

## 60935 - Digital image and video processing

### Información del Plan Docente

Academic Year	2017/18
Subject	60935 - Digital image and video processing
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	533 - Master's Degree in Telecommunications Engineering
ECTS	5.0
Year	2
Semester	First semester
Subject Type	Optional
Module	---

### **1.General information**

#### **1.1.Introduction**

#### **1.2.Recommendations to take this course**

#### **1.3.Context and importance of this course in the degree**

#### **1.4.Activities and key dates**

### **2.Learning goals**

#### **2.1.Learning goals**

#### **2.2.Importance of learning goals**

### **3.Aims of the course and competences**

#### **3.1.Aims of the course**

#### **3.2.Competences**

### **4.Assessment (1st and 2nd call)**

#### **4.1.Assessment tasks (description of tasks, marking system and assessment criteria)**

### **5.Methodology, learning tasks, syllabus and resources**

#### **5.1.Methodological overview**

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as Lectures (M1), computer lab sessions (M9), projects (M4), tutorials (M10), and assessment (M11).

## 60935 - Digital image and video processing

### 5.2.Learning tasks

The course includes the following learning tasks:

- **A01 Lectures** and **A03 computer lab sessions** (40 hours). All these sessions take place in the computer room so that students can work on the theoretical aspects, by means of proposed exercises or mini-projects, as soon as they are introduced.
- **A05 Project** (25 hours). At the beginning of the semester, a specific application will be established as a subject for the project (see 5.3 Syllabus, Section 2. APPLICATIONS). The results of this project must comprise both theoretical and practical issues. For instance, a typical project could consist on choosing a relevant scientific paper related to the application, and prepare and report experiments in order to check that the main contributions of the paper have been understood.

### 5.3.Syllabus

The course will address the following topics:

#### Section 1. BASIC TOOLS

- Topic 1. Multidimensional signals: interpretation, visualization and basic manipulations
- Topic 2. Image point operators and histogram
- Topic 3. Geometric image transforms
- Topic 4. Local nonlinear operators
- Topic 5. Linear operators: convolution, correlation and applications
- Topic 6. Multidimensional transforms

#### Section 2. APPLICATIONS

- Topic 7. Coding
- Topic 8. Inverse problems (denoising, deblurring, super-resolution)
- Topic 9. Computational photography
- Topic 10. Medium and high level tasks: image alignment, tracking, segmentation, indexation

### 5.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

### 5.5.Bibliography and recommended resources

- Marques, O. Practical Image and Video Processing Using MATLAB / O. Marques Wiley-IEEE Press, 2011
- González, R.C. Digital Image Processing using Matlab / R.C. González, R.E. Woods, S.L. Eddins Prentice Hall, 2004
- Handbook of image and video processing / editor Al Bovik. - 2nd ed. Burlington [Massachusetts] : Elsevier Academic Press, cop. 2005
- Castleman, Kenneth R.. Digital image processing / Kenneth R. Castleman Upper Saddle River, New Jersey : Prentice-Hall, cop. 1996
- Jain, Anil K.. Fundamentals of digital image processing / Anil K. Jain Englewood Cliffs (New Jersey) : Prentice Hall, cop. 198
- Pratt, William K.. Digital image processing / William K. Pratt . - 2nd ed. New York [etc.] : John Wiley and Sons, cop. 1991
- Dudgeon, Dan E.. Multidimensional digital signal processing / Dan E. Dudgeon, Russell M. Mersereau Englewood Cliffs ; London : Prentice-Hall, cop. 1984
- Lim, Jae S.. Two-dimensional signal and image processing / Jae S. Lim Englewood Cliffs, New Jersey : Prentice Hall, cop. 1990