INSTITUTION	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS				
SCHOOL	SCHOOL OF SCIENCE				
DEPARTMENT	INFORMATICS AND TELECOMMUNICATIONS				
COURSE LEVEL	GRADUATE				
COURSE TITLE	**Advanced Graphics Algorithms**				
COURSE CODE	**C10**	**Semester**	Fall	**ECTS**	6
TEACHING HOURS per week	**THEORY** 3	**SEMINAR.**		**LABORATORY**	1
URL	https://eclass.uoa.gr/courses/D187/				

COURSE CONTENT

A quick review of basic concepts: coordinate systems and transformations, clipping algorithms, projections, lighting models and algorithms, hidden surface algorithms, antialiasing algorithms, primitive rasterization algorithms.

A selection from the following topics: 3D object representation models and their simplification, Culling algorithms. Ray tracing algorithms. Advanced lighting models and algorithms. Texture generation algorithms: parametric and procedural. Animation. Scene management. Shadow algorithms. Scientific visualization principles and algorithms. Parametric curves and surfaces: Bezier, B-spline. Advanced representations for rotation: quaternions, continuous representation. Fractals and their applications in computer graphics: principles, iterated function systems, Julia and Mandelbrot sets, two-dimensional and pseudo-three-dimensional representations.

STUDENT LEARNING OBJECTIVES

Upon successful completion of the course the student will be able to:
- Define and explain basic and advanced concepts in computer graphics, visualization, fractals
- Study and summarize research articles in the above fields
- Program in a graphics API

TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD	In Class (Face to Face) and /or distance (online) teaching when required
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	The e-class platform will be used to support learning activities (distribution of course material, announcements, discussions, project announcement and delivery). Communication mainly via e-class. When online teaching takes place, there will be live sessions which may be recorded and remain available for a specific amount of time. Use of online teaching tools such as Zoom, WebEx. An online whiteboard will be used and made available.

TEACHING ORGANIZATION *Describe in detail the way and methods of teaching: Enhanced Lectures, Online Lectures, Seminars,*	**Activity**	***Student Workload*** *(hours)*
	Lectures	52

Tutorial, Laboratory, Laboratory Exercise, Study & analysis of literature, Practice (Positioning), Interactive teaching, Developing a project, Individual / group work Telework (reference to tools) etc. Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS		
	Lab	8
	Project work	40
	Individual study	50
	Total Course	**150**

ASSESSMENT OF STUDENTS *Description of the assessment process* *Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other* *Fully defined evaluation criteria are mentioned and if and where they are accessible to students.*			
	Assessment methods	*Number*	**Percentage**
	Written examination	1	70%
	Research article presentation	1	15%
	Project	1	15%

LITERATURE AND STUDY MATERIALS / READING LIST

- Theoharis T., et al, 'Graphics and Visualization: principles & algorithms', CRC Press.
  Also available in Greek: Θεοχάρης Θ., et al, 'Γραφικά και Οπτικοποίηση: αρχές & αλγόριθμοι', Εκδόσεις ΕΚΠΑ.
- Drakopoulos V., Fractals, notes.
- Selected research articles.