Programs for the Different Semesters of the Bachelor's

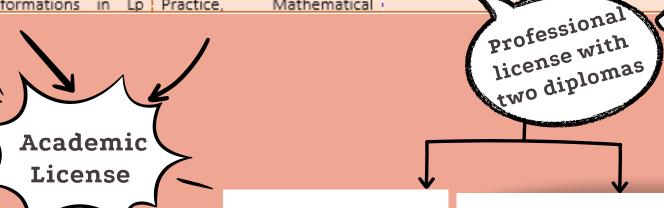| Core Curriculum (L1)	Mathematical modeling and decision support (L1)
Semester 1: Algebra 1, Analysis 1, Introduction to Algorithms, Coding and Information Representation, Office Automation, Electronics and System Components, Communication Techniques, English. **Semester 2:** Algebra 2, Analysis 2, Introduction to Probability and Descriptive Statistics, Programming and Data Structures, Machine Structure, History of Sciences, Physics 02, Introduction to Object Oriented Programming.	**Semester 1:** Algebra 1, Analysis 1, Introduction to Algorithms, Descriptive statistics, ICT, Digital Skills 1, Creativity tools, English 1. **Semester 2:** Algebra 2, Analysis 2, Algorithms and data structure 2, Probability 1, Numerical Analysis 1, Digital Skills 2, History of Mathematics, Creativity Workshop 1, and English 2.

Mathematics and Applied Mathematics Track (L2)	Mathematical modeling and decision support (L2)
Semester 3: Algebra 3, Analysis 3, Introduction to Topology, Mathematical Logic, Programming Tools 2, Numerical Analysis 1, History of Mathematics. **Semester 4:** Algebra 4, Analysis 4, Complex Analysis, Probability, Geometry, Numerical Analysis 2, Application of Mathematics to other Sciences.	**Semester 3 & 4:** Algebra 3 / 4, Analysis 3 / 4, Probability 2 / Decision statistics, Linear programming, Numerical analysis 2, Mathematical Logic, , Digital Skills 3, Programming Tools 1 / 2 (Python), Prediction methods 1, Modeling, Web application development 1, Creativity Workshop 2, English 3 / 4.

Mathematics Bachelor (L3)	Applied Mathematics Bachelor (L3)	Mathematical modeling and decision support (L3)
Semester 5 & 6 : Measure and Integration, Introduction to Hilbertian Analysis, Differential Equations, Mathematical Physics Equations, Unconstrained Optimization, Integral Transformations in Lp	**Semester 5 & 6 :** Advanced Probability, Parametric Statistics, Matrix Numerical Analysis, Information Systems and Databases, Exploratory Data Analysis, Graph Theory, Linear Programming, Software Simulation and Practice, Mathematical	**Semester 5 & 6 :** Dynamic Random Models, Data mining, Optimization 1, Prediction methods 2, Stock Management Models, Web² application development 2, Scientific Writing, English 5, Simulation, Optimization 2, Multi-criteria decision support analysis, Information systems and databases, Introduction to game theory, Project.

Academic License

Professional license with two diplomas

Alger 3 Diploma
Specialty: Quantitative Economics

Alger 1 Diploma
Specialty: Mathematical Modeling) and Decision Support

The Department of Mathematics offers programs following the Bachelor's-Master's-Doctorate (LMD) system in two fields:

Mathematics and Applied Mathematics.

The first year is common to all tracks. It is a year of preparation and orientation. Starting from the second year, students choose between Mathematics or Applied Mathematics. This is a year of gradual specialization. The third year is a year of specialization, offering a choice between several Bachelor's degrees.

Opportunities and Integration:

- **Mathematics and Applied Mathematics**
Students can continue their studies at the Master's level or enter the world of work in various careers such as consulting, teaching and those in engineering consultancy.

- **Mathematical modeling and decision support**
Students can either enter the job market directly, or continue their studies with a master's degree in applied mathematics, computer science or economics. The career paths targeted are Financial analyst, Data analyst, Statistical analyst, Operations research analyst, Teacher or trainer in applied mathematics.

كلــيــة العلــوم
2024/2025

Department of mathematics

Licence cycle

L1 : 1st year Bachelor's degree Mathematical modeling and decision support

L2 : 2nd year Bachelor's degree Mathematical modeling and decision support

L3 : 3rd year Bachelor's degree Mathematical modeling and decision support

Core Curriculum
L1 : 1st year Bachelor's degree

L2 : 2nd year Bachelor's degree in applied mathematics

L3 : 3rd year Bachelor's degree in applied mathematics

L2 : 2nd year Bachelor's degree in Mathematics

L3 : 3rd year Bachelor's degree in mathematics

Master Cycle

- Master in Quantitative Economics (Univ. Alger 3)
- Master in Operations Research
- Master in Mathematical Engineering for Artificial Intelligence
- Master in Mathematics and Applications

Job opportunities and integration

• Master in Mathematics and Applications
Students can go on to study for a doctorate or enter the world of work in a variety of professions, including consulting and teaching.

• Master in Operations Research
Students can continue their studies at doctoral level, or join the professional world as specialists who can invent, design, manage and run all or part of a project, whatever its size, complexity or technicality, and in all its dimensions,

• Master in Mathematical Engineering for Artificial Intelligence
Students can either work as graduates of the IMIA Master's program, or continue their studies with a doctoral thesis in mathematics or computer science. At the end of the Master's program, the professions targeted include: **Artificial Intelligence Engineer, Data Scientist, AI Consultant, AI Software Developer**, Research and Development Engineer...

Masters modules

Master in Mathematics and Applications	Master in Operations Research	Master in Mathematical Engineering for Artificial Intelligence
M1		
Functional analysis 1 / Functional analysis 2	Linear Programming	Pobabilities and Random Modeling
Distribution Theory	Graph theory	Stochastic optimization
Ordinary differential equations	Probability and statistics / Waiting queues	Chronological series
Optimization with constraints / Convex Optimization	Systems Modeling	Simulation methods
Programming Tools / Mathematics software	Organizational Systems	Operations research and combinatorics
Fractional Differential Equations	Programming Tools	Applied analysis and PDE
Spectral Methods	Partnering	Programming Tools
Elliptic PDE	Data Analysis	English 1 / English 2
Spectral Operator Theory	Technical English 1 and 2 / Scientific Writing	Inferential Statistics
Technical English 1 / 2	Project management / Production Management	Machine Learning / Data mining
Choose a module from : - Dynamic systems and modelling - Mathematical modeling	Combinatorial Optimization	Stochastic EDP
	Multicriteria Decision Support	
	Non-linear optimization	Company management
M2		
Analytical function spaces and their operators	Meta heuristic optimization	Random processes and applications
Elliptic PDEs with irregular data	Scheduling	Advanced Machine Learning
Finite Difference and Finite Elements	Multi-Objective Optimization	Numerical methods
Kernel methods for automatic learning	Artificial Intelligence	Kernel methods for machine learning
Introduction to variational computation and applications.	Modeling and Simulation	Non-parametric estimation
Scientific communication	Data mining	Optimum control
Choose a module from : - Finite volumes - Optimum control	Expression and communication techniques	Big Data
	Game theory	Entrepreneurship
End-of-studies project	Deontology and ethics	Expression and communication techniques
	End-of-studies project	End-of-studies project