

MASTER MODULE	SUBJECT	COURSE	SEMESTER	ECTS	CHARACTER
Radiation physics and technology	Radiobiology	1º	1º	6	Optional
LECTURERS			CONTACT		
<ul style="list-style-type: none"> Antonio M. Lallena Rojo Departamento de Física Atómica, Molecular y Nuclear Universidad de Granada. 958243216. lallena@ugr.es Damián Guirado Llorente Servicio de Radiofísica, Hospital Universitario “San Cecilio”. Granada. damian.guirado.llorente@gmail.com José Manuel de la Vega Fernández Servicio de Radiofísica, Hospital Universitario “San Cecilio”. Granada. jasx77@gmail.com 			Dpto. Física Atómica, Molecular y Nuclear. Despachos nº . TUTORING SCHEDULE Prof. Lallena Rojo - L,Mi: 9 - 11; M: 17 - 19 (Profs. Guirado Llorente and de la Vega Fernández will maintain personal tutoring during the teaching period of the part of the course they will impart and will attend students by e-mail)		
MASTER DEGREE					
University Master in Physics: Radiations, Nanotechnology, Particles and Astrophysics, University of Granada					
REQUISITES AND/OR RECOMMENDATIONS					
Basic knowledge of radiation-matter interaction					
BRIEF DESCRIPTION OF CONTENTS					
Cellular physiology. Cellular growth models. Effects of ionizing radiation on the cell. Basic epidemiology.					
CONTENTS OF THE COURSE					
<p>1. Subcellular and cellular effects of ionizing radiation. Cellular radiochemistry. DNA lesions and cell repair. Types of cell death and its quantification. Cellular signaling. Bystander and adaptable response effects.</p> <p>2. Basic concepts of epidemiology. Evidence based medicine. Association measurements and statistical significance. Regression models and survival analysis. Epidemiologic studies.</p>					

3. The radiobiology of the radiation protection.

Types of effects produced by ionizing radiations. Carcinogenesis by radiation. Risk quantification in radiation protection. The radiation protection system of ICRP. Dose limitation.

4. Clinical radiobiology: the radiobiology of radiotherapy.

Dose-response relation in radiotherapy. Tumor growth. Tumor response to radiation Health tissues organization. Response of health tissues to radiation. Fractioning in radiotherapy. Isoeffect equations. Clinical forms of fractioning. Practical examples. Biological foundations of hadrotherapy.

5. Computational methods in radiobiology.

Monte Carlo method applied to radiobiology. Models of carcinogenesis by radiation. Dose-response models and radiotherapy individualization. Simulation of radiotherapy fractioned treatments.

REFERENCES

United Nations Scientific Committee on the Effects of Atomic Radiation, UNSCEAR 2000 Report. Sources and Effects of Ionizing Radiation.

Radiobiología Clínica. Sociedad Española de Física Médica (SEFM), Almería, 2003.

EJ Hall y AJ Giaccia. Radiobiology for the Radiologist. 6ª edición, Lippincott Williams & Wilkins. Filadelfia 2006.

Radiobiological Modelling in Radiation Oncology. Editado por RG Dale y B Jones. The British Institute of Radiology. Londres 2007.

Principios de radiobiología clínica. Guerrero R, Guirado D, Vilches M, editores. Asociación Española de Técnicos en Radiología (AETR). Ronda, 2007.

Comisión Internacional de Protección Radiológica (ICRP). Recomendaciones 2007, ICRP-103. Traducción autorizada de la Sociedad Española de Protección Radiológica (SEPR). Senda Editorial, Madrid 2008.

Basic Clinical Radiobiology. Editado por M Joiner y A van der Kogel, 4ª edición, Edward Arnold, Londres 2009.

USEFUL LINKS

<http://www.rerf.jp/>

<http://www.icrp.org/>

<http://www.albireotarget.com/>

http://www.epa.gov/radiation/understand/health_effects.html

<http://www-naweb.iaea.org/NAHU/index.html>

