GIMAS8AB COMPUTATIONAL SOLUTION PARTIAL DIFFERENTIAL EQUATIONS

SG243	6ICG283	Duration: 21 hours	ECTS Credits: 2	Semester: S8	
Course Title:		1			
Computational solution to Partial Differential Equations and applications					
Person(s) in charge:					
Xavier ANTOINE, Professor, xavier.antoine@univ-lorraine.fr					
Keywords: Partial differential Equations, Numerical Methods, Finite differences, Finite Elements					
Prerequisites: the partial differential equations course. Basic knowledge in numerical analysis and MATLAB would be helpful.					
Objective: Give an introduction to the numerical solution of Partial Differential Equations arising in many applied sciences and engineering problems					
Program and contents:					
The goal of this course is to give an introduction to the numerical solution of Partial Differential Equations arising in many applied sciences and engineering problems. We mainly focus on Finite Element Methods as well as Finite Difference Methods. We develop different applications for the solution of equations related to engineering problems. Some examples are related to wave equations, heat equations, elliptic equations, models coming from financial mathematics, two-dimensional problems A large part of the course is to explain how to concretely develop a professional finite element or finite difference code. Examples will be considered in Matlab using e.g. the dedicated PDE Toolbox.					
Content					
 Chapter 1: The Finite Element Method: from theory to codes Chapter 2: The Finite Difference Method: essential elements 					
Abilities:					
Levels		Description	and operational verbs		
Know					
Understand					
Apply					
Analyze					
Summarise					
Evaluate					

Evaluation:

Written test	
--------------	--

Project