Graduate Student Handbook

Academic Year 2025-2026

Department of Mathematics

University of Houston

Contents

Preface

The purpose of this handbook is to collect together practical information about our graduate programs in the Department of Mathematics at the University of Houston. It is intended as an *unofficial* but nonetheless informative and helpful guide. We have done our best to present information which is accurate at the time that this version of the handbook was completed. However, it is not intended as a legal document. For the official guidelines regarding any and all departmental and university courses, policies, and other matters, including TA and employment policies, the reader should consult the relevant portions of the University of Houston Graduate Catalog as well as the NSM Graduate Academic Policies page:

`https://publications.uh.edu/index.php?catoid=53`

`https://uh.edu/nsm/students/graduate/policies/`

Last update: August 2025

1 | Overview of the Department

The Department of Mathematics at the University of Houston offers an excellent environment to study mathematics and its applications. We have approximately 250 undergraduate majors, 150 graduate students, and the largest instructional mission on campus, with over 70,000 student credit hours offered each year, including over 10,000 student credit hours in online courses.

We have close to 50 permanent members of faculty in our department. Our students and faculty are supported by millions of dollars of external grant funding, and they travel internationally to conduct world class research in a broad variety of fields, including: Complex Geometry, Complex Analysis, Dynamical Systems and Ergodic Theory, Financial Mathematics, Statistics, Image Analysis, Functional Analysis and Operator Algebras, Mathematical Biology, Numerical Analysis, Scientific Computing, Partial Differential Equations, Stochastic Processes, and Number Theory.

The Department of Mathematics offers graduate programs leading to the degrees of Doctor of Philosophy (PhD), Master of Science in Mathematics (MS), Master of Science in Applied Mathematics (MS Applied), Master of Arts in Mathematics (MA), and Master of Science in Statistics and Data Science (MSDS).

2 | Important Contacts and Administrative Forms

For questions related to our graduate programs or advising, please contact the most appropriate person from the list below. For questions related to graduate student life, you may also consider contacting the Graduate Student Representatives (mathgsrs@central.uh.edu). A complete list of departmental contacts is available here: `https://www.uh.edu/nsm/math/people/`

Name	Title	Email	Office
Dr. Alan Haynes	Director of Graduate Studies	akhaynes@central.uh.edu	PGH 641C
Dr. Jennifer May	Assistant Director of Graduate Studies	jrmay@uh.edu	PGH 206
Katrice Bender	Graduate Advisor	kmbender@central.uh.edu	PGH 625
Tierra Kirts	MSDS Program Manager	tskirts@central.uh.edu	Flem 11C

Most of the commonly used forms that you will need as a graduate student are available on the page: `http://www.uh.edu/nsm/students/graduate/forms`

PhD students (in years 3-5) will also need the APR Report form:

`https://www.uh.edu/nsm/math/graduate/forms/apr-form.docx`

3 | Doctor of Philosophy in Mathematics (PhD)

3.1. Degree Requirements

The requirements that must be satisfied for a student to receive a PhD include:

1. The student must satisfy the Candidacy Requirements (see Section 3.2) before the end of their second year in the program.
2. The candidate must complete 54 hours of coursework (some of which may be graded on an S/U basis), and they most obtain a grade of B or better in at least 24 semester credit hours of courses in the Mathematics PhD program. Students should take doctoral research classes MATH 8x98 (where "x" is the number of credit hours) while conducting thesis research. Students must register for the course MATH 8x99 "Doctoral Dissertation" in the semester when they intend to graduate.
3. Starting from their 3rd year in the program, the candidate must complete an Annual Performance Review (APR) each year. The APR evaluates research progress of the candidate. The APR is conducted in oral or written form by a committee consisting of at least two faculty members of the Mathematics Department. The APR committee is chaired by the candidate's advisor. After the APR the advisor must complete the APR Report form (`https://www.uh.edu/nsm/math/graduate/forms/apr-form.docx`) and email it to the Director of Graduate Stud-

ies. Candidates failing the APR are subject to termination from the PhD program.

4. The candidate must be in residence, and take 9 semester credit hours of courses, in two consecutive long semesters, Fall followed by Spring. Alternatively, the candidate must be in residence and take a full load in consecutive Spring, Summer, and Fall terms.
5. The candidate must write a doctoral dissertation with the guidance of an advisor who is a regular faculty member of the Mathematics Department.
6. The candidate must defend their dissertation in a public examination by a thesis committee consisting of at least 4 members, three of whom are faculty members in the Mathematics Department and at least one of whom is outside of the UH Mathematics Department.
7. A copy of the dissertation, approved by all the members of the thesis committee is transmitted to, and approved by, the office of the Dean of the College of Natural Science and Mathematics. Detailed instructions for how to complete this process are available here:
`https://www.uh.edu/nsm/students/graduate/thesis-guidelines/thesis-instructions/`

3.2. Candidacy Requirements

Note: Students admitted to our PhD program before Fall 2024 are subject to our old candidacy requirements, which can be found here:
`https://www.uh.edu/nsm/math/graduate/phd-outline/pre-fall2024.php`

To qualify for PhD candidacy, before the end of their 2nd year in the PhD program, students must complete at least 2 of the following two semester course sequences, with

grades of B- or higher, and pass the corresponding preliminary examinations:

- Math 6320, 6321 Functions of a Real Variable
- Math 6370, 6371 Numerical Analysis
- Math 6382, 6383 Probability and Statistics
- Math 6302, 6303 Modern Algebra

The maximum total number of attempts at prelim exams is 4.

Preliminary examinations are three-hour written examinations. The questions in the examination emphasize problem solving skills and mathematical ability as opposed to memorization. Preliminary examinations are usually offered twice a year: at the end of the Fall and Spring semesters.

Syllabi for the preliminary examinations, and practice problems, are available here: `https://www.uh.edu/nsm/math/graduate/phd-outline/#p1`

3.3. Dissertation Committee

Doctoral students' dissertation committees must be comprised of a minimum of four members, three of whom have their primary appointment within the major department and one approved member external to the major department from industry or academia.

A faculty member with a joint appointment in the major department is considered as an outside member unless he/she chairs the committee. In this case, an additional external member outside the major department is required. After these minimum requirements for

committee members are satisfied, additional committee members may be approved from industry or academia, but at least 50% of the committee must be tenured/tenure-track faculty at the University of Houston. Research faculty or instructional faculty may serve on dissertation committees, but not chair the committees. A research professor may also serve as a co-advisor with a tenured/tenure-track faculty.

Candidates must specify a dissertation committee and have the names on file in the Office of the Dean at least one semester prior to their graduation. The committee composition form can be found at:
`http://www.uh.edu/nsm/_docs/nsm/students/graduate/forms`

3.4. Annual Performance Review (APR)

Typically, PhD students are expected to begin research after they have met the candidacy requirements. To ensure that a student is making progress towards their dissertation, an Annual Performance Review (APR) must be completed at the end of the 6th, 8th, and 10th long semesters during which they are enrolled in the program. The APR may be completed in one of two ways:

1. A student can present their progress in the presence of their defense committee.
2. A student can submit a report about their research. This report can be treated as the chapters that will be added to the student's dissertation.

Notes:

1. The APR committee is usually composed of members who will later be asked to be on the defense committee of the student. However, the APR committee should not include any external committee members.

2. Upon successful completion of the APR, the thesis advisor and committee members should complete the APR Report form (https://www.uh.edu/nsm/math/graduate/forms/apr-form.docx) and email it to the Director of Graduate Studies.

3.5. Obtaining a Master's Degree Together with a PhD Degree

From the beginning of their 4th year in the program, PhD students are allowed to petition to obtain a non-thesis based Master's degree concurrently with their PhD. The petition will be accompanied by a letter of support from the research advisor acknowledging that the student remains on track for a PhD. If it is approved, the MS career will be open for one semester only, when the student wishes to obtain the MS degree. For more details, see point 'a.' in the relevant section at the bottom of this page:
https://publications.uh.edu/content.php?catoid=53&navoid=20128&hl=%22graduate+degree+requirements%22&returnto=search

3.6. Applying for Graduation

It is advised that students should start planning their graduation early and be aware of the submission deadlines. For the rules surrounding graduation please read this page in the Graduate Catalog:
https://publications.uh.edu/content.php?catoid=53&navoid=20027&hl=%22graduation%22&returnto=search

as well as points 3, 11, and 13 from this page on the NSM website:
`https://www.uh.edu/nsm/students/graduate/policies/`

The procedure to apply for graduation can be summarized as follows:

1. Submit the Committee Composition Form to the Graduate Advisor at least **one semester before graduating**. `https://www.uh.edu/nsm/_docs/nsm/students/graduate/Committee-Composition.pdf`
2. If there is any change in the committee thereafter, students must submit a Change in Committee Form as soon as possible. `https://www.uh.edu/nsm/_docs/nsm/students/graduate/Change-Committee-Composition.pdf`
3. Enroll in at least 3 credit hours of Doctoral Dissertation (MATH 8x99) with faculty advisor in the graduating semester.
4. Apply for graduation on AccessUH:
   - Go to `https://accessuh.uh.edu`
   - Sign in with Cougarnet account and password
   - Select myUH Self Service → Academic Records
   - On the right pane, choose "My Academics"
   - In the Graduation section, select "Apply for Graduation"

   The deadline to apply for graduation is printed on the UH Academic Calendar.
   `https://publications.uh.edu/content.php?catoid=48&navoid=18142`
   There is a fee for graduation applications. Late fees may be applied up to a certain date, after which applications will not be accepted by the University system.
5. Submit the dissertation to NSM by the deadline:
   `http://www.uh.edu/nsm/students/graduate/thesis-guidelines/`
6. Contact the Graduate Advisor to make sure all required paperwork is submitted.

IMPORTANT: Rules and deadlines surrounding graduation and thesis submission are set by the College and by the University, and they are strictly enforced.

3.7. Graduate Tuition Fellowships

Students who are admitted to our PhD program with TA or RA support are usually eligible to receive a Graduate Tuition Fellowship (GTF) from the College of NSM, which pays for tuition and mandatory fees. Full details about eligibility and other rules are available on the NSM webpage here:
`https://uh.edu/nsm/students/graduate/financial-support/`

A few important point to be aware of are that:

- A minimum 3.0 GPA is required in order to be eligible for a GTF.
- Students receiving a GTF must be employed as a graduate assistant for no more and no less than 20 hours per week by the University.
- The GTF will cover the full cost of in-state tuition and fees during the Fall and Spring semesters, for students who are enrolled full time (9 hours), but it will not cover more than 9 hours during these semesters.
- Domestic (i.e. non-international) students must fill out the FAFSA each academic year before being eligible to receive a GTF.
- The rules surrounding GTFs during the summer vary from year to year. However, remember that PhD students are not technically required to register during summer sessions.

It is also very important to understand, from the beginning of your time here as a PhD student, that GTF funding is provided for at most your first 10 long semesters (i.e. Fall or Spring) in the program. It is sometimes possible, but not guaranteed, to request an extension of GTF funding for the 11th, and even 12th long semester (but not beyond that).

3.8. Graduate Student Assistantships

The department employs several types of Graduate Student Assistants, the most common being Teaching Assistants (TAs) and Research Assistants (RAs) (others that you may hear of are TFs, IAs, and GAs) . Research Assistants are usually chosen by individual faculty members and funded by external grants. Full time enrollment is required in order to be eligible for a Graduate Student Assistantship.

Please be aware that, if you have obtained a funded offer in our PhD program, the funding is usually only guaranteed for at most 5 years from when you begin (contingent upon satisfactory performance of duties). Therefore, you should do your best to complete the program in that time frame. Even in cases when extra funding is available, it is an NSM rule that PhD students may hold an assistantship for no more than 6 years.

Most of our PhD students are funded as TAs. The following policies and guidelines apply to all TAs working in the Department of Mathematics.

3.8.1 TA Assignment

The Director for Instructional Support and Coordination is currently responsible for teaching assignments.

In order to avoid conflict with student course schedules, all TAs must fill out the Online Graduate Course Selection form. The link to the form will be sent to you at least two weeks prior to the beginning of each semester. It is the TAs responsibility to fill the form in a timely manner and inform the department of any changes in his/her class schedule. If you are supported by a faculty member (fully or partially), it should be indicated in the Course Selection form. If you have certain specific requests or concerns related to your teaching duties, you should include them in the Course Selection form.

Teaching assignment notices will be emailed to each TA during the week leading to the start of classes or earlier. You must check your official UH email daily during that week.

3.8.2 Duties and Hours

Typical duties of a teaching assistant consist of, but are not limited to, one or some combination of the following:

1. Working in CASA tutoring center as a tutor.
2. Conducting recitation sessions for Calculus.
3. Grading assignments for a professor.

In the teaching assignment, you will find your duties, the course number, name of the instructor, and required hours for tutoring at CASA. It is a TAs responsibility to contact the professor(s) as soon as he/she receives the assignment.

All TAs must report to work from the first day of the semester until their TA duties for the semester are complete. A TA might also be required to attend orientation/training sessions prior to the beginning of the semester.

A semester officially ends on the day set as the deadline for faculty to post Final Grades in myUH. The exact date for each semester can be found in UH Academic calendar. TAs are expected to report to work until the end of the semester. Any travel plans and requests to leave Houston before the end of a semester must be discussed with and approved by the faculty member the TA had been assigned to work with.

All TAs must check their official UH emails daily.

3.8.3 FERPA

All TAs must familiarize themselves and follow the University of Houston's policies relating to Family Educational Rights and Privacy Act (FERPA). In particular, TAs must take precautions to keep student grades private, and not release grade information publicly or to outside parties (including a student's parents) without prior written consent of the student. More information on the FERPA policy can be found here:

`http://www.uh.edu/dos/parents/resources/ferpa-explanation/`

3.8.4 University Policies Related to Discrimination, Harassment, and Misconduct

All TAs must be familiar with and follow the University of Houston's policies related to discrimination, harassment, and other forms of employee misconduct. Specifically, we refer TAs to the administrative memorandums 01.D.07, 01.D.08, and 01.D.10 for details regarding these policies:

`http://www.uh.edu/af/universityservices/policies/sam/1GenAdmin/1D7.pdf`

http://www.uh.edu/af/universityservices/policies/sam/1GenAdmin/1D8.pdf

http://www.uh.edu/af/universityservices/policies/sam/1GenAdmin/1D10.pdf

If you have any questions regarding these policies, please contact the Chairman or the Graduate Director.

3.8.5 Tutoring Work

Every TA who receives a notice to work certain hours at CASA Tutoring Center will be contacted and will receive instructions and the working schedule from the Program Director of the CASA Tutoring Center. All TAs must follow the rules at the CASA Tutoring Center.

3.8.6 TAs for Recitation Classes

Class Cancellation Policy

TAs are not authorized to dismiss or reschedule their class without prior approval of the department Chair, the Director of Undergraduate Studies, Director for Instructional Support and Coordination, or Assistant Director of Undergraduate Studies. TAs are not authorized to have anyone else teach his or her class without prior approval of the professor you have been assigned to work with. Should a TA be unable to meet a class due to an unforeseen emergency, they are expected to make every effort to find a substitute and notify the professor they have been assigned to work with. If a TA is unable to find a substitute,

they should inform the Front Office (713-743-3500).

TAs are expected to be on time for their classes; they should be prepared to teach and must follow instructions from their professors.

Incident Reporting and CAPS

If you have a student that exhibits concerning or threatening behavior, please report the incident as soon as possible to the instructor of record for the course (or if immediate safety is a concern, please call campus police or 911).

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. *You can reach (CAPS) by calling 713-743-5454 during and after business hours for routine appointments or if you or someone you know is in crisis.* No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus. Please visit https://www.uh.edu/caps/ for more information on these services.

Mental health services

CAPS clinical staff consists of a large number of mental health professionals who are employed to help students, faculty, and staff. Students who are experiencing personal issues that interfere with their daily activities, including stress, anxiety, relationship problems, loneliness, depression, adjustment issues, identity issues, or suicidal thoughts are encouraged to contact CAPS staff, who can help.

CSD Students and Requests for Accommodations

The University of Houston System complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable accommodations for students who have a disability. In accordance with Section 504 and ADA guidelines, University of Houston strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them.

The instructor of record generally handles implementation of accommodations. Instructors will coordinate with the The Center for Students with Disabilities (CSD) office to make such accommodations.

If you are working as a Calculus TA and a student approaches you regarding CSD accommodations, please refer the student to the instructor of record for the course. Please do not ask the student to disclose confidential information about their accommodations, such as details about their condition.

If you are a graduate student serving as the instructor of record for a course, please consult your course coordinator for the proper way to handle such requests. Since information regarding a student's approved accommodations is confidential, any related discussions with the student should be conducted privately and not within earshot of other students.

More information on the UH Academic Adjustments/Auxiliary Aids policy can be found here:

`http://www.uh.edu/af/universityservices/policies/sam/1GenAdmin/1D9.pdf`

Exam Grading

The Lead TAs will announce exam-grading days in advance. All Calculus TAs are required to be present and to participate in every exam grading session. TAs may leave to attend their classes or tutoring session at CASA but must return to the exam grading and stay until dismissed by the lead TA. If you are unable to attend a grading session due to an unforeseen emergency, you are expected to find a substitute and notify the Lead TA. The Director of Undergraduate Studies, Director for Instructional Support and Coordination, Assistant Director of Undergraduate Studies, or the professor the TA is assigned to work with must approve the substitute. Exam grading is an integral part of the TA duties and is not to be considered as voluntary work.

Record Keeping

At the end of each semester, all graded student assignments not returned to students during the semester must be returned to the professor the TA had been assigned to work with.

3.8.7 Being an Instructor of Record

If you are a PhD student with a good academic standing and prior teaching experience, you may request to teach a regular course as an Instructor of Record. If approved, you will be assigned to a mentor who usually is a senior faculty member and/or a course coordinator. You may contact the Director for Instructional Support and Coordination or Assistant Director of Undergraduate Studies with your request.

3.8.8 Who to See for Questions About Your TA Duties

If you have any questions regarding your grading/teaching assignment, contact the professor you have been assigned to work with or the lead TA for the course as soon as possible. If the questions remain, contact the Director for Instructional Support and Coordination. The Graduate Director will be able to help with any unresolved concerns.

3.8.9 End-of-Semester Evaluations

At the end of each semester, professors, and/or Program Director of the CASA Tutoring Center and/or Lead TAs will evaluate TAs on their performance. *These evaluations are sometimes used to decide on distribution of TA assignments, possible promotions, and allocation of summer TA funding.*

The Graduate Studies Committee may revoke a teaching assistantship at any time if a TAs performance is found to be unsatisfactory.

3.8.10 Supplies Policies

All department equipment and materials such as Xerox machines, telephones, computers, print papers, mails and supplies are provided for professional use only, and are not for personal use.

4 | Master of Science in Mathematics (MS)

Our Master of Science in Mathematics is designed for students who would like to have an advanced degree in the area of pure mathematics and/or intend to enter a PhD program after completing the program. A well prepared full time student can complete this degree in two academic years. There are two options available for obtaining an MS in Mathematics.

Option I - Thesis:

- A minimum of 30 semester hours with a GPA 3.0 or higher is required.
- These hours include 6 credit hours of Master's Thesis (MATH 6399 followed by 7399, in the final two semesters of the program) and a minimum of 24 credit hours in graduate course work (5000 level or above).
- At least 18 credit hours must be at MATH 6000 level or above, excluding MATH 6308, 6309, 6312, or 6313. Also see requirement * below.
- No more than 3 credit hours in special problems.
- It is a responsibility of the student to find a faculty member to supervise their Master's Thesis.

- An oral and/or written examination over the thesis material will be conducted by the thesis committee. Questions for this examination may be drawn from the thesis background material and the thesis itself.
- Once the thesis has been accepted by the committee, a final corrected version must be submitted to the College by the student.

Option II - Tutorial

- A minimum of 36 semester hours with a GPA 3.0 or higher is required.
- These hours must include 6 credit hours in MATH 6315 and 7315 Master's Tutorial and a minimum of 30 credit hours in graduate course work (5000 level or above).
- At least 21 credit hours must be at MATH 6000 level or above, excluding MATH 6308, 6309, 6312, or 6313. Also see requirement * below.
- Not more than 6 credit hours in special problems.
- It is a responsibility of the student to find a faculty member to supervise their Master's Tutorial.
- A formal defense of Master's Tutorial and submission to the College are not required.
- The tutorial requirement may be satisfied by participating in regularly scheduled classes, if this is the decision of the student and advisor.
- Master's Tutorial requires a written approval by advisor that is submitted to the Director of Graduate Studies.

*In addition, for both of the above options, at least two one-year sequences from the following different areas must be completed:

Area I

- MATH 6320;6321: Functions of a Real Variable
- MATH 6322;6323: Complex Analysis
- MATH 7320;7321: Functional Analysis

Area II

- MATH 6302;6303:Modern Algebra
- MATH 6342;7350:Topology/Geometry

Area III

- MATH 6324;6325: Differential Equations
- MATH 6326;6327: Partial Differential Equations
- MATH 6370;6371: Numerical Analysis
- MATH 6382;6383: Probability Models and Mathematical Statistics
- MATH 6360; 6361: Applicable Analysis

5 | Master of Science in Applied Mathematics (MS Applied)

The intent of this program is to provide students with training in mathematics appropriate for many professional mathematical positions in industry. Recent graduates are employed in the aerospace, engineering, energy, actuarial and financial industries, as well as in biostatistics, and as teachers in high schools and community colleges.

Students take two one-year sequences of core courses chosen from the areas of mathematical analysis, numerical analysis, applied and computational mathematics, and probability and statistics. They also take electives and complete a tutorial project. Currently the requirements for the MS degree in Applied Mathematics are that a student complete 30 credit hours of courses at the University of Houston with an average grade of B (that is a 3.0 GPA) and no more than 3 grades of C+ or below. A student must:

1. Successfully complete (C or higher) two out the following four basic course sequences:

    - MATH 6360; 6361: Applicable Analysis
    - MATH 6370; 6371: Numerical Analysis
    - MATH 6382; 6383: Probability and Statistics
    - MATH 6366; 6367: Optimization

2. Successfully complete another 12 credit hours of courses at the 5000, 6000 or 7000 level.

    - At most two of these courses can be selected from MATH 6308, 6309, 6312 and 6313.
    - At most two of these courses can be 5000 level subject to approval from the Graduate Director.
    - "Special Problems" courses may not be used to satisfy this requirement.
    - At most two of these courses can be taken outside of the Department of Mathematics.

3. Complete a tutorial project under the supervision of a faculty member. Students working on this project sign up for MATH 6315 and 7315: Master's Tutorial. Alternatively, the student, with consent of his/her advisor, may decide to satisfy this requirement by taking two other graduate level (6000 or higher) courses.Within these requirements, students are encouraged to pursue their own interests. In particular, the subject matter of the tutorial project is often related to a student's professional work. It is usually less formal than a thesis but it is expected that the topic chosen will be treated thoroughly and in depth. To pass MATH 7315, a student writes a project report, which must be approved by his/her supervisor and a summary of the project must be provided to the Director of Graduate Studies.

5.1. Certificate Programs

The Department of Mathematics has developed two Graduate Certificate Programs emphasizing particular areas of Applied Mathematics. Students in our MS in Applied program may consider also fulfilling the requirements to obtain a certificate.

5.1.1 Certificate in Computational Mathematics

The Certificate in Computational Mathematics (CCM) is within our program of Master of Science in Applied Mathematics, and has been offered since 2001. A student who meets the requirements of the CCM will receive a certificate in addition to the Master's degree.

Students who might benefit from the program are individuals who are either currently employed in a Houston area industry (oil, computer software, etc.) and are seeking a terminal professional degree to enhance their skills, or current students who are in other scientific graduate programs and wish to strengthen their future resumes by the addition of this advanced degree.

To receive this certificate, a student must take courses satisfying the following requirements:

- Successful completion (B- or higher) of:

  MATH 6370;6371: Numerical Analysis

  MATH 6378: Basic Scientific Computing

- Successful completion (B- or higher) of at least 9 credit hours of courses selected from:

  MATH 6366-67: Optimization

  MATH 6372: Numerical Ordinary Differential Equations

  MATH 6374: Numerical Partial Differential Equations

  MATH 6376: Numerical Linear Algebra

  MATH 7374: Mathematical Theory of Finite Element Methods, or a Selected Topics course in Numerical Analysis

5.1.2 Certificate in Financial Mathematics

The Certificate in Financial Mathematics (CFM) is obtained within our Master of Science in Applied Mathematics program and it has been offered since 2002. A student that meets the requirements of CFM will receive a certificate in addition to the Master's degree.

The program prepares students with mathematical foundations for risk management in financial and energy markets. Core-course requirements include Probability, Statistics, Optimization Methods, and Discrete-time and Continuous-time Financial Mathematics.

To receive this certificate, a student must take courses satisfying the following requirements

- Completion of the following courses with a grade of B- or higher:

  MATH 6382, 6383: Probability and Mathematical Statistics

  MATH 6366, 6367: Optimization

  Completion of the following two courses in the core of finance mathematics

  MATH 6384: Mathematical Finance in Discrete Time

  MATH 6385: Mathematical Finance in Continuous Time

  Completion of two more courses from the following list:

  MATH 6397: Numerical Method for PDE,

  MATH 7397: Special Topics in Mathematical Finance (the subject varies from semester to semester; possible topics: Monte Carlo Methods in Finance, Analysis of Finance and Energy Time Series),

  MATH 6397: Time Series Analysis,

MATH 6386: Computational Statistics (Markov Chains Monte Carlo, and Bayesian Statistics)

6 | Master of Science in Statistics and Data Science (MSDS)

The Master of Science in Statistics and Data Science (MSDS), offered by the Department of Mathematics, provides students with training in the statistical analysis of data sets, as well as in state-of-the-art data mining techniques. The program includes computational implementations on real data sets and learning key theoretical concepts. The program provides students with necessary skills required for professional positions in data analysis and statistics. Recent graduates from our MS in Statistics and Data Science program are currently employed in the banking, biomedical, energy, insurance, and financial industries.

This program is designed to be completed within one year. To earn the MS degree in Statistics and Data Science, students must complete 30 credit hours of coursework at the University of Houston, maintaining an average grade of B (3.0 GPA) and earning no more than three grades of C+ or lower. The requirements for the 30 credit hours are as follows:

1. Required Courses (24 credit hours):

    - MATH 6350 - Statistical Learning and Data Mining (3 credit hours)
    - MATH 6357 - Linear Models and Design of Experiments (3 credit hours)
    - MATH 6358 - Probability Models and Statistical Computing (3 credit hours)
    - MATH 6359 - Applied Statistics and Multivariate Analysis (3 credit hours)

- MATH 6373 - Deep Learning and Artificial Neural Networks (3 credit hours)
- MATH 6380 - Programming Foundation for Data Analytics (3 credit hours)
- MATH 6381 - Information Visualization (3 credit hours)
- MATH 6386 - Big Data Analytics (3 credit hours)

2. One Elective Course (examples of courses, 3 credit hours):

    - Financial & Commodity Markets
    - Biomedical Data Analysis & Computing
    - Case Studies in Data Science
    - Special Topics in Statistics

3. Internship:

    - MATH 6315 - Masters Tutorial (3 credit hours)

MSDS students must complete the master tutorial course (internship) to earn the required 3 credits for the program. This internship can be undertaken in an industrial company, a research lab at the medical center, a government agency, or a college research and teaching entity.

7 | Master of Arts in Mathematics (MA)

The Master of Arts Program in Mathematics was established in 2002. Classes in this program were first offered in Fall 2003. The primary purpose of the program is to prepare students to teach mathematics at the secondary school and junior/community college levels. The program also provides advanced degree credentials for teachers who wish to take on supervisory positions in mathematics or in mathematics administration.

All of the courses in the program are offered online, and the entire program can be completed in that format. It is also possible to take approved on-campus courses as alternatives to online courses. There is a regular schedule of online (asynchronous) classes each semester, including the summer sessions. As a result, there is little difficulty in combining a full-time teaching or work position with the program's course work.

The program requires 33 semester hours of course work including:

- A minimum of 21 semester hours in mathematics.
- Completion of at least one course in each of the groups: Algebra, Analysis, Probability & Statistics, and Applied Mathematics. See below for a list of the course groups.
- A 3-semester hour Master's tutorial. In order to enroll in a Master's Tutorial course 6315 and satisfy the Tutorial requirement, students should first contact one of the instructors who previously taught classes in the MA program and request to take the Tutorial course with him/her. If the instructor agrees, they will assign a project

and provide the course section number so that student is able to enroll into the course. If you have any questions, please contact Prof. Gary Etgen or the Director of Graduate Studies.

- A maximum of 9 semester hours of approved elective course work can be taken from other departments. We will not automatically accept for elective credit courses taken in any other College or department. For a course to be acceptable in the MA program, it must have some mathematical content. Students must fill out a petition in advance requesting that a particular course be approved for elective credit in the MA program. Some details such as syllabus or topics covered should be attached. Students must fill out the Graduate General Petition form and submit it for approval to the graduate advisor.

Course Groups:

I. Algebra Courses

- MATH 5330: Abstract Algebra
- MATH 5331: Linear Algebra
- MATH 5336: Discrete Mathematics
- MATH 5383: Number Theory

II. Analysis Courses

- MATH 5333: Analysis
- MATH 5350: Introduction to Differential Geometry
- MATH 5334: Complex Analysis
- MATH 53XX: Analysis II

III. Probability & Statistics

- MATH 5382: Probability
- MATH 5385: Statistics
- MATH 5386: Regression Analysis

IV. Applied Mathematics

- MATH 5332: Differential Equations
- MATH 5341: Mathematical Modeling
- MATH 5344: Scientific Computing with Excel

8 | Policies Which Apply to All Graduate Students

Here we list some of the most important academic policies which apply to all NSM Graduate Students.

- **Continuous enrollment**: All graduate students (Master's and PhD) who do not plan to enroll in a Fall or Spring semester must file for a Leave of Absence (LOA), before the semester of absence begins. If the LOA form is not submitted on time, students will be subject to termination from the program. An LOA request is only good for one semester, and at most 3 of these requests can be granted during a student's graduate career. Upon returning from an LOA, students are required to apply for reinstatement to their program of study. Details and forms related to LOA requests can be found here on the NSM webpage:
  `https://uh.edu/nsm/students/graduate/leave-absence/`

  Summer enrollment is not required unless student is graduating or directed to register by advisor. Registration for PhD students is determined each summer, so follow advisor's instructions in April or May.

- **Full time enrollment for international students and Graduate Student Assistants:** International students and Graduate Student Assistants (TAs, RAs, etc.) must maintain full-time enrollment in the Fall and Spring terms.

- **Time limit:** The maximum time allowed for obtaining a Master's degree is 5 years, and for a PhD it is 10 years.

- **Minimum GPA:** You need a minimum 3.00 cumulative GPA in order to receive a graduate degree. You need a minimum 3.00 cumulative GPA in your certificate classes in order to obtain the certificate.

  If a graduate student's cumulative GPA falls below 3.00, the student is placed on Academic Warning. When a student is placed on Academic Warning, the student will be notified and will be instructed to contact their academic advisor. If the student does not raise the GPA to 3.00 after one long semester on Academic Warning, the student will be placed on Academic Probation. A student on Academic Warning or Academic Probation is not allowed to defend their thesis or dissertation.

  A student regains satisfactory academic standing when their cumulative GPA returns to 3.00 or above. A student on Academic Probation will be dismissed from the graduate program if any of the following occurs:

  – the student's cumulative GPA remains below 3.00 after completing an additional 9 SCH of letter-graded coursework.

  – the student has not completed 9 SCH of letter-graded coursework within two long semesters after being placed on academic probation and the student's cumulative GPA remains below 3.00.

  Important: In addition to what is mentioned above, to be eligible for a tuition waiver, scholarship, research assistantship, or teaching assistantship, you must have at least a 3.00 cumulative GPA in all the graduate courses you have on your UH graduate transcript.

- **Low grade policy:** If you accumulate 12 or more hours with grades of C+ or lower or U grades, you will be dropped from your graduate program and will be ineligible

to enroll in graduate courses at UH. You will receive notification from the college when you have accumulated 6 hours of low grades, and you will need to meet with your graduate faculty advisor to draft a Grade Deficiency Plan that must be filed with the college.

- **Course enrollment restrictions:** Graduate students are not allowed to register for undergraduate classes.

- **99-hour doctoral cap:** The Texas Higher Education Coordinating Board and the Texas Legislature have determined that the doctoral degree can be completed with less than 100 credit hours at the doctoral level. This corresponds to about 5 years as a full-time student. If you exceed 100 credit hours at the doctoral level, you may be charged a premium tuition which is about 4 times the in-state graduate tuition. A petition requesting an extension of this deadline may be filed.

- **Transfer credit:** There are strict requirements regarding transferring credit earned from other graduate programs, to a graduate program at UH. See this page for details:
  `https://publications.uh.edu/content.php?catoid=53&navoid=20007&hl=%22transfer+credit%22&returnto=search`

  Transfer credit is not guaranteed, and a maximum of 9 hours of transfer credit is allowed. Students who would like to request transfer credit for previously earned work should submit a Graduate and Professional Student Petition (`https://uh.edu/nsm/_docs/nsm/students/graduate/gps-petition.pdf`) during their first semester at UH. For outside classes taken concurrently with UH studies, all transfer requests have to be submitted prior to the graduating semester. In addition, approval for taking an outside class concurrent with the UH studies must be obtained prior to enrolling into that class. Credit transfer does not apply to the MSDS program.

- **Academic honesty:** Academic honesty is expected of all faculty and students at the University of Houston. Academic dishonesty is grounds for serious consequences, which can include dismissal. Please familiarize yourself with the official policy, which can be found on this page (especially Sections 3 and 4):
  https://publications.uh.edu/content.php?catoid=53&navoid=20213&hl=%22academic+honesty%22&returnto=search

- **Graduation:** It is advised that students should start planning their graduation early and be aware of the submission deadlines. For the rules surrounding graduation please read this page in the Graduate Catalog:
  https://publications.uh.edu/content.php?catoid=53&navoid=20027&hl=%22graduation%22&returnto=search
  as well as points 3, 11, and 13 from this page on the NSM website: https://www.uh.edu/nsm/students/graduate/policies/

- **Grievance procedures:** Guidelines for filing grievances at the departmental level can be found here:
  https://www.uh.edu/nsm/_docs/math/graduate/math_grievances.pdf
  For College level grievance procedures, see this page:
  https://www.uh.edu/nsm/students/graduate/grievance-procedures/

9 | Graduate Student Organizations

9.1. Graduate and Professional Students Association (GPSA)

9.1.1 Mission

The GPSA serves **all** graduate and professional students at the University of Houston. The organization acts as a channel where students can voice their concerns, resolve difficulties, and provide feedback on issues that directly affect graduate student life. GPSA's missions are:

1. To foster interdisciplinary excellence in master's and doctoral research as well as to enhance the impact of graduate groups and students.
2. To advocate changes deemed necessary by graduate students.
3. To encourage unity among the graduate and professional students as a whole.
4. To improve the academic environment for graduate and professional students through sponsored events.
5. To serve as an outreach venue for graduate and professional students by providing opportunities for social interaction and services to the local community.

9.1.2 Website and Contacts

Website: `https://www.uh.edu/graduate-school/gpsa/`

Contact: Sydnee Spruiell Eldridge (slspruie@central.uh.edu)

9.2. University of Houston AMS Graduate Chapter

9.2.1 Mission

The AMS Graduate Student Chapter is sponsored by the American Mathematical Society. The chapter promotes mathematical research and education among graduate students in the following ways:

1. Encourage students in pure and applied mathematics.
2. Organize social and professional activities to discuss mathematics, share ideas, hone job skills, and prepare students for jobs in academia and elsewhere.
3. Increase awareness of opportunities and experiences related to mathematics and professional development.
4. Inform graduate students about all aspects of mathematics, both as a subject and a profession.
5. Promote interaction among graduate students, faculty, and undergraduates and strengthen the sense of community in our department.

9.2.2 Website and Contacts

Website: `https://www.math.uh.edu/ams/`

9.3. University of Houston AWM Graduate Chapter

9.3.1 Mission

The purpose of the Association for Women in Mathematics is to encourage women and girls to study mathematics and its applications to the sciences, to support women who are currently pursuing careers in mathematics, and to build a network among the women in mathematics at the University of Houston. Also, we strive to promote a welcoming community for all graduate and undergraduate students interested in mathematics. UH-AWM supports the Non-Discrimination Statement of the Association for Women in Mathematics:
`https://sites.google.com/site/awmmath/awm-resources/policy-and-advocacy/harassment-statement`
Notably, our group is not only open to women- all are welcome to join our chapter activities and become members of the organization! In addition to graduate students, we welcome undergrads, lecturers, postdocs, faculty, and basically anyone interested in learning more about math, whether it's about career paths, math education, or research-related.

9.3.2 Website and Contacts

Website: `https://math.uh.edu/awm`

Contact: awm@math.uh.edu

9.4. University of Houston SIAM Student Chapter

9.4.1 Mission

UH SIAM is a student organization sponsored by the Society for Industrial and Applied Mathematics (SIAM) and Department of Mathematics at the University of Houston, including students from various departments: mathematics, computer sciences, engineering, physics, biology, and other sciences.

The chapter's primary goals are:

1. To help facilitate applications of mathematics and computational science to industry and academics
2. To provide a community for the exchange of information and ideas among mathematicians, engineers, and scientists.
3. To promote career opportunities for students
4. To encourage students to develop effective presentation and leadership skills.

9.4.2 Website and Contacts

Website: `https://math.uh.edu/uhsiam`

Contact: uhsiam@gmail.com