Computer Graphics and Artificial Intelligence

Academic Year: (2022 / 2023) **Review date: 26-04-2023**

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: BERLANGA DE JESUS, ANTONIO

Type: Electives ECTS Credits : 6.0

Year : 4 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Linear Algebra, Algorithms and Data Structures

OBJECTIVES

1. To give an overview of the algorithms involved in Computer Graphics
2. Studends must know both hardware and software components of computer graphics systems
3. Students must know the basics about computer software that supports the development of systems for graphics rendering and modeling
4. Students should be able to use some computer graphic software to solve homework tasks
5. Students should work on the homeworks in teams
6. Students should generate highly realistic images, using techniques based on physical simulation of light
7. To know the applications of artificial intelligence in the area of computer graphics.

CECC1. Ability to have a deep knowledge of the fundamental principles and models of computing and know how to apply them to interpret, select, evaluate, model, and create new concepts, theories, uses and technological developments related to computing.
CECC3. Ability to evaluate the computational complexity of a problem, to know algorithmic strategies that can lead to its resolution and to recommend, develop and implement the one that guarantees the best performance according to the established requirements.
CECC6. Ability to develop and evaluate interactive and complex information presentation systems and their application to the resolution of human-computer interaction design problems.

DESCRIPTION OF CONTENTS: PROGRAMME

0. Introduction to computer graphics. Elements and applications
1. Visual perception
2. Colour models
3. Geometric and raster transformation algorithms
4. 3D modelling
5. Fractal graphics, theory and applications
6. Lighting and shading techniques
7. Rendering Algorithms
8. Introduction to animation
9. Scientific Visualization Applications
10. Application of Artificial Intelligence techniques to Computer Graphics

LEARNING ACTIVITIES AND METHODOLOGY

Theoretical lectures: 2 ECTS. To achieve the specific cognitive competences of the course.
Practical lectures: 3 ECTS. To develop the specific instrumental competences and most of the general competences, such as analysis, abstraction, problem solving and capacity to apply theoretical concepts. Besides, to develop the specific attitudinal competences.
Guided academic activities (whitout present teacher): 1 ECTS. The student proposes a project according to the teachers guidance to go deeply into some aspect of the course, followed by public presentation.

ASSESSMENT SYSTEM

Exercises and examinations are both learning and evaluation activities. The evaluation system includes the assessment of guided academic activities and practical cases, with the following weights:

Final Exam: 30%
Test: 20%
Exercises: 35%
Academic activities without teacher presence: 15%

A minimum score of 3,0 is required to pass the exam.

% end-of-term-examination:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

BASIC BIBLIOGRAPHY

- Foley, J.D., et. al. Computer Graphics. Principles and Practice, Ed. Addison Wesley, 1990.
- Shirley et al. Fundamentals of Computer Graphics, Second Edition,, AK Peters, Ltd..

ADDITIONAL BIBLIOGRAPHY

- Hearn, D., Baker, M.P. Gráficas por computadora,, Ed. PrenticeHall, 1995.