UCLouvain

lbnen2006

2022

Nuclear energy introduction (Centre d'étude nucléaire-Mol)

3.00 credits		Q1

Language :	English
Place of the course	Autre site
Prerequisites	Students are supposed to have a solid knowledge in basis engineering sciences such as thermodynamics, fluid mechanics, heat transfer, material science etc. (Level of electro-mechanical university graduated engineers is optimal.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 • To give a first overview of nuclear electricity generation and an overall introduction to reactor and plant engineering • To place the world and the Belgian nuclear energy production in its economic, social, technical and cultural context
Evaluation methods	Open book preparation of two or three (generally overview) questions. Students can take notes during the 30 min preparation. Students will then be interrogated orally (whereby they can use the just made notes if they wish) to check whether they have thoroughly understood the study material. Questions are oriented towards understanding and insight; marks are given for the performance during the oral examination (lasting 30 mins); not for the written preparation.
Content	• Elementary aspects (first acquaintance) with practical nuclear physics and interaction of radiation with matter. • Birds-eye view of nuclear power generation: principle of generating electricity by nuclear means (fission; chain reaction; heat transfer to coolant; turbine; alternator); fissile & fertile materials; burn up; production of fission products; breeding; current types of power plants (PWR, BWR,'); future types of power plants (LWR-type, gas cooled, ADS, '); introduction to the fuel cycle; front end, back end; introduction to safety aspects of nuclear reactors (criticality; core melt); engineered safety systems; risk; difference with research reactors & fusion reactors; proliferation issues & safeguards • Economics of nuclear power generation: cost of nuclear kWh; investment costs of new types NPP's; construction time; decommissioning costs; internalisation of waste management; external costs • Compatibility of nuclear power generation with sustainable development. Public perception & communication (media, general public, public authorities).
Faculty or entity in charge	EPL

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Advanced Master in Nuclear Engineering	GNUC2MC	3		🔍