




5.00 credits

30.0 h + 22.5 h

Q1

Teacher(s)	Absil Pierre-Antoine ; Vary Simon (compensates Absil Pierre-Antoine) ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Basic skills in numerical methods, as covered, for example, within LEPL1104 (Numerical methods). Remark : LINMA2171 is the second part of a teaching programme in numerical analysis, of which LINMA1170 is the first part ; however, LINMA1170 is not a prerequisite for LINMA2171.
Main themes	<ul style="list-style-type: none"> <li>• Interpolation</li> <li>• Function approximation</li> <li>• Numerical integration</li> </ul>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <ul style="list-style-type: none"> <li>• AA1.1, AA1.2, AA1.3</li> </ul> <p>At the end of the course, the student will be able to:</p> <ul style="list-style-type: none"> <li>• Implement, in concrete problems, the basic knowledge required from an advanced user and a developer of numerical computing software;</li> <li>1 • Analyze in depth various methods and algorithms for numerically solving scientific or technical problems, related in particular to interpolation, approximation, and integration of functions.</li> </ul> <p>Transversal learning outcomes :</p> <ul style="list-style-type: none"> <li>• Use a reference book in English;</li> <li>• Use programming languages for scientific computing.</li> </ul>
Evaluation methods	<ul style="list-style-type: none"> <li>• Work carried out during the term: homework assignments, exercises, or laboratory work. These activities are thus organized (and evaluated) only once per academic year.</li> <li>• Exam: written, or sometimes oral depending on the circumstances.</li> </ul> <p>The final grade is <math>\min(2/5 D + 3/5 E, D+5, E+5)</math>, where D is the grade of the work carried out during the term and E is the grade of the exam.</p> <p>Further information is provided in the "Course outline" document available on Moodle (see "Online resources" below).</p>
Teaching methods	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Homeworks, exercises, or laboratory work under the supervision of the teaching assistants</li> </ul>
Content	<ul style="list-style-type: none"> <li>• Interpolation: polynomial, by spline functions, rational, trigonometric.</li> <li>• Orthogonal polynomials: Legendre polynomials, Chebyshev polynomials.</li> <li>• Approximation: uniform and in the least-square sense, by polynomials and by splines.</li> <li>• Numerical integration: Newton--Cotes formulas, Gauss method.</li> <li>• Other topics related to the course themes.</li> </ul>
Inline resources	<a href="https://moodle.uclouvain.be/course/view.php?id=747">https://moodle.uclouvain.be/course/view.php?id=747</a>
Bibliography	<ul style="list-style-type: none"> <li>• Textbook</li> <li>• Complementary documents posted on Moodle</li> </ul> <p>Further information is provided in the "Course outline" document available on Moodle.</p>
Faculty or entity in charge	MAP

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Mathematics	<a href="#">MATH2M</a>	5		
Master [120] in Mathematical Engineering	<a href="#">MAP2M</a>	5		
Master [120] in Data Science Engineering	<a href="#">DATE2M</a>	5		
Master [120] in Data Science: Information Technology	<a href="#">DATI2M</a>	5		