MATH-611

Scientific programming for Engineers

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Cursus	Sem.	Type
Civil & Environmental Engineering		Obl.
Mechanics		Obl.

Language of teaching	English
Credits	4
Session	
Exam	Project report
Workload	120h
Hours	**56**
Courses	18
TP	38
Number of positions	**10**

Frequency

Every year

Remark

Every year/ Next time: Fall 2017

Summary

The students will acquire a solid knowledge on the processes necessary to design, write and use scientific software, including the analysis of results. Modeling aspects, which constrain software design, will lead the students to algorithmic and complexity concepts inherent to all numerical calculati

Content

Programming techniques, code factorization
Pointers, memory management, data structures
Linear system solving (LAPACK/MUMPS)
Numerical error and convergence analysis
Object Oriented Paradigm
C/C++ programming (class, operator, template)
Python/MatPlotLib
Paraview
Classical problems: series calculations, Mandelbrot fractal, signal filtering (audio and image), Fourier transform, sparse linear system, conjugate gradient optimization, heat propagation, mass spring model, wave propagation and dispersion relations.

Keywords

programming, scientific, code design, algorithm, optimization, analysis

Learning Prerequisites

Required courses

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