LMECA2300

2015-2016

Advanced Numerical Methods

5.0 credits	30.0 h + 30.0 h	2q

Teacher(s) :	Remacle Jean-François ; Legat Vincent ; Craeye Christophe ; Chatelain Philippe ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=MECA2300
Main themes :	-- Integral Methods -- Finite elements -- Spectral and pseudo-spectral Methods -- Error estimation, adaptivity, mesh generation -- Techniques of resolution of large (non-)linear systems -- Implementation data-processing: parallel calculation, use of the specialized libraries, techniques of numerical programming.
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: AA1.1, AA1.2, AA1.3 AA2.2, AA2.3, AA2.4 AA3.1, AA3.3 AA6.1, AA6.4 Advanced numerical methods The requirements for the students are the following: -- To select and to apply the right method for a given problem. -- To evaluate the algorithmic complexity of a method. -- To efficiently use the numerical available libraries (Lapack) -- To provide an estimate of the error. -- To evaluate the quality of a mesh for a given method. -- To perform a calculation on a parallel architecture. -- To program a simple integral method. -- To program a method finite elements. -- To solve in an iterative way of the (non-)linear large systems *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 :	Exam.
Teaching methods :	In the pratical organisation, a great importance will be given to collaborative projets. Flexibility will be emphazed in order to focus on a problem solving approach.
Content :	-- Integral Methods. -- Finite elements. -- Spectral and pseudo-spectral Methods. -- Error estimation, adaptivity, mesh generation.

	-- Techniques of resolution of large (non-)linear systems. -- Implementation data-processing: parallel calculation, use of the specialized libraries, techniques of numerical programming.
Faculty or entity in charge:	MECA

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

Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Biomedical Engineering	GBIO2M	5	-	
Master [120] in Mechanical Engineering	MECA2M	5	-	
Master [120] in Electro-mechanical Engineering	ELME2M	5	-	
Master [120] in Physical Engineering	FYAP2M	5	-	
Master [120] in Computer Science	SINF2M	5	-	
Master [120] in Computer Science and Engineering	INFO2M	5	-	
Master [120] in Electrical Engineering	ELEC2M	5	-	