2.3 CE0230 – Applied Informatics & Computer Programming

(1) GENERAL

SCHOOL	ENGINEERING SCHOOL		
ACADEMIC UNIT	CIVIL ENGINEERING DEPARTMENT		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**CE0230**	**SEMESTER**	**2**
COURSE TITLE	**Applied Informatics & Computer Programming**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background Course
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.uniwa.gr/courses/PEY104/

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aims of the course are: a) To introduce the student to the basic algorithmic thinking, b) To provide the student with the basic knowledge of sequential programming and procedural programming, c) To give basic knowledge about networks, the Internet and the tools available.

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

- solve computational problems using applications such as MatLab and Excel
- use computer and internet tools efficiently
- functionally combine different applications with each other, transferring data and results for a more complex task
- understand the subject of algorithms and technical problem solving methods
- implement the graphical representation of data and experimental results with PC as well as their further processing with algorithms

- understand the basic logic and philosophy of programming, so that having acquired appropriate knowledge in MatLab and Excel, they can in longer semesters to write and develop programs that will solve problems of their specialty.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?;.

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*

Specifically, students will be able to perform:

- Search, analysis and synthesis of data and information, using the necessary technologies
- Autonomous work
- Teamwork
- Promotion of free, creative and inductive thinking

(3) SYLLABUS

Theoretical Part of the Course

The MATLAB scientific programming language. The MATLAB program development environment. Introduction to programming. Algorithmic. Logic diagram. Variables and constants, nomenclature and formulas, input and output commands, assignment commands, arithmetic expressions, internal functions, programs with simple sequential structure. Loop and control structures, use of files for data I/O, programs with more complex structure. Variables with pointers, vectors, tables, matrices and operations. User subroutines and functions. Exercises and simple applications of the specialty. Special tools for handling tables, matrices, graphs, statistical analysis. Graphics creation tools. Graphic User Development Tools (GUI). Solving problems in the specialty of Civil Engineer. Data files and connection of MATLAB with other applications (Fortran, Excel, etc.) with data and results standardization for compatibility and transfer. Specialized use of the Internet to find sources of information and collect data. Connecting MATLAB programs to the Internet.

Laboratory Part of the Course

The syllabus of the laboratory part follows the program of the theoretical part mentioned above. Each laboratory exercise is designed to enable the trainee to understand and consolidate the topic developed in the theoretical part and to see directly the results of the taught commands and applications. Some of the lab exercises are also demonstrated in Fortran or Excel, so that students can identify common programming techniques between languages. The exercises must be completed within the time of the laboratory and the students are evaluated according to the degree of completion and completeness with which they perform them. The final examination of the laboratory takes place in the last week of the semester. The exercises are selected so that they are related to practical technical problems that the student will encounter in the specialty courses of the following semesters. The laboratory exercises have steps/questions of varying degree of difficulty in order to better assess the skills of the trainees.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Teaching using ICT, Communication and Electronic Submission, supported by the university e-Class platform and Specialised software for programming - IDE (MatLab/Octave, Excel/Calc).
TEACHING METHODS *The manner and methods of teaching are described in detail.*	

Activity	***Semester workload***

Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. *The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS*		Lectures	39
		Classwork	26
		Preparation for Project	35
		Personal Study	40
		Course total	**140**
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open- ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Language of evaluation: Greek Final score is tha average of Theory & Laboratory results. Theory: - Final written examination: 60% - Midterm examination & project: 40% (20+20) Laboratory: - Oral examination in lab assignments: 50% - Final written examination: 50% The evaluation criteria, and the grades are presented to the students through the online platform of the Institution. The language of assessment is Greek unless the students come from the Erasmus program, in which case the examination is in English.		

(5) **ATTACHED BIBLIOGRAPHY**

Greek Bibliography:

1. Μούσας Β.Χ., Βασική Χρήση & Προγραμματισμός του MATLAB, Εκδόσεις Ίων, 2008.
2. Παπαγεωργίου Γ.Σ., Τσίτουρας Χ.Γ., Φαμέλης Ι.Θ., Σύγχρονο Μαθηματικό Λογισμικό: MatLab-Mathematica, Εκδόσεις Συμεών, 2004.
3. Hanselman D.C. and Littlefield B.L., Μάθετε το MATLAB 7, Εκδόσεις Κλειδάριθμος, 2006.
4. Δημόπουλος Κ., Γλαμπεδάκης Μ., Excel, Θεωρία-Εφαρμογές-Συναρτήσεις Ίων, 1998
5. Μούσας Β.Χ., Προγραμματισμός για Μηχανικούς με την Fortran 95/2003, Εκδόσεις Ίων, 2006.
6. Nyhoff L.R. και Leestma S., Introduction to Fortran 90, Εκδόσεις Ίων, 2001

Foreign Bibliography:

1. Palm W., Introduction to MatLab 7 for Engineers, McGraw-Hill, 2004.
2. Hanselman D.C. and Littlefield B.L., Mastering MatLab 7, Prentice Hall, 2004.
3. Gilat A., Matlab: An Introduction with Applications, 2nd edition, John Wiley, 2008.
4. Chapman S., MatLab Programming for Engineers, Cengage Learning, 2008