

# MASTER STUDIES IN MATHEMATICAL SCIENCES

## 1 General objective

The fundamental objective of the Master's degree curriculum is to provide the student with a deep preparation in one or more fields of knowledge of mathematics, from among those offered in this Program, based on a broad culture of the discipline. These studies will provide the student with a solid training and will have at least one of the following objectives: to generate research skills; give them the knowledge necessary for the exercise of high quality teaching at the university level; or develop in them a high capacity for professional practice.

## 2 Profiles

### 2.1 Income Profile

The applicant must:

- Possess advanced knowledge of Basic Mathematics.
- Be able to carry out mathematical demonstrations of simple results.
- Be able to read math texts in English.
- Have a commitment to the excellence of their profession and interest in keeping up to date

This profile is expected to be fulfilled by students with undergraduate studies in Mathematics or related careers.

### 2.2 Egress

During their master's studies the student will have acquired knowledge and skills to:

- Analyze mathematical theories reaching their full understanding.
- Rigorously demonstrate deep mathematical facts.
- Have mathematical intuition, that is, be able to discern through heuristic arguments, the feasibility of some mathematical fact.
- Apply the knowledge and methods studied in solving problems related to their specialty.
- Acquire new mathematical knowledge for themselves.
- Proactive attitude in achieving the objectives of its scope of action.
- Ethical commitment in their professional performance.

### 2.3 Graduate

The graduate from this Program has deep knowledge in some field (s) of Mathematics included in this Program and is capable of solving problems that involve complex mathematical models.

They are able to:

- Academic work in secondary and higher education institutions.
- Research collaboration in natural sciences or social sciences.
- Collaboration in Technology Development.
- Collaboration in project development.

Due to their training, the work horizon of the graduated from this Program is very broad. They can participate by developing high-level professional work in any activity where analysis and conceptual training are relevant.

According to the chosen orientation, you can apply your knowledge in:

- Scientific computing
- Applied mathematics
- Statistics
- Finance

### 3 Duration of studies and total credits and academic activities

The proposed curriculum for the Master of Science in Mathematics:

- It will be taught in face-to-face mode (school system).
- Its duration is up to four semesters for full-time students and up to six semesters for part-time students. Period in which the student must complete all the credits, the academic activities of the study plan and obtain the degree.
- It consists of at least 70 credits, of which:
- At least 24 must be accredited in four compulsory academic activities of choice.
- The rest of the credits may be accredited in a minimum of four academic activities, either compulsory academic activities of choice or optional.

### 4 Structure and organization

#### 4.1 General description of the academic structure and organization

The Master's studies in Mathematical Sciences are organized into compulsory academic activities of choice and electives, in these the following fields of knowledge converge:

- Algebra
- Analysis
- Numerical Analysis and Scientific Computing (including Modeling)
- Differential Equations (ordinary and partial)
- Statistics
- Mathematical Finance
- Geometry
- Discrete mathematics
- Probability
- Continuous Systems
- Topology

Compulsory activities of choice. These activities are aimed at providing the student with the basic elements in their training, they will be chosen from at least three different fields of knowledge and according to the needs and interests of the student. These courses must be offered at least once a year and form the basis for the exams required in the General Knowledge Exam graduation modality.

Optional activities. These activities are aimed at training and deepening knowledge. They may be taken from among those listed as electives in the study

plan and the Compulsory activities of choice courses; or, in other study plans within the University or outside it, with the approval of the Academic Committee.

The content of these activities will be defined every six months, for which the Academic Committee of the Program will issue an open call to tutors for the Program proposal of some academic activity and its delivery. This opening allows to have a study plan and an updated academic offer.

It is worth mentioning that there is no serialization between academic activities.

Depending on the activities chosen in their individual plan of academic activities, designed between the student and their tutor, a studies plan may be formed in an orientation, according to their work interests.

These orientations are:

- **Statistic and probability.** For this orientation the student must cover at least 60% of the credits in academic activities in the fields of knowledge of Statistics and Probability.
- **Applied mathematics.** In the case of this orientation, it must cover at least 60% of the credits in academic activities in the following fields of knowledge: Numerical Analysis and Scientific Computing (including Modeling), Differential Equations (ordinary and partial), Statistics, Probability, Continuous Systems and Mathematical Finance.
- **Mathematical Finance.** In this orientation, three compulsory academic activities of choice in the field of knowledge Finance Mathematics must be accredited.

In all cases, if the graduation is by General Examination of Knowledge, the exams included in this modality and the report of results or research project must be in the field or in one of the fields of knowledge of the chosen orientation. If the graduation is by thesis, it must be in a field of knowledge of the chosen orientation.

#### 4.2 Flexibility mechanisms of the curriculum

Some of the elements that promote flexibility in this curriculum are:

- The diversity of fields of knowledge in which the student can be trained.
- The option of studying full-time or part-time.
- Academic activities are designed to adapt with opportunity to the academic needs of the discipline, students and tutors.
- There are academic activities that will allow the inclusion of emerging and cutting-edge topics, which are designed under the focus of select topics.
- The optional academic activities are planned each semester, the professor interested in teaching them, proposes a syllabus that must be submitted for review and approval by the Academic Committee.
- Provides facilities for the continuous updating of the academic activity programs.
- Most academic activities are of choice.
- The option of taking additional academic activities to those indicated in the study plan, without value in credits, so they will not be taken into account in the global calculation of these.
- Ease of designing an individual plan of activities oriented to a trajectory that responds to the needs of the labor field.
- Obtaining the degree through two modalities.

- The Academic Committee may authorize the registration of a greater number of semester academic activities than indicated on the curriculum map.
- There is no serialization between academic activities, which provides ample flexibility to the curriculum.
- The possibility of selecting optional academic activities among the compulsory of choice not taken, thereby providing the preparation required for the development of multi and transdisciplinary research topics.
- The student may take academic activities in other postgraduate plans within UNAM or in national or foreign higher education institutions, with which UNAM maintains agreements for this purpose and in accordance with the provisions of current University Legislation, and has with the favorable opinion of the Academic Committee, who may approve the equivalence of up to 50% of the total credits. Likewise, the Academic Committee may grant value in credits to postgraduate academic activities carried out prior to admission, up to 40% of the total credits. The thematic contents must be equivalent, at least, by 80%, however, the academic activity must have an equal value in credits, if it is higher, only the credits established in this study plan will be recognized.

### Student mobility

Considering what was indicated in the last point in flexibility mechanisms, the study plan opens the possibility of student mobility. Thus, the student, following the procedure for this, will be able to take and accredit academic activities in other postgraduate plans at UNAM; or in other national or foreign higher education institutions, with which the UNAM maintains agreements for this purpose and in accordance with the provisions of current University Legislation.

## 5 Requirements

### 5.1 Income

Applicants who intend to enter the study plan must obtain a letter of academic acceptance from the Academic Committee of the Program. To do so, they must meet, present and deliver the requirements stipulated below, with the academic criteria indicated in the Program Regulations and with the provisions of the call:

1. Title or 100% of undergraduate credits in Mathematics or any other that in the opinion of the Academic Committee is related.
2. Complete bachelor's degree certificate with an average equal to or greater than 8.0 (eight point zero). In the event that this does not specify it, an official average certificate issued by the institution of origin must also be delivered. Based on the academic trajectory and the results in the selection process, in exceptional cases, the Academic Committee may authorize the entry of applicants with an average lower than 8.0, as long as said average is equal to or greater than 7.0 (seven point zero) .
3. Compulsory documents of an administrative nature, in accordance with the provisions of the call.
4. Academic requirements established in the Program Operating Regulations.
5. Evidence that certifies reading comprehension of the English language issued by the National School of Languages, Linguistics and Translation (ENALLT), other UNAM language centers, state universities or international organizations and certifications with which UNAM has agreements of academic collaboration for this

purpose. In the latter case, the level accredited in the certificate must be at least B1 of the Common European Framework of Reference for Languages.

6. Submit to the evaluation mechanisms (exams, interviews, among others that the Academic Committee considers pertinent) provided for in the call, in accordance with the provisions of the Program Operating Regulations.

7. Not having been discharged from a graduate program for lack of academic integrity.

Additionally, for applicants who have studied abroad:

8. Proof of equivalence of minimum average established in undergraduate studies, issued by the Dirección General de Revalidación e Incorporación de Estudios (DGIRE) of the UNAM.

9. In case the documents are in a language other than Spanish, they must be translated into it by an official Mexican expert.

10. Documents apostilled or legalized, as appropriate in accordance with the provisions of the call.

The accepted applicants must formalize their enrollment as students of the study plan, following the procedure indicated in the corresponding instructions. In the event that an applicant does not complete the registration procedures on time, they will lose their place and must submit to a new call.

## 5.2 Permanence

The permanence of students in the study plan will be subject to the provisions of articles 10, 11, 13, 14, 15, 28, 30, 39 and 40 of the General Regulations for Postgraduate Studies, which literally say:

Article 10. It will be understood that the persons who have not completed the corresponding procedures on the dates established for that purpose renounce their registration or re-registration.

Article 11. Registration or re-registration will be canceled when the total or partial falsity of a document is proven or in the cases provided for in the University Legislation, in which case, all acts derived from them will be rendered ineffective.

Article 13. Students may remain enrolled within the terms established in these Regulations. If you do not complete the compulsory and optional academic activities established in the study plan, the academic committee or the collegiate body in charge of conducting the specialization program will decide whether to withdraw.

The academic committee or the collegiate body in charge of conducting the specialization program, upon request made by the student, may grant an additional term of up to two consecutive semesters immediately after the term established in the corresponding study plan, to conclude the credits and obtain the degree. In no case will this period exceed 50% of the duration of the study plan.

[...]

Article 14. Students may not be enrolled more than twice in a subject or academic activity.

If you enroll twice in the same academic activity without accrediting it, you will be withdrawn from the study plan in which you are enrolled.

Whoever is affected by this provision may request the academic committee or the collegiate body in charge of conducting the specialization program, to reconsider their withdrawal, under the terms and deadlines indicated in the General Guidelines for Postgraduate Operation.

Article 15. The academic committee of the master's and doctoral programs will determine the conditions under which a student will continue in the study plan when they receive an unfavorable semester evaluation from their tutor, main tutors or their tutor committee. If the student obtains a second unfavorable semester evaluation, he or she will be withdrawn from the study plan.

Whoever is affected by this provision may request the academic committee to reconsider the second negative evaluation, under the terms and deadlines indicated in the General Guidelines for Postgraduate Operation.

Article 28. When a study plan is modified, the student may request in writing to continue and conclude their studies in said plan, provided they do not exceed the times established in these Regulations. The academic committee will decide the number of credits or academic activities that may be recognized.

Article 30. Postgraduate students have the right to:

I. Request during the first two weeks of each school year, the suspension of their studies for up to two semesters, without affecting the terms provided in these Regulations. The academic committee or the collegiate body in charge of conducting the specialization program may authorize said suspension and extend it in exceptional and fully justified cases. Gender reasons will be particularly addressed;

II. Request their reinstatement in the study plan when they suspend studies without authorization. The academic committee or the collegiate body in charge of conducting the program will determine the origin and terms of the reinstatement. In this case, the total registration time may not exceed the limits established in these Regulations.

III. Request authorization to carry out final exams or evaluations when for duly justified reasons they have not complied with this requirement. The academic committee, the collegiate body in charge of conducting the specialization program, will study the case, and may establish alternative evaluation mechanisms;

IV. Request the academic committee or collegiate body in charge of conducting the specialization program, for justified cause, to change the subject of the degree project, tutor, main tutors or members of the tutor committee, and

V. Submit in writing to the person in charge of the coordination, to the academic committee or to the collegiate body in charge of conducting the specialization program, requests for clarification regarding academic decisions that affect them and receive the answer by the same means within a period of time maximum of thirty business days.

Article 39. Students may enroll in a master's degree study plan to study it full-time or part-time as contemplated in the corresponding plan and must complete their studies within the established period, without exceeding four and six semesters, respectively.

Article 40. To remain enrolled in master's studies, students must satisfactorily accredit, within the indicated deadlines, the academic activities of the study plan, as well as those assigned to them by their tutor, main tutors or, where appropriate, by its guardian committee, in accordance with the provisions of these Regulations, and have a favorable semi-annual evaluation thereof.

Additionally, the student must:

- Deliver the documentation required for re-registration, within the established deadlines.
- Present the bachelor's degree, at the latest for enrollment in the third semester, in the case of students who entered their studies with 100% credits.
- Maintain an ethical behavior and not commit serious offenses against academic integrity and university discipline.

The cases not foreseen in the previous points must be analyzed and resolved by the Academic Committee of the Program, in accordance with the provisions of the current University Legislation.

### 5.3 Egress

The student must have completed and approved 100% of the credits and all the academic activities contemplated in the study plan, within the established deadlines.

### 5.4 To obtain the degree

To obtain the master's degree, the student must meet the following requirements based on current regulations:

- Meet the graduation requirements.
- Choose and approve any of the graduation modalities, which are:
  - Thesis
  - General Knowledge Exam
- Deliver the obligatory academic-administrative documents and carry out the respective procedures in accordance with the provisions of the institution.

The student must graduate in the times provided in the study plan. If this is not achieved, you may request the authorization of the Academic Committee to obtain it, following the provisions of the Program Regulations.

### Modalities for obtaining the degree

**Thesis.** It must correspond to a scientific or applied research project, of teaching application or of professional interest, in accordance with the objectives of the Program.

**General Knowledge Exam.** In this modality, the student must pass three exams corresponding to three fields of knowledge, in addition to presenting a clear and

well-written methodologically structured report of results or research project in which an advanced topic of an academic activity or the description of a protocol, respectively. The exams aim to check the level of knowledge acquired by the student. The examination of each field of knowledge will be presented in writing and will be based on the official programs of the compulsory or choice courses of the study plan of each field.

In all modalities, the requirements and processes established in the operating manual for the modalities of obtaining the degree prepared and approved by the Academic Committee must be met. Likewise, these may be used by students of previous generations for the sole purpose of obtaining the degree.