UCLouvain

wrdth3160

2021

Dosimétrie informatisée en radiothérapie

5.00 credits	30.0 h + 60.0 h	Q2

Teacher(s)	Geets Xavier ;Kirkove Carine ;Renard Laurette ;Sterpin Edmond (coordinator) ;
Language :	French
Place of the course	Bruxelles Woluwe
Main themes	A. Production of radiotherapy beams : - Cobalt-60, - linear accelerators, - neutron beams, proton beams, heavy ion beams. B. Definition of dosimetry quantities for radiotherapy: - PDD, RTM, RTA, OAR, isodoses, BSF, PSF. C. Quality assurance in radiotherapy : - definition and importance - recommendations - quality control in radiotherapy -quality control of CT scanners - quality control of linear accelerators - quality control of treatment planning systems - in-vivo dosimetry D. Calculation methods for external beam therapy - matrix system in TPS - separation of scatter and primary beam - pencil beam methods - Monte Carlo calculations E. Dosimetry for Brachy therapy
Learning outcomes	
Evaluation methods	Laboratories account for 40% of the mark. For each project, the evaluation focuses on the quality of the programming and the report provided. The final exam counts for 60% of the mark and is essentially theoretical. This consists of a written part and an oral part. The written part is done with open notebook and accounts for 80%. The oral part (closed notebook) accounts for 20%.
Teaching methods	The course is essentially given in lecture format. Laboratory sessions (computer simulations) are also planned. The student will have to complete two projects for which he / she will have to provide a report each time.
Content	The principle is to teach students the essential theoretical concepts underlying the practice of radiotherapy, both to prepare the student for a possible internship in a radiotherapy department, or to provide him with a solid knowledge of the field appreciated by companies working in the field. Aspects specific to proton therapy are also discussed. The course is structured around two main objectives: 1. To transmit the general principles underlying the delineation of volumes in radiotherapy (mainly GTV - CTV - PTV), as well as their specificities according to the localizations. The clinical aspects (both theoretical and practical) will be taught by radiotherapy physicians oncologists, the physical aspects by a hospital physicist. 2. Teach students the basic algorithmics of dose calculation engines (including Monte Carlo simulations). This will be exclusively given by a hospital physicist.
Inline resources	All slideshows and most appendices are on Moodle
Bibliography	• Les diaporamas et les cours magistraux constituent exclusivement la matière d'examen. Les aspects théoriques sont couverts dans les références suivantes : • Handbook of Radiotherapy Physics (Mayles, Nahum, Rosenwald) • The physics of proton therapy (Neuwhauser and Zhang, Physics in Medicine and Biology 2015)
Other infos	Slideshows and media are in English. The preferred language for the course is French, but English can be considered on request.
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	5		
Advanced Master in Radiotherapy-Oncology	RDTH2MC	5		
Master [120] in Physics	PHYS2M	5		
Certificat universitaire en physique d'hôpital	RPHY9CE	5		