

## Content

| Course Code | Course Name               | Semester | Theory | Practice | Lab | Credit | ECTS |
|-------------|---------------------------|----------|--------|----------|-----|--------|------|
| MAT202      | Multivariable Analysis II | 4        | 5      | 0        | 0   | 5      | 7    |

|                        |  |
|------------------------|--|
| Prerequisites          |  |
| Admission Requirements |  |

|                         |   |
|-------------------------|---|
| Language of Instruction | French  |
| Course Type             | Compulsory  |
| Course Level            | Bachelor Degree   |
| Objective               | The aim of this course is to generalize the notion of derivation and integration for single variable functions to the functions of multivariable functions, and to understand and to be able to apply the Stoke's theorem.  |
| Content                 | Differentiable functions, Local inverse function theorem, Implicit function theorem, Higher order partial derivatives, Derivatives of integrals, Multiple integral, Change of variables, Differential forms, Stokes' theorem, Closed forms and Exact forms, Vector analysis, Green's theorem. |
| References              | Principes d'Analyse Mathématique, Walter Rudin.<br>Analyse Concepts et Contextes : Volume 2, Fonctions de Plusieurs Variables, James Stewart.   |

## Theory Topics

| Week | Weekly Contents  |
|------|--|
| 1    | Recall (Elementary topology + Linear applications)         |
| 2    | Limit and continuity of multivariable functions            |
| 3    | Differentiable functions                                   |
| 4    | Fixed point theorem, Local Inverse function theorem        |
| 5    | Implicit Function theorem                                  |
| 6    | Rank theorem, Determinant                                  |
| 7    | Higher order partial derivatives, Derivatives of integrals |
| 8    | Multiple integration, primitive functions                  |
| 9    | Change of variables  |
| 10   | Differential forms, Simlexes and chains                    |
| 11   | Stokes' theorem  |
| 12   | Closed forms and exact forms                               |
| 13   | Vectorial analysis   |
| 14   | Vektorial analysis, Green's theorem                        |