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

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<tr>
<th>Topic</th>
<th>Degree competences to which the content contributes:</th>
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<tr>
<td><strong>Fundamentals of Digital Image Processing</strong></td>
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<tr>
<td><strong>Images as matrices. Brief review of matrix- and array-based operations in MATLAB</strong></td>
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<tr>
<td><strong>Basic Image operations in MATLAB: Intensity transformations and Spatial Filtering</strong></td>
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<td><strong>Color Image Processing. Color Spaces: RGB, YCbCr, HSV, CMY</strong></td>
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<td><strong>2D Fast Fourier Transform in MATLAB</strong></td>
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<td><strong>Image compression: the JPEG Compression algorithm</strong></td>
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<td><strong>Morphological Image Processing: dilation and erosion. Morphological operations</strong></td>
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<td><strong>Image segmentation: point, line and edge detection. Line detection and the Hough transform. Thresholding methods. Region-based segmentation</strong></td>
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<td><strong>Watermarking and encryption</strong></td>
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GPU programming

Degree competences to which the content contributes:

Qualification system

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.

Regulations for carrying out activities

The usual in University teaching

Bibliography

Basic:

