GENERAL OBJECTIVES
As part of the syllabus of the Faculty of Medicine, Radiology and Physical Medicine deals with the clinical application of physical agents for the purposes of diagnosis, therapy and rehabilitation. It covers four medical specialties: radiodiagnosis, radiotherapeutic oncology, nuclear medicine and rehabilitation.

The general aim is that students who complete the course will have acquired basic knowledge about the physical foundations of the techniques used in radiology and physical medicine, and be familiar with both the imaging diagnosis procedures used in the study of different organs and systems, as well as the therapeutic applications of physical agents.

This will enable them, in the second cycle, to acquire more specific knowledge about diagnostic, therapeutic and rehabilitation procedures applied to each of the pathologies associated with different organs and systems.

SPECIFIC OBJECTIVES

RADIODIAGNOSIS
Students will be able to:
• Name the radiological procedures commonly used in the study of each organ or system, as well as the basic details of the technique involved.
• Identify an image and be able to place it correctly in the corresponding viewing equipment.
• Identify the different projections of an image.
• Recognize technical errors in the procedure that could lead to erroneous images
• Recognize and describe the organs and structures observable in a radiological image
• Distinguish between a normal and a pathological radiograph
• Recognize and describe basic images and their characteristics
• Formulate the radiological procedures relevant to a given case of clinical suspicion, evaluating the technical and socio-economic characteristics of the examination
• Evaluate whether the results obtained are sufficient to enable a diagnosis to be made

NUCLEAR MEDICINE
Students will be able to:
• Explain the physical and biological foundations of the most widely used techniques in nuclear medicine
• Name the procedures used in the study of each organ or system, and explain why they are used
• Identify a procedure based on images obtained from it
• Recognize and describe the organs and visible structures in images, as well as the data that can be evaluated or calculated on the basis of visual recordings
• Identify a normal visual recording
• Recognize the different types of abnormal image
• Identify the different therapeutic applications of nuclear medicine

RADIOThERAPY
Students will be able to:
• Define the terms associated with basic radiotherapy
• Name the radiotherapy techniques which may be applied, including their advantages and disadvantages
• Evaluate the possibility of combining radiotherapy with other treatments (surgical, chemotherapy, hormone therapy and immune treatments)
• Evaluate the possible reactions and/or sequelae associated with each treatment

REHABILITATION
Students will be able to:
• Describe the systems of assessment, functional diagnosis and therapeutic procedures in rehabilitation
• Name and describe the most widely used techniques for different levels of disability
• Name the diagnostic procedures normally used in physical medicine in the study of each organ or system, as well as the basic details of the technique itself

SYLLABUS

Theory

Topic 1. Definition and objectives of the subject module
Medical specialties included in the subject module Radiology and Physical Medicine. Radiology in medicine today. Definition and limits of radiological science and physical medicine. The subject module as part of the syllabus of the Faculty of Medicine of the University of Barcelona. Course syllabus.

Topic 2. Physical bases of ID (1)

Topic 3. Physical bases of ID (2)
Types of ultrasound image: Indications and applications of ultrasonography.

Topic 4. Physical bases of ID (3)

Topic 5. Physical bases of ID (4)

Topic 6. Introduction to nuclear medicine

Topic 7. Radiological examination of the thorax (1)

Topic 8. Radiological examination of the thorax (2)

Topic 9. Radiological examination of the thorax (3)
Radiological signs in the mediastinum: lesions of the anterior, middle and posterior mediastinum. Vascular pathology. Radiological signs in the pleura and diaphragm.

Topic 10. Radiological examination of the abdomen (1)
Topic 11. Radiological examination of the abdomen (2)
Computed tomography: description of the system, manipulation of the image, artefacts. Technique and indications of abdominal computed tomography. Magnetic resonance in abdominal examinations.

Topic 12. Radiological examination of the digestive tract
Contrast materials. Technique. Radiological anatomy of the oesophagus, stomach, small and large intestine. Radiological signs.

Topic 13. Radiological examination of the head and neck

Topic 14. Radiological examination of the CNS

Topic 15. Angiography of the extremities and body

Topic 16. Radiological examination of the skeletomuscular system (1)
Ultrasonography. Conventional radiology.

Topic 17. Radiological examination of the skeletomuscular system (2)
Computed tomography. Magnetic resonance.

Topic 18. Radiological examination of the genito-urinary apparatus
Examination techniques: simple X-ray, IV urography, retrograde cystourethrogramraphy, ultrasound, computed tomography, hysterosalpingography. Signs of the main ureteral-renal and vesico-prostatic disorders. Testicular examination. Examination of the uterus and adnexa.

Topic 19. Radiological examination of the breast

Topic 20. PET: positron emission tomography

Topic 21. Therapeutic applications of nuclear medicine

Topic 22. Radiobiology (1)

Topic 23. Radiobiology (2)

Topic 24. Radioprotection
**Topic 25. Applied radioprotection**
Protection in radiotherapy. Selective protection of critical organs: dose levels. Protection of professional staff exposed to radiation, as well as the general public. Radioprotection in radiodiagnosis. Radioprotection in nuclear medicine.

**Topic 26. Physical bases of radiotherapy**

**Topic 27. Instruments used in radiotherapy**

**Topic 28. Radiotherapy (1)**

**Topic 29. Radiotherapy (2)**

**Topic 30. Radiotherapy (3)**

**Topic 31. Introduction to physical medicine in rehabilitation**

**Topic 32. Diagnostic and therapeutic applications in physical medicine**
Different interactions of physical agents: biothermal, bioelectric and feedback. Analgesic agents. Different interactions of physical agents: electromagnetic bioenergetic, mechanical or vibratory bioenergetic, and photobiological (light radiation).

**Topic 33. Diagnostic and therapeutic applications in rehabilitation**
Functional assessment. Therapeutic procedures: Kinesitherapy, and techniques of forced mobilization and gait retraining.

**Practice**
Seminar 1. Radiological anatomy of the thorax
Seminar 2. Pulmonary patterns
Seminar 3. CT and MR of pulmonary mediastinum
Seminar 4. Pulmonary gammagraphy
Seminar 5. Simple abdominal radiology
Seminar 6. Contrast studies of the digestive apparatus
Seminar 7. Abdominal ultrasound
Seminar 8. Abdominal CT
Seminar 9. Nuclear cardiology
Seminar 10. Isotopic studies in endocrine system
Seminar 11. Ultrasound/vascular Doppler
Seminar 12. Ultrasonography of thyroid glands, testes and soft parts
Seminar 13. Brain CT and MR
Seminar 14. Brain SPECT  
Seminar 15. Angiography of the extremities and the body  
Seminar 16. Bone gammagraphy  
Seminar 17. Radiological signs in bone (1)  
Seminar 18. Radiological signs in bone (2)  
Seminar 19. Radiological signs in the spine  
Seminar 20. Renal gammagraphy and renogram  
Seminar 21. Imaging diagnosis in the genitor-urinary apparatus  
Seminar 22. Mammography  

LEARNING RESOURCES AND TEACHING METHODS  

Teaching method  
The course objectives will be met through a combination of theory teaching and practical classes.  
The theoretical program will be based on theory classes for all students at the times established in the general course timetable.  
The practical program will be run during the same period in the mornings (8.00-9.00 a.m.). Practical work will be carried out in groups as small as possible and will involve showing students slides, videos and images from imaging diagnosis (radiographs, ultrasounds, CT, MR, gammagraphs). These classes will not take the form of a teacher-led presentation of a given subject but rather will encourage the active participation of students, who must ask questions, make comments and share any doubts.  

The methodology used will be:  
1. Description by the teacher of:  
   The findings in normal examinations, as well as the possible variations from normality.  
   The basic images and their characteristics, and the different types of pathological image.  
2. Description by students of the findings observed in different examinations, both normal and pathological.  
3. Joint discussion between students and teacher regarding the observed data in order to arrive at a diagnosis.