

Elective Subject

(Academic Course 2025-2026)

Subject title: Radiological Protection Fundamentals in Health Sciences.

Code:

Subject: Elective

Responsibility Center: Faculty of Nursing, Physiotherapy and Podiatry

Credits: 3 ECTS

Number of places offered: 30

	Total (30% attendance)	Theory	Seminars	Practices	Others
Classroom activities	24 h	15 h	9 h		
e-learning	51 h				Final work 10 h
Total	75 h				

Course schedule: (semester, day and schedule):

First semester. Theory and seminars classes One day per week from 1.30 to 3.30 pm.

From September 13 to October 4, Friday.

From October 8 to December 17, Tuesday

STUDENT PROFILE (University degrees for which they are offered, if applicable)

Nursing, Physiotherapy and Podiatric.

BRIEF DESCRIPTOR

The use of ionizing radiation for diagnosis and therapy suggests the training of the health professionals in radiological protection.

Ionizing radiation can produce harmful effects with probability of appearance proportional to the dose or safe after a certain absorption.

Radioactive facility operator and supervisor courses train for work with these agents.

In this course the meaning of electromagnetic radiation is exposed. Interaction of photons with matter is explained. X Rays are reviewed. Radioactive decays and ionizing radiation types, radioactive isotopes and X Rays applications in Health Sciences are described also. The criteria and principles of radiologic protection and safety regulations are due to the biological effects that can be produced by ionizing radiations.

These contents can be useful as a basic introduction to study the radioactive facility operators course.

OBJECTIVES

- General objective:

That the student be motivated in the study of radiological protection in Health Sciences.

Specific objectives:

That the student be aware that the possible biological effects that ionizing radiation can produce are the basis for radiological protection.

ACADEMIC SKILLS

KNOWLEDGES

Know the basis and fundamentals of radiological protection in Health Sciences.
Know the principles and criteria of radiological protection and safety regulations in Health Sciences.
Know the principles and theories of the types of radiation and their interaction with matter.
Know the types of radiation and their applications in Health Sciences.

SKILLS

Awareness of the usefulness of radiological protection, in particular in Health Sciences.

Skill in the application of Radiation Protection knowledge.

COMPETENCES

Application of knowledges,
skills and
ethical values in
course work situations Health Sciences situations that require radiological protection.

LEARNING OUTCOMES

After finishing this course, the student will be able to:

Distinguish ionizing from non ionizing radiation.

Have the capacity for understanding and critical analysis in the application of knowledge and skill and ethics in Health Sciences situations that require radiological protection.

TEACHING ACTIVITIES (theoretical, practical, seminars, workshops, etc.)

24 hs in-person hours of which:
15 hs theoretical classes,
9 hs seminars and discussions
51 hs e-learning of which final work 10 hs.

CONTENT TOPICS

DIDACTIC UNIT I: PHYSICAL BASES OF IONIZING RADIATIONS AND RADIODIAGNOSIS

UNIT 1: Introduction to Quantum Mechanics.

UNIT 2: Atoms, molecules and nuclei.

UNIT 3: X-rays.

UNIT 4: Radioactive decays.

UNIT 5: Introduction to Radiodiagnosis.

DIDACTIC UNIT II: PROTECTION AGAINST IONIZING RADIATIONS. RADIOTHERAPY

UNIT 6: Interaction of Ionizing Radiations with matter.

UNIT 7: Magnitudes and radiological units.

UNIT 8: Biological Effects of Ionizing Radiations, shielding.

UNIT 9: Dosimetry and radiotherapy.

UNIT 10: Safety standards against Ionizing Radiations.

EVALUATION

REGULAR CONVOCACTION			
EVALUATION ACTIVITY	WEIGHTING	REMARKS	MAXIMUM SCORE
Continuous evaluation.	Attendance 10% Course work 40% Exam or level prove or final work 50%.		10
EXTRAORDINARY CALL			
EVALUATION ACTIVITY	WEIGHTING	REMARKS	MAXIMUM SCORE
Continuous evaluation	The same as ordinary call		10

BIBLIOGRAPHY - INTERNET Resources

Bibliography:

Council Directive 96/29 / Euratom, of May 13, 1996, which establishes the basic rules relating to the health protection of workers and the population against the risks resulting from ionizing radiation. Official Journal of the European Communities. June 29, 1996, L 159, 39th year.

Council Directive 97/43 / EURATOM of June 30, 1997, on the protection of health against the risks derived from ionizing radiation in medical exposures, by which Directive 84/466 / EURATOM is repealed. Official Journal of the European Communities. July 9, 1997, L 180, 40th year.

Council Directive 2013/59 EURATOM, of December 5, 2013, which establishes safety standards for protection against the dangers arising from exposure to ionizing radiation, and repeals Directives 89/618 Euratom, 90/641 Euratom, 96/29 Euratom, 97/43 Euratom and 2003/122 Euratom,

Books of Quantum Physics and Medical Physics concerning to ionizing radiation.

INTERNET Resources:

Recognized scientific databases, with access through the UCM Library (or CSIC, Nuclear Safety Council, BOE or other prestigious entities) in which bibliography with scientific evidence on radiological protection appears.

TEACHING STAFF *(It should be indicated whether teachers have completed all their teaching dedication or not)

Teacher Responsible (coordinator):

Name M^a Lourdes de Pedraza Velasco

Department: Nursing.

Teachers:

Name: M^a Lourdes de Pedraza

Velasco

Department: Nursing.

To complete dedication to Physics (first degree course in

Physiotherapy).