■ CE810 - Digital Signal Processing

GENERAL

SCHOOL	EXACT SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE810	**SEMESTER**	H
COURSE TITLE	DIGITAL SIGNAL PROCESSING		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS**
Lectures	2	6
Lab	2	

COURSE TYPE	Skills Development
PREREQUISITE COURSES	-
LANGUAGE OF TEACHING AND EXAMINATIONS	Greek/English
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://eclass.uowm.gr/

LEARNING OUTCOMES

Learning Outcomes
With the successful completion of the course, the student will be able to: • identify and describe digital signals and systems, • appreciate the advantages of digital signals over analogue ones, • plan the steps of signal analysis and processing, • recognize the transformations and apply them appropriately, • create applications in Matlab of appropriate signal management.
General Competencies

- Search, analysis and synthesis of data and information, using the necessary technologies, Adaptation to new situations.
- Making decisions.
- Independent work.
- Team work.
- Criticism and self-criticism.
- Promotion of free, creative and inductive thinking.

CONTENT OF THE COURSE

- Introduction to Signals.
- Digital signal processing tools.
- Fourier series and Fourier transform.
- Discrete time systems.
- System response-convolution.
- Sampling of Continuous Time signals.
- The Shannon-Nyquist Sampling Theorem.
- Discrete Fourier Transformation.
- Fast Fourier Transformation.
- Laplace transformation.
- Z transformation.
- Analog Filters.
- Digital Filters.

In the laboratory part with the Matlab tool, the following exercises will be carried out:

- Signal creation.
- Analysis of signal peaks.
- Comparison of signals.
- Pulse analysis.
- Discrete Fourier transformation.
- Periodic signal power measurement.
- Cutoff filters.

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom and computer-lab.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Learning process support through the Moodle online platform. Laboratory teaching.
TEACHING ORGANIZATION	**Activity** | **Semester Workload**

	<table><tr><td>Lectures</td><td>26 hours</td></tr><tr><td>Laboratory Exercise</td><td>26 hours</td></tr><tr><td>Individual Study</td><td>98 hours</td></tr><tr><td>Course Total (25 hours per ECTS)</td><td>150 hours</td></tr></table>
STUDENT EVALUATION	For the successful examination of the course, the student must be successfully examined independently in both parts of the course, theory and laboratory. The evaluation in the theoretical part results from: - 35% will be graded for performance in individual assignments-online tests with multiple choice questions through the course page, - 65% of the final exams of the course with a comparative evaluation of theory elements. The assessment in the laboratory part results from: - active participation during the student's presence and work in the laboratory by 30%, - his/her final exam by 70%. The overall grade of the course is the weighted average of 60% the grade of the theoretical part and 40% of the laboratory.

RECOMMENDED BIBLIOGRAPHY

1. Digital Signal Processing, Antoniou, A. Publications TZIOLA & SONS S.A. (Greek)
2. Digital Signal Analysis, Proakis J, Manolakis D. Ion Publications. (Greek)
3. Digital Signal Processing, A computer-based approach S.K. Mitra McGraw-Hill.
4. Theory and problems in digital signal processing, Monson H. Hayes Tziola Publications. (Greek)
5. Introduction to the theory of signals and systems, Theodoridis S. Berberidis K., Typothito Publications, Athens 2003. (Greek)
6. Introduction to digital signal processing Kogias, G. Synchroni Ekdtotiki 2010. (Greek)
7. Digital signal processing, Basic concepts and applications, Fotopoulos, Spyros Publisher Inspiration S.A. 2010. (Greek)
8. Signal Modulation and Transmission, Kottis P., Tziolas Publications, Thessaloniki 2008. (Greek)