University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
COMP-320	Computer Graphics	6
Department	**Semester**	**Prerequisites**
Computer Science	Fall	COMP-113, MATH-280
Type of Course	**Field**	**Language of Instruction**
Elective	Computer Science	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	3rd	Dr Andreas Savva
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to the design and construction of models that represent information in ways that support the creation and viewing of images.
- Provide practical experience to two-dimensional and three-dimensional transformations, i.e. scaling, rotations, translation, and sheering,
- Introduce students to the design of devices and techniques through which a person may interact with the model or the view.
- Introduce students to techniques for rendering a model, and the design of ways the image may be presented.
- Provide practical experience to API programming using OpenGL.
- Introduce students to a three-dimensional environment for enhancing interaction between a human user and a computer-created world.

Learning Outcomes:

Upon completion of the course students should be able to:

- Distinguish the capabilities of different levels of graphics software and describe the appropriateness of each.
- Create images using a standard graphics API.
- Use the facilities provided by a standard API to express basic transformations such as scaling, rotation, translation, and sheering.
- Describe the appropriateness of graphics architecture for given applications.
- Explain the function of different input devises.
- Compare and contrast the techniques of raster graphics and vector graphics.
- Use current hardware and software for creating and displaying graphics.
- Create simple polyhedral models by surface tessellation.
- Construct CSG models from simple primitives, such as cubes and quadric surfaces.
- Generate a mesh representation from an implicit surface.
- Explain the operation of Bresenham algorithm for rendering a line or pixel-based display.
- Demonstrate rendering techniques by creating an image using API.
- Describe how a graphics image has been created.

Course Contents:

1. Introduction to Computer Graphics and OpenGL.
2. 2D and 3D Geometric Transformations
3. Viewing and Projections
4. Hidden Surface Removal
5. Lighting and Shading
6. Color, Texture Mapping
7. Geometric Modeling - Curves and Surfaces
8. Subdivision surfaces
9. Radiosity

Learning Activities and Teaching Methods:

Lectures, In-class Exercises, Assignments

Assessment Methods:

Homework, Assignments, Mid-Term, Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
T. Theocharis, G. Papaioannou, N.M. Patrikalakis	Graphics and Visualization – Principles and Algorithms	A.K. Peters Ltd	2008	13:978-1-56881-274-8

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Eduard Angel	Interactive Computer Graphics – A top-down approach using OpenGL, 5th Ed	Addison-Wesley	2008	0-13-140909-3
Dave Shreiner	OpenGL Programming Guide, 7th Ed	Addison-Wesley	2009	0-321-55262-8