

## Programming and numerical methods

Subject Information	
<b>Code</b>	UE2 S2
<b>Credits (ECTS)</b>	7
<b>Semester</b>	1 (mid-September – mid-January)
<b>Time Allocation (Lec. / Prac. / Lab/ Project)</b>	28 h / 22 h / 0 / 50 h
<b>Lecturer</b>	
<b>Pre-requisites</b>	
<b>Assessment</b>	1 hour test (1/3) / 2 hours final examination (2/3)

*Lec. : Lectures*

*Prac. : Practical works ("small classes")*

*Lab.: Laboratories*

Subject Description	
<b>Introduction</b>	The purpose of this module is to provide students a solid foundation in scientific computing that enables them to independently use the computer in the context of modelling and data analysis.
<b>Learning outcomes</b>	<p>After this course the students should be able to:</p> <ul style="list-style-type: none"> <li>• Choose the most suitable method of resolution and then to implement it.</li> <li>• Use software tools (languages but also libraries and productivity)</li> <li>• Implement algorithms for solving</li> <li>• Present and analyse the results</li> </ul>
<b>Content</b>	<p><b>Solving nonlinear equations and systems [10h]</b>  <b>Interpolation and approximation techniques [5h]</b>  <b>Numerical integration and derivation [5h]</b>  <b>Resolution of systems of ordinary differential equations [15h]</b>  <b>Numerical Resolution of Partial Derivative Equations [25h]</b></p> <p><b>Project [50h]</b></p>
<b>Literature</b>	<i>PATANKAR S.V., numerical heat transfer and fluid flow, Hemisphere Publishing Corporation, McGraw Hill, 1980.</i>