UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Diagnostic Imaging Techniques III

2324-2-I0303D035

Aims

Students are expected to acquire basic knowledge on MR physics, MRI techniques, and main clinical indications of MR imaging and MR angiography for body and neuro imaging. Students are required to achieve a solid knowledge of radiological anatomy and demonstrate confidence in the use of coils, application of acquisition protocols and managing of contrast media in the context of body and neuro MR imaging. Student will learn the fundamental aspect of chemical classification, mechanism of action, general safety and approved clinical indications of MR contrast agents

Contents

The course aims to provide students with basic knowledge of physical principles, clinical indications, techniques, diagnostic protocols and applied aspects of magnetic resonance imaging

Detailed program

Genesis and semeiotics of the signal in MRI sequences and coils used in MRI, the signal quality in different sequences. The main indications for MRI clinical examination and general information on the most frequent pathological occurrences. Fundamentals of radiological anatomy. The diagnostic protocols in the study of the lung parenchyma, mediastinum, abdominal organs, and of the muscoloskeletal structures.

MRI in neuroradiology: the main sequences and their application in neuroradiology; standard study of the brain, the stony rocks, the pituitary, the facial, the temporal lobe, orbit, cranial nerve; the MRI study of the spine and spinal cord, the study of diseases of the white matter; special MRI techniques, therapeutic techniques in neuroradiology.

Advanced MRI techniques : DWI, PWI, fMRI , Spectroscopy, complementarities and differences between CT and MRI. The MRA. Formation and Processing of Images RM: K-space image formation and Fourier transform,

Digital Imaging: the main features, the image matrix and field of view, image processing and analysis interpolation of raw data, algorithms reconstruction, 2D post processing (MPR), 3D post processing (MIP,SSD,VR,VE).

Fundamental of pharmacological and regulatory basis of MR contrast media including: elements used for MRI imaging contrast, physico-chemical properties of contrast agents; stability, pharmacokinetics and mechanism of action; approved clinical indication, safety, drug interaction and; Summary of Product Characteristics of MR contrast media.

Prerequisites

Diagnostic Imaging Techniques I

Teaching form

Lectures and exercises

Textbook and teaching resource

TECNICHE DI TOMOGRAFIA COMPUTERIZZATA E DI RISONANZA MAGNETICA- Cei Luigi. Società Editrice Universo (2011).

RM ADDOMINALE. PARTE GENERALE- Stefano Colagrande e Pasquale Paolantonio. Poletto Editore (2014).

LEZIONI DI NEURORADIOLOGIA – Bozzao, Colonnese, Pantano; Società Editrice Esculapio, 2019

The teachers will provide other educational materials

Semester

Second semester

Assessment method

Written and oral exam.
The written test will consist of:
• multiple choice questions and open questions on MRI and Ultrasonography equipment
• multiple choice questions and open questions on MR Image Construction and Processing

• 2 open questions on Neuroradiological Semeiotics in MRI
The oral exam will cover Contrast Media, MRI Diagnostic Techniques and MRI Semeiotics modules.
The overall evaluation will be expressed in thirtieths.

Office hours

By appointment required by mail

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING