

Course Syllabus

COMPUTER GRAPHICS

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Program: Computer Science

1. Course number and name

CCPG1020 - COMPUTER GRAPHICS

2. Credits and contact hours

3 credits and 3 contact hours

3. Instructor's course or coordinator's name

JOSE LUIS ASENCIO MERA

4. Text book, title, author, and year

- Hughes, J., Van Dam, A., Mcguire, M., Sklar, D.. Computer Graphics: Principles and Practice (Tercera Edición)
 - a. Other supplemental materials
- Shirley, P., Marschner, S.. Fundamentals of Computer Graphics (Cuarta Edición)
- Guha, S.. Computer Graphics through OpenGL: from theory to experiments (Tercera Edición)

5. Specific course information

- a. Brief description of the content of the course (catalog description)

This course is part of the multimedia itinerary and starts with a general view of the diverse computer graphics applications in the world. Then the technical and scientific concepts behind the creation of synthetic images generated by a computer are presented, this includes the concepts of linear algebra that explain the related transformations. The course explores central concepts in computer graphics for the generation of synthetic images with greater realism such as: lighting models, methods of assigning color to the pixel ("shading"), color theory, texture mapping, algorithms of clipping ("clipping") and the way to project the images in displays. Finally, the technology of ray tracing and radiosity is discussed. For the practical implementation of each subject, students used OpenGL, an API (library of functions) standard of the industry, that takes advantage of the computational power of current graphic cards in the computers.

- b. This course is: Selected elective

6. Specific goals for the course

- a. Specific outcomes of instruction
 - 1.- To use the functionalities of the current computer graphics cards using OpenGL for the generation of synthetic images
 - 2.- To apply techniques for improving synthetic images by using texture mapping.
 - 3.- To select anti-aliasing methods for the elimination of artifacts in synthetic images
- b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other



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outcomes are addressed by the course

7. Brief list of topics to be covered

- 1.- Introduction and review of lineal algebra applied to computer graphics
- 2.- Transformations and viewing
- 3.- Color theory, illumination, shading and texture
- 4.- Representation of 3D objects and visibility detection methods
- 5.- Global illumination, radiosity and ray tracing
- 6.- Signal processing, aliasing y anti-aliasing methods in computer graphics
- 7.- Introduction to animation

