1.1.1 Computer Programming

GENERAL

SCHOOL	Engineering
ACADEMIC UNIT	CIVIL ENGINEERING
LEVEL OF STUDIES	Undergraduate
COURSE CODE	ΓΕΝ006 **SEMESTER** 2nd
COURSE TITLE	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**
	3	3
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*	Scientific Background	
PREREQUISITE COURSES:		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek	
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No	
COURSE WEBSITE (URL)		

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*

Upon completing this course students should be able to define the way computers work, basic principles of programming, the value of computers for civil engineering, build short programs for engineering applications, calculate numerical problems for civil engineering though computer programming.

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...*

....

- Working independently
- Team work
- Decision-making
- Criticism and self-criticism
- Production of free, creative and inductive thinking

SYLLABUS

Introduction to programming. Algorithms and flowcharts. Matlab environment (Octave). Command line. Constants, variables, arrays, library functions. Arithmetic operations with scalar variables and arrays. Help commands and files. Writing programs. .m Files. Input and output commands (input, disp, fprintf). User-defined functions using inline. Program execution. Debugging. Decision-making statements (if, switch). Looping statements (for, while). Counters, accumulators. Array indexing. Graphical representations. Plotting commands (plot, figure, hold, axis, xlabel, ylabel, title, plot3). 3D graphs (meshgrid, mesh, surf, contour). User-defined functions using the 'function' keyword. function calls. recursion. Data files, reading, writing. Symbolic toolbox. Symbolic variables, functions, roots, derivatives, integrals, differential equations. Data modeling: curve fitting, curve fitting in Matlab

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*	The course is taght in a computer cluster room with Matlab/(Octave clone) and open source GNU
TEACHING METHODS *The manner and methods of teaching are described in detail.* *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*	<table><tr><td>***Activity***</td><td>***Semester workload***</td></tr><tr><td>Lectures</td><td>13</td></tr><tr><td>Practice/exercises</td><td>26</td></tr><tr><td>Individual study</td><td>39</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total (26 hours workload per ECTS credit)</td><td>***78***</td></tr></table>
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.*	Written final examination (50% of the final grade) that includes: • Open ended questions • Problem-solving exercises • Group written assignment (2/3 students) (30% of the final grade) • Individual laboratory work during the course (20% of the final grade).

ATTACHED BIBLIOGRAPHY

-[In Greek]. Γραββάνης Γιώργος, Γιαννουτάκης Κωνσταντίνος, Προγραμματισμός με τη Χρήση Matlab,

Εκδόσεις Α. ΠΑΠΑΣΩΤΗΡΙΟΥ ΣΙΑ ΟΕ, 2012, ISBN: 978-960-491-057-1
-[In Greek]. Stormy Attaway, Matlab: Μια πρακτική εισαγωγή στον προγραμματισμό και την επίλυση προβλημάτων, Εκδόσεις Κλειδάριθμος ΕΠΕ, 2016, ISBN: 978-960-461-663-3
-[In Greek]. Musto J., Howard W., Williams R., Υπολογιστική Μηχανική με Matlab και Excel, Εκδόσεις Τζιόλα, 2015, ISBN: 978-960-418-504-7