COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Sciences		
ACADEMIC UNIT	Department of Computer Science		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	716SKOC	**SEMESTER**	7
COURSE TITLE	COMPUTER GRAPHICS		

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**
Lectures	2	5
Tutorial' Exercises	1	
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*	Specialised general knowledge, Skills development
PREREQUISITE COURSES:	Mathematics I, Mathematics II
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	http://195.130.93.18/pachidis/ comgraph /index.html

(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 course is designed to bring in contact and give the possibility to the student to deal with all those topics in a very interesting field of informatics, computer graphics. Computer graphics have a huge number of applications in different areas of science and technology. Topics presented and discussed during lectures are related to:

Processing systems and graphic information visualization systems. Vectorised and mosaic graphics. Colour models. Algorithmic processing and display hierarchy of graphical information. Basic algorithms to generate a line, cycle into a mosaic. Coordinate Systems. Homogeneous coordinates. Basic and composite transformations in two and three dimensions. Windows and views, Window into view transformation. Clipping in two and three dimensions. Observation spaces in three dimensions.

Projective representations in three dimensions. Geometric modeling / representation of objects in two and three dimensions. Adding texture to three-dimensional models. Key-frame and Camera animation. Lighting. OpenGL graphics library.

Upon successful completion of the course the student will be able to:

- Know information related to the history and the development of computer graphics both in terms of software and hardware used.
- Understand the two-dimensional graphics and algorithms that include the drawing of lines, circles and polygons, clipping and transformations. Be able to apply these algorithms and evaluate them.
- Understand the concepts and techniques used in three-dimensional computer graphics, including transformations, hierarchical modeling, colour, lighting and texture mapping.
- Implement fundamental algorithms and techniques to three-dimensional graphics and explain the relationship between two-dimensional and three-dimensional versions of such algorithms.
- Use the OpenGL graphics library and tools to evaluate and develop programs based on OpenGL and application development related tools.

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…*
	…….

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Working independently
Project planning and management
Production of new research ideas

(3) SYLLABUS

I.Introduction - Processing systems and graphical information visualization systems.
I.Vectorised and mosaic graphics. Colour models. Algorithmic hierarchy of processing and visualization of graphical information.
I.Basic algorithms to create a line, circle in mosaic.
/.Clipping in two and three dimensions.
/.Coordinate Systems. Homogeneous coordinates.
I.Basic and composite transformations in two and three dimensions.
I.Windows and views, Window into view transformation.
I.Observation spaces in three dimensions. Projective representations in three dimensions.
X.Geometric modeling / representation of objects in two and three dimensions. OpenGL Graphics library.
X.Adding texture to three-dimensional models. Examples with OpenGL.
I.Key-frame and Camera animation. Lighting. Examples with OpenGL.
I.Programming with OpenGL.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Presentation with the help of slides and of the whiteboard, Website of the course with supporting and auxiliary material, Contact by e-mail.</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>26x2=52</td></tr>
<tr><td>Tutorial Exercises: Selected, representative exercises are solved concerning different modules of the course.</td><td>13x2=26</td></tr>
<tr><td>Individual or Team Project</td><td>30x0,5=15</td></tr>
<tr><td>Written Exams</td><td>2x1=2</td></tr>
<tr><td>Individual Study</td><td>150x0,2=30</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>125</td></tr>
</table>
</td></tr>
<tr><td>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.</td><td>Theory
Final written exam (70%) which includes the solution of exercises, selected from different modules of the course.

Individual or Team Project
Software application development (30%) based on OpenGL or other language or computer graphics environment.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
- Related academic journals:

- T. Theoharis, G. Papaioannou, N. Platis, N. M. Patrikalakis, “Graphics and Visualization: Principles and Algorithms”, SYMMETRIA Editions, 2010, ISBN: 9789602662960. (Greek Edition)
- T. Theoharis, A. Bem, “Graphics: Principles and Algorithms” SYMMETRIA Editions, 1999. (Greek Edition)
- P. Shirley, M. Ashikhmin, S. Marschner, "Fundamentals of Computer Graphics", A K Peters/CRC Press, 3rd Edition, 2009, ISBN: 9781568814698.
- J.F. Hughes, A.V. Dam, M. McGuire, D. Sklar, S. K. Feiner, J. D. Foley, K. Akeley, “Computer Graphics: Principles and Practice (3rd Edition),“ Addison Wesley, 2013, ISBN**:** 9780321399526**.**
- J. D. Foley, A.V. Dam, S. K. Feiner, J.F. Hughes, “Computer Graphics: Principles and Practice in C" (2nd Edition) , Addison Wesley, 1995, ISBN**:** 9780201848403**.**
- IEEE, Computer Graphics and Applications Magazine
- IEEE, Computer Graphics & Applications
- IEEE, Transactions on Visualization and Computer Graphics