The University of Texas at Austin
Department of Mathematics
College of Natural Sciences

MATH MAJOR NEWSLETTER

Spring 2025

ACADEMIC CALENDAR

April 7 - 18

Summer & Fall 2025 registration for continuing and readmitted students.

April 16

Last day an undergraduate may: Q-drop a class; withdraw; change a class to pass/fail

April 28

Last Class Day

April 29 - 30

No-Class Study Days

May 1- 3, 5

Final Exams

UPCOMING FALL 2025 REGISTRATION

Please do read your university emails and SANs.
Follow the pre-registration steps found in the SANs and/or emails from your advisor.
Step 1: Run a degree audit for the degree you plan to pursue (select the correct Catalog).
Step 2: List the courses you plan to take on the spring Advising Worksheet(s) (use course numbers, not unique numbers); include questions or explanations under "Student Comments."
Step 3: Read your advisor's response on the Worksheet as they may make recommendations.

If you wish to make an appointment with Summer Cacciotti (s.cacciotti@austin.utexas.edu), Nathaniel Sulapas (nathaniel.sulapas@austin.utexas.edu), or Amy Stokes (amy.stokes@austin.utexas.edu)please email them directly. If you wish to meet with a faculty advisor, email the Math, Physics, and Astronomy advising office at mpaadv@austin.utexas.edu to schedule an advising appointment.

Learn more about how to register for classes here.

Course Schedules

Mathematics Courses & Prerequisites

Highlighted Mathematics Courses Offered Fall 2025

M 375T Geometric Foundations of Machine Learning MW 3:30 – 5 pm (59105)

M375T History of Mathematics TH 11:00 – 12:30 pm (59110) Prof. Dunlop. (Same as: CTI 371M) This course presents mathematics as a historical phenomenon, considering when, where, how, and even why mathematical ideas arose, and how they were transmitted. We will study the development of arithmetic and geometry: in ancient Egypt, Mesopotamia, Greece, and India; through the medieval period; and in early modern Europe. We will consider the emergence of algebra and analysis, and end with case studies from the 20th century (Ramanujan and Cambridge mathematics, and the mathematicians of the American Space Program). Material should be accessible to students with a solid precalculus background. To satisfy Independent Inquiry and Writing Flag requirements, students will complete a substantial (about 15 page) paper on a topic of their choice and will exchange preliminary drafts for comments.

M 375T Introduction to Quantum Information Science Honors TH 2:00 – 3:30 pm (59115) TTH Prof. Aaronson. This is an undergraduate-level introduction to the theory of quantum information and computation. Fundamentals: We'll cover the rules of quantum mechanics (states, qubits, unitary transformations, density matrices, measurement), quantum gates and circuits, entanglement, Bell's inequality, non-locality, decoherence and the measurement problem. Protocols: quantum money, quantum key distribution, quantum teleportation, superdense coding, entanglement swapping. Quantum algorithms: Deutsch-Jozsa, Bernstein-Vazirani, Shor's algorithm, Grover's algorithm. Time permitting,

some quantum complexity theory, an introduction to quantum error correction, and the challenges of building a scalable quantum computer. Previous exposure to quantum mechanics is not assumed or required. As such, we'll make the presentation of the material self-contained.

M 375T Introductory Game Theory MW 8 – 9:30 am (59120) & 9:30 - 11 am (59125) Prof. Thomas & look for two additional sections to be added to the course schedule**.** (Same as: ECO 354K, CS 378) This course is an introduction to game theory, i.e., decision-making in a strategic context. Its objective is to provide a thorough understanding of the core concepts and analytical methods of game theory at an undergraduate level. At the end of this course, a student should be familiar with fundamental concepts and models of non-cooperative game theory. They should be able to analyze static and dynamic games with complete and with imperfect information, and to understand how to apply these models to shed light on real-world phenomena in economics, political science and biology.

M 375T Math for Machine Learning TTH 3:30PM – 5PM (59130) Prof. Delgadino.

MATHEMATICS, PHYSICS, & ASTRONOMY ADVISING WEBSITE

You will find information about the following registration matters on the Mathematics, Physics, & Astronomy Advising website: Registration Tips; Requesting to take M 371E, summer over hours, registering for over 14 hours in the summer or over 17 hours in the fall, Mathematics Conference Courses, Honors Tutorial Courses, Graduate Mathematics Courses, and more.

UPPER DIVISION MATHEMATICS COURSE PREREQUISITES TO BE ENFORCED

Note that the Mathematics Department may at any time choose to enforce prerequisites on any course as they are published in the catalog. Here the upper division mathematics courses for which prerequisites will be strictly enforced: M 427J, M 427L, M 328K, M 329F, M 339C, M 339D, M 339U, M 346, M 368K, M 362M, M 343K, M 361K, M 365C, M 367K, and M 373K. See the decision trees at the end of this newsletter to inform you about the prerequisites that are new to being enforced.

MATHEMATICS MAJOR DEGREE OPTIONS

You will find the degree checklists for each of the mathematics major degree options here. In particular, I want to highlight in this newsletter the variety of pathways through earning the BS Mathematics degree. All students pursuing the Bachelor of Science in Mathematics (Option VII: Mathematics) degree must complete a lower-division calculus sequence, a minimum of 33 hours of upper-division coursework in mathematics, an introductory computer programming course, and a Math in Context course.

The Bachelor of Science in Mathematics allows each student to choose a concentration based on their own academic and career goals. While earning a BS Mathematics degree a student may choose to follow a pathway in pure mathematics, applied mathematics, statistics and probability, data science, scientific computation, actuarial science, or UTeach. The BS Mathematics Pathways provide guidance on relevant courses and certificate programs for these different fields and applications of mathematics. These pathways prepare graduates to either enter the workforce or to pursue graduate studies.

Q: How do I satisfy the Math in Context degree requirement?

A: Dr. Austin is willing to consider *any course in any college* on campus that is an upper division course and uses mathematics above calculus. Have you found an interesting course? Meet with Dr. Austin, share the syllabus, and she will decide if the course will satisfy your Math in Context degree requirement. The courses listed on the degree plan under the Math in Context degree requirement automatically count, but you may need the Math, Physics, and Astronomy Advising Staff to secure the seat in the non-mathematics courses for you. These automatic Math in Context courses include M 374M; PHY 329, 336K, 352K; CS 341, 342, 345, 346, 353, 367; CH 353, 354; and EE 411, 325, 360C, 362K.

FALL 2025 MATHEMATICS COURSES CARRYING INDEPENDENT INQUIRY FLAG

M 328K Introduction to Number Theory TTH 12:30PM – 2PM (58805) Prof. Miner
M 328K Introduction to Number Theory TTH 2PM – 3:30PM (58820) Prof. Miner
M 175 (59075)
M 275 (59080)
M 375 (59085)
M 475 (59090)

M 375T History of Mathematics TTH 11AM – 12:30PM (59110) Prof. Dunlop
M 379H (59155)

FALL 2025 MATHEMATICS COURSES OFFERED IN INQUIRY BASED LEARNING FORMAT

M 328K Introduction to Number Theory TTH 12:30PM – 2PM (58805) Prof. Miner
M 328K Introduction to Number Theory TTH 2PM – 3:30PM (58820) Prof. Miner
M 333L Structure of Modern Geometry MWF 10AM – 11AM (58845) Prof. Osborn
M 333L Structure of Modern Geometry MWF 11AM – 12noon (58850) Prof. Osborn
M 339U Actuarial Contingent Payments I TTH 2PM – 3:30PM (58870) Prof. Harper
M 362K Probability I TTH 8AM – 9:30AM (59020) Prof. Maxwell
M 367K Topology I TTH 9:30AM – 11AM (59045) Prof. Sadun
M 378K Introduction to Mathematical Statistics TTH 9:30AM – 11AM (59145) Prof. Maxwell

FALL 2025 MATHEMATICS COURSES CARRYING WRITING FLAG

M 333L Structure of Modern Geometry MWF 10AM – 11AM (58845) Prof. Osborn
M 333L Structure of Modern Geometry MWF 11AM – 12noon (58850) Prof. Osborn
M 339D Introduction to Financial Mathematics for Actuaries MWF 12noon – 1PM (58855) Prof. Cudina
M 375T History of Mathematics TTH 11AM – 12:30PM (59110) Prof. Dunlop
M 379H (59155)

FALL 2025 MATHEMATICS COURSES CARRYING ETHICS FLAG

M 175T BEING YOU IN MATHEMATICS W 2PM – 3PM (59095) PROF. AUSTIN
M 371E LEARNING ASSISTANT EXPERIENCE IN MATHEMATICS (59050)

NETWORKING

There are various organizations with which you might like to connect while you are a math major here at UT.

- There is a general Mathematics open Facebook group within UT Austin.
- The UT Math Club is an active group of undergraduate math majors who meet to discuss and share their wisdom as they navigate through being a UT math major, apply for and participate in summer research opportunities, and head towards graduate school.
- We have recently created a UT Mathematics LinkedIn group which we encourage all of you to join!
- The UT chapter of Association for Women in Mathematics (AWM)'s purpose is to encourage women and girls to study and to have active careers in the mathematical sciences, and to promote equal opportunity and the equal treatment of women and girls in the mathematical sciences.
- The UT Actuarial Science Club (ASC) is open to students of all majors and academic backgrounds who have an interest in furthering their academic and professional careers. Whether you've never heard of an actuary before or you're already on your way to your ASA, the Actuarial Science Club has something for you!
- UT Mathematics and Science Teachers of Tomorrow (MASTT) is a student-led organization whose activities help to promote the success of UTeach pre-service teachers in STEM fields (science, technology, engineering and mathematics) at the University of Texas at Austin.
- The UT chapter of the Society of Industrial & Applied Mathematics (SIAM) promotes promote interaction between members of the applied mathematics community at UT Austin, across departments, institutes, and professional marks.
- Gamma Iota Sigma is a recently established Risk Management, Insurance, and Actuarial Science fraternity.

JOB PREPARATION

Take full advantage of CNS Career Services while you are a student. This is a great resource for our students! Seek out project-based courses and internships while you are an undergraduate. Be sure to highlight these in your personal statement when applying for jobs.

You can be a mathematics major or a mathematics actuarial science major AND become certified to teach middle school and high school mathematics all in four years. If you are interested, please see the UTeach Program in Natural Sciences or email

Pam Elias. If you have ever thought about becoming a certified teacher in the state of Texas, you owe it to yourself to try it out with a program that is nationally recognized for its success at training highly qualified math, science, computer science and engineering teachers.

A new edition of SIAM's careers brochure, Careers in the Mathematical Sciences, is now available and is a great resource for anyone wondering what they can do with math. Available in print and as a free PDF online, this publication spotlights applied mathematicians working in various facets of the mathematical sciences, with a focus on industrial careers. It contains personal insights and advice as well as career path, salary, and job skill information from 23 people, including freelancers, consultants, and those working in a variety of capacities at industry giants, small start-ups, research labs, and non-profits.

MENTORING PROGRAM

The Directed Reading Program (DRP) pairs undergraduate students with graduate student or faculty mentors to undertake independent projects in mathematics. Any undergraduate student may apply for DRP and, if accepted, will be assigned an appropriate graduate mentor. The student and the mentor will agree on a project. It can be based on reading through a book or an article, but the project is not limited to such things.

UTEACH NATURAL SCIENCES

Have a passion for STEM and want to inspire the next generation of learners while gaining skills that can be translated to any career? Learn how you can add a teaching certification to your degree by trying out teaching with UTeach Natural Sciences! By registering for our one-credit hour introductory course, Step 1 (UTS 101), you can easily learn if teaching is for you in a low-pressure environment as you teach elementary students engaging math and science lessons!

Get to know us better by visiting our website, where we have a team of Student Ambassadors dedicated to answering questions about the program along with our scholarships and internships.
If you want more details about how UTeach can fit into your degree plans, RSVP to one of the UTeach information sessions, and talk directly with UTeach students and staff. Information sessions will be held Monday-Thursday from November 4 to November 14, with in-person and virtual options available.
More ways to connect:

- Schedule an advising appointment (it is not required to meet with an advisor to register for UTS 101)
- Follow us on Instagram and like us on Facebook
- Send us a note at ambassador@uteach.utexas.edu

OUTREACH OPPORTUNITIES

With registration for the fall semester coming soon, we want to take a moment to share about UTeach - Natural Sciences Program. UTeach - Natural Sciences is a widely recognized teacher preparation program that offers extensive in-the-classroom teaching experience, interdisciplinary skills, and current pedagogical strategies and practices taught to you by extremely successful and knowledgeable master teachers. By the end of the UTeach program, you will be fully certified to teach STEM at the middle or high school level in the state of Texas. This program can fulfill the certification requirement for students on a BSA degree plan. UTeach provides flexible entry points no matter how far along you are in your degree plan. The UTeach program is open to any student, in any college, and students do not have to change their major to join! Sign up for the first course in the program, UTS 101 when you register! We look forward to having you join our program! For more information, attend an information session; find details at https://uteach.utexas.edu/.

While you're planning your courses for Fall 2025, we invite you to sign up for the UTeach Outreach class! UTeach Outreach: CH 207K or CH 371K allows you to teach hands-on science lessons with a partner at local elementary and middle schools while receiving course credit at UT! This unique course is planned around your schedule and provides opportunities to boost your resume with leadership roles in your area of interest and improve your communication and presentation skills while helping the community. You can receive two (CH 207K) or three (CH 371K) graded credit hours of science or elective credit, depending on your major and prerequisites. Check with your advisor for the type of credit you could receive. See course registration details and more information at https://outreach.uteach.utexas.edu/undergraduates.

Each fall Dr. Austin organizes a *Math Fun Day* for elementary-age children and a *Sonia Kovalevsky Day* for middle and high school students. Each spring Dr. Austin organizes the mathematics department activities for STEM Girl Day at UT. Reach out to Dr. Austin if you are interested in these outreach opportunities.

SUMMER 2024 REU NEWS

"Last summer, I participated in the Interdisciplinary Computational Biology REU at the University of Tennessee at Chattanooga, where I explored the application of coding to biological questions, with a focus on machine learning. My project involved developing software to model arm motion in real time by building a 3D model controlled by Inertial Measurement Units (IMUs). I worked collaboratively in an engineering lab, where I used my mathematical background to develop and optimize this model. The software is designed to help patients in physical therapy monitor joint range of motion and contribute to the development of assistive technologies for individuals with limited mobility. Through this REU, I had the opportunity to present my research at the Biomedical Engineering Society's annual meeting, where I engaged with researchers at the intersection of computation, engineering, and biomedical science. This experience was incredibly valuable in shaping my academic and research interests. I gained hands-on experience in applying computational methods to biological problems and developed a deeper understanding of what it means to conduct research as a graduate student. This REU played a significant role in shaping my career goals and ultimately motivated me to pursue a Ph.D. in the field of computational biology." – **Graduating Longhorn Mathematics Major Abby Beman**

RESOURCES

Email the Math, Physics, and Astronomy advising office at mpaadv@austin.utexas.edu if would like a list of math tutors available for hire. If you are enrolled in calculus, be sure to utilize the Calculus Lab. For many mathematics courses the Sanger Learning Center is a valuable resource. Moreover, did you know that the UT Counseling and Mental Health Center offers a wide variety of free workshops and events intended to provide valuable life skills? Check them out here.

Finances may already be a concern when you are a college student. These UT partners are here for you: Texas Global at The University of Texas at Austin, for International Students and Scholar Services, Office of the Dean of Students at UT Austin, for UT Outpost Food Delivery and for Student Emergency Services, Financial and Administrative Services, UT Austin, and UT Austin Voices Against Violence for the Survivors Emergency Fund.

The Office of the University Ombuds for Students is here to listen to your concerns in a safe setting about life at the university and confidentially discuss interpersonal difficulties, university policies, university bureaucracy, and conflict resolution techniques.

CARE Counselors offer short-term counseling and mental health consultation, workshops and outreach, and assistance in connecting to resources on and off campus in an accessible academic setting. CNS CARE Counselors Nic Dahlberg, LPC, Damaris Rodriguez, LPC, and Katie Griffin, LPC, are here to support you through various life events. Please don't hesitate to reach out if you need anything at all. Call Nic Dahlberg at (512) 232-9247, Damaris Rodriquez at (512)471-7162, or Katie Griffin at (512)232-3685 and leave a message. The CNS CARE counselor office is located in PAI 3.04M.

Delve into the resources from CNS Career Services. Follow the Chamber of Commerce Austin job opportunities website. Check out the Handshake blog on Getting Hired Remotely. Enhance your skills through LinkedIn Learning offered through UT.

GRADUATE SCHOOL PREPARATION

Juniors, spend the summer compiling the list of schools to which you will apply this fall. In the fall, have fellow students, CNS Career Services, and/or Dr. Austin proofread your statement of purpose. By November be prepared to request letters of recommendation from at least three faculty members (at least two of which will probably be mathematics facutly). When you request letters of recommendation, provide your letter writers with your resume, statement of purpose, and a spreadsheet or chart listing all schools to which you are applying. (In this spreadsheet or chart include the name of the school, the particular program to which you are applying, due dates, and method of letter submission.)

Sophomores and Freshmen, check in with Dr. Austin once a semester or at least once a year to see that you are taking the best mathematics coures to prepare you for graduate school. Participate in our Directed Reading Program, UT Math Club, and UT AWM. Make meaningful connections with your mathematics faculty as you will need at least three to write letters of recommendation for you during the fall of your senior year. To write strong letters on your behalf they need to know you, how

you work with others, how you work independently, and your overall potential. Be an active participant in your mathematics courses, attend office hours, ask your professors about their research, and get to know your professors.

Are you looking for a program to bridge your undergraduate work with graduate work? Post-baccalaureate programs aim to prepare students to be successful in graduate studies in mathematics and to experience graduate school. Here is a list of post-baccalaureate programs around the US: https://mathalliance.org/our-partners/post-baccalaureate-programs/

Find more graduate school resources listed under Preparing for Graduate School here.

SUMMER 2025 UNDERGRADUATE RESEARCH

Winter break is a great time to review all the ways that undergraduates can participate in summer research. If you are considering applying for REU programs or other summer research experiences check out this AMS Blog post "Advice for Applying to REU Programs (From Recent Participants!)." Find REUs and many other summer research opportunities listed under Summer Opportunities in Mathematics here.

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➢ ***Be sure to check out the list of resources (scroll to section Information for Math Majors) that Dr. Austin has compiled for math majors.***

REQUESTING LETTERS OF RECOMMENDATION

What to do well before requesting letters of recommendation

Change can be challenging for anyone and the transition in moving beyond an undergraduate career can be arduous for many. You can make this time easier by being proactive and planning ahead to ensure your success. In the semesters before you are at the point of requesting letters of recommendation there are a number of actionable steps you should be practicing.

First, make meaningful connections with your mathematics faculty as you will need at least three faculty members in your field of study to write letters of recommendation for you during your senior year. To write strong letters on your behalf they need to know you, how you work with others, how you work independently, and your overall potential. Be an active participant in your mathematics courses, attend office hours, ask your professors about their research, get to know your professors, and allow them to get to know you. Second, you must check in with your academic advisor and/or faculty advisior at least once a semester to see that you are taking the best mathematics coures to prepare you for your desired career or graduate school program.

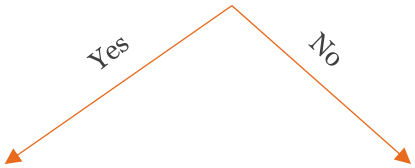
Third, network, network, network. Participate in your school's math club, actuarial science club, or future mathematics teachers club. Finally, I would add that volunteering for outreach opportunities is a great way to connect with the larger community, serve as a math ambassador, bring mathematics alive, and enhance your own communication skills. *(Continue reading Dr. Austin's advice here.)*

Are you prepared for our intermediate or advanced proof writing mathematics courses?

Enrolling in M 328K

Decision Tree

Have you completed at least one of M 325K, M 333L, or M 341 with a grade of at least C-?



Allowed to register if seat available.

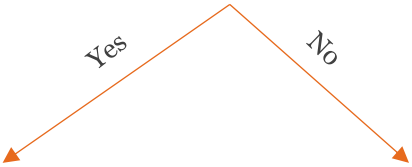
Stop. Enroll in M M 325K, M 333L, or M 341, if you meet the prerequisites.

Enrolling in any of: M 343K, M 361K, M 365C, or M 373K

1. You **must** meet the prerequisites as published in the catalog.
2. You **should** meet the prerequisites with grades of B or higher in the prerequisite courses.

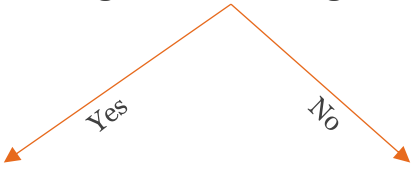
Decision Tree

Have you completed at least one of M 325K or M 333L with a grade of C- or higher?



Have you completed at least one of M 328K or M 341 with with a grade of C- or higher?

Stop. Enroll in M 325K or M 333L.



Allowed to register if seat available.

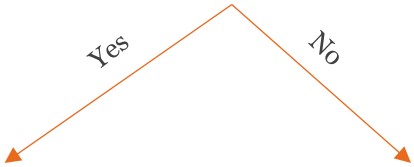
Stop. Enroll in M 328K or M 341, if you meet the prerequisites.

Enrolling in M 367K

3. You **must** meet the prerequisites as published in the catalog.
4. You **should** meet the prerequisites with grades of B or higher in the prerequisite courses.

Decision Tree

Have you completed at least one of M 361K or M 365C with a grade of C- or higher?



Allowed to register if seat available.

Stop. Enroll in M 361K or M 365C, if you meet the prerequisites.

"Math is not a spectator sport.""
– Mrs. Morgan, Professor Walch's high school math teacher
