UCLouvain

lbnen2011

2020

Radiation protection (Centre d'étude nucléaire-Mol)

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

3 credits		Q1

Language :	English
Place of the course	Autre site
Aims	The aim of the course is: 1 • to introduce the student to the physical principles of the interaction of subatomic particles and high-energy radiation with matter • to learn how to apply the concepts of external/internal radiation dosimetry • to introduce the student to the biologic effects of ionising radiation • to learn how to apply dispersion models • to be able to calculate the effects of shielding materials • to know the concepts and legislation of radiation protection • to give an overview of the different methods for detecting and quantifying the presence of such particles and radiation • to give an introduction to the principles of particle acceleration - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Written examination. Exercise part: "open book", theoretical part "closed book". Report of lab sessions account for 20% in the total mark.
Content	Part H. Thierens and K. Bacher 1: Radiological quantities and units 1.1 : Exposure and kerma 1.2 : Absorbed dose 1.3 : Equivalent dose 1.4 : Effective dose 1.5 : Operational dose quantities 2: External dosimetry 2.1 : Ionometry of low energy photon fields 2.2 : High energy photon fields: the Bragg Gray relation 2.3 : Dosimetry of neutron fields 3: Internal dosimetry 3.1 : Concept of committed dose equivalent 3.2 : Concept of specific effective energy 3.3 : Compartmental model analysis 3.4 : Dosimetric model for the respiratory system 3.5 : Dosimetric model for the gastrointestinal tract 3.6 : Dosimetric model for bone 3.7 : Metabolic data of important fission products and actinides 4: Biological effects of ionizing radiation 4.1 : Deterministic and stochastic effects 4.2 : Overview of direct effects including utero 4.3 : Overview of late effects: the UNSCEAR report 4.4 : Biological effect models used in radiation protection 5: Engineering aspects of radiation shielding 5.1 : Build up factors 5.2 : Shielding of photon fields 5.3 : Shielding of combined neutron-photon fields 6: Dispersion of effluents from nuclear facilities

	6.1 : Meteorology of dispersion 6.2 : Diffusion of effluents-Pasquill conditions 6.3 : External dose from plume 6.4 : Internal dose from inhalation 7: Legislation and regulations 7.1 : The ICRP 103 publication 7.2 : The conceptual framework of radiological protection 7.3 : The system of protection in occupational and public exposures 7.4 : The system of protection in interventions, accidents and emergencies 8: Measurement techniques in radiation protection 8.1 : Ionometry 8.2 : Film dosimetry 8.3: TLD dosimetry 8.4: OSL dosimetry
Inline resources	https://www.sckcen.be/fbnen
Other infos	This course is part of the Advanced Master programme in nuclear engineering organized by the Belgian Nuclear Higher Education Network (BNEN). BNEN is organised through a consortium of six Belgian universities and the Belgian Nuclear Research Centre, SCK-CEN and takes place at the SCK-CEN in Mol. Prof. Hubert Thierens - Universiteit Gent Prof. Klaus Bacher ' Universiteit Gent
Faculty or entity in charge	EPL

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Electro-mechanical Engineering	ELME2M	3		
Advanced Master in Nuclear Engineering	GNUC2MC	3		
Master [120] in Mechanical Engineering	MECA2M	3		