UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Applications of Physics To Medicine

2122-1-F1701Q126

Aims

The main aim of the course is to give the basics of the application of physics principles to Medical Imaging and Radiotherapy.

Contents

Medical Imaging and Radiotherapy: physical principles, instrumental equipment, quantification and processing of images.

Detailed program

Interactions with matter.

Ultrasound Imaging.

Radiography and Computed Tomography.

Functional Imaging Diagnostics: Positron Emission Tomography and Single Photon Emission Computed Tomography.

Magnetic Resonance Imaging.

Hybrid systems PET-CT and PET-MRI

Molecular imaging.

The Radon transform and image reconstruction techniques. Physical effects corrections, image quality and

quantification.

Montecarlo simulation of tomographic systems and extraction of physical parameters useful for diagnosis.

Radiomics.

Multi-modal and multi-parametric images in clinical practice.

Total Body Irradiation, brachytherapy, radiosurgery, hadrotherapy.

Prerequisites

No prerequisites are required.

Teaching form

Lectures and exercise sessions.

In the period of the Covid-19 emergency, lessons will take place in asynchronous video-recorded lessons.

Textbook and teaching resource

Notes, software, data and scientific articles handed over to students during the course.

Semester

First semester.

Assessment method

The exam consists in a colloquium aimed at assessing the student's knowledge level on the subjects addressed in the course.

During the Covid-19 emergency period, oral exams will only be telematic. They will be carried out using the WebEx platform and on the e-learning page of the course a public link will be shown for access to the exam of possible virtual spectators.

Office hours

Normally Tuesday from 10.30 to 11.30, at the request of students.