■ CE71 - Mathematical Physics

GENERAL

SCHOOL	EXACT SCIENCES
DEPARTMENT	MATHEMATICS
LEVEL OF STUDIES	UNDERGRADUATE
COURSE CODE	CE71	**SEMESTER**	G
COURSE TITLE	MATHEMATICAL PHYSICS

INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	ECTS
Lectures	4	6

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
The students who successfully complete this course will be able to: • understand basic mathematical theories and tools that are used in the study of differential equations in various branches of physics, • know modern-day techniques of symbolic computation to analytical approaches of physical problems, • handle problems with new data (various physical states, boundary conditions, etc.), • synthesize or find solution methods in new physical applications.

General Competencies
- Search for, analysis and synthesis of data and information, with the use of the necessary technology.   - Decision making.   - Production of free, creative and inductive thinking.

CONTENT OF THE COURSE

Basic introductory concepts in programming with symbolic programming languages. Basic operations and commands, functions, integrals, lists, diagrams. Introduction to Complex Analysis. Vector Spaces, Hilbert Spaces, Operators, Integral Transformations. Special Functions of Mathematics and Physics (Gamma function, Theta function, Zeta function). Differential Equations and their solution with a computer. Non-homogeneous Differential Equations. Green's method. Applications in Physics.

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Software Mathematica. e-Lectures. Use of e-class. Communication through face-to-face discussions and e-mails.
TEACHING ORGANIZATION	<table><tr><th>Activity</th><th>Semester Workload</th></tr><tr><td>Lectures</td><td>52 hours</td></tr><tr><td>Projects</td><td>25 hours</td></tr><tr><td>Individual Study</td><td>73 hours</td></tr><tr><td>Course Total (25 hours per ECTS)</td><td>150 hours</td></tr></table>
STUDENT EVALUATION	Projects 10%. Progress-exam 20%. Written final examination 70%.

RECOMMENDED BIBLIOGRAPHY

1. Vergados J., Mathematical Methods of Physics, Vol. I, Crete University Press, 2004. (Greek)
2. Chow T., Mathematical Methods for Physicists: A concise introduction, Kleidarithmos Publications, 2018. (Greek)
3. Mathematical Methods of Physics, Volume A, Complex Functions, Fourier Analysis, S. Masen, M. Grypaios, Charalambos Publications Nik. Aivazis. (Greek)