UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Imaging

2425-1-H4102D004-H4102D012M

Aims

Knowledge of digital image generation and image processing technologies; structural quantification and functional analysis of images of biological structures, at macro and microscopic level. This will include image storage, processing by filtering, segmentation, registration, computational techniques for the functional evaluation of three-dimensional structures, as well as the practical use of software dedicated to the processing of medical images.

Contents

Fundamentals in medical device for digital image generation.
Numerical techniques for generation of digital images, storage and processing; Generation of surface models and graphical visualization, Processing of image data and structural quantification.

Detailed program

Instrumentation and signal processing for image generation, technologies and algorithms for storing and processing digital images; Image formats and storage systems; Histogram operations and mathematical morphology techniques; Recognition of objects by automatic image segmentation techniques; Numerical generation of surface models and visualization techniques; Recording of spatial and temporal images for different acquisition modes; Numerical analysis for structural quantification; Visualization and rendering techniques; Generation of digital models for stereoscopic visualization and 3D printing.

Prerequisites

Basic knowledge in mathematics, algebra and physics

Teaching form

Lessons in class, demonstrations by the use of digital image processing software and quantitative solution of simple problems.

Textbook and teaching resource

Suggested textbook: The Image Processing Handbook, Seventh Edition, John C. Russ,? F. Brent Neal, CRC Press ISBN-10: 149874026X.

Open-source software for DICOM image visualization and processing.

Slides of the course will be transmitted to the students using the e-learning platform

Semester

First semester

Assessment method

Assessment will consist of a final written and an oral examination accounting for 60% and 40% of the final evaluation, respectively.

Office hours

Monday, 4 to 6 PM (Dalmine and by remote call)

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY