



INSTITUTO DE FÍSICA
FACULTAD DE FÍSICA

COURSE	: PHYSICS AND SPECIAL TECHNIQUES OF RADIOTHERAPY
TRANSLATION	: FÍSICA DE LA TERAPIA CON RADIACIONES
NUMBER	: FMD3004
CREDITIS	: 10 UC / 6 SCT
MODULES	: 2
FORMAT	: THEORETICAL LECTURES
REQUISITES	: FMD3002
CONECTOR	: AND
RESTRICTIONS	: 030401, 030501, 030801, 030802, 030803
CHARACTER	: MINIMUM (FOR CURRICULUM 030801, 030802, 030803)
QUALIFICATION	: STANDARD
FORMATIVE LEVEL	: MAGISTER
DISCIPLINA	: PHYSICS

I. COURSE DESCRIPTION

This course provides the student with the fundamentals of ionizing radiation therapy to the knowledge of special techniques in radiotherapy.

II. LEARNING OUTCOMES

- Know the technology currently available for the generation of ionizing radiation beams.
- Know the commissioning protocols of these generating units as well as their practical implementation.
- Learn to experimentally characterize photon and electron beams, as well as their modeling through the calculation algorithms that are incorporated into planning systems.
- Know the physical principles of the implementation of special radiotherapy techniques.
- Become familiar with quality control protocols for radiotherapy treatments

III. CONTENT

- Principles of radiation producing devices
- Beams of radiation with photons
- Radiation beams with electrons
- Calibration protocols
- Commissioning
- Treatment plans and dose depot modeling
- Quality assurance in radiotherapy
- Special techniques in radiotherapy
 - o Brachytherapy
 - o SRT, TBI, TSEI, IORT
 - o Basic aspects of conformal radiation therapy
 - o Fundamentals of IMRT and IGRT
 - o Hadron therapy

IV. METHODOLOGICAL STRATEGIES

Theoretical lectures



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V. EVALUTIVE STRATEGIES

- 2 tests (60%)
- Final exam (40%).

VI. BIBLIOGRAPHY

REQUIRED

- Curry, T.S., Dowdey, J.E., Murry, R.C., Christensen's Introduction to the Physics of Diagnostic Radiology. Lea and Febiger, Philadelphia, 1984.
- DeVita, V.T., Hellman, S., Rosenberg, S.A., Cancer: Principles and Practice of Oncology, Volumes I and II, 2nd Ed. J. B. Lippincott, Philadelphia, 1985.
- Dobbs, J. and Barrett, A., Practical Radiotherapy Planning. 4th ed, Arnold, Baltimore, 2009.
- Khan F.N. Physics of radiation therapy. 4th Edition. Lippincott Williams & Wilkins, Baltimore, 2010.
- Johns, H.E. and Cunningham, J.R., The Physics of Radiology, 3rd Ed., Charles C. Thomas, Springfield, IL, 1983.
- Levitt, S. H., Purdy, J. A., Perez et al. (eds.), Technical basis of radiation therapy. 4th ed. Springer-Verlag Berlin Heidelberg, Heidelberg, 2006.
- Mizer, S., Schiller, R.R., and Deye, J.A., Radiation Therapy Simulation Workbook. Pergamon Press, New York, 1986.
- Schlegel, W., Bortfeld, T., and Grosu, A.L., New Technologies in Radiation Oncology. Springer- Verlag Berlin Heidelberg, Heidelberg, 2006.
- Van Dyk, J., The Modern Technology of Radiation Oncology, Volume 2. Medical Physics Publishing, Wisconsin, 2008.

OPTIONAL

N/A