COURSE OUTLINE

(1) GENERAL

SCHOOL	Social Sciences			
ACADEMIC UNIT	Cultural Technology and Communication			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	PLR107	SEMESTER 4 th		
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	3
Laboratories			2	2
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			4	5
COURSE TYPE general background, special background, specialised general knowledge, skills development	Optional/Spe	ecial Background		
PREREQUISITE COURSES:	None			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes			
COURSE WEBSITE (URL)	https://eclass.aegean.gr/courses/131137/			

(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

At the end of this course, the students will be able to:

- report with accuracy the basic characteristics of vector images and the input/output devices.
- Identify the basic differences between 2D and 3D graphics.
- Define the parameters of affine transforms in computer graphics.
- Be aware of the 3D and 2D modelling techniques (polygons, particle systems, constructive solid geometry, fractals).
- Understand algorithms for: line printing, oval printing, cycle printing, Bresenham algorithms, RasterOp algorithm.
- Be familiar with new technologies in animation such as: key-frame animation, procedural animation, motion capture techniques and devices, particle systems.
- Describe the effect of aliasing and anti-aliasing.
- Design algorithmic procedures for process, analyze, and design computer graphics, considering specific issues for object modelling, placing objects in global coordination systems, inserting texture in objects, defining lighting conditions and projecting objects in 2D planes.
- Composing algorithmic structures for object modelling using modern freeware software.

- Generate executable applications using modern freeware software (Unity) and related libraries in javascript for game development.
- Describe the appropriate procedures for composing affine transformations related to translation, rotation, warping and object scaling.
- Communicate efficiently their knowledge, which is acquired from the lectures, to colleagues to establish fruitful co-operations for creating cultural informatics applications and computer games.

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,	Project planning and management
with the use of the necessary technology	Respect for difference and multiculturalism
Adapting to new situations	Respect for the natural environment
Decision-making	Showing social, professional and ethical responsibility and
Working independently	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 in an interdisciplinary environment
- Production of free, creative and inductive thinking
- Transfer of know-how in other environments
- Working independently
- Practice Critical Thinking

(3) SYLLABUS

This course introduces the theory of computer graphics and digital processing of vector images. The lectures also include the principles of computer animation and aspects related to 2D and 3D graphics. A brief structure of the course is the following:

- 1. Introduction to mathematical background
- 2. 3D representation models Polygonal model
- 3. 3D representation models Algorithms for drawing lines
- 4. Algorithms for drawing circles
- 5. Algorithms for drawing circles
- 6. Transformations in 2D and 3D
- 7. Homogeneous coordinates
- 8. Transformations Homogeneous coordinates -examples
- 9. Transformations Homogeneous coordinates -examples
- 10. Transformations Homogeneous coordinates -examples
- 11. Clipping
- 12. Texture Illumination models
- 13. Course summary

(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	Use of open source software for laboratory education. Use ICT in teaching and communication with students (Blender).		
TEACHING METHODS	Activity	Semester workload	
The manner and methods of teaching are	Lectures	13 *2 hours =26 hours	
described in detail.	Lectures' study 13*4 hours = 52 hours		
Lectures, seminars, laboratory practice, fieldwork, study and analysis of biblioaraphy.	Laboratory Practice	13*2 = 26 hours	
tutorials, placements, clinical practice, art	Laboratory Preparation and	45 hours	
workshop, interactive teaching, educational	semester assignment		
etc.			
The student's study hours for each learning			
directed study according to the principles of the			
ECTS			
	Course total	149 hours	
STUDENT PERFORMANCE			
EVALUATION	The evaluation of students' performance evaluation is		
Description of the evaluation procedure	conducted at the end of the se	emester with written exams in	
Language of evaluation, methods of evaluation,	the form of open questions that require critical thinking. These		
summative or conclusive, multiple choice	examinations during the periods of January and September		
		/ /	
questionnaires, short-answer questions, open-	are the major evaluating meth	ods. Students' performance is	
ended questions, problem solving, written work, essay/report, oral examination, public	are the major evaluating methe measured on a 1-10 scale (10	ods. Students' performance is excellent). A final assignment	
ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical	are the major evaluating meth measured on a 1-10 scale (10) for the course is released at the	ods. Students' performance is excellent). A final assignment middle of the course, which is	
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	are the major evaluating meth measured on a 1-10 scale (10) for the course is released at the not mandatory, but it contrib	excellent). A final assignment middle of the course, which is utes to the final grade with a	
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,	are the major evaluating meth measured on a 1-10 scale (10) for the course is released at the not mandatory, but it contrib weighted percentage of 30%.	excellent). A final assignment middle of the course, which is utes to the final grade with a	
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.	are the major evaluating methemeasured on a 1-10 scale (10) for the course is released at the not mandatory, but it contribies weighted percentage of 30%. Students are familiar with the ecourse lecture. All notes are	excellent). A final assignment e middle of the course, which is utes to the final grade with a evaluation criteria from the first	
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.	are the major evaluating methemasured on a 1-10 scale (10) for the course is released at the not mandatory, but it contribution weighted percentage of 30%. Students are familiar with the ecourse lecture. All notes are subject on the second scale of the second scale	excellent). A final assignment e middle of the course, which is utes to the final grade with a evaluation criteria from the first stored in the course's area in ass aggean gr)	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Θεοχάρης Θ., Μπεμ Α., Γραφικά: Αρχές και Αλγόριθμοι, Σ.ΑΘΑΝΑΣΟΠΟΥΛΟΣ & ΣΙΑ Ο.Ε. 1999, ISBN: 978-960-11-0004-3.
- Η. Bakers, Γραφικά Υπολογιστών με OpenGL, Α. Τζιόλα & υιοι Α.Ε. 2010, ISBN: 978-960-418-257-2.
- Θεοχάρης Θ., Παπαιωάννου Γ., Πλατής Ν., Πατρικαλάκης Ν.Μ., Γραφικά και Οπτικοποίηση: Αρχές και Αλγόριθμοι, Εκδόσεις ΕΚΠΑ, 2019, 978-960-466-210-4.

- Related academic journals:

- IEEE Transactions on Visualization and Computer Graphics, IEEE Society
- ACM Transactions on Graphics
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
- Visual Computer
- IEEE Computer Graphics and Applications
- Computers and Graphics
- Graphical Models

• Computer Animation and Virtual Worlds