

**Clinical Radiology**

Code: 102929  
 ECTS Credits: 6

Degree	Type	Year	Semester
2502442 Medicine	OB	3	0

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
 Some groups entirely in English: No  
 Some groups entirely in Catalan: Yes  
 Some groups entirely in Spanish: No

**Prerequisites**

It is advisable to have "Biofísica and Anatomia Humana I and II" completed.

The student will commit to preserve the confidentiality and professional secrecy of the data he or she may access during clinical training. The student will be have according to professional and ethical standards.

**Objectives and Contextualisation**

"RADIOLOGIA I MEDICINA FÍSICA" "

**KNOWLEDGE CONTENTS:** Electromagnetic radiation. Basic concepts. Interaction between radiation and the human being. Detection and measurements of radiation. Radioprotection. Image formation. Contrast media. Radiologic technics. Interpretation of images: systematic reading and basic semiology. Echography. Basic concepts. Instrumentation. Image modalities. Doppler ultrasonography. Semiology and indications. Magnetic resonance. Basic concepts. Semiology and indications.

Radiology of the thorax, abdomen, gastrointestinal tract, bone and joints, kidney and urinary tract, nervous system, cardiovascular system. Obstetrics gynecology and breast. Interventional radiology. Pediatric radiology. Radioisotopes in medicine, radiotracers and radiopharmaceuticals. Morphologic and functional studies with isotopes. SPECT, PET and other technics. Semiology and indications.

Radiotherapy. Response of normal tissues. Tumoral response. Technics for radiotherapy.

**ABILITIES:** The student will be able to identify the normal anatomic structures and to detected abnormalities in the thorax X-RAY, abdomen and bone structures.

To identify basic semiology in abdominal echography, CT and MR of the thorax, abdomen, and brain. To describe measures of radioprotection.

Under appropriate tutorship, the student will identify the radiological signs of the most prevalent diseases, and will stablish the diagnosis in case of vital risk.

The student will follow procedures of interventional radiology performed by an expert. The student will evaluate radiation therapy fields in various tumors.

The student will evaluate safety and protection in a radiology and nuclear medicine departments.

The student will develop professional and ethical values, and communication skills. The student will learn to handle properly information and will develop critical analysis and research skills.

## Competences

- Communicate clearly, orally and in writing, with other professionals and the media.
- Convey knowledge and techniques to professionals working in other fields.
- Critically assess and use clinical and biomedical information sources to obtain, organise, interpret and present information on science and health.
- Demonstrate an understanding of the fundamentals of action, indications, efficacy and benefit-risk ratio of therapeutic interventions based on the available scientific evidence.
- Demonstrate basic research skills.
- Demonstrate knowledge and understanding of descriptive and functional anatomy, both macro- and microscopic, of different body systems, and topographic anatomy, its correlation with basic complementary examinations and its developmental mechanisms.
- Demonstrate understanding of the manifestations of the illness in the structure and function of the human body.
- Demonstrate understanding of the structure and function of the human organism in illness, at different stages in life and in both sexes.
- Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
- Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
- Indicate the basic diagnosis techniques and procedures and analyse and interpret the results so as to better pinpoint the nature of the problems.
- Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
- Maintain and use patient records for further study, ensuring the confidentiality of the data.
- Use information and communication technologies in professional practice.

## Learning Outcomes

1. Apply the criteria of radiation protection in diagnostic and therapeutic procedures with ionising radiation.
2. Assess the indications and contraindications of radiological studies.
3. Communicate clearly, orally and in writing, with other professionals and the media.
4. Convey knowledge and techniques to professionals working in other fields.
5. Demonstrate basic research skills.
6. Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
7. Describe the basic radiological semiology of the different body systems.
8. Describe the principles behind the interaction of radiation with the human organism.
9. Differentiate between images of normality and those of abnormality.
10. Explain the use of the different imaging techniques.
11. Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
12. Identify images that do not correspond to normal variants.
13. Identify the indications of imaging tests.
14. Identify the principles and indications of radiotherapy.
15. Indicate diagnostic imaging tests.
16. Indicate other techniques for obtaining diagnostic images.
17. Interpret a radiological image by systematic reading.
18. Interpret diagnostic imaging reports (radiological image, among others).

19. Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
20. Make correct use of information sources, including textbooks, atlas images, internet resources and other specific bibliographic databases.
21. Make correct use of the international nomenclature.
22. Perform and interpret an electrocardiogram and an electroencephalogram.
23. Understand the basic principles of diagnostic imaging.
24. Use information and communication technologies in professional practice.

## **Content**

1. General descriptions
  2. Topics in radiology
  3. Topics in nuclear medicine
  4. Topics in radiotherapy
- Introduction to radiology
  - Ionizing radiation
  - Nuclear Medicine
  - Radiology I
  - Radiology II
  - CT
  - Ultrasound
  - MR
  - Radiotherapy and radioprotection
  - Radiobiology
  - The normal thorax
  - Heart and mediastinum
  - Abdomen
  - Abdominal organs
  - Anatomy of the kidney and urinary tract
  - Bone and joints
  - The skull
  - Semiology of the lungs I
  - Semiology of the lungs II
  - Semiology of the lungs III
  - The pleura

- The diaphragm and other structures of the thorax
- The mediastinum
- The heart and the aorta
- Nuclear cardiology
- Abdominal diseases
- Gastrointestinal tract I
- Gastrointestinal tract II
- The liver
- Nuclear medicine in the abdomen
- The brain
- The spinal cord
- Diseases of the kidney
- Nuclear medicine of the kidney and urinary tract
- Diseases of the bones
- Diseases of the spine and joints
- Nuclear medicine in bone and joints
- Nuclear medicine in endocrinology

## **Seminars**

All seminars consists on clinical cases for groups of 10-12 students.

1. Radioprotection
2. Breast and gynecology
3. Retro peritoneum and large vessels
4. Pediatric radiology
5. Interventional radiology
6. Nuclear medicine
7. Radiotherapy

## **Methodology**

This guide describes the frame, contents, methods and general rules of Clinical Radiology, following the current plan in the University. The organization of Clinical Radiology regarding the size and number of groups, calendar distribution, evaluation dates, evaluation criteria, and evaluation reviews will be define in each of the "Unitats Docents Hospitalaries (UDH)". Such rules will be available on the respective web sites and will be explaine the first day of the course by the responsible professors in the respective UDHs. Currently, the responsible professors as

designed by the Departments at each UDH are: "Medicina Responsable de Facultat": Ignasi Carrió Gasset "Responsables" UDH UD Vall d'Hebron: Jordi Giralt UD Germans Trias i Pujol: Ricard Pérez Andrés UD Sant Pau: Ignasi Carrió Gasset UD Parc Taulí: Lluís Bernà Roqueta

Oral lectures: 38 topics are programmed. The teacher will present each topic in detail, to expose the students to the full contents. Clinical practice: 15 hours (3 hours x 5 days) will be offered. The teacher will present series of demonstrative clinical cases. The students will discuss the findings and will learn the appropriate image reading methodology, as well as the diagnostic value in the clinical context of the patients. Seminars: 15 hours will be programmed. The students will review, together with the teacher, different key topics in Clinical Radiology, learning the contents, discussing clinical indications and clinical applications. Tutorships: under defined mentorship, the students will prepare and discuss case examples in diagnostic imaging. Autonomous activities: the students will prepare the contents of Clinical Radiology following the recommended bibliography and preparing all programmed activities.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Clinical care practices (PCAh)	15	0.6	1, 3, 5, 6, 9, 4, 23, 22, 13, 16, 15, 18, 17, 21, 20, 24
Clinical case seminars (SCC)	15	0.6	1, 8, 7, 9, 23, 10, 14, 12, 13, 16, 15, 18, 17, 20, 2
Contents given as oral lectures (Theory)	38	1.52	1, 8, 7, 9, 23, 10, 11, 14, 12, 13, 16, 15, 18, 17, 2
Type: Autonomous			
Preparations for written works, self-study and reading articles/reports of interest	74.5	2.98	8, 9, 23, 22, 11, 13, 16, 17, 19, 21, 20, 24

## Assessment

Two evaluations will be performed during the calendar year. Such evaluations will consist of a writing part with multiple-choice questions in both evaluations, and a practical part of short questions only in the second evaluation. Each writing part will account for 35% of the final qualification. If a student does not come for the evaluation will be considered "non-evaluable". A final exam will be offered if necessary. The preparation and presentation of topics will be evaluated by the tutors on individual basis.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practical evaluations: Objective and	30%	4	0.16	1, 3, 9, 22, 11, 13, 16, 15, 18, 17, 24
Written evaluations: objective tests: Multiple choice questions	70%	3.5	0.14	1, 5, 6, 8, 7, 9, 4, 23, 10, 14, 12, 19, 21, 20, 24, 2

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## Bibliography

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- <http://www.e-anatomy.org>
- <http://www.e-mri.org>
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