National University of Science and Technology

POLITEHNICA Bucharest

Faculty of Applied Sciences

Master's Program in Decision Models, Risk, and Forecasting

Description

Decision-making in today's complex economic and technological environments increasingly relies on mathematical modeling, data analytics, risk assessment, and predictive methods. Organizations operating in engineering, finance, industry, logistics, and public administration require specialists capable of transforming data into reliable forecasts and evidence-based decisions.

The **Master's Program in Decision Models, Risk, and Forecasting** provides advanced interdisciplinary training in applied mathematics, operations research, data analytics, risk modeling, simulation, and forecasting. The program combines rigorous theoretical foundations with practical computational techniques, enabling students to analyze uncertainty, optimize complex systems, and support strategic decision-making across a wide range of engineering, scientific, and economic applications.

Established in 2003 and continuously updated to reflect the evolving demands of industry and research, the program offers an excellent balance between mathematical theory, computational methods, and real-world applications. Through coursework, case studies, and research projects, students develop the analytical and computational skills needed to address today's increasingly data-driven challenges.

Relevance to the Job Market

The growing digitalization of engineering, business, and public services has significantly increased the demand for professionals capable of analyzing complex systems, assessing risks, and supporting strategic decisions through quantitative methods. Graduates acquire a versatile skill set that is applicable across multiple industries where forecasting, optimization, and decision support play a critical role.

Career opportunities include positions in engineering consulting, finance, insurance, banking, manufacturing, logistics, energy, information technology, business analytics, and public administration. Graduates are qualified for roles such as **Data Analyst**, **Decision Support Specialist**, **Risk Analyst**, **Operations Research Analyst**, **Business Intelligence Analyst**, **Quantitative Analyst**, **Research Engineer**, and **Applied Mathematician**. The program also provides a solid foundation for doctoral studies and research careers in applied mathematics, engineering sciences, operations research, and data analytics.

Competencies Acquired

Upon completion of the program, graduates will be able to:

- Develop mathematical models for complex engineering, economic, and decision-making processes.
- Analyze and interpret technical, engineering, and economic data using modern analytical methods.
- Design and implement algorithms for optimization, simulation, and decision support.
- Apply Monte Carlo methods, stochastic modeling, and operations research techniques to solve real-world problems.
- Perform quantitative risk assessment and develop forecasting models for uncertain environments.
- Utilize specialized software tools for simulation, predictive analytics, and decision analysis.
- Integrate mathematical methods with computational technologies to solve interdisciplinary challenges.
- Conduct independent scientific research while adhering to professional ethics and intellectual property standards.

Selected Courses

The curriculum includes advanced topics such as:

- Decision Theory and Decision Support Systems
- Risk Analysis and Management
- Mathematical Forecasting
- Data Analytics and Data Mining
- Big Data Methods
- Operations Research
- Monte Carlo Methods and Simulation
- Optimization Techniques
- Mathematical Modeling
- Scientific Research Methodology

Research Areas

Students have the opportunity to participate in research projects covering topics such as:

- Decision support systems
- Risk assessment and management
- Predictive analytics and forecasting
- Data mining and big data analytics
- Simulation and Monte Carlo methods
- Operations research and optimization
- Mathematical modeling of engineering and economic systems
- Intelligent decision-making under uncertainty
- Applied statistics and stochastic modeling
- Computational methods for interdisciplinary applications

Program Highlights

- Strong interdisciplinary curriculum combining applied mathematics, data analytics, optimization, and risk modeling.
- Emphasis on practical applications through case studies, simulation projects, and computational methods.
- Close integration of teaching and research activities throughout the program.
- Curriculum continuously updated to reflect developments in data science, quantitative analysis, and decision support.
- Excellent preparation for both industry careers and doctoral research.

Additional Information

- **Language of instruction:** Romanian
- **Duration:** 2 years (120 ECTS)
- **Degree awarded:** Master of Science (M.Sc.) in Applied Engineering Sciences
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