■ CE74 - Symbolic Programming Languages

GENERAL

SCHOOL	EXACT SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE64	**SEMESTER**	F
COURSE TITLE	SYMBOLIC PROGRAMMING LANGUAGE		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS**
Lectures	4	6

COURSE TYPE	Skills Development
PREREQUISITE COURSES	Introduction to Programming
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 students: • will have acquired the knowledge of basic concepts of informatics, • will have become familiar with the use of computational algebra systems such as Mathematica to solve mathematical problems in all areas of mathematics, • will be able to design problem-solving algorithms, • will be able to present mathematical concepts to students in a more demonstrative way, • will have acquired necessary teaching skills for teaching computer science in high

school.

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

The course is included in the section of Special Teaching of Mathematic courses. An introduction to the use of informatics concepts suitable for presentations to junior high school students. Required laboratory course of a large number of compulsory courses. Introduction to systems of symbolic mathematical manipulations. The Mathematica language. Representation of symbolic mathematical expressions. Numerical calculations. Symbolic calculations. Symbolic manipulation of mathematical expressions. Basic functions. List and list manipulation. Functions, program flow control structures. Programming. Introduction to using additional packages. Create new packages. Study and didactic approach to the understanding of special topics from the areas of Algebra (expansion-factorization of expressions, simplification-transformation of expressions into equivalent simpler forms, tables, sets), Analysis (exact and numerical solutions of equations and systems of algebraic equations, differentiation, Taylor series, limits, integration, series) and Geometry (second order curves and surfaces, static and moving graphs). Use of other symbolic languages such as Maple, Reduce, Macsyma, Matlab. Comparison.

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	e-Lectures. Use of e-class. Communication through face-to-face discussions and e-mails.
TEACHING ORGANIZATION	

Activity	Semester Workload
Lectures	52 hours
Individual Study	98 hours

	Course Total (25 hours per ECTS)	150 hours
STUDENT EVALUATION	Programming tasks 30%. Written final examination 70%.	

RECOMMENDED BIBLIOGRAPHY

1. Karampetakis Nikolaos, Stamatakis Stylianos, Psomopoulos Evangelos, 2004, Mathematics and Programming in Mathematica, Ziti Publications. (Greek)
2. Papadakis Konstantinos E., 2010, Introduction to Mathematica, Tziola Publications. (Greek)
3. Stefanos Trahanas, 2004, Mathematica and applications, University Press of Crete. (Greek)
4. N. Glynou, Introduction to symbolic calculations with Mathematica, Ioannina 2002. (Greek)
5. S. Trachanas, 2001, Mathematica and Applications: For Mathematicians, Physicists and Engineers, University Press of Crete. (Greek)
6. John W. Gray, 1997, Mastering Mathematica: Programming methods and applications, Academic Press.
7. R.J. Gaylord, S.N. Kamin and P.R. Wellin, 1993, Introduction to Programming with Mathematica, Springer-Verlag.
8. Roman Maeder, 1991, Programming in Mathematica, Addison-Wesley Publishing Co., Second Edition.