



## **Radiology diagnostic imaging and radiotherapy techniques II**

### **DIAGNOSTIC IMAGING TECHNIQUES II**

SSD: MEDS- 22/A, MEDS-26/B

CFU: 12

RESPONSIBLE TEACHER: PROF. DEMETRIO DE ALMEIDA

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### **Teaching: Diagnostic Imaging and radiotherapy**

SSD: MEDS- 22/A

CFU: 6

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### **TEACHING: Medical Sciences and techniques II**

SSD: MEDS- 26B

Number of CFU: 6

Professors:

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## **PREREQUISITES**

Minimum basic knowledge of human anatomy, general and atomic physics is required.

## **LEARNING OBJECTIVES**

The course aims to provide students with the specific skills to correctly use radiological equipment. The teaching, integrated with the study of radiographic techniques, is fundamental for the development of specific professional skills.

## **LEARNING OUTCOMES**

At the end of this course the student will have to know:

- Know the radiodiagnostic equipment and the physical principles of operation
- Describe the main components
- Know the physical principles of operation
- Explain the correct use of the equipment
- Know and understand the main technical-practical notions, necessary for conducting traditional radiology, contrast X-ray and MRI tests in compliance with radiation protection regulations, and professional ethics.

## **Applying knowledge and understanding**

At the end of the course, the student will be able to:

- Use the equipment consciously
- Perform radiographic projections independently
- Use the knowledge acquired for the autonomous study of aspects relating to the specific field to which the student will dedicate himself in the professional activity;
- Know and apply the basic principles of the various radiological practices for carrying out in complete autonomy and a correct practical execution necessary for the radiological study.

## **Communication skills**

At the end of the course, the student must know:

- Use specific scientific terminology appropriately.



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- be able to apply their knowledge and understanding skills in order to demonstrate a professional approach to work and have adequate skills both to devise and support arguments and to solve problems in their field of study
- Must be able to collaborate in teams in order to perform radiological practices in the field of technical competence, to be supportive and to be able to involve patients during the radiological study.

### **Making judgements**

At the end of the course, the student must know:

- carry out general evaluations relating to the topics covered.
- Know the main correctness criteria for a careful evaluation of all radiological practices treated during teaching.

## **COURSE SYLLABUS**

### **Medical Sciences and techniques II**

- Principles of TC operation
- CT image formation
- Evolutions of CT and MRI
- Software for TC retreading and MRI
- Principles of operation of MRI
- RM image formation
- MRI security
- CT and MRI study techniques

### **Diagnostic Imaging and radiotherapy**

CT and MRI study of the human body, osteoarticular, muscular, respiratory, digestive and osteoarticular systems. Diagnostics for neurological images, in urgency and stroke



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## **COURSE STRUCTURE**

The module of IMAGE DIAGNOSTICS TECHNIQUES II is organized in lectures (120 hours) and theoretical-practical exercises. The lessons are held by projecting illustrative images (Power-Point) and through the use of paper material provided by the teacher

## **COURSE GRADE DETERMINATION**

### **Medical Sciences and techniques II**

The teaching module is integrated with another discipline always related to radiological sciences. The student can take the Applied Medical Technical Sciences test in a single session or in different sessions of the current academic year.

The test consists of a compulsory written test and an optional oral test. The written and oral tests are aimed at assessing both the theoretical knowledge and the student's ability to solve problems. The written test includes a multiple choice quiz and open-ended questions for some radiological procedures.

The oral exam is not compulsory but chosen by the student to improve the grade. You can access the oral exam if the minimum score for the written test is 18/30. The student can be sent back to the oral even if he has passed the written test.

### **Diagnostic Imaging and radiotherapy**

The test consists of a compulsory written test and an optional oral test. The written and oral tests are aimed at evaluating both the theoretical knowledge and the student's ability to solve problems.

The examination paper will be graded overall according to the following criteria:

Unsuitable: major deficiencies and/or inaccuracies in knowledge and understanding of topics; limited ability to analyze and synthesize; frequent generalizations.

18-20: barely sufficient knowledge and understanding of topics with possible imperfections; sufficient skills of analysis synthesis and autonomy of judgment.

21-23: routine knowledge and understanding of topics; correct analysis and synthesis skills with coherent logical argumentation.

24-26: fair knowledge and understanding of topics; good analysis and synthesis skills with rigorously expressed arguments.

27-29: Comprehensive knowledge and understanding of topics; remarkable skills of analysis,



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synthesis. Good autonomy of judgment.

30-30L: excellent level of knowledge and understanding of topics. Remarkable analytical and synthesis skills and autonomy of judgment. Arguments expressed in an original way

### **OPTIONAL ACTIVITIES**

Students will have the opportunity to carry out theoretical / practical exercises and participate in seminars. The teachers will provide constant support during and after the lessons

### **READING MATERIALS**

#### **Medical Sciences and techniques II**

- Diagnostic Radiology Physics: A Handbook for Teachers and Students. D.R. Dance, S. Christofides, A.D.A. Maidment, I.D. McLean, K.H. Ng. Technical Editors
- MRI The Basics. Christopher J. Lisanti, William G. Branley, Jr. WOLTERS KLUWER
- MDCT PHISICS The Basics. Technology, Image Quality, and Radiation Dose. Mahadevappa Mahesh

WOLTERS KLUWER

- MDCT Anatomy-Body. Luigia Romano, Massimo Silva, Sonia Fulciniti, Antonio Pinto

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#### **Diagnostic Imaging and radiotherapy**

- MRI in practice. Westbrook, Kaut Roth, Talbot. WILEY-BLACKWELL
- Computed tomography for technologists (a comprehensive text), Lois e. Romans, Wolters Kluwer Health, the point.

<https://uwgect.wiscweb.wisc.edu/protocol-manuals/>

#### **Recommended Readings and Bibliography:**

1. "Computed Tomography for Technologists: A Comprehensive Text" by Lois E. Romans. Publisher: Wolters Kluwer Health, The Point.
2. Slides provided by the professor.
3. <https://uwgect.wiscweb.wisc.edu/protocol-manuals/>