UCL Université catholique de Louvain

LMAT2410

2015-2016

Partial differential equation : heat equation, brownian moves and numerical aspects

5.0 credits	30.0 h + 15.0 h	2q

Teacher(s) :	Ponce Augusto ; Van Schaftingen Jean ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	Site iCampus > http://icampus.uclouvain.be/claroline/course/index.php?cid=MAT2410+
Prerequisites :	Students are expected to have followed an introduction to functional analysis or partial differential equations such as LMAT1321 - Analyse fonctionnelle et équations aux dérivées partielles, ou LINMA1315 - Compléments d'analyse, ou LMAT2130 - Equations aux dérivées partielles 1 : équations de Poisson et de Laplace
Main themes :	<!--{cke_protected}{C}%3C!%2D%2D%0A%20%2F*%20Font%20Definitions%20*%2F%0A%40font-face%0A%09%7Bfont-family%3A%22Cambria%20Math%22%3B%0A%09panose-1%3A2%204%205%203%205%204%206%203%202%204%3B%0A%09mso-font-charset%3A0%3B%0A%09mso-generic-font-family%3Aauto%3B%0A%09mso-font-pitch%3Avariable%3B%0A%09mso-font-signature%3A3%200%200%200%201%200%3B%7D%0A%40font-face%0A%09%7Bfont-family%3A%22%E3%83%92%E3%83%A9%E3%82%AE%E3%83%8E%E8%A7%92%E3%82%B4%20Pro%20W3%22%3B%0A%09mso-font-charset%3A0%3B%0A%09mso-generic-font-family%3Aroman%3B%0A%09mso-font-pitch%3Aauto%3B%0A%09mso-font-signature%3A0%200%200%200%200%200%3B%7D%0A%20%2F*%20Style%20Definitions%20*%2F%0Ap.MsoNormal%2C%20li.MsoNormal%2C%20div.MsoNormal%0A%09%7Bmso-style-unhide%3Ano%3B%0A%09mso-style-qformat%3Ayes%3B%0A%09mso-style-parent%3A%22%22%3B%0A%09margin%3A0cm%3B%0A%09margin-bottom%3A.0001pt%3B%0A%09mso-pagination%3Awidow-orphan%3B%0A%09font-size%3A12.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-fareast-font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-bidi-font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-ansi-language%3AEN-US%3B%0A%09mso-fareast-language%3AEN-US%3B%7D%0Ap.CorpsA%2C%20li.CorpsA%2C%20div.CorpsA%0A%09%7Bmso-style-name%3A%22Corps%20A%22%3B%0A%09mso-style-update%3Aauto%3B%0A%09mso-style-unhide%3Ano%3B%0A%09mso-style-parent%3A%22%22%3B%0A%09margin%3A0cm%3B%0A%09margin-bottom%3A.0001pt%3B%0A%09mso-pagination%3Awidow-orphan%3B%0A%09font-size%3A12.0pt%3B%0A%09mso-bidi-font-size%3A10.0pt%3B%0A%09font-family%3AHelvetica%3B%0A%09mso-fareast-font-family%3A%22%E3%83%92%E3%83%A9%E3%82%AE%E3%83%8E%E8%A7%92%E3%82%B4%20Pro%20W3%22%3B%0A%09mso-bidi-font-family%3A%22Times%20New%20Roman%22%3B%0A%09color%3Ablack%3B%0A%09mso-font-kerning%3A.5pt%3B%0A%09mso-ansi-language%3AEN-US%3B%7D%0A.MsoChpDefault%0A%09%7Bmso-style-type%3Aexport-only%3B%0A%09mso-default-props%3Ayes%3B%0A%09font-size%3A10.0pt%3B%0A%09mso-ansi-font-size%3A10.0pt%3B%0A%09mso-bidi-font-size%3A10.0pt%3B%7D%0A%40page%20WordSection1%0A%09%7Bsize%3A612.0pt%20792.0pt%3B%0A%09margin%3A70.85pt%2070.85pt%2070.85pt%2070.85pt%3B%0A%09mso-header-margin%3A36.0pt%3B%0A%09mso-footer-margin%3A36.0pt%3B%0A%09mso-paper-source%3A0%3B%7D%0Adiv.WordSection1%0A%09%7Bpage%3AWordSection1%3B%7D%0A%2D%2D%3E--> Study of partial differential equation based on methods from real analysis, harmonic analysis, functional analysis and measure theory. The goal is to establish the existence, uniqueness and qualitative properties of solutions.
Aims :	Contribution of the course to learning outcomes in the Master in Mathematics programme. By the end of this activity, students will have made progress in: - Independently acquire and use new knowledge and skills throughout his professional life. - Show evidence of abstract thinking and of a critical spirit. - Argue within the context of the axiomatic method. - Construct and draw up a proof independently, clearly and rigorously. - Write a mathematical text according to the conventions of the discipline. - Structure an oral presentation and adapt it to the listeners' level of understanding. - Find sources in the mathematical literature and assess their relevance. - Correctly locate an advanced mathematical text in relation to knowledge acquired. - Ask relevant and lucid questions on an advanced mathematical topic in an independent manner. Learning outcomes specific to the course. By the end of this activity, students will be able to: - Illustrate the problems studied in the course through applications. - Provide some mathematical information on solutions of partial differential equations, including existence, uniqueness and qualitative properties. - Apply techniques of real analysis, harmonic analysis, functional analysis and measure theory to study partial differential equations. - Interpret mathematical theorems in the setting of modeling problems

	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 :	Learning will be assessed by individual written and oral tasks supplied during the semester and by a final examination.
Teaching methods :	Depending on the available sources (books, lecture notes, scientific papers), the lectures will be based on - oral presentations by the faculty, invited guests or students, - questions arising from some written support provided beforehand.
Content :	Variable.
Bibliography :	Extracts of different works available in the library.
Faculty or entity in charge:	MATH

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Physics	PHYS2M	5	-	
Master [120] in Mathematical Engineering	MAP2M	5	-	
Master [120] in Mathematics	MATH2M	5	-	