



Information about the subject

Degree: Bachelor of Science Degree in Podiatry

Faculty: Faculty of Medicine and Health Sciences

Code: 470306 **Name:** Radiology and Radiation Protection

Credits: 6,00 **ECTS Year:** 3 **Semester:** 1

Module: GENERAL PODOLOGY AND BIOMECHANICS

Subject Matter: Radiology **Type:** Compulsory

Field of knowledge: Health Sciences

Department: Medical Specialities

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

473A Ruben Lorca Gutierrez (**Responsible Lecturer**)

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Module organization

GENERAL PODOLOGY AND BIOMECHANICS

Subject Matter	ECTS	Subject	ECTS	Year/semester
General Podiatry	21,00	Evolutionary Podiatry	3,00	This elective is not offered in the academic year 25/26
		Expertise in podiatry	3,00	This elective is not offered in the academic year 25/26
		General Podiatry	6,00	1/2
		Preventive Podiatry	3,00	4/1
		Social Morality. Deontology	6,00	3/1
Biomechanics	27,00	Biomechanics	6,00	2/1
		Ergonomics and footwear	3,00	4/1
		General Intervention Procedures	6,00	This elective is not offered in the academic year 25/26
		Physiotherapy Assessment	6,00	This elective is not offered in the academic year 25/26
		Sports Podiatry	6,00	3/2
Radiology	6,00	Radiology and Radiation Protection	6,00	3/1



Research and management	12,00	Introduction to research and sanitary documentation	6,00	4/1
		Planning and management of the podiatric clinic	6,00	4/2

Recommended knowledge

Not required

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 Through imaging techniques, the student identifies the morphology and structure of tissues, organs and systems of the locomotive system.
- R2 Knows the different techniques for obtaining diagnostic images and the most commonly used projections for their correct study.
- R3 Knows the basic radiological semiology of the locomotive system.
- R4 Knows how to interpret a radiological and nuclear medicine image by systematic reading.
- R5 The student critically evaluates and knows how to use technologies and sources of clinical and biomedical information to obtain, organize, interpret and communicate clinical, scientific and health information.



Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC	Weighting			
	1	2	3	4
CB3 Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific or ethical issues.			X	

GENERAL	Weighting			
	1	2	3	4
CG1 Students know and apply the theoretical and methodological foundations of Chiropody and Podiatry.				X
CG2 Students know the structure and function of the human body, especially of the lower limb, semiology, mechanisms, causes and general manifestations of the disease and diagnostic methods of medical and surgical pathological processes, interrelating general pathology with foot pathology.		X		
CG3 Students develop the capacity, ability and skill necessary to diagnose, prescribe, indicate, perform and/or elaborate and evaluate any type of podiatric, orthopedic, chiropractic, podiatric surgery, physical, pharmacological, preventive and/or educational treatment, based on the clinical history.			X	
CG9 Students critically assess the terminology, clinical trials and methodology used in podology-related research.			X	
CG11 Students incorporate the ethical and legal principles of the profession into practice, always acting on the basis of compliance with deontological obligations, current legislation and normopraxis criteria, integrating social and community aspects into decision-making			X	



SPECIFIC	Weighting			
	1	2	3	4
CE41 Students learn about the different diagnostic systems, their characteristics and interpretation, as well as the handling of podiatric radio-diagnosis facilities and radio-protection. Atomic structure of matter. Radioactivity. Interaction of electrons and photons with matter.				X
CE42 Students develop the ability to perform radiological activities typical of podiatry. X-ray equipment. Magnitudes and imaging units. Radiation detection. Quality control and calibration of radiodiagnosis facilities. Radiobiology and radioprotection. Legislation. Knowledge of other techniques for obtaining diagnostic images of the foot. Radiological techniques. Radiological interpretation.				X

TRANSVERSAL	Weighting			
	1	2	3	4
CT1 Analytical capabilities			X	
CT7 Problem solving			X	
CT8 Decision making			X	
CT10 Interdisciplinary teamwork			X	
CT17 Adaptation to new situations			X	
CT22 Motivation for quality		X		



Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R5	70,00%	Open questions
R1, R2, R3, R4, R5	10,00%	Practice (exercises, case studies, problems)
R1, R2, R3, R4, R5	20,00%	Practice exam- technical proficiency testing

Observations

The Radiodiagnosis and Radioprotection parts will be evaluated separately and will be calculated at the rate of 2/3 of the student's grade (Radiodiagnosis) and 1/3 of the student's grade (Radioprotection). To pass the subject, the student must obtain a minimum grade of 4 in each of the parts, so that the overall mark weighted according to the previous paragraph is equal to or greater than 5.

Regarding the Radiodiagnosis part, the theoretical test and the practical test must be passed independently. Attendance to classes is not compulsory, although participation and attitude in them will be taken into account.

Theoretical written test: it will consist of an exam of about 40 multiple choice questions. In the multiple choice test there will be four options as answers of which only one will be correct. Each answer answered correctly will add 0.25 point. Every 3 wrong answers will subtract 0.25 points.

Practical written test: it will consist of an exam with 20 multiple choice multiple choice questions about images. The practical exam will only be corrected if the theory has been passed and if the practical sessions have been carried out.

MINIMUM REQUIREMENTS TO PASS THE SUBJECT: To pass the subject you must pass the theoretical exam of both parts. If only one of the two parts is passed (with a 5 or more) in the first call, the grade will be saved for the second call, so that only the suspended part will be presented in the second call.



MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 Theoretical classes (TC). Training activity preferably oriented to the acquisition of knowledge skills. It is characterised by the fact that students are spoken to. Also called master class or expository class, it refers to the oral exposition made by the teacher, (with the support of a blackboard, computer and cannon for the exposition of texts, graphics, etc.).
- M2 Seminars (S). Training activity preferably oriented to obtain knowledge application and research competences. Knowledge is built through interaction and activity. Consisting of supervised monographic sessions with shared participation (Teachers, students, experts). The size of the group is variable, from a large group to small groups, no less than 6 students for interaction. The evaluation will be made by means of follow-up records by the teacher. Participation and development of problem-solving skills should be taken into account.
- M3 Problems practice (CPP). Training activity oriented to group work for problem solving under the supervision of a teacher. The size of the group is variable, in a range of 10-20 students, to avoid confusion with a master class.
- M4 Classroom practice (CPA). Training activity of work in groups that is developed in the classroom. It includes work with documents (e.g.: work with articles or documents, clinical case studies, diagnostic analyses, etc). The size of the group is variable, in a range of 10-20 students.



- M6 Laboratory Practice (CPL). Training activity of work in groups that is developed in the Laboratory. It includes the sessions where students actively and autonomously develop, supervised by the teacher, laboratory experiments. The size of the group is variable, in a range of 10-20 students.
- M7 Tutorials (T). Set of activities carried out by the teacher with personalised attention to the student or in small groups with the aim of reviewing and discussing the materials and topics presented in the classes, seminars, readings, completion of assignments, etc. The aim is to ensure that education is truly a comprehensive training of the student and is not reduced to a transfer of information. It is, therefore, a personalized relationship of help in which the teacher-tutor attends, facilitates and guides one or more students in the formative process.
- M8 Evaluation (Ev). It is the set of processes that try to evaluate the learning results obtained by the students and expressed in terms of acquired knowledge, capacities, developed skills or abilities and manifested attitudes. It covers a wide range of activities that can be developed for students to demonstrate their training (e.g. written, oral and practical tests, projects or assignments,). It also includes Official Calls.
- M10 Estudio del alumno: Preparación individual de lecturas, ensayos, resolución de problemas, seminarios



IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons M1	R1, R2, R3, R4, R5	37,00	1,48
Seminar M2	R1, R2	12,50	0,50
Practice lessons M4	R1, R2, R4	6,00	0,24
Office Hours M7	R1, R2	2,50	0,10
Evaluation M8	R1, R2, R3, R4	2,00	0,08
TOTAL		60,00	2,40

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Autonomous work M10	R1, R2, R4	90,00	3,60
TOTAL		90,00	3,60



Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
RADIODIAGNOSIS DIDACTIC UNIT I	Morphology, structure and normal function of the Human Body.
RADIODIAGNOSIS DIDACTIC UNIT II:	COMMUNICATION SKILLS: Teamwork. Radiological terminology. Relationship between radiologists, nuclear physicians and other specialties
RADIODIAGNOSIS DIDACTIC UNIT III	DIAGNOSTIC AND THERAPEUTIC PROCEDURES: Semiology of bone and joint lesions in MI. Scintigraphic examinations in the osteoarticular system: ankle and foot. Ankle and foot radiological anatomy: Simple radiology, X-ray projections, Anatomical angles. Variants of normality. General indications. Radiological examination of the spine. Ultrasound anatomy of the ankle and foot: Characteristics of the technique. Advantages and disadvantages. General indications. Computed tomography of the ankle and foot: Characteristics of the technique. Advantages and disadvantages. General indications.
RADIODIAGNOSIS DIDACTIC UNIT IV	HUMAN CLINICAL TRAINING: Most frequent infectious ankle and foot lesions. The diabetic foot. Ankle and foot arthritis. Traumatic ankle and foot bone injuries. Traumatic soft tissue injuries of the ankle and foot. Image-guided therapeutic procedures.
RADIOPROTECTION DIDACTIC UNIT I	BASIC CONCEPTS OF RADIOPROTECTION Atomic structure Interaction of radiation with matter Magnitudes and radiological units



RADIOPROTECTION DIDACTIC UNIT II	<p>PHYSICAL CHARACTERISTICS OF X-RAY EQUIPMENT AND BEAMS</p> <p>The X-ray beam. Control and modification</p> <p>The radiological image.</p> <p>Characteristics of the different imaging systems.</p>
RADIOPROTECTION DIDACTIC UNIT III	<p>MAGNITUDES AND MEASUREMENT OF RADIATION</p> <p>Detection and measurement of radiation</p> <p>Quality control of installations and detector calibration</p>
RADIOPROTECTION DIDACTIC UNIT IV	<p>RADIOBIOLOGY</p> <p>Biological effects of ionizing radiation.</p>
RADIOPROTECTION DIDACTIC UNIT V	<p>BASIC RADIOLOGICAL PROTECTION AND SPECIFIC RADIOLOGICAL PROTECTION IN PODIATRIC RADIODIAGNOSTIC INSTALLATIONS</p> <p>Radiation protection.</p> <p>General criteria Operational radiation protection.</p> <p>Professionals Operational Radiation Protection.</p> <p>Patients Radiation protection of the facility.</p>
RADIOPROTECTION DIDACTIC UNIT VI	<p>QUALITY GUARANTEE</p> <p>Quality assurance in installation Management and administrative controls</p>
RADIOPROTECTION DIDACTIC UNIT VII	<p>BASIC REGULATIONS AND LEGISLATION IN RADIODIAGNOSTIC INSTALLATIONS</p> <p>Spanish legislation on nuclear and radioactive facilities</p> <p>Spanish legislation and documents on quality control in radiodiagnosis facilities</p>



Temporary organization of learning:

Block of content	Number of sessions	Hours
RADIODIAGNOSIS DIDACTIC UNIT I	4,25	8,50
RADIODIAGNOSIS DIDACTIC UNIT II:	4,50	9,00
RADIODIAGNOSIS DIDACTIC UNIT III	4,50	9,00
RADIODIAGNOSIS DIDACTIC UNIT IV	5,25	10,50
RADIOPROTECTION DIDACTIC UNIT I	1,50	3,00
RADIOPROTECTION DIDACTIC UNIT II	2,00	4,00
RADIOPROTECTION DIDACTIC UNIT III	2,00	4,00
RADIOPROTECTION DIDACTIC UNIT IV	1,50	3,00
RADIOPROTECTION DIDACTIC UNIT V	1,00	2,00
RADIOPROTECTION DIDACTIC UNIT VI	1,50	3,00
RADIOPROTECTION DIDACTIC UNIT VII	2,00	4,00



References

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- Turner W, Merriman L. Habilidades clínicas para el tratamiento del pie. Barcelona: Elsevier;2007
- Tyrrell W, Carter G. Therapeutic Footwear. A Comprehensive Guide. China: Churxhill Livingstone; 2009

WEBS OF INTEREST

- Consejo de Seguridad Nuclea, <http://www.csn.es>
- UNSCEAR, United Nations Scientific Committee on the Effects of Atomic Radiation, <http://www.unscear.org/>
- ICRP, Comisio´n Internacional de Proteccio´n Radiolo´gica, <http://www.icrp.org/>
- SEPR, Sociedad Espan~ola de Proteccio´n Radiolo´gica (SEPR), <http://www.sepr.es/>
- SERAM, Sociedad espan~ola de radiologí´a me´dica, <http://www.seram.es>
- SEFM, Sociedad espan~ola de fı´sica me´dica, <http://www.sefm.es>
- La Comisio´n Europea, Direccio´n general de medio ambiente, http://ec.europa.eu/energy/nuclear/radioprotection/index_en.htm
- EURADOS, European Radiation Dosimetry Group , <http://www.eurados.org/>
- <http://www.imagegently.org> Alliance for Radiation Safety in Pediatrics.
- Sociedad de Proteccio´n radiolo´gica de Reino Unido http://www.spr_uk.org/medicine/training.html
- <http://rpop.iaea.org/RPoP/Content/AdditionalResources/Training/index.htm>
- Portal de PR del CIEMAT: <http://www.ionizantes.ciemat.es/>
- Recursos sobre Radiaciones Ionizantes: <http://www.npl.co.uk/ionising-radiation/>



Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

Microsoft Teams

Kaltura



Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

Microsoft Teams

Kaltura

Explanation about the practical sessions:



2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

The following changes will be made to adapt the subject's assessment to the online teaching.

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System:

The practical exam, if it cannot be done in person, will consist of a theoretical test of the videos presented on practical skills, via the UCVnet platform. It will consist of four short theoretical questions, development. The time that will be allowed to complete the exam will be 20 minutes.

The Open Questions and multiple choice test (theoretical exam) will be carried out via the UCVnet platform and the response time will be limited to 80 minutes.



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Course guide

Year 2025/2026
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