Academic Year/course: 2023/24

60966 - Digital image and video processing

Syllabus Information

Academic year: 2023/24
Subject: 60966 - Digital image and video processing
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 623 - Master's Degree in Telecommunications Engineering
ECTS: 6.0
Year: 2
Semester: First semester
Subject type: Optional
Module:

1. General information

This subject lays the theoretical foundations of this discipline and initiates and trains the student for the practical work on it.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030(https://www.un.org/sustainabledevelopment/es/) and certain specific targets, such that the acquisition of the learning results of the subject will contribute to some extent to the achievement of Objective 8.2 of Goal 8, and Objective 9.5 and 9.c of Goal 9.

2. Learning results

- To understand and apply basic knowledge in digital image and video processing.
- To apply technological knowledge to acquire, manipulate, modify or improve images or videos in different applications within the field of telecommunication engineering.
- To apply the knowledge acquired to solve complex problems in multidisciplinary fields involving images or video sequences.

3. Syllabus

MODULE 1: BASIC ASPECTS

1. Multidimensional signals: interpretation, visualization and basic manipulation
2. Point operators and histogram
3. Geometric transformation of images
4. Local linear and nonlinear operators
5. Transform theory

MODULE 2:APPLICATIONS

6. Computational photography
7. Inverse problems (denoising, deblurring, super-resolution)
8. Compression
9. Other medium and high level tasks: image matching, tracking, segmentation, indexing.

4. Academic activities

- **Theoretical-practical sessions guided by the teacher**(57 hours): theoretical contents of the subject are presented while students work at a computer workstation carrying out exercises or practical mini-projects that allow them to consolidate such contents.
- **Personal study (**90 hours): dedication on the part of the student including aspects such as: preparation and revision of the work of the theoretical-practical sessions, maturing of the skills practiced, study and preparation for the exam.
- **Assessment tests**(3 hours): subject´s exam.

5. Assessment system

The subject is preferably oriented towards a **mixed system** of evaluation in which the following items are considered:

- **C**. 65% of the grade: **Evaluation of performance in the theoretical and practical sessions** of the subject**.**

The performance and attitude shown by the student in the development of the tasks assigned in class is taken into account. The evaluation is based on the teacher's observations and the quality of the documentation provided. During the sessions, students

must generate on-site reports on the work done. These reports can be simple explanations or technical summaries. In the problem solving sessions, the requested results (solutions, justifications, etc.) must be delivered.

- **E**. 35% of the grade: **Exam**(written test) on the whole of the theoretical-practical contents of the subject.

In **this mixed system** context, the subject can only be passed with a minimum grade of 4 out of 10 in itemT2 and 4.5 in item **E**.

Alternatively, there is also a **simple system** based exclusively on a single overall final test in the two official calls for exams. This simple system consists of 2 parts **C** and **E** as in the mixed system and with the same percentages. Part **E** is the same written test as in the mixed system. The additional part of the global test **C** is focused on verifying that the student has worked on the subject on their own, acquiring competencies similar to those required in the development of the theoretical-practical sessions.