Information about the subject

Degree: Bachelor of Science Degree in Physiotherapy

Faculty: Faculty of Medicine and Health Sciences

Code: 240210 **Name:** Radiology

Credits: 6,00 **ECTS Year:** 2 **Semester:** 2

Module: MODULE 5: UNIVERSITY-SPECIFIC

Subject Matter: Training in complementary techniques **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:

242A	Jorge Casaña Mohedo **(Responsible Lecturer)**	jorge.casana@ucv.es
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Module organization

MODULE 5: UNIVERSITY-SPECIFIC

Subject Matter	ECTS	Subject	ECTS	Year/semester
Social Sciences	6,00	Science, Reason and Faith	6,00	2/1
Health Research and Documentation	6,00	Healh Research and Documentation	6,00	3/2
Training in complementary techniques	6,00	Radiology	6,00	2/2
Training in physiotherapeutic techniques	30,00	Geriatric Physiotherapy	6,00	4/1
		Manual Therapy	6,00	3/2
		Paediatric Physiotherapy	6,00	3/2
		Preventive and Evolutionary Physiotherapy	6,00	3/2
		Special Procedures in Physiotherapy	6,00	3/2

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 image techniques, the student identifies the morphology and structure of tissue, organs and systems.

R2 Knows the different techniques for obtaining the diagnostic image.

R3 Knows the basic radiological semiology of the different apparatus and systems.

R4 Evaluates the indications and contraindications of radiological and nuclear medicine studies.

R5 Knows how to interpret radiological and nuclear medicine images by systematic reading.

R6 Evaluates the risk/benefit ratio of diagnostic and therapeutic procedures

R7 The student is able to apply the criteria of radiological protection in diagnostic and therapeutic procedures with ionising radiation.

R8 The student has acquired knowledge, critical reasoning and the ability 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
CB1	Students demonstrate knowledge and understanding in an area of study that is at the core of general secondary education, and is often at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.		x		
CB2	Students know how to apply their knowledge to their work or vocation in a professional way and possess the skills usually demonstrated by developing and defending arguments and solving problems within their area of study.			x	
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		
CB4	Students can convey information, ideas, problems and solutions to both specialized and non-specialized audiences.			x	
CB5	Students develop those learning skills necessary to undertake further studies with a high degree of autonomy.		x		

SPECIFIC		Weighting			
		1	2	3	4
CE2	Students identify the physiological and structural changes that can occur as a result of the application of physiotherapy.				x
CE3	Students identify the factors that influence human growth and development throughout life.			x	
CE4	Students know the principles and theories of physics, biomechanics, kinesiology and ergonomics, applicable to physiotherapy.			x	
CE5	Students know the physical bases of the different physical agents and their applications in Physiotherapy.			x	

CE6	Students know the principles and applications of measurement procedures based on biomechanics and electrophysiology.	x		
CE9	Students assimilate theories of communication and interpersonal skills.		x	
CE11	Students identify the factors involved in teamwork and leadership situations.			x
CE16	Physiotherapeutic Procedures based on specific Methods and Techniques of physiotherapeutic actions to be applied in the different pathologies of all the apparatuses and systems, and in all the specialties of Medicine and Surgery, as well as in the promotion and conservation of the health, and in the prevention of the disease.	x		
CE17	Students manage research and evaluation methodologies that allow the integration of theoretical perspectives and research experiences in the design and implementation of effective physiotherapy.		x	
CE18	Students resort to theories that support problem-solving capacity and clinical reasoning.		x	
CE19	Students comprehend the processes of health administration and management, especially of physical therapy services, in the diverse and changing context in which it operates.	x		
CE20	Students comprehend the implications of organisational arrangements and working models.	x		
CE21	Students give proof of the criteria and indicators that guarantee the quality in the provision of the physiotherapy service, through the use of good clinical practice guidelines and professional standards.			x
CE22	Students evidence the fundamental concepts of health, health systems and levels of care. Epidemiology. Physiotherapy in the health-disease process.		x	
CE23	Students comprehend the impact of socio-health policies on professional practice	x		
CE28	Students prepare and systematically fill in the complete Physiotherapy Clinical History, where all the steps followed from the reception of the patient/user to the report at the discharge of Physiotherapy are properly and efficiently recorded.	x		

CE35	Students provide a Physiotherapy attention in an effective way, giving an integral assistance to the patients/users, for which it will be necessary: To interpret the medical prescriptions; to prepare the environment in which the Physiotherapy attention will be carried out so that it is comfortable; to keep the patient informed of the treatment that is applied, explaining him/her the tests and maneuvers that are practiced, the preparation that they require, and to exhort him/her to collaborate at all times; to register daily the application of the Physiotherapy attention, the evolution and the incidents of it.	x		
CE36	Students participate in the areas of health promotion and disease prevention. This includes, among others: identifying the social and economic factors that influence health and health care; designing and carrying out disease prevention and health promotion activities; advising on the development and implementation of care and education policies in the field of physiotherapy; identifying risks and risk factors; assessing and selecting users who can benefit from preventive measures; providing health education to the population in the various fields.		x	
CE37	Students relate effectively with the whole multidisciplinary team. This includes: establishing the objectives of Physiotherapy within the team; collecting, listening and assessing the reflections of the rest of the multidisciplinary team towards their actions; accepting and respecting the diversity of criteria of the rest of the team members; recognizing the competences, skills and knowledge of the rest of the health professionals.		x	
CE38	Students incorporate the ethical and legal principles of the profession into the professional culture. This implies: respecting the rights of the patient/user and the relatives; identifying possible violations of these rights and taking appropriate measures to preserve them; identifying ethical problems in daily practice and applying reasoning and critical judgment in their resolution; participating in health care ethics committees and clinical research ethics committees; adjusting professional practice to the deontological conditions and legal regulations of professional practice; guaranteeing the confidentiality of user and professional data.	x		

CE39	Students incorporate scientific research and evidence-based practice as a professional culture This includes: Establishing lines of research in the field of the competences of the profession and disseminating them in the research group; participating in the research group of the environment; disseminating the research work and its conclusions in the scientific and professional community; establishing physiotherapy care protocols based on practice by scientific evidence; promoting all those professional activities that involve the dynamization of research in physiotherapy	x		
CE42	Students develop planning, management and control activities for Physiotherapy services. This includes: participating in the preparation, management and execution of the health plan of the institution in which one works; establishing, defining and applying the operation of the Physiotherapy unit; establishing the health programs in the area of Physiotherapy; establishing, defining and applying the criteria of attention in Physiotherapy, using adequately the available resources, applying efficiency criteria as work tools and using technology adequately.	x		
CE43	Students apply the mechanisms of quality assurance in the practice of Physiotherapy, adjusting to the criteria, indicators and standards of quality recognized and validated for good professional practice.		x	
CE45	Students take some risks and live in uncertain environments, i.e. having the ability to carry out a responsibility without knowing 100% the final result.	x		
CE46	Motivate others. This means having the ability to generate in others the desire to actively and enthusiastically participate in any project or task.	x		
CE50	Students collaborate and cooperate with other professionals, enriching each other This includes: resolving most situations by establishing direct and assertive communication and seeking consensus; assisting other health professionals in professional practice; knowing interprofessional boundaries and employing appropriate referral procedures.	x		
CE52	Develop the ability to organize and lead work teams effectively and efficiently.	x		

CE55	Show its orientation towards the patient/user, making it clear in its actions that the citizen and his/her needs are the axis around which its decisions revolve. As can be seen, some of the competencies that we have gathered as specific coincide in their denomination and contents with certain transversal competencies, but we have decided to incorporate them as specific competencies, given the extraordinary importance that national and international Professional Associations and Colleges confer on them			x	

TRANSVERSAL		Weighting			
		1	2	3	4
CT1	Decision-making			x	
CT2	Problem solving.				x
CT3	Capacity for organization and planning.			x	
CT4	Analysis and synthesis capacity.			x	
CT5	Oral and written communication in the native language.			x	
CT6	Information management capacity.		x		
CT7	Computer skills related to the field of study.		x		
CT8	Knowledge of a foreign language.	x			
CT9	Ethical commitment.			x	
CT10	Teamwork.			x	
CT11	Interpersonal relationship skills.		x		
CT12	Work in an interdisciplinary team		x		
CT13	Critical Reasoning			x	
CT14	Work in an international context.	x			

CT15	Recognition of diversity and multiculturalism	x		
CT16	Motivation for quality			x
CT17	Adaptation to new situations.		x	
CT18	Creativity		x	
CT19	Autonomous learning			x
CT20	Initiative and entrepreneurship		x	
CT21	Leadership.			x
CT22	Knowledge of other cultures and customs	x		
CT23	Sensitivity to environmental issues.			x

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R6, R7, R8	40,00%	TEST TYPE: Multiple choice test with one correct answer out of five possible ones. It allows the student to know in greater detail the contents acquired by him/her. It allows the following generic or transversal competences to be assessed: 2 Problem solving 1 Decision making 13 Critical thinking
	5,00%	WORKS: The student, individually or in a group, elaborates a revision or research topic and presents it, in writing, for the evaluation by the teacher. The following generic or transversal competences are valued: 4 Capacity for analysis and synthesis. 3 Capacity for organisation and planning. 7 Computer skills. 6 Information management skills. 10 Teamwork. 14 Working in an international context. 11 Interpersonal skills. 13 Critical thinking. 19 Autonomous learning. 18 Creativity. 21 Leadership. 20 Initiative and entrepreneurship. 16 Motivation for Quality. 70 Maintaining an attitude of learning and improvement. 72 Knowing one's own skills and limitations.
R1, R3, R5	40,00%	PRACTICAL EXAM: The student is faced with a test in which s/he must demonstrate through practical application the acquisition of certain knowledge. For example, histological or anatomopathological diagnosis, image interpretation or diagnostic tests. This test evaluates the following generic or transversal skills: 13 Critical reasoning. 19 Autonomous learning.

R1, R2, R3, R4, R6, R7, R8	10,00%	PRESENTATION: The student develops, through an oral presentation, supported or not by audiovisual means, a subject or work commissioned by the teacher. This is the method of evaluation of the Final Degree's Project. At the end of the presentation, the teacher or the audience can ask questions.
R1, R2, R3, R4, R6, R7	5,00%	ATTENDANCE AND PARTICIPATION IN CLASS: The teacher evaluates the participation, involvement and progression of the student's acquisition of knowledge and skills during the theoretical and practical classes. It will not exceed 5% of the final grade.

Observations

Participation in each activity will be considered as part of the continuous assessment. This includes engagement with the virtual campus, in-class work, seminars, and tutorials, as well as responses to daily questions on the material covered.
In this course, students may opt for a single assessment, which is considered an exceptional and extraordinary evaluation method that will only be applied when a student, for a justified and duly accredited reason, cannot meet the minimum attendance requirement. This option must be requested from the responsible professor, who, in coordination with the Head of the corresponding Department, will assess its appropriateness and communicate the decision in writing. The single assessment is not configured as a single test, but as a set of tasks and/or exams through which all the established learning outcomes will be evaluated, ensuring that the student has dedicated the corresponding ECTS credits to the course.

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	Master class Problem solving Exposition of contents by the teacher. Explanation of knowledge and skills
M2	Case resolution: Analysis of sample realities - real or simulated - that allow the student to connect theory with practice, to learn from models of reality or to reflect on the processes used in the cases presented.
M4	Personalized attention. Period of instruction and/or guidance by a tutor with the aim of analyzing with the student their work, activities and their evolution in learning the subjects.
M5	Set of tests carried out to know the degree of acquisition of knowledge and skills of the student.
M6	Problem solving and case studies Written work Online activity in the e-learning platform Personal study. Search of information and documentation.
M11	Oral presentation
M12	Group work: Group work sessions supervised by the teacher. Knowledge construction through student interaction and activity.
M14	Group work to search, discuss and filter information about the subjects
M15	Seminar, supervised monographic sessions with shared participation
M16	Student's study: Individual preparation of readings, essays, problem solving, seminars.

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical lessons M1, M5, M6, M11, M12, M14, M16	R1, R2, R3, R4, R5, R6, R7, R8	35,00	1,40
Practice lessons M2, M6, M12	R1, R3, R5, R8	7,00	0,28
Seminar M1, M15	R1, R2, R3, R4, R5	8,00	0,32
Office Hours M4	R5, R8	7,00	0,28
Assessment M5, M6	R1, R2, R3, R4, R5, R6, R7, R8	3,00	0,12
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Autonomous work M6, M11, M16	R1, R2, R3, R4, R5	75,00	3,00
Group work M6, M12, M14	R1, R2, R3, R4, R5	15,00	0,60
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
DIDACTIC UNIT I: TECHNIQUES IN RADIODIAGNOSIS AND BIOMEDICAL IMAGING	TOPIC 1. The structure of matter. Atomic structure. Electromagnetic radiation. Interaction of radiation, particles and photons with matter. TOPIC 2. Physical characteristics of the Radiodiagnostic equipment. Basic components of the Rx tube. Automatic exposure control. Image receptors. The radiation beam. The Rx spectrum. Scattered radiation. Influence of the radiation beam on the image quality and the dose to the patient TOPIC 3. Magnitudes and radiological units. Dosimetry. Radiation detection and dosimetry. Legislation. TOPIC 4. General criteria and basic measures in Radiological Protection. Operational and specific radiological protection in radiodiagnostic facilities.

DIDACTIC UNIT II: TECHNIQUES IN RADIODIAGNOSIS AND BIOMEDICAL IMAGING	TOPIC 5. Conventional X-ray I: chest. Reading standards. Interpretation of pathological results. Practical advice on interpretation and frequent errors. Examples. THEME 6: Conventional radiography II: spine. Reading norms. Interpretation of pathological findings. Practical advice on interpretation and frequent errors. Examples. TOPIC 7. Conventional radiography III: extremities, skull. Reading norms. Interpretation of pathological results. Practical advice for interpretation and frequent errors. Examples. TOPIC 8. Conventional radiography IV: abdomen and others. Reading norms. Interpretation of pathological results. Practical advice for interpretation and frequent errors. Examples. TOPIC 9. Ultrasound I: Fundamentals, technique, applications and indications. Interpretation of pathological results. Examples. THEME 10. Ultrasound II: Ultrasound of soft and muscle-tendinous parts. Interventional ultrasound. Examples. THEME 11. CT: Computerized, helical and multislice. Fundamentals, advantages, disadvantages and indications. Applications and interpretations of pathological results. Examples. Multiphase studies. Complications. Frequent errors and interpretation rules. TOPIC 12. MRI I: fundamentals, indications and contraindications. How to read and interpret. Recognizing a normal or pathological study. When to indicate it in front of the CT. Examples with practical applications. TOPIC 13. MRI II: Examples with practical applications with special attention to the musculoskeletal system. THEME 14. Other tests: Doppler, mammography, bone densitometry, gammagraphy, radioisotopes, PET, others. Practical examples and indications. THEME 15. Diagnostic tests in neuroimaging. THEME 16. Biomedical imaging and research. Image analysis techniques.

DIDACTIC UNIT III: BIOMEDICAL IMAGING SEMINARS	SEMINAR 1.-Image diagnosis in spine pathology. Clinical cases (I). SEMINAR 2.- Image diagnosis in spine pathology. Clinical cases (II). SEMINAR 3.- Diagnostic imaging in shoulder pathology. Clinical cases (I) T20.SEMINAR 4.- Diagnostic imaging in shoulder pathology Clinical cases (II) T21.SEMINAR 5.- Diagnostic imaging in knee pathology Clinical cases. (I) SEMINAR 6.- Diagnostic imaging in knee pathology Clinical cases. (II) SEMINAR 7.- Diagnostic imaging in ankle and foot pathology Clinical cases (I) SEMINAR 8.- Image diagnosis in ankle and foot pathology. Clinical cases (II) SEMINAR 9.- Injuries of the musculoskeletal system of soft parts. Entesitis and tendinopathies. Muscle injuries. Sports practice and image assessment. Clinical cases. SEMINAR 10.- Therapeutic interventionism with the help of image. Clinical cases. SEMINAR 11.- Diagnostic imaging in muscular-skeletal pathologies of childhood and adolescence. SEMINAR 12.- Image diagnosis in rheumatic, oncological, rare and other systemic diseases.

Temporary organization of learning:

Block of content	Number of sessions	Hours
DIDACTIC UNIT I: TECHNIQUES IN RADIODIAGNOSIS AND BIOMEDICAL IMAGING	12,00	24,00
DIDACTIC UNIT II: TECHNIQUES IN RADIODIAGNOSIS AND BIOMEDICAL IMAGING	14,00	28,00
DIDACTIC UNIT III: BIOMEDICAL IMAGING SEMINARS	4,00	8,00

References

·Weber EC, Vilensky JA, Carmichael SW Netter. Essential Radiological Anatomy. 1st ed. Elsevier-Masson Spain; 2009.

·Bontrager KL, Lampignano JP. Radiological projections with anatomical correlation. Madrid: Harcourt Brace-Elsevier Spain; 2006.

·Cabrero FJ. Radiological Image. Physical principles and instrumentation. Barcelona: Masson; 2004.

·Ziessman HA, O'Malley JP, Thrall JH. Nuclear Medicine. Requirements in Radiology. Madrid. Mosby-Elsevier; 2007.

·Diaz C, De Haro FJ, Exploration techniques in Nuclear Medicine. 2nd edition. Barcelona: Masson; 2009.

·Minoves M, Riera E. Nuclear Medicine Imaging in benign bone and joint diseases. Elsevier-Masson: Madrid; 2005.

·Martín-Comín J et al. Diagnosis of inflammation and infection in nuclear medicine. Madrid: General Electric; 2005.

·Rudolf Weiss et al. Diagnostic-based physiotherapy for scoliosis. Editorial Paidotribo.

·IAEA web portal. http://rpop.iaea.org radiation protection of patients.

·CIEMAT web portal. www.ionizante.ciemat.es

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:

[X] Microsoft Teams

[X] 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:

X	Microsoft Teams
X	Kaltura

Explanation about the practical sessions:

not required

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

ONSITE WORK

Regarding the Assessment Tools:

[X] 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:

not required