



MATHEMATICS	
Cycle	XXXV
Coordinator	Prof.ssa Alessandra LUNARDI Department of Mathematical, Physical and Computer Sciences email: alessandra.lunardi@unipr.it
Duration	3 years
Starting date of the PhD program	01/11/2019
Partner Institution	<ul style="list-style-type: none">• University of Modena e Reggio Emilia• University of Ferrara
Partner Institution for University Cooperation Agreements	<ul style="list-style-type: none">• Université d'Orléans (France)• KU Leuven (Belgium)• Universidade do Minho (Portugal)
Research Topics	
<ul style="list-style-type: none">• Statistical mechanics• Probability• Discrete mathematics and combinatorial geometry• Algebraic and geometric topology of manifolds• Partial differential equations• Differential equations and dynamical systems• Calculus of variations and applications to variational problems• Infinite dimensional analysis• Mathematical models and methods for complex systems• Mathematical methods of quantum mechanics• Modelization and scientific calculus• Numerical methods for integral equations• Numerical optimization and applications• Combinatorial optimization• Sequential, parallel, and real-time algorithms• Hopf algebras and quantum groups• Projective algebraic geometry• Geometry and complex analysis• Differential geometry• History of mathematics• Didactics of mathematics• Thermomechanics of continuous systems• Exterior differential systems• Kinetic methods in physics, economy, and social sciences• Number theory• Artificial intelligence• Automatic reasoning	



Training Objectives

The main aim is to produce highly qualified researchers in the field of Mathematics, with advanced skills on mathematical models and methodologies that can be used also in interdisciplinary applied sciences. This aim will be achieved through series of lectures, conferences, participations to workshops and congresses, research periods in foreign institutions that one one hand introduce the students to the academic research community and on the other side let them establish work relationships along their PhD career and later. Education is addressed to the ability of recognizing significant research problems, to formulate solutions and to transmit knowledge through written works and oral presentations. At the end of the PhD program any Doctor should be able to carry on scientific research autonomously, to produce original considerable scientific results and to integrate into the international scientific community.

Admission requirements

Regardless of age and citizenship, applicants holding at least one of the following academic qualifications can apply for admission:

- Laurea specialistica or Laurea magistrale (second cycle master's degree)
- Laurea Vecchio Ordinamento (degree obtained under the previous Italian regulations);
- Second cycle Master's degree obtained abroad, equivalent to the above mentioned Italian degrees and recognized as suitable for the admission to doctoral programs

Undergraduate applicants may also submit applications with the obligation of getting their degree by **October 31st 2019**.

POSITIONS PUT OUT TO COMPETITION


With Scholarship	11
Without Scholarship	2
TOTAL	13

Positions with University Scholarship

N°	Funding entity	Research Topic, if any
2	Scholarship University funds	---
3	Scholarship funded by University of Ferrara	---
3	Scholarship funded by University of Modena e Reggio Emilia	---
1	Scholarship co-funded by Fondazione Cariparma	---

Position with Scholarship LINKED TO SPECIFIC TOPICS (art. 11 of the Call for applications)

During the Oral Exam, applicants may express their interest in being assigned a scholarship dedicated to a specific research topic to the Examination Board. The Board will express its judgement on eligibility to be assigned the scholarship in consideration of the specific competences, experience and specific aptitudes of the applicants.

N°	Funding entity	BOUND RESEARCH TOPIC
1	Funded by University of Ferrara with funds from EMILIA ROMAGNA REGION 	<ul style="list-style-type: none"> • Mathematical and statistic methods for machine learning in biomedical and public health settings. Construction and analysis of automatic learning models, stochastic optimization methods, big data analytics and uncertainty quantification techniques.



1	<p>Funded by University of Modena e Reggio Emilia - Department of Physics, Informatics and Mathematics</p>	<ul style="list-style-type: none"> Design, prototyping and validation of fail-operational, safety-compliant components for autonomous driving (AD) vehicles, with a particular focus on control components, and perception. Moreover, it will explore the adoption of embedded platforms based on multi-core host and heterogeneous many-core accelerators, such as NVIDIA Xavier or Xilinx Versal, for next generation of AD systems
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ADMISSION PROCEDURES

Assessment of QUALIFICATIONS: up to 60 points

ORAL EXAM: up to 60. points

Minimum score for ELIGIBILITY: 70/120

Foreign Language	<p>Language the fluency of which shall be assessed during the Oral Exam: ENGLISH. The evaluation of the knowledge of this language will be written/oral and will consist a short conversation and translation of a scientific text</p>
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At the discretion of the Examination Board, candidates (Italian and foreign) who request it will be able to support the interview by videoconference
(the relevant request shall be submitted using the form attached to the competitive examination announcement **specifying the motivation**)

THE INTERVIEW MAY BE HELD ALSO IN ENGLISH

LIST OF QUALIFICATIONS TO BE SUBMITTED AND THEIR ASSESSMENT

Mandatory documents to be attached to the on-line application

- **ANNEX A** (art. 5 of the Call for Applications)
- Scanned Copy of a **valid identification document** with photo
- **Curriculum Vitae et studiorum** (art. 4 of the Call for Applications)
- **Abstract of the second cycle master's degree thesis.** Undergraduate applicants may submit the draft of the thesis approved by their supervisor (abstract/draft of the thesis: 10.000 characters including spaces)
- **Certificates and academic transcript of records for both Bachelor' and Master' degrees** containing the following details for each degree held: (art. 4 of the Call for Applications):
 - University that granted the degree
 - Type of degree (first cycle/second cycle/single cycle)
 - Name of the degree program
 - Date of graduation
 - Final mark
 - List of exams and corresponding scores (academic transcript of records)
 - Translation into Italian or English (only for degrees issued in languages other than Italian or English)

Further qualifications that may be attached to the application, if in possession of the applicant

(only qualifications attested by a document drawn up in Italian or in English)

- **Statement of Research Interest:** Short text – maximum 2 pages – in Italian or in English, aimed at explaining the candidate's reasons to attend the PhD program and at describing the specific her/his research interests. It may contain the proposal for a research project;
- **Scientific Publications:** Articles on national and international journals, contribution presented at conferences or symposia, book chapters etc.



- **Reference Letters:** A maximum of 2 written by professors or researchers at the University of origin of the candidate or from other universities or from experts in the research areas working in public or private research facilities
- **Academic qualifications:** First or second level Master's degree obtained in Italy and/or specialization degree in subjects consistent with the research topics of this PhD program
- **Mobility experience abroad** (e.g. Erasmus or similar);
- **Any other document** certifying the applicant's training and abilities (grants, awards, etc.)

EVALUATION CRITERIA

QUALIFICATION	EVALUATION CRITERIA	POINTS
Curriculum Vitae et studiorum	Including academic career and postgraduate experience, accompanied by a statutory declaration in lieu of the certification of the exams passed with the relevant marks, as well as the final graduation mark.	Up to 10 points
Graduation thesis	Scientific content and presentation	Up to 20 points
Statement of Research Interest	Candidate's maturity and depth in the presentation of his interests, his motivation and a possible research project	Up to 20 points
Scientific publications	Scientific relevance of the results and their editorial positioning	Up to 5 points
Reference Letters	Significant presentation of the candidates in the letters, relevance of the qualifications for the PhD purposes.	Up to 5 points
ORAL EXAMINATION	EVALUATION CRITERIA	POINTS
The oral proof consists in a presentation and discussion of the scientific interests of the candidate; it aims to find out the aptitude of the candidate for scientific research and her/his general knowledge of basic topics relevant to the subject matters of the PhD course.	<ul style="list-style-type: none"> ○ knowledge of foreign languages: max 10 points ○ good argument concerning research interests: max 25 points ○ preparation on the topic of the PhD course: max 25 points 	Up to 60 points

SCHEDULE OF THE ADMISSION EXAMS

ORAL EXAM	DATE	17 September 2019
	TIME	09:00 am
	PLACE	Department of Mathematical, Physical and Computer Sciences Parco Area delle Scienze, 53/A – 43124 PARMA - ITALY
Possible continuation of the Oral Exam: 18 September 2019 same time and same place		
OTHER INFORMATION	For foreign candidates, the admission examinations may be held in English at the candidate's choice.	