year	code	course name	ECTS	type	semester	educational activity type	ECTS	hours	faculty
1	F9201P204	MULTIMEDIA DATA PROCESSING	6	optional	second semester	lecture	4	32	Gasparini Francesca
						practice exercise	2	24	Corchs Silvia

CV: http://www.unimib.it/go/176181440

Contents

The course provides the basis for digitizing and encoding analogic signals: images, audio and videos. It also provides the competences to develop algorithms to process, code and compress digital signals.

Textbooks

R. Gonzalez, R. Woods, Digital Image Processing, Pearson International Edition

Course objectives

The course offers an introduction to multimedia signals: images, video and audio, presenting the main methods of processing, digitizing and encoding. At the beginning the course analyzes the analog to digital conversion in particular by introducing the concepts of sampling and quantization. The main processing algorithms especially for the case of digital images are shown: histogram modification, filtering and white balancing. During the practical activities the student will apply the acquired theory to audio, image and video signals.

Prerequisites No prerequisite

Teaching methods The course consists of lectures, classroom exercises, and practical activities. Several exercises will be carried out during the practical activities to verify the new expertise acquired.

Learning assessment

Oral exam. The assignments carried out during the practical activities will provide further points for the final exam.

Extended Syllabus

1 Definition of one-dimensional signals, two-dimensional signals, N-dimensional signals
- Analog signal
- Digital signal

2 Analog to digital conversion
- sampling theorem
- Filter Anti-Aliasing
- Quantization

3 Digital signals: sampling and quantization:
- Images
- Audio
- Video

4 Image processing
- Contrast enhancement
- High and low pass filtering
- With balance

5 Signal in the transformed domain: Fourier Transform
- Fourier analysis in the frequency domani

6 Compression
- Main compression loss-less and lossy algorithms
- Audio Compression
- Image Compression (particularly JPEG)
- Video Compression (in particular MPEG)
- Main image Formats