Universidad Zaragoza

Academic Year/course: 2024/25

69169 - Advanced Computational Imaging

Syllabus Information

Academic year: 2024/25
Subject: 69169 - Advanced Computational Imaging
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 615 - Máster Universitario en Robótica, Gráficos y Visión por Computador / Robotics, Graphics and Computer Vision
ECTS: 3.0
Year: 1
Semester: Second semester
Subject type: Optional
Module:

1. General information

The goal of this course is the study and learning of advanced and emerging techniques and applications in the field of computational imaging, their application to practical cases of use through the design and implementation of algorithmic solutions, and the study of state-of-the-art methods and open problems. The student will learn to present the acquired knowledge, and to work independently and in teams.

2. Learning results

At the end of the course, the student should have acquired the following capabilities:

- Knowledge of advanced computational imaging capture hardware and key principles.
- Understanding of advanced computational imaging algorithms and techniques based on capture, propagation, and computational processing of photons and waves.
- Knowledge of the latest applications of computational imaging based on capture, propagation, and computational processing of photons and waves.
- Understanding and development of advanced techniques and algorithmic solutions for different computational imaging applications.

3. Syllabus

- Advanced capture systems: hardware and principles
- Hyperspectral imaging
- Polarization-based imaging
- Non-line-of-sight imaging
- Wave-based computational imaging: visible and non-visible spectrum
- Computational displays

4. Academic activities

The course consists of 3 ECTS credits, which correspond to an estimated total of 75 work hours by the student, with the following distribution:

- Master classes (16h): Exposition of contents by means of presentation or explanation by a lecturer.
- Problem solving and cases (5h): Exposition and solving of practical cases as a counterparts to the theoretical concepts.
- Laboratory assignments (9h): Practical activities developed in computer machinery and tutored by a professor.
- Study and acquirement of the theoretical concepts of the master classes, practical application or research works (42h)
- Evaluation tests (3h)

5. Assessment system

The course can be passed by means of continuous evaluation, which consists of the following components programmed during the course:

- Assignments related to the laboratory sessions (60% of the final grade).
- Development of a final practical assignment as an extension to the laboratory assignments (30% of the final grade).
- Oral presentations and debates related to the content of the course and the practical work (10% of the final grade)

Students will also have the option to pass the course by a global evaluation, on the day designated by the center, having to pass the same evaluation items as in the continuous evaluation.

6. Sustainable Development Goals

8 - Decent Work and Economic Growth
9 - Industry, Innovation and Infrastructure