**Università degli Studi di L'Aquila - Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica**

# Master Degree in Mathematics

*Degree Profile*

*Page compiled on 14/12/2019*

**Degree profile of**
**Master Degree in Mathematics**

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| Type of degree and length | Single degree (120 ECTS credits, 2 years) A double degree is awarded jointly with the following universities to the students enrolled in the international track "Applied and Interdisciplinary Mathematics": University of Silesia, Katowice, Poland; Gdansk University of Technology, Gdansk, Poland; Ivan Franko National University of Lviv, Ukraine. |
| Institution(s) | • University of L'Aquila, Italy.<br>• University of Silesia, Katowice, Poland.<br>• Gdansk University of Technology, Gdansk, Poland.<br>• Ivan Franko National University of Lviv, Ukraine. |
| Accreditation organisation(s) | Ministero dell'Istruzione dell'Università e della Ricerca (MIUR), Italy. |
| Period of reference | MIUR 2015, for 2 years |
| Cycle /level | QF for EHEA: 2nd cycle; EQF level: 7; Italian NQF: Laurea Magistrale |

| **A** | **PURPOSE** |
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| | To provide a deep understanding and knowledge of advanced topics in theoretical and applied mathematics and to provide a knowledge of mathematical techniques that will be applied to the study of various mathematical problems in applied sciences. To become eligible for Doctoral studies in mathematics (pure and applied) and interdisciplinary PhD programs related to Mathematics. To enable access to secondary school teaching certification |

| **B** | **CHARACTERISTICS** | |
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| 1 | Discipline(s) / subject area(s) | Mathematics; Others (70:30) |
| 2 | General / specialist focus | Advanced education in pure and applied Mathematics. At the second year the student can choose between a research and applied oriented tracks or a teaching track |
| 3 | Orientation | The research track is oriented to form a graduate student eligible for Doctoral studies in pure or applied mathematics. The applied track is oriented to form a graduate student with additional employment opportunities by virtue of more advanced and specific skills and eligible also for interdisciplinary Doctoral studies. The teaching track to form a graduate student eligible for secondary school teaching certification |
| 4 | Distinctive features | All the courses of the master degree are taught in English. |

| **C** | **EMPLOYABILITY AND FURTHER EDUCATION** | |
|---|---|---|
| 1 | Employability | Management and research employment opportunities in financial companies or institutions, in insurance companies, governmental departments, ICT companies. Access to Secondary school teaching certification and to research positions in University or Research Organizations |
| 2 | Further studies | Doctoral studies in pure or applied mathematics and interdisciplinary Ph. D. programs related to mathematics |

| D | EDUCATION STYLE | |
|---|---|---|
| 1 | Learning and teaching approaches | Lectures and exercises, laboratory classes, small work groups, individual study based on text books and lecture notes. Tutorials with academic staff. Individual tutorial for preparing the Master theses dissertation |
| 2 | Assessment methods | Written exams, oral exams, laboratory reports, continuing assessments, final comprehensive exam, assessment of Master theses dissertation |

| E | PROGRAMME COMPETENCES |
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| 1 | Generic |
| | • Flexible mind: acquisition of a way of thinking that will enable them to penetrate and solve problems, while maintaining a critical stance towards established scientific insights.<br>• Team- work: capability to perform guided teamwork in a lab setting and related special skills demonstrating capacity for handling the rigor of the discipline and for time management (including meeting deadlines).<br>• Communication skills: ability to communicate effectively and to present complex information in a concise manner orally and in writing and using appropriate technical language.<br>• Popularization skills: ability to hold an oral presentation and to write a lucid article on the research conducted and on modern concepts in physics and astronomy for a general, non- specialist public.<br>• Math culture: ability to transfer the mathematical knowledge to others<br>• Learning ability: ability, through independent study, to enter new fields by using mathematics knowledge<br>• Problem solving: capacity to solve complex problems in a logical and rigorous way. |
| 2 | Subject specific |
| | • Deep knowledge and understanding: ability to use mathematical principles in order to describe an actual problems<br>• Problem solving: ability to formulate, analyze and synthesize solutions to scientific problems at an abstract level by dividing them into testable sub- problems, differentiating between major and minor aspects.<br>• Modelling: ability to set up appropriate models of natural phenomena, deriving consequences and deepening understanding of the natural world.<br>• Computing skills: ability to design and implement computer programs and to use current application programs.<br>• Research skills: ability to formulate new questions and hypotheses in the fields of physics and astronomy, and to select the appropriate pathways and research methods for solving these questions, taking into account the available resources, on the occasion of presentations and/or reports submission.<br>• Analysis and synthesis skills: Ability to analyze and make diagnosis for various types of complex management questions in science- related, knowledge- intensive organizations.<br>• Applying specialized knowledge: ability to put effectively into practice a number of theories in the fields of management science and business administration.<br>• Communication skills: ability to communicate with colleagues in the same discipline about scientific knowledge, both at basic and specialist levels; ability to report orally and in writing, and to discuss a scientific topic, in the home language as well as in English scientific insights.<br>• Teaching skills: ability to reflect on the ways in which teaching skills are put into practice, efficiently applying educational concepts. |

| F | COMPLETE LIST OF PROGRAMME LEARNING OUTCOMES |
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| | • Acquisition of knowledge and understanding of advanced mathematical techniques acquired from the compulsory in Algebra, Calculus, Geometry of the first year.<br>• Acquisition of knowledge and understanding of mathematical modeling: mechanics, analytical mechanics, classical mathematical models of physics acquired in courses in mathematic and physics courses.<br>• Acquisition of knowledge and understanding of mathematical techniques and modeling acquired in specific courses in Probability, Mathematical Physics and Numerical Analysis<br>• Ability to demonstrate knowledge and understanding of the models and techniques of proof and computation in specific areas, both theoretical and applied through elective courses in the areas mentioned above range, depending on the choice of the student, the more theoretical areas since the financial sphere, engineering and management.<br>• Ability to understand and master complex mathematical structures. |

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| | • Ability to apply, develop and devise techniques for advanced computing.<br>• Ability to apply mathematical tools in any area of cognitive reasoning with flexibility.<br>• Ability to analyze critically and rigorously a decisional problem.<br>• Ability to produce rigorous and original proofs.<br>• Demonstrated proficiency in using English language, including subject area terminology, for literature search. |