COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Computer Engineering		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	4.004	**SEMESTER**	4th
COURSE TITLE	Signals and Systems		
COURSEWORK BREAKDOWN		**TEACHING WEEKLY HOURS**	**ECTS Credits**
	Theory (Lectures)	4	4
	Tutorial/Exercises	1	1
	TOTAL	**5**	**5**
COURSE UNIT TYPE	Specialized knowledge/Skills development		
PREREQUISITES			
LANGUAGE OF INSTRUCTION/EXAMS	Greek		
COURSE DELIVERED TO ERASMUS STUDENTS	No		
WEB PAGE (URL)	https://eclass.hmu.gr/courses/ECE151/		

(2) LEARNING OUTCOMES

Learning Outcomes

The course introduces the basic concepts and properties of signals and systems in continuous and discrete time. It is a fundamental course for Electrical Engineers, especially in the directions of Electronics, Systems & Computers, and Telecommunications & Information Technology within the department's curriculum.

Upon successful completion of the course, the student will be able to:

- Understand the basic concepts and properties of signals in discrete and continuous time.
- Comprehend the transformations of continuous and discrete-time signals and their practical application.
- Describe and resolve linear time-invariant systems, calculate their response, and analyze transfer functions.
- Implement applications of the signals and systems course in Matlab/Python.

General Skills

- Autonomous work
- Teamwork
- Search, analysis and synthesis of data and information, using the necessary technologies
- Decision making
- Promoting liberal, creative and inductive/deductive thinking
- Work in an interdisciplinary environment

(3) SYLLABUS

- Introduction to Signals and Continuous-Time Systems: Basic operations, properties, elementary signals, types of continuous-time systems, and methods of description, convolution, and properties.

- Continuous Time Fourier analysis: Fourier Transform, Properties, Frequency Response Analysis, and introduction to linear filters.
- Laplace Transform for Continuous-Time Systems: Properties, convolution, and transfer function.
- Introduction to Signals and Discrete-Time Systems: Sampling and Quantization, Reconstruction of analog signal from digital.
- Fundamental discrete-time signals, operations, and transformations (scaling, inversion, and shifting).
- Discrete-time systems, linear time-invariant systems, description with difference equations, study using the convolution method, impulse response, step response.
- Z-Transform for the study of Discrete-Time Systems: Properties of the Z-transform, poles and zeros, transfer function and inverse Z-transform, solving difference equations.
- Introduction to the Discrete Fourier Transform and Discrete Fourier Transform of signals.
- Computational Applications of signals and systems in Matlab/Python.

(4) TEACHING METHODS - ASSESSMENT

<table>
<tr><td>MODE OF DELIVERY</td><td>In-Class Face-to-Face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</td><td>▪ Use of ICTs in lecturing
▪ Use of ICTs in Lab work
▪ Use of ICTs for the communication with students via the e-class platform</td></tr>
<tr><td>TEACHING ORGANIZATION</td><td>
<table>
<tr><th>Method description/Activity</th><th>Semester Workload</th></tr>
<tr><td>Lectures</td><td>50</td></tr>
<tr><td>Project (journal/paper reading and theoretical study)</td><td>30</td></tr>
<tr><td>Lab work</td><td>20</td></tr>
<tr><td>Non-guided personal study</td><td>50</td></tr>
<tr><td>Total Contact Hours</td><td>150</td></tr>
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<tr><td>ASSESSMENT METHODS</td><td>All announcements for the course are posted in the course web page. The course grade incorporates the following evaluation procedures:

1. Written final examination (60 %)
• Problem solving.
• Short answer questions
• Multiple choice
2. Lab project (report and oral exam) 20%
3. Weekly assignments (20%)

The evaluation criteria will be announced each year on the beginning of the semester. Typically, the final mark is comprised 80% of the final written exam and 20% of the lab and weekly assignments average.</td></tr>
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(5) RECOMMENDED BIBLIOGRAPHY

The recommended bibliography is in Greek.