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Computer graphics

Academic Year: (2023 / 2024)   **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 : 3.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Algebra
Calculus
Programming
Artificial Intelligence

SKILLS AND LEARNING OUTCOMES

Complement the basic, transversal and compulsory knowledge of the Degree according to the student's preferences.

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. Ability to generate images using techniques based on artificial intelligence.

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

- Introduction to computer graphics. Elements and applications
- Generation and transformation algorithms
- Color models and 3D modeling
- Rendering techniques
- Summary of applications to Computer Science
- Application of Artificial Intelligence techniques in Computer Graphics

LEARNING ACTIVITIES AND METHODOLOGY

Seminars and lectures supported by computer and audiovisual aids.
Practical learning based on cases and problems, and exercise resolution.
Individual and group or cooperative work with the option of oral or written presentation.
Individual and group tutorials to resolve doubts and queries about the subject.
Internships and directed laboratory activities.

ASSESSMENT SYSTEM

The exercises and exams, in addition to serving as a training activity, have the dual purpose of being a measure for the evaluation system.
The evaluation system includes the assessment of the directed academic and practical activities according to the following weighting.
Final exam: 30%.
Partial test: 10%.
Student works: 45%.
Directed Academic Activities:
Without the presence of the professor: 15%.

A minimum of 3.0 on the final exam is required.

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

BASIC BIBLIOGRAPHY

- Peter Shirley et al. Fundamentals of Computer Graphics, CRC Press, 3rd edition (2009)

ADDITIONAL BIBLIOGRAPHY

- Foley, Van Dam, Feiner, & Hughes Computer Graphics: Principles and Practice, Addison-Wesley.

- Samuel R. Buss 3D Computer Graphics A Mathematical Introduction with OpenGL, Cambridge University Press.