

Educational Programme	<b>Formal Methods in Programing</b>
Degree Awarded	Master in Computer Science
Standard Length of Studies (Number of ECTS Credits)	2 years – 4 semesters – 120 ECTS
Type of Study	Full-time
Higher Education Institution	Babeş-Bolyai University
Faculty / Department	Faculty of Mathematics and Computer Science
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Profile of the Degree Programme	Formal Methods degree program
Target Group / Addressees	Graduates in Mathematics, Informatics, Economics, Electrical/Electronic Engineering, Physics, Chemistry, Biology, etc.
Entrance Conditions	The overall three-year undergraduate average grade is taken into consideration as selection criterion.
Further Education Possibilities	The master's program aims at providing students with the appropriate tools for further doctoral studies and professional activity.
Description of Study	<p>The mathematical techniques and rigour is widely needed to build reliable software systems. The safety-critical software must be reliable, error-free systems. Formal Methods are needed to build such systems.</p> <p><i>Core courses:</i></p> <p>Formal Methods in Programming,  Software architecture  Software modeling  Framework Design  Automated Theorem Proving  Rules Based Programing  Advanced Methods of Data Analysis  Formal Models in Programing Languages  Formal Methods in Paralel Programming,  Machine Learning  Temporal Logic  Algebraic Specification  Java Technologies and Platforms for Distributed Applications.  Methodology of Scientific Research in Computer Science</p>
Purposes of the Programme	In recent years there is a growing demand of specialized people in software engineering, educated to build reliable systems. This program was created to respond to that demand, offering theoretical knowledge in using formal methods in software engineering.
Specialization / Area of Expertise	Formal Methods, SoftwareVerification and Validation, Software Engineering
Extra Peculiarities	Optional: Practice of Education.

Practical Training	In the 2 <sup>nd</sup> year (4 <sup>th</sup> semester) of the program the students participate in a research project in the field of Formal Methods
Final Examinations	Disertation
Gained Abilities and Skills	<p>Solid knowledge to analyse, design, implement, verify and validate a reliable software system.</p> <p>Advanced capacity of using Formal Methods to design and build correct safety-critical systems.</p> <p>Advanced knowledge of theoretical, methodological, and practical developments in computer science</p> <p>Abilities and skills to use tools for all activities of a software process.</p> <p>Abilities and skills to:</p> <ul style="list-style-type: none"> <li>- model various problems of real-life;</li> <li>- use mathematical rigour for all software process activities;</li> <li>- use conceptual and methodological apparatus pertaining to informatics to provide solutions for incompletely defined situations, to solve new theoretical and practical problems</li> <li>- work in a team, assuming different execution and leading roles, performing professional tasks with considerable amounts of autonomy and responsibility</li> <li>- use Java platforms and technologies.</li> </ul> <p>Advanced communication skills within different professional environments, appropriate use of computer science vocabulary, good English knowledge.</p> <p>Advanced skills for Software Quality Assurance.</p>
Job Placement, Potential Field of Professional Activity	Experts in software engineering; Developer positions, verification and validation positions.