



Universidad de Jaén

School of Engineering of Jaén

Computer graphics and visualization

2024-2025

Grado en Ingeniería Informática (E.P.S. Jaén)



CREA



Acceso Mayores 40

Guías docentes UJA

Horarios de tutorías

Llamamientos PAU

Movilidad (Coordinador)

P.O.D.

Solicitud bilingüismo

Syllabus 2024-25 - 13312018 - Computer Graphics and Visualization (Informática gráfica y visualización)

Caption

- Level 1: Tutorial support sessions, materials and exams in this language
- Level 2: Tutorial support sessions, materials, exams and seminars in this language
- Level 3: Tutorial support sessions, materials, exams, seminars and regular lectures in this language

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DEGREE: Grado en Ingeniería informática
FACULTY: SCHOOL OF ENGINEERING OF JAÉN
ACADEMIC YEAR: 2024-25
COURSE: Computer Graphics and Visualization

SYLLABUS

1. COURSE BASIC INFORMATION

NAME: Computer Graphics and Visualization

CODE: 13312018

ACADEMIC YEAR: 2024-25

LANGUAGE: English

LEVEL: 1

ECTS CREDITS: 6.0

YEAR: 3

SEMESTER: PC

2. LECTURER BASIC INFORMATION

NAME: JIMÉNEZ DELGADO, JUAN JOSÉ

DEPARTMENT: U118 - INFORMÁTICA

FIELD OF STUDY: 570 - LENGUAJES Y SISTEMAS INFORMÁTICOS

OFFICE NO.: A3 - 142

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WEBSITE: <https://www.ujaen.es/departamentos/dinformatica/contactos/jimenez-delgado-juan-jose>ORCID: <https://orcid.org/0000-0003-3014-0496>

LANGUAGE: English

LEVEL: 1

3. CONTENT DESCRIPTION

SYLLABUS

THEORY

Lesson 1. Introduction to Computer Graphics

* Computer Graphics and Applications

* Graphic Hardware & Software

* Overview of the Graphic Pipeline

Lesson 2. Data visualization and 2D rendering

* Primitives, transformation matrices in 2D

* Algorithms for the 2D visualization process

* Data visualization

Lesson 3. The 3D rendering process

* Geometric foundations

* Transformation Matrices

* The camera

* Projective transformations

* 3D clipping

* Visible surface detection

Lesson 4. 3D model representation and interaction

- * Boundary representation
- * Model decomposition
- * Scene Graphs
- * 3D Picking and interaction

Lesson 5. Lighting and textures

- * Light sources
- * Lighting models
- * Shading models
- * Basic Texture mapping

LABORATORY

Practice 1. Introduction to the OpenGL graphics library

Practice 2. 3D rendering process

Practice 3. Representation of models and Interaction

Practice 4. Lighting and textures

Project

4. COURSE DESCRIPTION AND TEACHING METHODOLOGY

Theory: presentation of theoretical concepts and exercises.

Competences: CC17R, CB2R, CB3R, CB4R, CB5R. Learning results: 17

Laboratory: practical implementation of the techniques studied in theory classes. Tests or short questions. Final Project

Competences CC7R. Learning results: 7, 20R

Collective tutoring: not face-to-face

Competences: CC17R, CB2R, CB3R, CB4R, CB5R. Learning results: 17

The methodology and activities are more detailed in the guide in Spanish

Students with special educational needs should contact the Student Attention Service (Servicio de Atención y Ayudas al Estudiante) in order to receive the appropriate academic support

5. ASSESSMENT METHODOLOGY

Theory (50%). Exam consisting of: problems or test.

In ordinary, the student will be able to take advantage of one of the two exam modalities that are expressed below, selected at the beginning of the course, not being able to change the modality once one of them has been chosen:

- Partial tests during the course.
- Final exam.

Competences: CC17R, CB2R, CB3R, CB4R, CB5R. Learning results: 17

Laboratory (50%): Continuous assessment of practices and test or short questions (40%) and a project (10%). Each practice and the project will have a delivery date. Practices are mandatory. Competences: CC7R. Learning results: 7, 20R

It is mandatory to get a minimum of 5 points out of 10 points on the theory exam to pass the course.

Only final exam of theory part will be carried out on extraordinary.

Evaluation of the course will be global.

The assesment is more detailed in the guide in Spanish.

6. BOOKLIST [f5 WVVgg'h YVjV\]c\[fUd\ m\]b'h Y @VfUfmWUJc\[Ł](#)

MAIN BOOKLIST:

- Computer Graphics: Principles and Practice. Edition: 3. Author: JF Hugues, A Van Dam y otros. Publisher: Addison-Wesley ([Library](#))
- Fundamentals of computer graphics. Edition: 3rd ed. Author: Shirley, Peter. Publisher: Natick, MA : AK Peters, 2009 ([Library](#))
- Computer Graphics : principles and practice. Edition: 3rd ed.. Author: Hughes. Publisher: Upper Saddle River, NJ : Addison-Wesley, 2014 ([Library](#))

ADDITIONAL BOOKLIST:

- The visualization toolkit: an object-oriented approach to 3D graphics. Edition: 4th ed.. Author: Schroeder, Will. Publisher: Colombia : Kitware, cop. 2006 ([Library](#))
- Mathematics for Computer Graphics [Recurso electrónico]. Edition: -. Author: Vince, John A.. Publisher: London : Springer-Verlag London, 2010. ([Library](#))

7. SUSTAINABLE DEVELOPMENT GOALS

Educación de calidad

DETAILED INFORMATION

SDG 4 - Quality Education

- Design interactive visual tools to enhance the learning and teaching of complex concepts.
- Use computer graphics to create interactive and visually appealing educational materials that facilitate the understanding of complex concepts in various subjects.
- Develop 3D applications and simulations that allow students to interact with educational content in a more immersive way.
- Create data visualization platforms to assess and improve the quality of education in different regions.
- Provide crucial tools and knowledge for data-driven analysis, planning, and decision-making.

8. VIRTUAL / CLASSROOM TEACHING SCENARIO

The activities that cannot be carried out in person will be developed with rotational attendance and the use of videoconference systems, provided that the capacity and infrastructure of the space assigned for teaching the subject allow.

It is expressly forbidden to record the video or the audio of the face-to-face activities by any means.

The assessment system and instruments will be the same as for the face-to-face modality.

A more complete description can be seen in the guide in Spanish.

9. VIRTUAL TEACHING SCENARIO

Activities that cannot be carried out in person will be developed by means of synchronous and/or asynchronous activities through the learning platform and videoconference systems.

It is expressly forbidden to record the video or the audio of the face-to-face activities by any means.

The system and assessment instruments will be the same as for the face-to-face mode, but developed through the learning platform or other online technologies, provided that the identity of the student is guaranteed.

A more complete description can be seen in the guide in Spanish.

DATA PROTECTION CLAUSE (on line exams)

Institution in charge of data processing: Universidad de Jaén, Campus Las Lagunillas, s/n, 23071 Jaén

Data Protection Delegate: dpo@ujaen.es

Purpose: In accordance with the Universities Law and other national and regional regulations in force, carrying out exams and assessment tests corresponding to the courses students are registered in. In order to avoid frauds while sitting the exam, the exam will be answered using a videoconference system, being able the academic staff of the University of Jaén to compare and contrast the image of the person who is answering the exam with the student's photographic files. Likewise, in order to provide the exam with evidential content for revisions or claims, in accordance with current regulation frameworks, the exam will be recorded and stored.

Legitimacy: compliance with legal obligations (Universities Law) and other national and regional regulations currently in force.

Addressees: service providers who are the owners of the platforms where the exams are carried out and with whom the University of Jaén has signed the corresponding data access contracts.

Storage periods: those established in current in force regulations. In the specific case of exam videoconference recordings, not before the examination records and transcripts are closed or the exam can still be reviewed or challenged.

Rights: you can exercise your right of access, amendment, cancellation, opposition, suppression, limitation and portability by sending a letter to the postal or electronic address indicated above. In the event that you consider that your rights have been violated, you may submit a complaint to the Andalusian Council for Transparency and Data Protection www.ctpdandalucia.es

CLASS RECORDING CLAUSE PERSONAL DATA PROTECTION

Person in charge: Universidad de Jaén, Paraje Las Lagunillas, s/n; Tel.953 212121; www.ujaen.es

Data protection delegate (DPO): TELEFÓNICA, S.A.U. ; Email: dpo@ujaen.es

Procedure aim: To manage proper recordings of teaching sessions with the aim of facilitating learning process under a multimodal and/or online teaching

Period for record storage: Images will be kept during legal term according to regulations in force

Legitimacy: Data will be managed according to legal regulations (Organic Law 6/2001, December 21, on Universities) and given consent provided by selecting corresponding box in legal admission documents

Data recipients (transfers or assignments): Any person allowed to get access to every teaching modality

Rights: You may exercise your rights of access, rectification, cancellation, portability, limitation of processing, deletion or, where appropriate, opposition. To exercise these rights, you must submit a written request to the Information, Registration and Electronic Administration Service of the University of Jaen at the address above, or by e-mail to the address above. You must specify which of these rights you are requesting to be satisfied and, at the same time, you must attach a photocopy of your ID card or equivalent identification document. In case you act through a representative, legal or voluntary, you must also provide a document that proves this representation and identification. Likewise, if you consider that your right to personal data protection has been violated, you may file a complaint with the Andalusian Data Protection and Transparency Council www.ctpdandalucia.es