LMECA2300
2014-2015

Advanced Numerical Methods

5.0 credits	30.0 h + 30.0 h	2q

Teacher(s) :	Lambrechts Jonathan ; Craeye Christophe ; Legat Vincent ; Remacle Jean-François ; Legat Vincent (compensates Remacle Jean-François) ;
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 :	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.
Cycle and year of study :	> Master [120] in Computer Science > Master [120] in Computer Science and Engineering > Master [120] in Physical Engineering > Master [120] in Biomedical Engineering > Master [120] in Electro-mechanical Engineering > Master [120] in Mechanical Engineering > Master [120] in Electrical Engineering
Faculty or entity in charge:	MECA