32095 - AIPM - Advanced Image Processing in Matlab

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 731 - OO - Department of Optics and Optometry
Academic year: 2015
Degree: MASTER'S DEGREE IN PHOTONICS (Syllabus 2009). (Teaching unit Optional) ERASMUS MUNDUS MASTER'S DEGREE IN PHOTONICS ENGINEERING, NANOPHOTONICS AND BIOPHOTONICS (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 2,5

Teaching languages: English

Teaching staff
Coordinator: Artur Carnicer

Teaching methodology
Presencial Teaching + activities

Learning objectives of the subject
This subject overviews several advanced topics on digital image processing. The course provides an in-depth treatment of advanced image processing techniques, emphasizing software principles and practical implementation. This is a hands-on course and a basic knowledge of the MATLAB/Octave computing environment is required.
## Content

### Fundamentals of Digital Image Processing

Degree competences to which the content contributes:

### Images as matrices. Brief review of matrix- and array-based operations in MATLAB

Degree competences to which the content contributes:

### Basic Image operations in MATLAB: Intensity transformations and Spatial Filtering

Degree competences to which the content contributes:

### Color Image Processing. Color Spaces: RGB, YCbCr, HSV, CMY

Degree competences to which the content contributes:

### 2D Fast Fourier Transform in MATLAB

Degree competences to which the content contributes:

### Image compression: the JPEG Compression algorithm

Degree competences to which the content contributes:

### Morphological Image Processing: dilation and erosion. Morphological operations

Degree competences to which the content contributes:

### Image segmentation: point, line and edge detection. Line detection and the Hough transform. Thresholding methods. Region-based segmentation

Degree competences to which the content contributes:

### Watermarking and encryption

Degree competences to which the content contributes:
Students have to implement one of the algorithms analyzed in the course, providing examples of how it is used in practice. A written report of his/her work is required.

Qualification system

The usual in University teaching

Bibliography

Basic:

