



MATH MAJOR NEWSLETTER

Fall 2024

ACADEMIC CALENDAR

November 4 - 15

Spring 2025 registration for continuing and readmitted students.

November 20

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

December 9

Last Class Day

December 10 - 11

No-Class Days

December 12 – 14, 16

Final Exams

UPCOMING SPRING 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 Spring 2025

M375T History of Mathematics TH 11:00 – 12:30 pm (54530) Dr. 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 Actuarial Modeling and Simulations MWF 9AM – 10AM (54520) Prof. Cepparo.

M 375T Experimental Mathematics MWF 10AM – 11AM (54525) Prof. Sadun. Math is built on theorems and proofs, but where do mathematicians get their ideas on what to try to prove? We check whether such-and-such property of integers holds for all numbers up to a thousand (in Euler’s time) or a billion or more (nowadays). We solve combinatorics problems by counting the number of solutions up to a given size and extrapolating. We sample trajectories in a chaotic dynamical system to see what sorts of patterns are more common than others. We randomly sample gigantic spaces of parameters to find a configuration that maximizes some desired quantity. In other words, we conduct numerical experiments.

In this class, we will apply experimental methods to study problems across mathematics. The problems themselves are easy to state and don't require a lot of prior mathematical knowledge. In most cases, the answers are already known to the experts. In a few, we will explore new ground. In all cases, the emphasis is on learning how to use experiments to build intuition, form good conjectures, and (hopefully) eventually craft rigorous proofs. Prior computing experience is not required but is certainly helpful. Most of our experiments will be done using SageMath.

M 375T Math for Machine Learning TTH 9:30AM – 11AM (54545) Prof. Tsai.

M 375T Quadratic Forms TTJ 12:30PM – 2PM (54550) Prof. Ciperiani. Prerequisite: M 373K

M 375T Introductory Game Theory MW 8:30-10 am (54535) & 10:00 - 11:30 am (54540) Prof. Bhaskar. (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 367L Topology II TTH 9:30AM – 11AM (54460) Prof. Seibert If you want to find out if "geometry" in the broadest sense is your thing, come to this class! While Topology I is concerned with fundamental concepts in topology that appear in all kinds of applications from analysis to dynamical systems, we will now see how a topology gives a set a "shape", i.e. a geometry in the coarsest sense of the word.

An early highlight of the class is the classification of closed surfaces in terms of genus and orientability. The second topic is the fundamental group, an important algebraic invariant of a topological space, and its fascinating interplay with "unwrappings" of a space called covering spaces. (There is even a fun parallel with Galois theory in M 373 L that we won't cover but you might appreciate once you learn Galois theory!) And finally, we'll look into homology, that fundamental and most powerful tool that has reshaped large parts of modern mathematics from arithmetic to geometry and beyond.

The class is partly taught by inquiry-based learning, following Part II of the textbook by Starbird on Su "Topology Through Inquiry". I will provide some scaffolding by lecture snippets and solving some of the problems, but a large part is also your own discovery of the subject working in varying groups and setups, and in self-study.

Students that have taken the class provided overwhelmingly positive feedback and repeatedly told me how much they have gotten out of it. It's really a fun class about some of the most beautiful topics in mathematics, and I love teaching it. Some basic group theory and linear algebra appear in the sections on fundamental groups and homology, but the class can easily be done without M 373 K.

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.

MATH 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.

SPRING 2025 MATHEMATICS COURSES CARRYING INDEPENDENT INQUIRY FLAG

M 325K Discrete Mathematics TTH 12:30PM – 2PM (54090) Prof. Austin
M 328K Introduction to Number Theory TTH 9:30AM – 11AM (54205) Prof. Miner
M 328K Introduction to Number Theory TTH 3:30PM – 5PM (54215) Prof. Miner
M 329F Theory of Interest TTH 9:30AM – 11AM (54230) Prof. Austin
M 339C Actuarial Case Studies TTH 12:30PM – 2PM (54245) Prof. Walch
M 175 (54495)
M 275 (54500)
M 375 (54505)
M 475 (54510)
M 375T History of Mathematics TTH 11AM – 12:30PM (54530) Prof. Dunlop
M 379H (54570)

SPRING 2025 MATHEMATICS COURSES OFFERED IN INQUIRY BASED LEARNING FORMAT

M 325K Discrete Mathematics TTH 12:30PM – 2PM (54090) Prof. Austin
M 328K Introduction to Number Theory TTH 9:30AM – 11AM (54205) Prof. Miner
M 328K Introduction to Number Theory TTH 3:30PM – 5PM (54215) Prof. Miner
M 329F Theory of Interest TTH 9:30AM – 11AM (54230) Prof. Austin
M 333L Structure of Modern Geometry MWF 11AM – 12noon (54235) Prof. Osborn
M 333L Structure of Modern Geometry MWF 11AM – 12noon (54240) Prof. Osborn
M 339U Actuarial Contingent Payments I TTH 12:30PM – 2PM (54265) Prof. Harper
M 339V Actuarial Contingent Payments II TTH 2PM – 3:30PM (54270) Prof. Harper
M 362K Probability I TTH 8AM – 9:30AM (54425) Prof. Maxwell
M 367L Topology II TTH 9:30AM – 11AM (54460) Prof. Seibert
M 375T Quadratic Forms TTJ 12:30PM – 2PM (54550) Prof. Ciperiani
M 375T Experimental Mathematics MWF 10:00 – 11:00AM (54525) Prof. Sadun
M 378K Introduction to Mathematical Statistics TTH 9:30AM – 11AM (54560) Prof. Maxwell

SPRING 2025 MATHEMATICS COURSES CARRYING WRITING FLAG

M 325K Discrete Mathematics MWF 8AM – 9AM (54070) Prof. Martines
M 325K Discrete Mathematics TTH 12:30PM – 2PM (54090) Prof. Austin
M 333L Structure of Modern Geometry MWF 11AM – 12noon (54235) Prof. Osborn
M 333L Structure of Modern Geometry MWF 11AM – 12noon (54240) Prof. Osborn
M 339D Introduction to Financial Mathematics for Actuaries MWF 12noon – 1PM (54250) Prof. Cudina
M 375T History of Mathematics TTH 11AM – 12:30PM (54530) Prof. Dunlop
M 379H Honors Tutorial Course (54570)

SPRING 2025 MATHEMATICS COURSES CARRYING ETHICS FLAG

M 371E Learning Assistant Experience in Mathematics (54470)

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

CNS COMMON SCHOLARSHIP DEADLINE MARCH 15, 2025

Remember that by applying via the CNS Common Scholarship you will be considered for both CNS college-level scholarships and mathematics departmental scholarships. The deadline is March 15, 2025 (11:59 pm CT). You apply via LASSO beginning January 8, 2025.

OUTREACH OPPORTUNITIES

With registration for the Fall 2024 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 2024, 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.

RESOURCES

Email the [Math, Physics, and Astronomy advising](#) office at mpaadv@austin.utexas.edu if you 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 Rodriguez 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 faculty). 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 courses 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 Student Opps [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 Student Opps [here](#).

Be sure to check out the [list of resources](#) (under Student Opps) that Dr. Austin has compiled for math majors.



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If you wish to meet with Dr. Austin please email the Math, Physics, and Astronomy advising office at mpaadv@austin.utexas.edu to schedule an advising appointment.

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 advisor at least once a semester to see that you are taking the best mathematics courses 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.](#)*)

“At least for parts of mathematical research, you have to put yourself in a freewheeling frame of mind where you try to hold in your mind many different aspects of the concept and the construction you’re studying; and that is, to me, a typical attribute of play and playfulness.”

– Ingrid Daubechies

[You can read an MAA Focus interview with Ingrid Daubechies here.](#)