SYLLABUS DEL CORSO

Imaging

1819-1-H4102D004-H4102D012M

Aims

Knowledge of the technologies of digital image generation and processing.

Knowledge of methods for image segmentation and object quantification in biomedical images, at macro and microscopic level.

Knowledge of techniques for image storage, and transmission.

Knowledge of digital techniques for digital object creation and visualization, as well as of computational techniques for generation of three-dimensional structures.

Practical use of software dedicated to medical image processing.

Contents

Analogic and numerical techniques for generation of digital images, storage and processing. Generation of surface models and graphical visualization. Image processing finalized to increase of image quality and to structural quantification.

Detailed program

Instrumentation and signal processing for the generation of medical images (Xray, CT, MR, PET and SPECT).

Technologies and algorithms for storage and processing of digital images.

Image formats and archiving systems, image transmission.

Image segmentation ad object recognition, image processing by machine learning techniques.

Numerical generation of surface models and their visualization.

Spatial and temporal image registration for different acquisition modalities.

Numerical analysis for structural quantification.

Visualization techniques and rendering.

Generation of digital models for stereo visualization and 3D printing.

Prerequisites

Basic knowledge in mathematics, algebra, geometry and physics

Teaching form

- Lessons in class
- Solution of practical problems
- Practical use of image processing software.

Textbook and teaching resource

Recommended text: Digital Image Processing for Medical Applications, Cambridge Univ Press, ISBN: 978052186085.

The slides of the course will be distributed to the students using the e-learning platform.

Semester

First semester

Assessment method

The final examination consists of

• Written test with about 4 open questions and/or numerical exercises (60%)

• Oral examination in case the score of written text is greater or equal to 18/30 (40%).

Office hours

Tuesday at 1PM
