



**INSTITUTO DE FÍSICA**  
**FACULTAD DE FÍSICA**

COURSE	: <b>RADIATION PHYSICS AND DOSIMETRY</b>
TRANSLATION	: FÍSICA DE LAS RADIACIONES Y DOSIMETRÍA
NUMBER	: FMD3002
CREDITS	: 10 UC / 6 SCT
MODULES	: 2 PER WEEK
FORMAT	: THEORETICAL LECTURES
REQUISITES	: MAT1523, FIZ0221, FIZ0311
CONECTOR	: AND
RESTRICTIONS	: 030501, 030401, 030801, 030802 Y 030803
CHARACTER	: MINIMUM (FOR CURRICULUM 030801, 030802 Y 030803)
NIVEL FORMATIVO	: MAGISTER
DISCIPLINE	: PHYSICS

**I. COURSE DESCRIPTION**

This course provides the student with theoretical and practical concepts related to the physics of ionizing radiation: from the interaction of charged particles and photons with matter, to the determination of the absolute dose according to international dosimetry protocols. The student will become familiar with the detectors as well as with other dosimetric equipment (phantoms etc.) that are essential both in the determination of absolute dose and of relative dose distributions.

**II. LEARNING OUTCOMES**

- Become familiar with the knowledge of radiation physics.
- Acquire knowledge of cavity theory and its dosimetric applications.
- Become familiar with the various formalities included in international protocols for absolute dose estimates.
- Acquire concepts on the physical foundations of the use of various types of detectors commonly used in radiation beam dosimetry.

**III. CONTENT**

- Physics of radiation
- Radioactivity
- Interaction of charged particles with matter
- Interaction of photons with matter
- Detectors
- Magnitudes and units
- Balance of charged particles
- Cavity theory
- Determination of absolute dose: international protocols
- Monitor units and dose calculation

**IV. METHODOLOGICAL STRATEGIES**

Theoretical classes, seminars and practical experiences

**V. EVALUATIVE STRATEGIES**

2 tests (60%) and a final exam (40%).



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**VI. BIBLIOGRAPHY**

**REQUIRED**

- Attix F. H., Introduction to Radiological Physics and Radiation Dosimetry, Weinheim, Wiley-VCH, 1986.
- Harold Elford John. The physics of radiology. Fourth edition. Charles C. Thomas. Publisher. Springfield, Illinois, USA, 1983.
- IAEA (International Atomic Energy Agency), Absorbed dose determination in external beam radiotherapy: An international Code of Practice for dosimetry based on standards of absorbed dose to water, Technical Report Series no. 398, IAEA, Vienna, 2000.
- Journal of the International Commission on Radiation Units and Measurements, Report 64, 2001.
- Khan F.N. Physics of radiation therapy. 4th Edition. Lippincott Williams & Wilkins, Baltimore, 2010.
- Knoll G.F. Radiation detection and measurements. 3rd Edition, John Wiley & Sons Inc. Michigan, 2000.
- Mayles P., Nahum A. E., Rosenwald J. C. (eds.), Handbook of Radiotherapy Physics: Theory and Practice, Boca Raton, CRC Press, 2007.
- Podgorsak E. B., Radiation Physics for Medical Physicists, Springer, Berlin, 2010.

**OPTIONAL**

N/A