## UCLouvain

## Approximations : methods et theory

5.00 credits

2023

30.0 h + 30.0 h

Q1

Teacher(s)	Claeys Tom ;				
Language :	French > English-friendly				
Place of the course	Louvain-la-Neuve				
Prerequisites	Basic numerical analysis courses (e.g., LMAT1151 or LFSAB1104), basic concepts of linear algebra and analysis.				
Main themes	- Interpolation				
	<ul> <li>polynomial interpolation,</li> <li>piecewise approximations and splines.</li> </ul>				
	- Fourier analysis				
	• Fourier coefficients,				
	Fourier series,     convergence and Gibbs phenomenon,				
	• Fejer process.				
	- Numerical integration				
	<ul> <li>basic methods,</li> <li>quadrature rules.</li> </ul>				
	Evaluation will be based on an exam and projects.				
Learning outcomes	At the end of this learning unit, the student is able to :				
	At the end of this activity, the student will be able to :				
	1 - implement approximation methods using software,				
	- construct, mathematically analyze and evaluate approximation methods.				
Evaluation methods	The evaluation will consist of an exam, which will contain more theoretical questions and exercises, and a project to be done during the quadrennium. Students registered for the September term may choose to submit a revised version of the project.				
Teaching methods	Lectures and practice sessions				
Content	Topics covered :				
Content	- Introduction to approximation theory				
	- Approximation by polynomials				
	- Approximation by trigonometric polynomials				
	- Polynomial interpolation				
	- Introduction to Bézier curves and splines				
	- Fourier series - Orthogonal polynomials,				
	- Quadrature rules.				
	At the end of this activity, the student will be able to :				
	- implement approximation methods using software,				
	- construct, mathematically analyze and evaluate approximation methods.				
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=12858				
Faculty or entity in	МАТН				
charge					

Programmes containing this learning unit (UE)						
Program title	Acronym	Credits	Prerequisite	Learning outcomes		
Bachelor in Mathematics	MATH1BA	5		٩		