UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Instrumentation for Diagnostic Imaging and Radiotherapy

2425-2-H4102D014-H4102D042M

Aims

The course is design to provide Knowledge on X-ray based, US-based, Magnetic Resonance, Nuclear Medicine and hybrid diagnostic imaging instrumentation and Radiotherapy and Radionuclide therapy techniques, including instrumentation

Contents

Equipment for diagnostic imaging: X-Ray systems, mammography, scanner for CT, MRI. Gamma camera and hybrid system for PET/CT, SPECT/CT and PET/MR.
Facilities for radionuclide therapy
Equipment for external-beam radiotherapy, Intensity Modulated Radiotherapy (IMRT), Image Guided Radiotherapy (IGRT), cyber knife, gamma knife, proton therapy, flash therapy Linear accelerator and components
Dosimetric planning
Clinical indication and protocols

Detailed program

Diagnostic imaging instrumentation:
• X-ray imaging: revision of physical principles and image formation; multislice CT, cone beam CT, mammography, angiography
• Magnetic Resonance Imaging: revision of physical principles and T1/T2 image formation; diffusion weighted and perfusion weighted MRI, fMRI, spectroscopy
• Echography: physical principles and image formation; echographic probes
• Nuclear Medicine Imaging: revision of physical principles and image formation; PET/CTand PET/RM hybrid

instrumentation
• Role of integrated imaging modality for image-guide therapy
• Linear accelerator and components
• Intensity Modulated Radiotherapy (IMRT), Image Guided Radiotherapy (IGRT), tomotherapy
• Cyber knife, gamma knife
• Proton therapy,
• Flash therapy
• Dosimetric planning
• Clinical indication and protocols

Radionuclide therapy

• Principle of radiobiology
• Legislation and facilities requirements, supply and waste management
• Clinical indication and protocols

Prerequisites

Physics basic knowledge

Teaching form

Lectures. Active and interactive discussion on critical issues presented during the course. Case presentation and case discussion.

Textbook and teaching resource

Slides presented during the course; guide line and auto evaluation question to be discussed during lessons
Nuclear medicine textbook, Methodology and Clinical Applications. Editors: Duccio Volterrani, Paola Anna Erba, Ignasi Carrió, H. William Strauss, Giuliano Mariani. Springer 2019. Chapters 5-11

Semester

Second semester of the second year

Assessment method

Self evaluation with written or oral self-assessment test (closed questions or multiple choice); specific scientific question, problem solving activities on specific issues during the course.
Final test:
The course exam consists of a written exam with multiple-choice questions or open questions. Oral exam consisting of ample discussion on the basis of radiological images digitally provided with the aim of recognizing the

key anatomical features and the autonomous reflection capacity on critical points of the program.is also possible. The questions aim at verifying the student's knowledge. Each multiple-choice question is given a score between 0 and 1; each open questions is given a score between 0 and 2. Laude is assigned in case of particularly deserving tests.
Evaluation criteria: theoretical knowledge, synthesis skills, ability in the application of diagnostic methods to a specific clinical or experimental contest.

Office hours

By appointment fixed by e-mail

Sustainable Development Goals

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