EFS9AA NUMERICAL CODES FOR PROBLEM SOLVING IN ENGINEERING

EFS9AA **Numerical codes for problem solving in engineering**	**ECTS Credits:** 2 **Duration:** 21 h	**Semester:** S9

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Keywords: Numerical codes and methods, mesh, solvers, fluid mechanics, heat transfers

Prerequisites: Fluid mechanics , Thermal sciences - Numerical methods

Objective:

Be capable of using numeric codes, analyse and interpret their results

There are on the market numerous codes capable of solving fluid mechanics and thermal sciences engineering problems. Some of these codes are commercial such as Comsol Multiphysics, Fluent, ... but there also are "Open Source" alternatives such as Freefem, Thetis and OpenFOAM. Today, some of these codes are even built into CAD software (such as Fluent under Catia V5). The goal of this course is, in a first time, to present these different codes by describing their specificities and their field of use and, in a second time, to know how to use them to solve real problems. The contents of the classes are as follow :

1. BR General introduction to the different codes and their specificities (numeric methods used, ODE solving, adaptive mesh generator in time and in space, scripting, ...), criteria to make a choice
2. BR Introduction of Design Modeller and Meshing (Fluent under Workbench) as well as different types of elements and meshes. Export formats.
3. BR Introduction to Fluent and its functions
4. BR Solving fluid mechanics, thermal sciences and non isotherm fluid mechanics problems
5. BR Introduction to UDF writing under Fluent
6. MJ Introduction to "OpenSource" software, introduction to Freefem++
7. MJ Introduction to OpenFOAM solver and parallel computing

Abilities:

Level	Description and operational verbs
Know	
Understand	
Apply	
Analyse	
Summarise	
Assess	

Evaluation :

☐ Written test	☐ Continuous Control	☐ Oral report	☑ Project	☐ Written report