



Fall 2018

## ACADEMIC CALENDAR

### OCT 25-26, 29-31

Academic advising for continuing and readmitted students for the summer session and the spring semester.

### OCT 29-NOV 9

Daily Registration for the summer session and the fall semester for continuing and readmitted students.

### DEC 10

Last class day.

### DEC 13-15, 17-19

Fall semester final examinations.

## UPCOMING SPRING REGISTRATION

Visit Ronda Hall, Janna Adkins, Jiho Kim, and Dr. Jennifer Austin prior to the crunch-time of registration advising (October 25-26, 29-31) for one-on-one time with your advisor! Stop by the Math, Physics, and Astronomy advising office in RLM 4.101 or call 512-471-0900 to schedule an advising appointment. Students who are assigned to Ronda or Janna may be able to make an appointment [here](#).

### Course Schedules

<https://registrar.utexas.edu/schedules>

### Mathematics Courses & Prerequisites

<http://catalog.utexas.edu/undergraduate/natural-sciences/courses/mathematics/>

## Rare or New Mathematics Courses Offered Spring 2019

**M362M** Dr. Gordan Zitkovic will offer Introduction to Stochastic Processes TTh at 2 pm.

**M375T** Dr. Dan Freed's Analysis of Manifolds (Prerequisite: M365C with a grade of at least C-) will be offered TTh at 11 am.

**M367L** Dr. Cameron Gordon's Knot Theory (Prerequisite: M367K with a grade of at least C-) will be offered TH at 11 am.

**M375T** Dr. Gustavo Cepparo's Predictive Analytics (a new actuarial course) will be offered MWF at 11 am.

**M365D** Dr. Bill Beckner's Real Analysis II (Prerequisite: M365C with a grade of at least C-) will be offered TTh at 12:30 pm.

**M373L** Dr. Daniel Allcock's Algebraic Structures II (Prerequisite: M373K with a grade of at least C-) will be offered MWF at 12 pm.

### Q: Do mathematics conference courses count towards my math degree?

A: Mathematics conference courses that are pre-approved by Dr. Austin will count towards your math degree.

### 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, bring 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 to secure the seat in the non-mathematics courses for you.

## 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.

[The UT chapter of Association for Women in Mathematics \(AWM\)](#)

[UT Actuarial Science Club \(ASC\)](#)

[UT Mathematics and Science Teachers of Tomorrow \(MASTT\)](#)

[UT chapter of the Society of Industrial & Applied Mathematics \(SIAM\)](#)

[Gamma Iota Sigma](#) is a new Risk Management, Insurance, and Actuarial Science fraternity.

Be sure to check out the [list of resources](#) 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 [Dr. Daniels](#).

## DIRECTED READING 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.

## OUTREACH OPPORTUNITIES

Dr. Jennifer Austin is organizing volunteers for CNS Family Day, Saturday, October 27, 2018. We expect about 800 CNS students and their families. Dr. Austin will display mathematical puzzles and games with which families may interact. Email [Dr. Austin](#) if you can commit to representing our department at CNS Family Day. This is a great opportunity to connect with our larger Longhorn family, share your knowledge, serve as a math expert, bring mathematics alive, and enhance your communication skills.

While you're planning your courses for Spring 2018, we invite you to sign up for the UTeach Outreach class! UTeach Outreach allows students to teach hands-on science lessons with a partner at local elementary schools while receiving course credit at UT! Students can receive two (CH207K) or three (CH371K) graded credit hours of science or elective credit, depending on your major and prerequisites. Ask your advisor for credit you could receive. We invite you to be a part of this unique course that is planned around your schedule, provides a network with other UT students in a small classroom setting and opportunities to boost your resume with leadership roles in your area of interest. Check out this [video](#) or email [UT Outreach](#) for more information.



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## 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. Find out if there are local chapters of the [Association for Women in Mathematics](#) (AWM), [Society of Industrial and Applied Mathematics](#) (SIAM), and other professional mathematical societies on your campus. Join them or help found your own local chapter! 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, share your knowledge, serve as a math expert, bring mathematics alive, and enhance your own communication skills. (Continue reading Dr. Austin's advice [here](#).)

## 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.

Find more graduate school resources [here](#).

## BE FEATURED IN UPCOMING NEWSLETTERS

Please contact [Dr. Austin](#) if you would like your internship, REU, DRP, thesis, or research to be featured in an upcoming UT Math Major Newsletter!

## SUMMER 2018 REU NEWS

“This summer I had the opportunity to participate in an REU (Research Experiences for Undergraduates) program at Kent State University in Kent, Ohio. The experience was amazing, and it solidified my desire to attend graduate school. During the program, I worked with another undergraduate from Bowdoin College in Maine on a project involving change point analysis. Under the direction of our adviser Dr. Jun Li, we developed an R package that identifies change points (abrupt shifts) in the means of data using a 'wild' bisection algorithm. This algorithm begins by generating thousands of random sub-intervals within the time series data. From there, the algorithm determines which point maximizes a CUSUM-like test statistic for each sub-interval. If the largest value of the test statistic among these sub-intervals exceeds a certain threshold, then a change point is estimated at the corresponding location. From there, the algorithm divides the data into two halves on either side of the change point. The process of generating random sub-intervals to detect change points is repeated until no more statistically significant changes can be identified. Through both simulations and real-world data, my partner and I were able to confirm that our package performs better than existing change point detection packages, especially for particular change point configurations. We are preparing to submit our package to CRAN and a paper to the Journal of Statistical Software.”

**-Natasha Stewart, BS Mathematics Undergraduate Longhorn**

“I attended the Summer 2018 REU at Texas A&M University, in the Mathematics of Topological Computation group, under Professor Eric Rowell. With no prior research experience, the change in both pace and content was somewhat jarring, to say the least. Learning primarily from papers (vs textbooks) and solving a problem over a couple months (instead of over a couple hours to a day), meant that I encountered some new challenges. Learning things which didn't neatly build off of things I already knew meant that I had to invent new strategies of categorizing information. Also, not making progress on a problem for a week seems to be relatively typical for research mathematics, but if you're used to solving every problem you're given almost immediately, there can be psychological side effects. Having a better idea of what doing “real” math is like has made me more confident about applying to graduate schools for a PhD program, so the REU definitely succeeded in its purpose.

As to the actual content of my research, I helped in a classification program for rank 6 modular tensor categories, and succeeded in showing that in the case where such objects have a certain Galois group, all possible instances are already known up to a certain equivalence.”

**-David Green, BS Mathematics Undergraduate Longhorn**

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*“Maths is like electricity – you can't see it but it's in everything. Maths is what makes your phone work; maths algorithms are being used to encode the images you see on Twitter or Instagram; it's behind what is running on your computer and what powers Google search; it's what lets an airline schedule its flights – it is actually everywhere.”*

*-Dr. Lesley Ward, University of South Australia*

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