

Image Processing

1. **Course number and name:** 020TIMES4 Image Processing
2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours
3. **Instructor's or course coordinator's name:** Olfa Triki
4. **Text book:**
 - Digital Image Processing, Gonzalez and Woods, Ed 2.
 - Concise Computer Vision, an introduction into theory and algorithms (chapters 1 & 2), Reinhard Klette, Springer, 2014.

5. Specific course information

a. Catalog description:

The course introduces the basic techniques and concepts of image processing. It covers 3 principal approaches: (i) spatial transformations such as logical, arithmetic and LUT operations, histogram transformations and spatial filtering, (ii) frequency filtering and the use of the Fourier Transform for images and (iii) morphological mathematics and some of its basic operators.

Finally, some particular themes are also covered such as restoration and compression.

b. Prerequisites or co-requisites: 020THSES2 Signal theory

c. Required: Elective for CCE students

6. Specific goals for the course

a. Specific outcomes of instruction:

- Understand and be able to use image transformations in the spatial domain, such as histogram transformations, gamma correction, spatial and statistical filters.
- Understand well the notion of frequency in an image, and know how to use frequency filters.
- Know the basic morphological mathematics operators such as dilate, erode, open, and close.
- Be able to design relatively simple algorithms and program them in Matlab.

b. KPI

KPI	a2	k1	k2	k3
Covered	x	x	x	x
Assessed	x	x	x	x

7. Brief list of topics to be covered

- Point-wise, local and global transformations

- Frequency filtering
- Morphological mathematics
- Restoration
- Compression