Regulations of Graduate Studies - IMPA

IMPA offers three graduate programs: PhD, Master's and Professional Master's. The entire academic steps of the student, from admission to completion, is conducted by the Teaching Committee.

I – Teaching Committee Structure

According to RDI 009/2001, the Teaching Committee is composed of the Board of Directors, the Teaching Coordinator and representatives of the scientific body of the Institute.

II – Application

Applications to IMPA's graduate programs should be submitted through the online system http://ensino.impa.br.
The Teaching Committee reviews all complete processes. Each process is analyzed by at least three researchers from the institute. Attached documents are not returned to the candidate after the trial.
Results are sent by email.

Application Steps

Applicants must fill out a form with personal information, upload a recent digital photograph (close to a 3×4 cm standard) with clear background and also a photo ID.

Once the personal information is submitted, candidates must select the graduate program of interest and provide complementary information, including the desired starting date, request of financial support, etc. Candidates should also indicate two recommendation-letter writers, who will be contacted directly with instructions on how to submit their letters.

Applicants must attach online:

Candidates must provide official transcripts issued by the institutions where their previous university degrees were obtained. In case of incomplete degrees at the time of the application, the transcripts should be as up-to-date as possible.

Applicants must submit a personal short letter containing study plan for the program of interest. The letter should also mention a list of mathematics books the candidate has previously studied.

III – Admission

The program has three terms:
Summer: January – February
2nd Term: March – June
3rd Term: August – November

Each student enrolled at IMPA has an academic advisor who must approve the student's program of study at the beginning of each term and monitor their academic performance.

Every IMPA scholarship student is considered full-time, and must take at least one course in the summer period (January-February) and at least two courses in the other academic periods. Exceptions must be authorized by the Teaching Committee. Among the disciplines can be included: Preparation of Master's Thesis, Preparation of Doctoral Thesis and Seminars. Reading Courses can also be included, as long as they are approved by the supervisor and the teacher in charge of the course.

Students enrolled, even on a part-time basis, must enroll in courses and must justify to the Teaching Committee any absences during the IMPA academic periods.

III.1 Courses and Credits

The duration of courses is the same of a term and consists of three hours per week, except in the Summer Term when the workload is six hours per week. Each credit corresponds to 16 (sixteen) hours of class. In general, classes/hours of exercises are not computed. Approval in Scientific Initiation courses is not counted as a Graduate credit.

The performance in each subject is evaluated through tests, individual works or oral presentations. The evaluation process is the responsibility of the teacher in charge of the subject, respecting the general rules of the Teaching Committee.

Student achievement in subjects is measured by one of grades A, B, C, and F, with F being the only failing grade. However, in Seminars and in some advanced Doctorate courses, performance is measured by grades P (approving) and F (failing).

Grade I (incomplete) is also used to indicate that the student will complete the course work at a later date. In the event that this degree is not completed within 60 days after the end of the course, it will be transformed into grade F. Grade I will be accepted by the Teaching Committee only in exceptional and amply justified situations.

For locked subjects, grade E is assigned.

III.2 Enrollment and cancellation of courses by electronic means

Enrollment in courses offered at IMPA will be open for 30 (thirty) days: 15 (fifteen) days before and 15 (fifteen) days after the beginning of each academic period.

Up to the middle of each academic period, regular students can cancel their enrollment in any of the disciplines, respecting the minimum number of disciplines to be taken.

Enrollment and cancellation of a course, for students enrolled at IMPA, requires the consent of their supervisor.

IV – Leave of Absence

The request to cancel enrollment must be forwarded to the Teaching Coordination with the approval of the advisor. The maximum period of locking is 2 (two) years.

The return to the program is not automatic and depends on an evaluation by the Teaching Committee.

V – Withdrawal

The student enrolled in the Master's or Doctoral program will be terminated from the course in the following cases:

1. Obtaining two F degrees in subjects
2. Not meeting the first-year rule (1st year subjects for Masters, Stage I for PhD)
3. Fail the qualifying exam

VI – Reconsideration of Terminations

The student and supervisor will be given the opportunity to express themselves by email, within a maximum period of 15 (fifteen) days, regarding supporting circumstances that explain the student's unsatisfactory performance. Student and advisor can write a single letter and can also send documents of other natures that corroborate their statements. The Teaching Committee will review each application and may request additional information.

Requirements for the Master's Degree

Math Option
1st year courses

At the end of the first year, the students' performance will be analyzed by the Teaching Committee. Students must obtain at least 3 grades A or B in the subjects of the 1st year.

Courses: Analysis in Rn, Algebra I, Complex Analysis, Measurement and Integration, Analysis in Varieties.

In the case of replacement of subjects, these will be considered first-year subjects.

2nd year courses

Be approved in 5 subjects from at least 3 groups below:

Group 1	Group 2	Group 3	Group 4	Group 5
Algebra II	Functional Analysis	Differential Geometry	Hyberbolic Dynamics	Markov Chains
Commutative Algebra	Analysis Harmonic	Riemannian Geometry	Ordinary Differential Equations	Combinatorics I
Algebraic Function Fields	Partial Differential Equations	Symplectic Geometry	Introduction to Holomorphic Foliations	Combinatorics II
Algebraic curves	Analytic Number Theory	Fundamental Group and Covering Spaces	Riemann Surfaces	Introduction to Statistical Mechanics
Algebraic Geometry I	Partial Differential Equations: Linear Theory	Introduction to Complex Geometry	Differentiable Ergodic Theory	Probability I
Algebraic Geometry II	Spectral Theory	Group Geometric Theory	Differential Topology	Probability II
Introduction to the Theory of Numbers	-	Topology of Manifolds	-	Stochastic processes
Introduction to Lie Algebras	-	-	-	Optimization
Algebraic Number Theory	-	-	-	-
Representations of finite groups	-	-	-	-

Applied Math Masters

1st year courses:
The student is required to take at least 5 courses during their first year. These courses must include Analysis over R^n and Linear Algebra and Applications.

Emphasis Requirements:
The student must be approved in at least 5 courses distributed along the following groups:

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Numerical Methods and Optimization	Computer Graphics	Fluid Dynamics	Probability	Computer and Data Sciences	Economy
Optimization	Image Processing	Ordinary Differential Equations	Probability I	Algorithms	Mathematical Economics and Finance I
Numerical Analysis	3D Graphic Systems	Partial Differential Equations	Probability II	Information Theory	Microeconomics

Computational Methods of Optimization	Geometric Processing	Partial Differential Equations: Linear Theory	Measure and Integration	Statistics	Topics of Mathematical Economics
	Analysis on Manifolds	Spectral Theory	Stochastic Processes		
		Complex Analysis	Markov Chains		
		Fluid Dynamics	Introduction to Statistical Mechanics		
		Partial Differential Equations and Applications			
		Numerical Methods for Partial Differential Equations			

These 5 courses must belong to at least 3 distinct groups (i.e. three of the courses need to belong to different groups from the previous table). In the future, new courses may be added to one of these groups as they are offered.

Conditions for the Approval in the Master's Program:
1. The student must be approved in at least 36 credits, or 12 courses.
2. The student must be approved in his first-year courses with at least three As or Bs.
3. The student must be approved in the courses for the other periods as stated in previous rules.
4. Master's Thesis: Choose one of the following:
    a. Compose, oriented by one of IMPA's faculty members, a Master's dissertation, to be approved by a committee designated by IMPA's pela Teaching Coordination (Ensino);
    b. Take at least two of the following courses, obtaining grades of either an A or a B:
        i. Doctorate Courses;
        ii. Research Seminars;
        iii. Courses dedicated to carrying out projects for the application of mathematics in the resolution of concrete projects
5. Demonstrate reading proficiency in English.
6. Have been regularly enrolled at IMPA for at least two academic periods.

PhD

Stages I and II

The Doctoral Program consists of Stage I and Stage II. At the end of the first year, the student's performance will be examined by the Teaching Committee for admission to Stage II.

The analysis is based on the grades obtained in the courses taken and on the advisor's evaluation.

Qualifying Exam

The Qualifying Exam will take place a maximum of one and a half years after the start of the program in a single oral exam.

Exam content must be based on at least four IMPA courses. Two must be from the area of specialization and the other two from different areas.

The Examination Committee is composed of at least 3 (three) members: the advisor, a researcher from the area of specialization, and one researcher from each other area chosen.

The exam will be held in the first two weeks of each term. The designation of the board and the definition of the day of the exam will be in charge of the Teaching Coordination.

The exam syllabus must be sent by the student's advisor for approval by the Teaching Coordination at the end of the first year of the program and at least 30 (thirty) days before the intended exam period.

It is recommended that the student (with the supervisor's approval) prepare in advance a 10 to 15-minute exposition on one of the subjects. This presentation will be presented to the board at the beginning of the oral exam.

Language courses

During the third year of the doctoral program, for at least 1 term, all students must enroll in the Scientific English course, which has a weekly lesson of 1 hour and 30 minutes.

Thesis

The elaboration of the thesis must be guided by an IMPA professor. The Doctoral thesis is the main degree requirement.

The thesis must represent original and significant research work on relevant mathematical theory.

After completing the language course requirement and preparing the thesis, the student must send the preliminary version to the Teaching Coordination at least 30 (thirty) days before the suggested defense date. The advisor must suggest a Ph.D. Examination Committee composed of 5 (five) effective members and 1 (one) alternate, with at least 2 (two) from IMPA. The board must be approved by the Teaching Coordination.

A defesa será marcada após concordância da banca examinadora. Durante a defesa o aluno faz uma exposição pública oral e após é arguido pela banca. É também facultado aos membros do corpo científico do IMPA dirigir perguntas ao candidato sobre o assunto da tese.

Após aprovado, o aluno deve enviar a versão final da tese com até 30 (trinta) dias para a Divisão de Ensino.

Os alunos admitidos no programa de doutorado podem cursar a disciplina Preparação de Tese por no máximo 8 (oito) períodos letivos.

Requirements for the Ph.D. Degree

The Doctor degree is awarded to the student duly enrolled in IMPA who fulfills the following conditions:

1. Obtain 15 (fifteen) credits in doctoral subjects.

2. Pass the Qualifying Exam.

3. Pass the scientific English course offered at the institute.

4. Have remained for at least 3 (three) academic periods as a student duly enrolled in IMPA.

5. To be approved in the defense of a Doctoral Thesis.

PhD Courses Offered Annually

Summer	2nd Term	3rd Term
Commutative Algebra*	Commutative Algebra*	Vertex Algebras
Functional Analysis	Harmonic Analysis***	Harmonic Analysis***
Algebraic Function Fields	Numerical Analysis	Fluid Dynamics***
Algebraic Curves	Combinatorics II	Economic Dynamics**
Economic Dynamics**	Fluid Dynamics***	Mathematical Economics and Finance II#
Mathematical Economics and Finance II#	Hiperbolic Dynamics	PDE and Applications***
Symplectic Geometry#	Mathematical Economics and Finance II#	PDE: Linear Theory
Introd. to Statistical Mechanics	PDE and Applications***	Fluids in Porous Media
Numerical Methods for PDE**	Algebraic Geometry II	Holomorphic Foliations
Representations of Finite Groups	Riemannian Geometry	Algebraic Geometry I
Algebraic Surfaces	Symplectic Geometry#	Geometry of Submanifolds
Analytic Number Theory	Introd. to Complex Geometry	Symplectic Geometry #

Differential Topology	Introduction to Holomorphic Foliations Mathematical Theory of Inverse Problems Optimization Geometric Processing Stochastic Processes 3D Graphic Systems Minimal Submanifolds*** Algebraic Number Theory*** Spectral Theory Geometric Measure Theory*** Topology of Manifolds	Introduction to Lie Algebras Computational Methods of Optimization Numerical Methods for PDE** Parallelism in Modern Architectures Probability II Image Processing Minimal Submanifolds *** Algebraic Number Theory*** Group Geometric Theory Differentiable Ergodic Theory Geometric Measure Theory*** Topics of Hodge Theory

Subtitle:

\# disciplines with no defined period.

* Courses normally offered in the summer and March periods.

** Courses normally offered in the summer and August periods.

*** Courses normally offered in March and August.