Universidad Zaragoza

Academic Year/course: 2023/24

30234 - Graphic IT

Syllabus Information

Academic year: 2023/24
Subject: 30234 - Graphic IT
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 439 - Bachelor's Degree in Informatics Engineering
ECTS: 6.0
Year: 4
Semester: First semester
Subject type:
Module:

1. General information

The objective of the subject is to familiarize the student with the world of computer generated graphics, both in its role of knowledge related to the world of Computer Science, as well as as a possible professional outlet . The current state of the world of Computer Graphics in the expanded sense, including the world of Computational Imaging, will be presented.

Students taking this subject must have programming knowledge, as well as a basic knowledge of algebra and calculus.

These approaches and objectives are aligned with some of the SDGs:

- Target 8.2. Achieving higher levels of productivity [...]
- Target 8.3. To promote policies oriented to the development [...]
- Target 9.5. Increasing scientific research [...]

2. Learning results

The student, in order to pass this subject, must demonstrate the following results:

- Be able to design and perform two- and three-dimensional scene visualizations and analyze the results.
- Be able to integrate into a work group that requires the development of graphic applications.
- Ability to analyze the performance of a given graphics system and to evaluate the performance of the tools available for visualization design.
- Have initiative: he is decisive, know how to make decisions and act to solve a problem.
- Be able to relate and structure information from various sources, to integrate ideas and knowledge.
- Be able to work effectively in small groups of people for the resolution of a problem of medium difficulty.
- Have creativity as well as openness and intellectual curiosity.
- Have the capacity to adapt: Know how to change to actively face new situations derived from organizational or technological changes.

3. Syllabus

Computer Graphics

- what is Computer Graphics?

  -Introduction

  -Applications
- Geometry and geometric modeling

  -Transformations

  -Implicit geometries

- Physics of light transport

  -The rendering equation

  -Light source models

  -BRDF and material models
- Real time

  -Rasterization

  -Projection matrices

  -Local illumination models (Gouraud, Phong, etc.)
- Rendering algorithms

  -Ray tracing

  -Path tracing

  -Photon mapping
- Participatory media

  -Scattering

  -Simulation of light transport

  -Translucency, sub-surface scattering, skin
- Latest developments

Computational imaging

- what is an image?

  -Introduction

  -Applications

  -Color spaces
- Dynamic range

  -Color resolution

  -High dynamic range images

  -Tone mapping
- Latest developments

4. Academic activities

- The subject syllabus will be developed in the classes taught in the classroom.
- Theoretical and practical cases related to the development of the proposed works will be solved in the problem classes, as an application of the concepts of the program of the subject.
- The practical work related to the subject will be developed by the students in the practical sessions and partially autonomously in groups of a maximum of two people. In the practical sessions the teacher will guide and monitor the correct progress and development of such work, always related to the theoretical content of the subject.

5. Assessment system

1. **Two practical assignments** (2 x 40 = 80%). They may be in groups of two, with follow-up throughout the entire four-month period. A written document must be submitted as a report on each work. The performance of each work will be evaluated according to its specifications, as well as the quality of the report.

2. **Oral presentation** (20%). There will be a presentation of the work carried out, followed by an oral question-and-answer session. Knowledge of the entire course will be assessed, as well as the ability to associate the work with concepts seen in class.

In order to pass the subject, a weighted grade of not less than 5/10 and a grade of not less than 5/10 must be obtained both in each of the papers of test 1 and in the oral presentation of test 2. In case of not obtaining the minimum grade required in any of the tests, the grade in the subject will be the lower value between the weighted average of the three tests and 4/10.
Both the delivery and the oral presentation will take place on the official exam date according to the calendar of the center. Therefore, it is considered as a global assessment.