



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Diagnostic Imaging Techniques I

2223-1-I0303D006

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#### Aims

The course aims to provide students with:

- knowledge of main conventional radiological equipment, its functioning and its physical and structural characteristics, including the knowledge of some important dedicated radiological systems.
- knowledge of main digital radiological equipment, and Quality Controls
- theoretical and practical skills, and basic techniques to execute conventional radiological investigations, using direct techniques.
- theoretical and practical skills, and basic techniques to execute contrast X-rays investigations, using direct techniques.
- elements of semeiotics in the study of the osteoarticular and musculoskeletal system.
- elements of semeiotics in the study of the chest and abdomen

#### Contents

The student will learn:

- physics X-ray interaction with matter; main components of conventional radiological equipment; physical and technological basis of diagnostic radiology.
- main components of digital radiological equipment, physical and technological basis of diagnostic radiology;

quality controls in diagnostic Imaging.

- conventional radiological techniques. Image quality and diagnostic accuracy; imaging of normal and Pathologic conditions of the body systems
- contrast X-rays techniques; Image quality and diagnostic accuracy; imaging of normal and Pathologic conditions of the body systems
- elements of semeiotics in the study of the osteoarticular and musculoskeletal system.
- elements of semeiotics in the study of the chest, breast and abdomen

## **Detailed program**

X-ray production and X-ray tubes. Characterization of an X-ray beam. X-ray– matter interaction and image production in conventional radiology.

Physical and technological basis of diagnostic radiology. Main components of a conventional radiological equipment and main types of radiological equipments.

Scattered radiation, beam-limiting devices: collimation, anti-scatter grids, X-ray film Sensitometric and photosensitometric apparatus. Intensifying screens. Physical principles of fluorescence. Characteristics of materials, speed classes, film-shield system. Image quality, MTF, how to measure MTF. Noise, Wiener spectrum. Synthetic quality indices.

Differences between intensifying screen and shields for photostimulable luminescence. Photostimulable phosphors used in digital radiography.

Computed radiography. Analogical-digital conversion, the pixel and voxel, direct digital systems.

Conventional radiology in the study of the chest, abdomen, osteoarticular and musculoskeletal system radiographic projections.

The orthopantomography.

Mammographic techniques

Contrast media and contrast X-rays techniques; contrast X-ray investigation of the gastrointestinal system;

contrast X-ray investigation of the uro-genital system.

Radiographic anatomy, clinical signs, radiological elements of semeiotics in the study of osteoarticular and musculoskeletal system.

Radiographic anatomy, clinical signs, radiological elements of semeiotics in the study of the chest and abdomen. Radiographic anatomy, clinical signs, radiological semeiotics in the mammographic study.

Radiographic anatomy, clinical signs, elements of radiological semeiotics in the contrast X-rays investigation of the gastrointestinal and the uro-genital systems.

## Prerequisites

Organs and Functions

## Teaching form

Lectures, exercises

## Textbook and teaching resource

F.MAZZUCATO: "Anatomia Radiologica. Tecniche e Metodologie in Radiodiagnostica" Ed.Piccin

R.PASSARIELLO "Radiologia, Elementi di Tecnologia". Idelson Gnocchi

Teachers will provide other educational material.

## Semester

Second semester

## Assessment method

Written test about the modules **Conventional Equipments and Analogic Systems** and **Digital Systems and Quality Controls** comprising multiple choice questions and exercises. The written test is evaluated with a mark ranging from 0 to 30. If the mark is superior to 18/30, the oral test will follow. The oral test consists in the evaluation of the knowledge acquired among the course topics through open questions.

Modules:

**Conventional Equipments and Analogic Systems** and **Digital Systems and Quality Controls**

### Written test:

Open questions, quiz, exercises

Oral discussion related to the mistakes made during the written test.

Other modules:

Oral exam about module topics through open questions

## **Office hours**

By appointment required by mail

## **Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING

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