



Course Syllabus

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

Course Objectives:

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:

After completion of the course students are expected to be able to:

1. Distinguish the capabilities of different levels of graphics software and describe the appropriateness of each.
2. Create images using a standard graphics API.
3. Use the facilities provided by a standard API to express basic transformations such as scaling, rotation, translation, and sheering.

4. Describe the appropriateness of graphics architecture for given applications.
5. Explain the function of different input devices.
6. Compare and contrast the techniques of raster graphics and vector graphics.
7. Use current hardware and software for creating and displaying graphics.
8. Create simple polyhedral models by surface tessellation.
9. Construct CSG models from simple primitives, such as cubes and quadric surfaces.
10. Generate a mesh representation from an implicit surface.
11. Explain the operation of Bresenham algorithm for rendering a line or pixel-based display.
12. Demonstrate rendering techniques by creating an image using API.
13. Describe how a graphics image has been created.

Course Content:

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, Computer Lab Projects

Assessment Methods:

Homework, Projects, Mid-Term, Final Exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Practical Algorithms for	R. Stuart Ferguson	A.K. Peters /CRC Press	2013	978-1466582521

Computer Graphics, 2 nd ed.				
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Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
OpenGL Programming Guide, 9 th ed.	John Kessenich, Graham Sellers, Dave Shreiner	Addison-Wesley	2017	978-0134495491