

THE BACHELOR OF SCIENCE IN MATHEMATICS: GENERAL PROGRAM DESCRIPTION

The Bachelor of Science in Mathematics is designed to provide students with a solid foundation in mathematical theory and methods, preparing them for careers in education, research, finance, computer science, and engineering or for further academic studies in Master's or Doctoral programs.

The curriculum emphasizes logical reasoning, problem-solving skills, and rigorous analysis, incorporating both pure and applied mathematics, with an introduction to computing tools and scientific communication.

Program Objectives and Competencies:

Acquire deep understanding of algebra, analysis, topology, probability, geometry, and numerical methods.

Develop skills in abstract thinking, mathematical modeling, and computational techniques.

Learn to apply mathematics to real-world problems in science, technology, economics, and biology.

Gain experience in scientific communication, including written and oral presentation.

Admission Requirements:

Prerequisites: High school diploma (Baccalaureate) in Mathematics or Science track.

Admission Procedure: Based on academic performance, particularly in mathematics and physics.

Program Duration and Structure:

Duration: 3 years (6 semesters)

Total Credits: 180 ECTS

Semester Breakdown:

Core Courses (UEF – Fundamental Units)

Methodological Courses (UEM)

Discovery Courses (UED)

Transversal Skills (UET – e.g., English, Scientific Communication)

Core Subjects (Examples):

Year 1:

Mathematical Analysis I & II

Algebra I & II

Introduction to Algorithms and Programming

Introduction to Probability and Statistics

Structure of Machines (Computer Architecture)

Physics (Mechanics, Electricity)

Scientific Communication and Office Tools

English Language

Specialized Subjects:

Year 2:

Algebra III & IV: Linear transformations, eigenvalues, bilinear forms, quadratics

Mathematical Analysis III & IV: Series, improper integrals, multivariable functions, partial derivatives

Topology: Open/closed sets, continuity, compactness, metric spaces

Numerical Analysis I & II: Interpolation, numerical integration, solving equations, systems of equations

Logic and Programming Tools

Geometry: Curves, surfaces, affine and Euclidean geometry

Probability: Random variables, probability laws, expectations, Bayes' theorem

Mathematics Applications to Sciences

History of Mathematics

Year 3:

Measure and Integration: Lebesgue measure and integration, convergence theorems

Hilbert Spaces and Functional Analysis

Differential Equations: ODEs, stability, mathematical physics equations

Optimization Techniques

Specialty Courses (Electives):

Group Theory

Field Theory
Differential Geometry
Partial Differential Equations
Numerical Methods for PDEs
Mathematical Modeling
Probability and Statistics
Didactics of Mathematics
Capstone Projects and Scientific Report Writing
Ethics in Teaching and Research

Career Opportunities:

Graduates can work in:

Teaching and Academic Research

Finance and Insurance (quantitative analysis, risk management)

Data Science and Statistics

Software Development and Engineering

Public Administration and Research Institutes

Students are also well-prepared to pursue Master's or Ph.D. programs in Mathematics or Applied Sciences.

Language in which the training is provided:

The Bachelor's Degree in Mathematics is predominantly taught in French; however, in recent years, certain subjects or parts of them have been offered in English.