1. OVERVIEW

Subject Area	Diagnostic imaging Diagnostic and Therapeutic Procedures Module
Degree	Bachelor's Degree in Medicine
School/Faculty	BIOMEDICAL AND HEALTH SCIENCES
Ac. Year	THREE
ECTS	7 ECTS
Type	COMPULSORY
Language(s)	SPANISH
Delivery Mode	ON CAMPUS
Semester	Six-monthly

2. INTRODUCTION

Diagnostic Imaging is a compulsory subject (worth 7 ECTS) taught in the third year in the Degree in Medicine. This subject belongs to the Diagnostic and Therapeutic Procedures module worth a total of 43 ECTS.

Diagnostic imaging is a subject which teaches students the multiple imaging procedures used in daily medical practice. The aim is to develop students' ability to make a cost-effective use of the tests and provide added value to their clinical activity as they are able to interpret medical images of their patients.

3. SKILLS AND LEARNING OUTCOMES

Basic Skills (CB, by the acronym in Spanish):

• CB1: Students have shown their knowledge and understanding of a study area that builds on general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
• CB5: Students will develop the learning capacity required to undertake subsequent study with a high degree of autonomy.

General skills (CG, by the acronym in Spanish):

CG10 (CB10): Understand and recognise the causal agents and risk factors which determine health conditions and the development of a disease.

Cross-curricular skills (CT, by the acronym in Spanish):

• CT10: Independent learning: the ability to govern your own development by choosing the most effective lines of action, strategies, tools and opportunities to independently learn and apply knowledge to practice.

Specific skills (CE, by the acronym in Spanish):

CE4 1.1: Evaluate the risk/benefit ration of diagnostic and therapeutic procedures.

• CE4.1.9: Understand the principles of how radiation interacts with the human body. Radiological image: Radiological semiology of the different systems and apparatus. Awareness of other diagnostic imaging techniques. Evaluate the indications and contraindications of radiological studies.
• CE4.1.10: Have the ability to apply radiological protection criteria to diagnostic and therapeutic procedures with ionising radiation.
• CE4.2.4: Be able to systematically read a radiological image. Know how to use the different pharmaceutical products correctly. Know how to perform and interpret an electrocardiogram and electroencephalogram.

Learning outcomes (RA, by the acronym in Spanish):

- Study the principles of how radiation interacts with the human body.
- Evaluate the indications and contraindications of different diagnostic imaging studies.
- Be aware of other diagnostic imaging techniques.
- Identify the basic semiology of the different diagnostic imaging techniques.
- Know how to interpret the images obtained.
- Have the ability to apply radiological protection criteria to diagnostic and therapeutic procedures with ionising radiation.
- Understand the principles of digital technology applied to diagnostic imaging.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB1, CB5, CT10, CE4 1.1, CE4.1.9	Study the principles of how radiation interacts with the human body.
CB1, CB5, CT10, CE4.1.9	Evaluate the indications and contraindications of different diagnostic imaging studies.
CB1, CB5, CT10, CE4.1.9	Understand the basic principles of surgery.
CB1, CB5, CT10, CB10, CE4.2.4	Identify the basic semiology of the different diagnostic imaging techniques.
CB1, CB5, CT10, CE4.2.4	Know how to interpret the images obtained.
CB1, CB5, CT10, CE4.1.9	Have the ability to apply radiological protection criteria to diagnostic and therapeutic procedures with ionising radiation.
CB1, CB5, CT10	Understand the principles of digital technology applied to diagnostic imaging.

4. CONTENTS

This subject area is divided into six learning units, which are then divided into various topics.

Topic	Diagnostic imaging
	1. Basic concepts
Topic 1	Presentation. Subject – assessment content
Topic 2	Physical characteristics of an x-ray Radiation protection.
Topic 3	Pharmaceutical products in x-ray, contrast
Topic 4	Simple x-ray, computerised tomography and fluoroscopy

Topic 5	Ultrasound and magnetic resonance
Topic 6	Nuclear medicine, molecular imaging, hybrid techniques
	2. Thoracic radiology
Topic 7	Essential anatomy of the thorax
Topic 8	Semiology of the thorax
Topic 9	Lung collapse (atelectasis)
Topic 10	Alveolar lesion Pulmonary infection
Topic 11	Interstitial lesion Pathology of the airway
Topic 12	Pulmonary nodule Pulmonary neoplasm
Topic 13	Pathology of the mediastinum
Topic 14	Pathology of the pleura, wall and diaphragm
Topic 15	Heart failure. ICU thorax Tubes and catheters
	3. Abdominal radiology
Topic 16	Essential anatomy of the abdomen
Topic 17	Semiology of the abdomen
Topic 18	Pathology of the gastrointestinal tract
Topic 19	Pathology of the liver and vesicle
Topic 20	Pathology of the pancreas and spleen
Topic 21	Acute abdomen
Topic 22	Urinary apparatus Renal masses
Topic 23	Genital apparatus (female and male).
	4. Cardiac and vascular
Topic 24	Cardiac and pericardial pathology
Topic 25	Vascular pathology
	5. Radiology of the central nervous system
Topic 26	Essential anatomy of the CNS
Topic 27	Semiology of the CNS
Topic 28	Cranioencephalic trauma
Topic 29	CNS tumours
Topic 30	Vascular pathology and interventional procedures of the CNS
Topic 31	Pathology of white matter Hydrocephaly Advanced image
Topic 32	Sinonasal, orbital and auditory pathology
Topic 33	Anatomy and pathology of the neck
	6. Musculoskeletal radiology
Topic 34	Anatomy and musculoskeletal imaging methods
Topic 35	Musculoskeletal semiology Fractures
Topic 36	Images of arthropathy (degenerative, inflammatory, deposits, etc.)
Topic 37	Tumours of the bone and soft tissue
Topic 38	Spine
Topic 39	Shoulder Elbow, wrist and hand
Topic 40	Bony pelvis and hips
Topic 41	Knee Ankle and foot
	7. Miscellaneous
Topic 42	Polytrauma
Topic 43	Paediatric chest radiology Abused children
Topic 44	Paediatric abdomen radiology
Topic 45	Breast Basic semiology Mammogram-ultrasound-MR
Topic 46	Functional imaging in oncology

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

1. Problem-based learning: Presentation of problems, reorganising into small groups, literature analysis, analysis of scientific texts and documents, symposiums and presentations, directed debates, specialised individual and collective tutorials, and reaching a consensus.
2. Specialised seminars: literature research and debate on scientific data in small groups.
3. Lectures: Classroom presentations by the professor on basic theory, encouraging debate and student participation.
4. Case study method: presentation and discussion of clinical cases in small groups.
5. Skills learning in the classroom and simulation environments: Practical work with IT programs, anatomical models, human dissection and standardised patients.
6. Experiential learning in supervised clinical placements in the different hospital services: problem-solving in a practical context observing the tutor, being observed by the tutor, or with the tutor's supervision. Students will integrate themselves and participate in the activities performed in the healthcare units. The student activities will be programmed, tutor-assisted and assessed by the tutor.

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, and the percentage of participation in each of them are as follows:

On campus:

LEARNING ACTIVITIES	HOURS	ATTENDANCE MODE
Theory/practical learning activities	68	100
Directed learning activities	17	10
Independent working	45	0
Tutorials	18	100
Knowledge tests	2	100
Clinical placement	25	100
TOTAL	**175 h**	

7. ASSESSMENT

The assessment methods, plus their weighting in the final grade for the subject area, are as follows:

On campus:

		Assessment system	Weighting
THEORY (70%)	Cognitive objectives and clinical skills assessment	Final assessment exam	70%
PRACTICAL PART (30%)	Assessment of skills in clinical practice	Workshops	10%
		Assessment of skills in simulation	10%

	Assessment of clinical skills	Participation in clinical practice	5%
	Attitude assessment	Attitude in clinical practice	5%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference works for monitoring the subject are:

RADIOLOGY

- **Radiología básica. Aspectos fundamentales**. Herring, William. 4ª Edición 2020 ISBN: 9788491136651 / E-ISBN 9788491137115
- **Radiología clínica para estudiantes.** Miguel Ángel de Gregorio. 2013. Watson editorial. ISBN: 978-84-943410-0-7
- **Radiología esencial.** SERAM Sociedad Española de Radiología Médica, José Luis Del Cura Rodríguez, Ángel Gayete Cara,Àlex Rovira Cañellas, Salvador Pedraza Gutiérrez. A la 2ª edición 2019. Ed. Médica Panamericana. ISBN: 9788491103493

RADIOLOGICAL ANATOMY

- **Anatomía Radiológica para estudiantes.** Miguel Ángel de Gregorio. 2013. Watson editorial. ISBN: 978-84-92903-27-6
- **Anatomía para el diagnóstico radiológico**. Ryan. Marban ISBN 10: 8471015250

INTERNET

- www.learningradiology.com
- www.radiopaedia.org
- www.rad.usuhs.edu/medpix/medpix.html
- http://www.isradiology.org/isr/index.php

At this last address, you can download several manuals from the World Health Organization, such as a complete book on Thorax and Musculoskeletal.