UCLouvain

lmeca2648

2023

Nuclear Thermal-Hydraulics (Centre d'étude nucléaire-Mol)

5.00 crédits	40.0 h + 7.5 h	Q1

Enseignants	Bartosiewicz Yann ;
Langue d'enseignement	Anglais > Facilités pour suivre le cours en français
Lieu du cours	Louvain-la-Neuve
Acquis d'apprentissage	
Modes d'évaluation des acquis des étudiants	The evaluation is a combination of continuous and in-session exam. The continuous part is a project (team of 2) where the students have to set up a simulation tools to calculate the pressure drop (plus temperature, quality profiles) in a boiling channel under different conditions. The exam is written (in english), and assess both theoretical and practical leaning outcomes. Thus this exam is split according a theoretical part (closed book) and a practical part (opened book) The final mark is calculated as: • Project + pratical part of the exam (11/20) • Exam (theoetical part) (9/20)
Méthodes d'enseignement	• 30h of ex catedra lectures • 30h of partially-supervised personnal work (project) • 16h of supervised exercice sessions (exercice sessions) The course takes place at the Nuclear Research Centre of Belgium (SCK.CEN) in gthe framework of the BNEN interuniversity programme (see: http://bnen.sckcen.be). Courses taking place at SCK.CEN are condensed over a period of 2 intensive weeks of courses.
Contenu	• Lect. 1: Thermal design principles • Lect. 2: Reactor energy distribution • Lect. 3: Transport eqns. For 1-phase flow: Reminders/summary • Lect. 4: Tranport eqns. For 2-phase flows:basic formulation • Lect. 5: Tranport eqns. For 2-phase flows:equations • Lect. 6: Thermodynamics, cycles: non-flow and steady flow • Lect. 7: Thermodynamics, cycles: non steady flow first law • Lect. 8: Thermal analysis of fuel elements • Lect. 9: 1-phase fluid mechanics/heat transfer: Reminders/summary • Lect. 10: 2-phase fluid mechanics/pressure drops • Lect. 11: 2-phase fluid mechanics/pressure drops • Lect. 12: 2-phase heat transfer (pool boiling) • Lect. 13: 2-phase heat transfer (flow boiling) • Lect. 14: Single-heated channel: steady state analysis
Ressources en ligne	http://bnen.sckcen.be
Bibliographie	• Todreas, N.E. and Kazimi, M.S. Nuclear System I: Thermal Hydraulic Fundamentals, CRC Press, 2012. • Todreas, N. E. and Kazimi, M.S. Nuclear Systems II: Elements of Thermal Hydraulic Design, Hemisphere Publishing Corp., New York, 1990. **REFERENCE BOOKS ON THE CONTENT** • Todreas, N.E. and Kazimi, M.S. Nuclear System I: Thermal Hydraulic Fundamentals, CRC Press, 2012. Mandatory. • Todreas, N. E. and Kazimi, M.S. Nuclear Systems II: Elements of Thermal Hydraulic Design, Hemisphere Publishing Corp., New York, 1990. Advised.
Autres infos	**Note on the use of generative artificial intelligence:** • The use of generative AI is tolerated, but its use must be thoughtful, critical and ethical. • The student is required to systematically indicate all parts in which AIs have been used, e.g. in footnotes, specifying whether the AI was used to search for information, to write or correct the text, or to generate computer code. Sources of information must be systematically cited in accordance with bibliographic referencing standards. Students remain responsible for the content of their work, regardless of the sources used.

Faculté ou entité en charge:	MECA

Programmes / formations proposant cette unité d'enseignement (UE)

Intitulé du programme	Sigle	Crédits	Prérequis	Acquis d'apprentissage
Master [120] : ingénieur civil mécanicien	MECA2M	5		
Master [120] : ingénieur civil électromécanicien	ELME2M	5		