνη Αν., Σήματα & Συστήματα με MATLAB, Σύγχρονη Εκδοτική, 2010.
2. Φωτόπουλος Π., Παλαμίδης Αλ., Βελώνη Αν., Σήματα και Συστήματα, Σύγχρονη Εκδοτική, Αθήνα, 2019
3. Ziemer R. E., Tranter W. H., Fannin D. R., Signals and Systems: Continuous and Discrete, 4th Ed., Pearson Education, 2014.
4. Balmer L., Signals and Systems, 2nd Ed., Prentice Hall, 1997.
5. Girod B., Rabenstein R., Stenger A., Signals and Systems, Wiley, 2001.
6. Hsu H. P., Schaum's Outline of Signals and Systems, 2nd Ed., 2010.
7. Θεοδωρίδης Σ., Μπερμπερίδης Κ., Εισαγωγή στη Θεωρία Σημάτων και Συστημάτων, Εκδόσεις Τυποθήτω, 2002.
8. Haykin S., Van Veen B., Signals and Systems, John Wiley and Sons, 1999.
9. Oppenheim A.V., Willsky A.S., Nawab S.H., Signals and Systems, 2nd ed., Prentice Hall, 1996.