



MATH MAJOR NEWSLETTER

Spring 2024

ACADEMIC CALENDAR

March 26

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

April 8 - 19

Summer 2024 & Fall 2024 registration for continuing and readmitted students.

April 29

Last Class Day

April 30 & May 1

No-Class Days

May 2 - 4 & 6

Final Exams

UPCOMING SUMMER & FALL 2024 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 Jennifer McHam (jennifer.mcham@austin.utexas.edu), or Nathaniel Sulapas (nathaniel.sulapas@austin.utexas.edu) please email them directly. If Olivia Biehle was your academic advisor and you last name begins with letters A-K, then Nathaniel is your temporary academic advisor; last name begins with letters L-Z, then Jennifer McHam is your temporary academic advisor. 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 via Zoom.

Learn more about how to register for classes [here](#).

Course Schedules

Mathematics Courses & Prerequisites

Highlighted Mathematics Courses Offered Fall 2024

M175T Being You in Mathematics will be offered W 2 pm (54125). Dr. Austin will offer this course with the goals of building community among math majors, sharing advice on succeeding at UT Austin, and leaning about career options for mathematics majors. The course is restricted to freshmen and sophomores (at least initially).

M375T History of Mathematics MW 1:00 pm (54135) 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 (12-15 page) paper on a topic of their choice and will exchange preliminary drafts for comments.

M375T Introduction to Quantum Information Science Honors will be offered MW 2 pm (54140) by Professor 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 8:30 am (54145) & 10 am (54150) Dr. Thomas. (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, be able to analyze these models mathematically at a level of difficulty appropriate for an economics undergraduate and understand how to apply these models to shed light on real-world phenomena.

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 ([summer](#) or [fall](#)), Honors Tutorial Courses ([fall](#)), [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 Dr. Austin or Olivia Biehle 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 2024 MATHEMATICS COURSES CARRYING INDEPENDENT INQUIRY FLAG

M 328K Introduction to Number Theory TTH 9:30AM – 11AM (53835) Prof. Miner
M 328K Introduction to Number Theory TTH 2PM – 3:30PM (53850) Prof. Miner
M 175 (54105)
M 275 (54110)
M 375 (54115)
M 475 (54120)
M 375T History of Mathematics MW 1PM – 2:30PM (54135) Prof. Dunlop
M 379H (54175)

FALL 2024 MATHEMATICS COURSES OFFERED IN INQUIRY BASED LEARNING FORMAT

M 328K Introduction to Number Theory TTH 9:30AM – 11AM (53835) Prof. Miner
M 328K Introduction to Number Theory TTH 2PM – 3:30PM (53850) Prof. Miner
M 333L Structure of Modern Geometry MWF 10AM – 11AM (53880) Prof. Osborn
M 333L Structure of Modern Geometry MWF 11AM – 12noon (53885) Prof. Osborn
M 339U Actuarial Contingent Payments I TTH 2PM – 3:30PM (53905) Prof. Harper

M 362K Probability I TTH 8AM – 9:30AM (54050) Prof. Maxwell
M 378K Introduction to Mathematical Statistics TTH 9:30AM – 11AM (54165) Prof. Maxwell

FALL 2024 MATHEMATICS COURSES CARRYING WRITING FLAG

M 333L Structure of Modern Geometry MWF 10AM – 11AM (53880) Prof. Osborn
M 333L Structure of Modern Geometry MWF 11AM – 12noon (53885) Prof. Osborn
M 339D Introduction to Financial Mathematics for Actuaries MWF 12noon – 1PM (53890) Prof. Cudina
M 375T History of Mathematics MW 1PM – 2:30PM (54135) Prof. Dunlop
M 379H (54175)

FALL 2024 MATHEMATICS COURSES CARRYING ETHICS FLAG

M 175T Being You in Mathematics W 2PM – 3PM (54125) Prof. Austin
M 371E Learning Assistant Experience in Mathematics (54080)

SPRING 2025 MATHEMATICS COURSES CARRYING WRITING FLAG

M 325K Discrete Mathematics Prof. Austin

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.

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

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.

MATHEMATICS CAREER PANEL

Dr. Austin is hosting a **Mathematics Career Panel** on Wednesday, April 17, 4-5 pm. Former Longhorn Mathematics majors will return to campus to share their experiences. [Register via Handshake here](#).

MENTORING PROGRAMS

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.

The [SIAM Applied Mathematics Mentorship](#) program pairs undergraduate students whose interests lie in the applications of mathematics with experienced academics to mentor the undergraduate students as they discover their paths forward. If you can answer "Yes" to any of the following questions, then check back at the beginning of the semester to apply for the [SIAM Applied Mathematics Mentorship](#) program. Do you have an applied mathematics idea or application you're interested in? Do you want to know which mathematics courses fit your interests the best? Do you want to know the best ways to improve your graduate school application profile? Do you want to discover opportunities for applied mathematicians in industry?

2024 MATH FOR ALL CONFERENCE IN AUSTIN

We would like to invite you to register for the Math For All in Austin Conference. **Registration is now open and free.**

Math For All in Austin is a satellite conference for the annual Math For All Conference on math education and research happening on **April 5-6, 2024 at UT Austin**. The conference was created to provide a welcoming "first conference" environment, with the goal of supporting and retaining students interested in mathematics—especially those from historically excluded backgrounds.

The events this year include:

- Live streamed **Plenary Talks** by:
 - [Federico Ardila](#) - Professor of Mathematics (San Francisco State University),
 - [Daniel Reinholz](#) - Professor of Mathematics (San Diego State University)
- **Wikipedia Edit-A-Thon** - No prior experience necessary!
- [Undergraduate Lightning Talks](#) - Please encourage your undergraduate students to sign up for a talk! Talks can be on any mathematical topic (including a favorite mathematical result, an interesting piece of math history, a biography of a mathematician, an original research result and more!)

Check out [our website](#) for more information and for the most updated schedule of events.

If you have any questions, don't hesitate to reach out to us by email!

We hope to see you there!

The Math For All in Austin organizers

Contact: mathforallaustin@gmail.com

2024 TEXAS UNDERGRADUATE GROUPS AND DYNAMICS CONFERENCE

We are happy to announce the second annual meeting of the [Texas Undergraduate Groups and Dynamics Conference](#) at the University of Texas at Austin on April 19-20, 2024.

- This 2-day conference will run from Friday evening through Saturday afternoon and is designed to give undergraduates in Texas the opportunity to share their results and experiences, hear from faculty researchers, and build a community of students and faculty working in these fields.
- Undergraduate students are invited to submit abstracts to give 15-minute research talks during the conference. Beginning graduate students are also welcome to submit abstracts, especially about work that was completed as an undergraduate.
- See the [conference website](#) for information on registration and abstract submission.

This conference is supported by the National Science Foundation and by the University of Texas at Austin Mathematics Department. If you have any questions regarding the event, please email tmartines@utexas.edu.

CNS COMMON SCHOLARSHIP DEADLINE MARCH 15, 2024

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, 2024 (11:59 pm CT). You apply via lasso here: [CNS Common Scholarship application 2024-2025](#).

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.

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](#).



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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.

Austin posts in the [UT Math Club](#) and [UT AWM](#) Facebook groups as she hears of any that are new or are still recruiting. 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](#).

SUMMER 2024 VIRTUAL DIRECTED READING PROGRAM AT UT AUSTIN

The Groups & Dynamics RTG at UT Austin is once again organizing a [Summer 2024 Virtual DRP \(Directed Reading Program\)](#) for which we are hoping to recruit advanced undergrads across Texas (though they need to be US citizens or permanent residents). The DRP pairs undergraduates with (UT Austin) graduate students to read advanced material outside of the usual curriculum. Each student meets with their graduate student mentor for two 1-hour sessions each week from May 28 -- July 14. The students are expected to spend 3 hours reading between these sessions. There will be some common get togethers/seminars among the participants (via zoom) -- that will be optional but which they should find interesting. There

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](#).)

SUMMER 2024 REU NEWS

Although most REU application deadlines have recently passed, Dr.

will be a final get together where the students give 15-minute presentations on their reading. We assume that meetings between students will be done via Zoom, but we are happy to consider alternative arrangements where zoom is not readily available. We're offering a 1K stipend for each undergraduate participant (again, it can only go to US citizens and permanent residents because of NSF rules). We're looking for strong undergraduates across the state, and we're especially encouraging students from underrepresented groups to [apply](#). For full consideration, please **submit your application by March 20**. We will continue accepting applications after this date, until all vacancies are filled.

UT has been running the DRP program during the Fall and Spring semesters for a number of years now for UT Austin students, and it has often proven a very good experience for both undergrad and grad student. One of the strengths of the DRP is that it is a chance for the undergraduate to get an inside look at graduate school, and part of the job of the graduate student this summer will be to give them some guidance about applying to graduate schools. So ideally the students will be in the summer of their junior year, but others will be considered. We have funds for 15 pairs for this summer's program.

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. A crisis like a pandemic can create additional financial worries. Support services are available if you need them. 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. For more information visit: <https://bit.ly/StayWellatHome>.

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.

[Longhorn Resources](#) is a robust site that provides information about academics, advising, student support services and other important online contacts designed to help Longhorns successfully navigate their educational path during their time at UT Austin and beyond.

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 [LinkedInLearning](#) offered through UT.

"I'm a problem solver, primarily a counterexample discoverer...I still have this feeling that if a problem can be stated in a simple form that I can really understand, then I should be able to solve it even if doing so involves building some complicated structure. Of course, I have had some failures.

You can guess how often."

– Mary Ellen Rudin

[You can read more about Mary Ellen Rudin here.](#)