Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
MAT201	Series and Multivariable Functions	3	3	2	0	5	8

Prerequisites	MAT101 VEYA MAT102
Admission Requirements	MAT101 VEYA MAT102

Language of Instruction	French
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	To teach the notion of convergence of sequences and series To teach certain technics for testing their convergence To enable participants to work with multivariable functions, their limits and derivatives
Content	Convergence of series and power series Convergence tests Taylor Series Multivariate functions and their graphs Their limits Notion of continuity for multivariate functions Partial and directional derivatives of multivariate functions Differentiability of multivariate functions
References	[1] P. Liret et D. Martinais, Analyse, 2e année : cours et exercices avec solutions, Dunod. [2] A. Alves de Sá et B. Louro, Sequences and Series : Theory and Practice, Springer, 2024. [3] F. Q. Gouvêa, A Short Book on Long Sums : Infinite Series for Calculus Students, Springer, 2023. [4] A. Moreau, Suites et séries de fonctions, Université de Lille, Licence de Mathématiques, 2e année. [5] Calculus, James Stewart

Theory Topics

Week	Weekly Contents
1	Series, Absolute convergence.
2	Series with positive terms. Comparison theorems. Riemann series.
3	Convergence tests: Cauchy, d'Alembert, Abel.
4	Alternating series
5	Power Series
6	Taylor Series
7	Midterm
8	Series of functions, pointwise and uniform convergence of series of functions.
9	Stone-Weierstrass theorem
10	Multivariate functions, their graphs
11	Limits of multivariate functions, continutiy
12	Partial derivatives, differentiability
13	Second derivatives, Schwarz theorem
14	Optimization of multivariate functions