

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	RADIOBIOLOGY
Course number	AMSR3285
Faculty	
Department	
Course type	Major Needs
Course level	3
Credit hours (theoretical)	2
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1	- To provide a fundamental knowledge of the mechanisms and biological responses of human beings to ionizing and non-ionizing radiations through the study of the effects of radiation on biological molecules, cells, and man including cancer and mutagenesis.
2	- The course will develop the ability to make objective decisions regarding the relative risks and benefits of radiation use in a variety of applications
3	- To understand the principle of radiation interaction with matter

Intended Learning Outcomes

Knowledge and Understanding	<ul style="list-style-type: none"> * Explain the basics of ionizing radiation biological effects and risks from cellular to human * Summarize the factors that affect the dose-effect relationship * Summarize acute and late effects from ionizing radiation
Intellectual Skills	<ul style="list-style-type: none"> * Planning and implementing radiation protection education/information for patients, general public or professionals
Professional Skills	<ul style="list-style-type: none"> * Explain the principles of radiation protection for both ionizing and non-ionizing radiation * Understanding the dose-response curves * Applying Radiation Protection Act and the relevant radiation protection regulations

Course Contents

- 1 - The course covers basic knowledge on biological effects of radiation and risks on cellular level to humans, factors that affect the dose-effect relationship and a deeper knowledge on radiation protection for ionizing and non-ionizing radiation, both in legislation and practical radiation protection technology.
- 2 - The course covers radiation effects at cellular level including the formation of free radicals, chromosome breakage and repair mechanisms as well as target theory and the dose-response curves
- 3 - It also includes radiation effects on individual organs and humans, somatic, genetic as well as immediate and late radiation damages and factors affecting the relationship between dose and biological effects
- 4 - Irradiation-induced damage and the DNA damage response
- 5 - Cell death after irradiation: how, when and why cells die
- 6 - Quantifying cell kill and cell survival
- 7 - Linear energy transfer and relative biological effectiveness

Teaching and Learning Methods

- 1 - Standard lectures
- 2 - Project Based Learning
- 3 - Group discussion and class activities

Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
Assignments	the first trimester	30%
Midterm exam	Week 8	30%
Final Exam	Week 15	40%

Books and References

Essential books	Basic Clinical Radiobiology Ed: Michael Joiner & Albert van der Kogel, 5th Edition, Hodder Arnold, London UK Please order it for yourself (ex: Amazon). An additional copy is in the physics library
Recommended books	Radiobiology for the Radiologist Eric Hall, 7th (2011) Lippincott Williams & Wilkins, Philadelphia PA