.

Course introduction

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Methods for Image Processing

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Office hours: Monday h. 16:00

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Timetable

Day	Time	Room
Thursday	14:00–18:00	1Nord

Course structure

- frontal lessons
- laboratory exercise
  - experimentation with techniques seen at lesson
  - Matlab

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Course assessment

- Written exam (10–20/30) + oral exam (5–12/30)
- Project (0–3/30)
  - application of a technique seen at lesson to a real problem
  - in-depth study of some topics
  - introductory work for the thesis
- exams calendar ASAP

Some little problems...

- The course worths 6 CFU
- it covers a 5 CFU course
  - part of the lessons will deepen some topics and will be optional for students who attend the 5 CFU course
- it is offered to both bachelor and master degree students
  - oral exams and project will be differentiated
- for who already attended the course in previous years:
  - flexibility for the assessment topics
    - exams on the old syllabus
    - check it with the teacher

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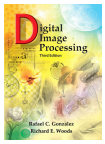
Course materials



- R.C. Gonzalez and R.E. Woods, *Digital Image Processing*, Prentice Hall, 2008, 3rd edition.

- R.C. Gonzalez e R.E. Woods, *Elaborazione delle immagini digitali*, Pearson Education Italia, 2008, terza edizione.

- Errata sheet: `http://www.imageprocessingplace.com/downloads_V3/dip3e_downloads/dip3e_errata_sheet/DIP3E_Errata_Sheet.zip`

The course syllabus follows the topics covered in the textbook. Only few notes are not present in the book:

- lecture notes on the course website.

For the exams, the assessed syllabus concerns the topics covered by the adopted textbook.

Course goals

- Learning the basic concepts of the automatic processing of *digital* images:
  - acquisition and representation;
  - enhancement;
  - information extraction from an image.
- Implementing some simple image processing techniques by using a numerical computing program.

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Syllabus

Introduction image basic concepts, image processing applications.

Digital images fundamentals light, vision and perception; acquisition and digitalization of images.

Representation formats for the representation of digital images, pixel relations, basic mathematical operations.

Intensity transforms and spatial filtering intensity transforms, histograms, equalization, spatial domain filtering, equalization, image improvement in spatial domain.

Filtering in the frequency domain Discrete Fourier Transform, extension to 2D functions, filtering and improvement of images in the frequency domain.

Morphological processing dilation, erosion, opening, closing, extraction of connected components, convex hull, thinning, thickening, contour extraction.

Segmentation edge detection and linking, region based processing.

Compression redundancy, image encoding.

Extended syllabus

Almost impossible in 48 hours, but maybe:

Image restoration noise models, motion blur, deconvolution.

Image restoration image inpainting.

GPU programming parallel architecture for image processing.

Topics for a project.

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Timing and calendar

- How use the "academic quarter"?
- Any calendar change proposal?