UCLouvain

wrdth3120

2022

Fundamental of dosimetry

3.00 credits	20.0 h	Q1

Teacher(s)	Sterpin Edmond ;
Language :	English
Place of the course	Bruxelles Woluwe
Main themes	A. INTRODUCTION - Definition of absorbed dose, KERMA and CEMA - Different types of ionizing beams used in radiotherapy B. INTERACTIONS WITH MATTER - Charged particles - Photons. - Neutrons. C. INTEGRATING DOSIMETRY DETECTORS - Calibration chain for dosimetry detectors - Calorimetry - Ionization Chambers. - Thermoluminescence. - Films. - Diodes. - Chemical dosimetry D. DETERMINATION OF THE ABSORBED DOSE IN A CLINICAL BEAM UNDER REFERENCE CONDITIONS - Calibration of an ion chamber in terms of Air-KERMA - Calibration of an ion chamber in terms of absorbed dose in water - Dosimetry recommendations based on Air-Kerma standards based on absorbed dose in water - Determination of the absorbed dose under non-reference conditions - Dosimetry audits E. INTRODUCTION TO RADIOTHERAPY TECHNIQUES
Learning outcomes	
Evaluation methods	The assessment is done entirely on the day of the exam. This consists of a written part and an oral part. The written part is done with open notebook and accounts for 70%. It consists of a theoretical part and exercises. The oral part (closed notebook) accounts for 30%. Exam material is constituted exclusively from the slides and the teaching lectures
Teaching methods	The course is given as a mix of teaching lectures and hands-on exercices done in class. All courses are given in hybrid mode (physical and remote). The location of the physical lectures is yet to be determined, but it will be either in Woluwe campus of UCLouvain or in the Gasthuisberg campus of KU Leuven
Content	This teaching unit consists in acquiring the theoretical principles of radiation dosimetry. The goal is to develop an intuition about dosimetry from basic principles, as a strong foundation before studying the applications of radiation dosimetry in the other courses for radiotherapy, nuclear medicine, and radiology. The course is organized around 5 main themes: 1. The interactions of particles with matter from the point of view of the medical physicist 2. Field and dosimetric quantities. Concept of charged-particle equilibrium 3. Characterization of radiation quality 4. Cavity theory 5. Radiation detectors from a medical physicist's perspective
Inline resources	All slideshows and most appendices are on Moodle
Bibliography	• Handbook of Radiotherapy Physics (Mayles, Nahum, Rosenwald) • Fundamentals of Ionizing Radiation Dosimetry by Andreo et al, 2017 edition.
Other infos	The language of the lectures and all materials is ENGLISH
Faculty or entity in charge	MED

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Biomedical Engineering	GBIO2M	3		
Advanced Master in Radiotherapy-Oncology	RDTH2MC	3		
Certificat universitaire en physique d'hôpital	RPHY9CE	3		
Master [120] in Physics [professional focus of Medical Physics : UCLouvain-KULeuven]	PHYS2M	3		