■ CE56 - Fourier Analysis

GENERAL

SCHOOL	EXACT SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE56	**SEMESTER**	E
COURSE TITLE	FOURIER ANALYSIS		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS**
Lectures	4	5

COURSE TYPE	Scientific Field
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
Upon successful completion of the course, the students will be able to: • know the measure and the Lebesgue integral, • have understood trigonometric polynomials, • recognize Fourier series and apply the convergence criteria of their partial sums, • solve Sturm-Liouville problems using integral calculus, • know the integral transforms (Laplace and Fourier) and use them in solving differential and integral equations.
General Competencies

- Search, analysis and synthesis of data and information, using the necessary technologies.
- Adapting to new situations, making decisions.
- Work in a team.
- Promotion of free, creative and inductive thinking.

CONTENT OF THE COURSE

Calculus of variations: Euler's differential equation. Problems of variations in conditions. Hamilton's principle. Lagrange's equations. Sturm-Liouville problems. Rayleigh-Ritz method. Laplace transformation: Properties- Inverse transformation- Applications to ordinary differential equations- Applications to partial differential equations. Fourier analysis: Orthogonal functions-Fourier series-Fourier integrals. Fourier transformation-Applications to partial differential equations. Bessel's functions-Legendre's functions. Integral Equations: Connection to Differential Equations.

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of e-class. Communication through face-to-face discussions and e-mails.
TEACHING ORGANIZATION	**Activity** / **Semester Workload** Lectures: 52 hours Individual Study: 73 hours Course Total (25 hours per ECTS): 125 hours
STUDENT EVALUATION	Progress-exam (calculation of indefinite and definite integrals) 30% Written final examination 70%.

RECOMMENDED BIBLIOGRAPHY

1. FOURIER ANALYSIS, Kolountzakis M., Papachristodoulos X., Kallipos. (Greek)
2. APPLIED MATHEMATICS, Mylonas N., Hatzarakis G. Tziola Publications. (Greek)