UCLouvain

lmeca2600

2020

Introduction to nuclear engineering and reactor technology

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).

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Aït Abderrahim Hamid ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	An introductory course in nuclear physics. Some basic knowledge and skill in mathematical analysis (integration, power series expansions, ordinary and partial differential equations) as well as in numerical computation. The aim of this course is threefold: a description of the basic principles of nuclear engineering (fuel cycles, reactor types, etc ...), the understanding of the fundsamental concepts (cross sections, phase space, neutron fluxes and currents, criticality, etc...) and the development of a model (the multigroup-diffusion model) allowing to perform reactor computations. By reactor computations, one generally refers to the determination of the conditions that have to be satisfied in order to produce energy in steady-state, the space dependence of the energy production inside the reactor and the time evolution of the energy production if the steady-state conditions are no longer met. The MECA2600 course is adapted from the reference "Nuclear Reactor Analysis", by J.J. Duderstadt and L.J. Hamilton (John Wiley, 1976), chapters 1 to 6.
Aims	In consideration of the reference table AA of the program "Masters degree in Mechanical Engineering", this course contributes to the development, to the acquisition and to the evaluation of the following experiences of learning: 1 • AA1.1, AA1.2, AA1.3 • AA2.1, AA2.4, AA2.5 • AA3.1, AA3.3 • AA5.1, AA5.4, AA5.5 • AA6.1, AA6.2 MECA2600 is an introduction to the physical principles governing nuclear reactors - - - - *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".*
Content	MECA2600 is an introduction to the physical principles governing nuclear reactors. The aim of this course is threefold: a description of the basic principles of nuclear engineering (fuel cycles, reactor types, etc ...), the understanding of the fundsamental concepts (cross sections, phase space, neutron fluxes and currents, criticality, etc...) and the development of a model (the multigroup-diffusion model) allowing to perform reactor computations. By reactor computations, one generally refers to the determination of the conditions that have to be satisfied in order to produce energy in steady-state, the space dependence of the energy production inside the reactor and the time evolution of the energy production if the steady-state conditions are no longer met.
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=10625'
Bibliography	Le cours MECA 2600 est donné à partir du livre "Nuclear Reactor Analysis" de J.J. Duderstadt et L.J. Hamilton (John Wiley, 1976), chapitres 1 à 6 inclus.
Faculty or entity in charge	MECA

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Electro-mechanical Engineering	ELME2M	5		
Certificat universitaire de contrôle physique en radioprotection (Classe I)	RCPA9CE	5		
Master [120] in Physics	PHYS2M	5		
Master [120] in Mechanical Engineering	MECA2M	5		