

**Elective subject**  
**Course 2023 24**

Subject title: **Radiological Protection Fundamentals in Health Sciences.**

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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
<b>Classroom activities</b>	24 h	15 h	9 h		
<b>e-learning</b>	51 h				Final work 10 h
<b>Total</b>	75 h				

Course schedule: of the course (semester, day and schedule):

First semester. Theory and seminars classes One day per week from 2.30 to 4.30 pm.

**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 acquires basic knowledge of radiation, interaction with matter and its applications in Health Sciences.

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

## **ACADEMIC SKILLS**

Know the basis and the foundations of radiation protection in Health Sciences.  
Awareness of the usefulness of radiological protection, in particular in Health Sciences.

## **LEARNING OUTCOMES**

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

Distinguish ionizing from non ionizing radiation.

Know the principles and theories of the types of radiation and their interaction with matter.

Know ionizing radiation types and its applications in Health Sciences.

Understanding the criteria and principles of radiologic protection and safety regulations.

## **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**

Continuous evaluation.

Attendance 10%

Course work 40%

Exam or level prove or final work 50%.

## 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<sup>a</sup> Lourdes de Pedraza Velasco  
Department: Nursing.

**Teachers:**  
Name: M<sup>a</sup> Lourdes  
de Pedraza Velasco  
Department:  
Nursing.

To complete dedication to Physics (first degree course in Physiotherapy).