Course Specifications

General Information

Course name	Physics of Radiotherapy
Course number	AMSR4395
Faculty	
Department	
Course type	Major Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - The aim of the Radiotherapeutic Physics unit of study is to provide candidates with the knowledge of physics and its clinical application. This knowledge is a fundamental requirement in forming the foundation of competent radiation oncologists

2 - Apply physics knowledge to safely use ionising radiation

3 - Justify the use of ionising radiation in clinical radiotherapeutic practice

4 - Differentiate between different treatment approaches and optimise solutions to clinical problems, based on physical concepts

Intended Learning Outcomes

Knowledge and Understanding	* Independently describe the most common treatment techniques in radiation therapy
	* Demonstrate insight into modern and future technologies for radiation delivery and dose planning
Professional Skills	* Be able to apply international conventions for target definition and standardization
	* Critically evaluate biological models for radiation therapy
	* Critically evaluate dosage plans for external beam radiation therapy
General Skill	* Independently calculatethe absorbed dose to the patient for photons and charged particles.
	* Have insight into dose planning and dose specifications for both external radiation therapy and Brachytherapy

Course Contents

1 - The course deals with different methods and highlights key safety aspects of radiotherapy and provides a good basis for work as a medical physicist in a radiotherapy department
2 - The course covers methods of internal and external radiotherapy, intensity modulation, as well as combination treatment with surgery, chemotherapy or hyperthermia
3 - Different calculation algorithms for treatment planning, the impact of inhomogeneities, simulation and control systems as well as radiation biological aspects of radiation therapy with models for fractional treatment are studied
4 - EXTERNAL BEAM RADIATION SOURCES
5 - COMMISSIONING AND QUALITY ASSURANCE OF RADIOTHERAPY EQUIPMENT
6 - CHARACTERISTICS OF PHOTON BEAMS
7 - DOSE DISTRIBUTION IN TISSUE PRODUCED BY EXTERNAL BEAM PHOTON RADIATION
8 - PHYSICAL CHARACTERISTICS AND CLINICAL APPLICABILITY OF PROTON BEAMS

Teaching and Learning Methods

1 - Standard lectures
2 - Project Based Learning
3 - Class activities
4 - Animation Videos

Students Assessment

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

Books and References

Course note	Khan FM: “The Physics of Radiation Therapy” 2nd Edition Williams and Wilkins (1994)
Essential books	Metcalfe P, Kron T & Hoban P: “The Physics of Radiotherapy X-Rays from Linear Accelerators” (1997)
	Mayles, P., Nahum, A., & Rosenwald, J. C. (2007). Handbook of radiotherapy physics: theory and practice. CRC Press
Recommended books	Williams JR & Thwaites DI (Eds): “Radiotherapy Physics in Practice” OUP (1993)