

Degree programme	Type	Course
Medicine	OB	3

Contact lecturer

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Group languages

You can consult this information at the [end](#) of the document.

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

"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 establish 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.

Learning outcomes

1. Identify the principles and indications of radiotherapy.
2. Explain the use of the different imaging techniques.
3. Describe the principles behind the interaction of radiation with the human organism.
4. Describe the basic radiological semiology of the different body systems.
5. Assess the indications and contraindications of radiological studies.
6. Identify images that do not correspond to normal variants.
7. Understand the basic principles of diagnostic imaging.
8. Differentiate between images of normality and those of abnormality.
9. Apply the criteria of radiation protection in diagnostic and therapeutic procedures with ionising radiation.
10. Indicate diagnostic imaging tests.
11. Interpret diagnostic imaging reports (radiological image, among others).
12. Identify the indications of imaging tests.
13. Indicate other techniques for obtaining diagnostic images.
14. Interpret a radiological image by systematic reading.
15. Perform and interpret an electrocardiogram and an electroencephalogram.
16. Make correct use of information sources, including textbooks, atlas images, internet resources and other specific bibliographic databases.
17. Make correct use of the international nomenclature.
18. Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
19. Convey knowledge and techniques to professionals working in other fields.
20. Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
21. Formulate hypotheses and compile and critically assess information for problem-solving, using the scientific method.
22. Demonstrate basic research skills.
23. Communicate clearly, orally and in writing, with other professionals and the media.
24. Use information and communication technologies in professional practice.

Contents

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General descriptions

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Topics in radiology

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Topics in nuclear medicine

8.

Topics in radiotherapy

2. Introduction to Radiology and Physical Medicine. Biophysical fundamentals of diagnostic imaging methods. Electromagnetic waves in medicine. Classification of ionizing radiation.
4. Nuclear Medicine (NM): Radioactivity. Radioactive isotopes. Activity. Effective period. Types and forms of application of radioactive isotopes. Positron emission tomography (PET).
6. Radiology. X-rays. Production. Spectrum. Modulation in quality and quantity. Attenuation coefficient. Radiological densities. Analogical images and digital images. Contrast media.
8. Computed Tomography (CT): Image acquisition. CT values. Advantages and disadvantages.
10. Ultrasound (US): Image acquisition. Sonic interfaces. Ultrasound patterns. Doppler effect.
12. Magnetic Resonance Imaging (MRI): Image acquisition. Enhancements of magnetic resonance images. Advantages and disadvantages.
14. Radiobiology (RB): Molecular lesions. Effects at the cellular level. Repair mechanisms. Biological effects at tissue level.
16. Radiotherapy and Radioprotection (RT): Fundamentals of clinical radiotherapy. Dosimetry. Irradiation techniques. Radioprotection mechanisms.
18. Radiology of the normal thorax. Projections. Vessels. Cystic fissures. Hilar anatomy.
20. Pulmonary radiological semiology: Alveolar pattern. Diffuse lesions. Pulmonary hyperclarity. Lobar and pulmonary atelectasis.
22. Pulmonary radiological semiology: Pulmonary nodule and mass.
24. Radiological study of the pleura: Pleural effusion. Pneumothorax. Pachypleuritis.
26. Radiological study of the diaphragm and rib cage. Diaphragmatic alterations. Pathology of the thoracic cage.
28. Radiological study of the mediastinum and heart. Radiological anatomy. Diaphragm. Cardiac anatomy.
30. Radiological pathology of the mediastinum. Pneumomediastinum. Mediastinal masses. Mediastinal widening.

32. Radiological pathology of the heart and aorta. Alterations of the size and morphology of the heart. Aortic, valvular and pericardial pathology.
34. Cardiac Nuclear Medicine: Coronary perfusion. Myocardial ischemia. Acute myocardial infarction. Ventricular function.
36. Complementation contents
38. Abdominal radiological studies. Abdominal radiological anatomy. Liver and biliary tract. Pancreas and retroperitoneum. Spleen.
40. Radiological pathology of the abdomen: Intra and extraluminal air. Ascites. Mechanical obstruction. Paralytic ileus. Abdominal masses.
42. Radiological pathology of the digestive system: Caliber changes. Repletion defects, ulcers and diverticula. Mucosal alterations.
44. Radiological pathology of the abdominal viscera: Changes in shape and size. Focal lesions. Diffuse pathology. Pathology of the biliary tract.
46. Liver. Spleen and pancreas.
48. Basic craniofacial radiological semiology. Normal radiological anatomy.
50. Radiological pathology of the brain. Displacements. Malformations. Supratentorial pathology. Infratentorial pathology. Vascular disorders.
52. Radiological pathology of the spinal cord. Malformations. Degenerative lesions. Tumor lesions.
54. Nuclear Medicine in Neurology and Urology: Applications of planar Nuclear Medicine, SPECT and PET.
56. Radiological anatomy of the kidney, urinary tract and genital system. Anatomical variants of the excretory system. Radiological anatomy of the female and male genital system.
58. Radiological pathology of the kidney and urinary tract: Congenital malformations. Renal lithiasis and tract. Cysts. Hydronephrosis. Inflammatory pathology of the kidney. Abscesses and renal masses. Inflammatory and tumoral pathology of the bladder. Pelvic pathology.
60. Complementation of contents
62. Radiological anatomy of bones and joints. Includes spine.
64. Radiological pathology of bones: Lesions that increase density. Lesions that decrease density. The solitary lesion. Alterations of the periosteum. Fractures.
66. Radiological pathology of joints and spine: Degenerative joint disease. Arthropathies. Inflammatory lesions. Degenerative lesions. Discopathies. Alterations of shape.
68. Osteoarticular nuclear medicine: Normal bone scan. Osteoarticular pathology. Benign bone lesions. Bone tumors and metastatic disease.
70. Nuclear medicine Diagnostic imaging of the endocrine system.
72. Nuclear Medicine and Oncology: SPECT-CT and PET-CT: Applications of Nuclear Medicine to Oncology.
74. Radiation Oncology

76. Complementation of contents

Seminars

All seminars consists on clinical cases for groups of 10-12 students. The attendance will be mandatory

2.

Radioprotection

4.

Breast and gynecology

6.

Retro peritoneum and large vessels

8.

Pediatric radiology

10.

Interventional radiology

12.

Nuclear medicine

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Radiotherapy

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Clinical case seminars (SCC)	15	0.6	
Contents given as oral lectures (Theory)	38	1.52	
Clinical care practices (PCAh)	15	0.6	
Preparations for written works, self-study and reading articles/reports of interest	74.5	2.98	

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": Jordi Giralt "Responsables" UDH UD Vall d'Hebron: Jordi Giralt UD Germans Trias i Pujol: Ricard Pérez Andrés UD Sant Pau: Alberto Flotats Giralt UD Parc Taulí: Eva Castañer Gonzalez

Oral lectures: 38 topics are programmer. 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 offer. 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. The attendance will be mandatory

Seminars: 15 hours will be programmer. 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 diagnosticimaging. The attendance will be mandatory

Autonomous activities: the students will prepare the contents of Clinical Radiology following the recommended bibliography and preparing all programmed activities.

In the current exceptional circumstances, at the discretion of the teachers and also depending on the resources available and the public health situation, some of the theoretical classes, practicals and seminars organized by the Teaching Units may be taught either in person or virtually.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Practical evaluations: Objective and	30%	4	0.16	1, 2, 7, 11, 12, 15, 16, 17, 18, 19, 23

Written evaluations: objective tests: Multiple choice questions	70%	3.5	0.14	1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 20, 21, 22, 23, 24
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This subject does not provide for the single assessment system

The continuous evaluation of the subject will be carried out through:

- Two partial exams, each of which will have a weight of 45% of the final grade of the subject. Each partial exam will include a theoretical part (35%) and a practical part (10%), using multiple choice questions and/or short questions.
- The evaluation of the internships, which will take into account the attendance and participation in the internships and seminars, with a weight of 10% of the final mark of the subject.

Therefore, the practical part will have a weight of 30% of the final mark of the subject

These two assessments will evaluate learning outcomes

If the student does not appear in the partial exams, he will be considered \"Not Evaluable\".

For students who have not passed the subject through continuous assessment, they can sit a final remedial exam, with the same characteristics as the partial exams.

Bibliography

- Diagnóstico por imagen. Compendio de Radiología Clínica. César S. Pedrosa, Rafael Casanova. Interamericana McGraw-Hill, 1995
- Atlas y texto de imágenes radiológicas clínicas. Weir J, Murray AD. Harcourt Brace de España SA. 1999
- Fundamentos de TAC body. Webb RW, Brand WE, Helms CA. Marban Libros SL, 1999
- Radiología de Tórax Felson B. ED SALvat. Barcelona
- Abdomen Agudo Felson B, Ed Toray
- Fundamentos de Radiología Noveline RA. Masson, Barcelona, 2000
- Radiología del Sistema óseo Edeiken J. Ed Salvat, 1997
- Radiología Gastrointestinal Eisenberg RL. Marban Ed. 3, 1997
- Radiología del aparato Genitourinario Barbaric ZL. Marban Ed, 2 1995
- Torax. \"FELSON. Principios de Radiología Torácica: un texto programado\". Autor. Lawrence R. Goodman. Editorial MC Graw Hill
- Radiología Esencial. SERAM. Editorial Panamericana, 2010
- Medicina Nuclear. Aplicaciones clínicas. Ed. Carrió, González. Masson, 2003
- Medicina Nuclear en la práctica clínica. Ed. Soriano Castrejón, Martín Comín, García Vicente. Biblioteca Áula Médica SL, 2009
- Radioterapia en el tratamiento del cáncer. Biete Solá, Alberto. Doyma: 1990.
- Principles and practice of Radiation Oncology. (3rd edition). Pérez CA; Brady LW. Edits. Lippincott-Raven publishers. Philadelphia. New York. 1998

- Radiology for the radiologist. HALL, Enric J. Lippincott Williams & Wilkins: 20000(5th edition)
- <http://campusvirtual.uma.es/rgral/ameram.html>
- <http://www.radiologico.org/archivo/index.php>
- <http://www.e-anatomy.org>
- <http://www.e-mri.org>
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Software

No specific software required

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE