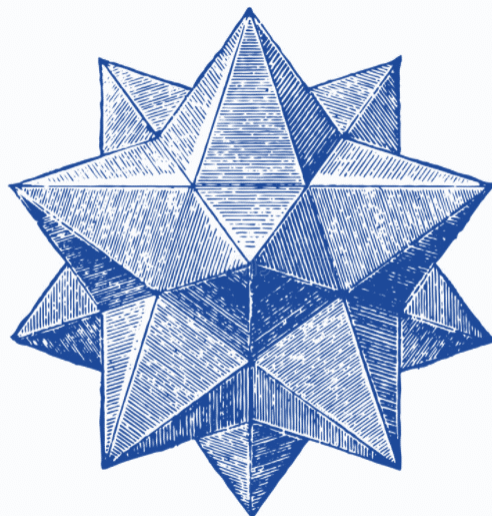


**The University of Texas at**

**TYLER**<sup>TM</sup>

*Department of Mathematics*

**UNDERGRADUATE  
HANDBOOK  
2023-2024**



## Chair's Welcome

Welcome, UT Tyler Students!

It is my pleasure to welcome you to the beautiful, wooded campus of the University of Texas at Tyler and especially to the fourth floor of RBN.

Mathematics is one of the best kept secrets in higher education. Many students think that the only thing you can do with a math major is become a high school teacher. While it is true that quite a number of our math students at UT Tyler do go on to become high school teachers, there are many other careers available to math majors. According to a 2009 Wall Street Journal article (<http://online.wsj.com/article/SB123119236117055127.html>), the top three jobs were (in order) mathematician, actuary, and statistician. It is still true today that a major in mathematics is the ticket to these three and others among the most interesting and rewarding careers in industry. There are many careers in the computer industry, both in programming and design, which involve mathematical skills and for which mathematics majors are hired. The same is true of many engineering related jobs. Management consulting firms employ a great many math majors on problem solving teams that would usually consist of several people from different areas of math, science and engineering working together to solve a specific problem. Your job, as the math person, would typically be to quantify the problem that is usually badly stated and put it into a form such that the skills of the other members of the team can be put to work on the problem. Of course, as noted above, mathematics is also the track into statistics and actuarial science, and there are many opportunities in the insurance and pharmaceutical industries.

By the way, all of the jobs mentioned in the paragraph above have very nice salaries. Math majors go into industry in the same price range as engineers and accountants.

So it is clear that mathematics is a good choice, and the University of Texas at Tyler is also an outstanding choice. We are a smaller university having only about 10,000 students, and you have the close personal contact with faculty that you find in a small liberal arts school. You also are part of a school with a vibrant research community with faculty in lower level courses who are at the cutting edge of their fields and who are interested in helping undergraduates experience the excitement of new research. You get all this energy and excitement, not at the expense of an Ivy League school, but at the low price of a state school in the University of Texas system.

So, welcome to UT Tyler. I know you are in for a great experience.

Sincerely,

Sheldon W. Davis  
Chair, Mathematics Department

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# FACULTY AND STAFF

## Department Chair



**Sheldon Davis**

**Professor and Chair**

Email: [sdavis@uttyler.edu](mailto:sdavis@uttyler.edu)

Phone: 903.566.7210

Office: RBN 4002

## Administrative Assistant



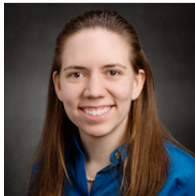
**Lori Wages**

**Administrative Assistant**

Email: [lwages@uttyler.edu](mailto:lwages@uttyler.edu)

Phone: 903.565.5839

Office: RBN 4001

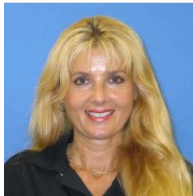


**Katie Anders**

**Associate Professor**

[kanders@uttyler.edu](mailto:kanders@uttyler.edu)

Office: RBN 4046



**Dijana Armstrong**

**Adjunct Instructor**

[darmstrong@uttyler.edu](mailto:darmstrong@uttyler.edu)

Office: RBN 4021



**J. Regan Beckham**

**Associate Professor**

[rbeckham@uttyler.edu](mailto:rbeckham@uttyler.edu)

Office: RBN 4012



**Dessie Camp**

**Adjunct Instructor**

[dcamp@uttyler.edu](mailto:dcamp@uttyler.edu)

Office: RBN 4021



**Chris Chappa**

**Adjunct Instructor**

[cchappa@uttyler.edu](mailto:cchappa@uttyler.edu)

Office: RBN 4021

**Andrew Davis**

**Adjunct Instructor**

[andrewdavis@uttyler.edu](mailto:andrewdavis@uttyler.edu)

Office: RBN 4021



**Madeline Dawsey**  
 Assistant Professor  
[mdawsey@uttyler.edu](mailto:mdawsey@uttyler.edu)  
 Office: RBN 4048



**Christy Graves**  
 Professor  
[cgraves@uttyler.edu](mailto:cgraves@uttyler.edu)  
 Office: RBN 4013



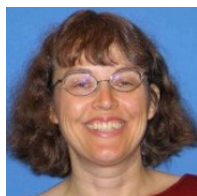
**Stephen Graves**  
 Associate Professor  
[sgraves@uttyler.edu](mailto:sgraves@uttyler.edu)  
 Office: RBN 4011

**Jack Grisham**  
 Adjunct Instructor  
[jgrisham@uttyler.edu](mailto:jgrisham@uttyler.edu)  
 Office: Houston  
 Engineering Center

**Rajat Gupta**  
 Postdoctoral Fellow  
[rgupta@uttyler.edu](mailto:rgupta@uttyler.edu)  
 Office: RBN 4038



**Gayathri Kambhampati**  
 Lecturer  
[gkambhampati@uttyler.edu](mailto:gkambhampati@uttyler.edu)  
 Office: RBN 4044



**Deborah Koslover**  
 Professor of  
 Instruction  
[dkoslover@uttyler.edu](mailto:dkoslover@uttyler.edu)  
 Office: RBN 4010



**Noah Lebowitz-Lockard**  
 Post-Doctoral Fellow  
[nlebowitzlockard@uttyler.edu](mailto:nlebowitzlockard@uttyler.edu)  
 Office: RBN 4038



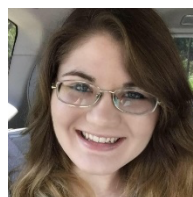
**Traci Mayo**  
 Adjunct Instructor  
[tmayo@uttyler.edu](mailto:tmayo@uttyler.edu)  
 Office: RBN 4021



**Fara Meza**  
 Lecturer  
[fmeza@uttyler.edu](mailto:fmeza@uttyler.edu)  
 Office: RBN 4049



**David Milan**  
 Professor  
[dmilan@uttyler.edu](mailto:dmilan@uttyler.edu)  
 Office: RBN 4006



**Robin Ragland**  
 Adjunct Instructor  
[rragland@uttyler.edu](mailto:rragland@uttyler.edu)  
 Office: RBN 4021

**Danish Rehman**  
Adjunct Instructor  
[drehman@uttyler.edu](mailto:drehman@uttyler.edu)  
Office: RBN 4021



**Joseph Vandehey**  
Assistant Professor  
[jvandehey@uttyler.edu](mailto:jvandehey@uttyler.edu)  
Office: RBN 4004

**Himanshu Singh**  
Visiting Assistant  
Professor  
[hsingh@uttyler.edu](mailto:hsingh@uttyler.edu)  
Office: RBN 4008

**Joseph Webster**  
Adjunct Professor  
[josephwebster@uttyler.edu](mailto:josephwebster@uttyler.edu)  
Office: RBN 4021



**Nathan Smith**  
Associate Professor  
[nsmith@uttyler.edu](mailto:nsmith@uttyler.edu)  
Office: RBN 4007

**Jie Zeng**  
Visiting Assistant  
Professor  
[jzeng@uttyler.edu](mailto:jzeng@uttyler.edu)  
Office: RBN 4005

## GENERAL INFORMATION

The Department of Mathematics is located on the fourth floor of the Ratliff Building North (RBN). This is the place where a majority of your classes in mathematics will take place.

Department of Mathematics  
3900 University Blvd.  
Tyler, TX 75799  
<https://www.uttyler.edu/math/>

All math faculty and staff have offices located on the fourth floor. You can find office numbers on pages 1 – 3. If you have any questions about particular classes, stop by your instructor's office and ask, or contact them through email.

Lori Wages, our department administrative assistant, can be found in RBN 4001. She will help you with general questions related to how to navigate the complexities of administrative matters such as obtaining permission codes, adding or dropping classes, finding classes, etc. You can also contact Ms. Wages by phone at 903-565-5839 or by email at [lwages@uttyler.edu](mailto:lwages@uttyler.edu).

The Math Learning Center (MLC) is centrally located in RBN 4021. The MLC serves multiple purposes. It is a free drop-in tutoring center for math classes through first year Calculus. It is a place to study between classes. And it is a place to meet with your fellow students in study groups. Computers are available to check your email and to do your math related homework. The math major lounge is a room located off the MLC where you can relax with your colleagues.

### Advising

Every math major should regularly see a Department of Mathematics advisor. An advisor will help you to pick your courses so that you will graduate in a timely fashion. You may obtain an advisor by contacting Lori Wages (see above), asking your choice of a faculty member if they are available to advise, or attending a Department of Mathematics open house. You are free to change your advisor at any time. Important advising documents are found at the end of this document on pages 16 – 22. We recommend that you bring this document with you during advising sessions. However, if it is not available, that's okay.

My advisor is \_\_\_\_\_

Email address \_\_\_\_\_

## **Additional Advising Information for Teachers-to-be**

As was mentioned in the Chair's Welcome, a math major is the appropriate vehicle for those students interested in teaching secondary mathematics. To teach mathematics in a high school setting, you will need to earn a teacher certification from the state of Texas. In addition to the courses required for the B.S. in Mathematics, students interested in earning a teacher certification will need to take the courses toward that end, an up-to-date list of which is kept in the department's advising packet materials. The teacher certification courses are offered as part of the UTeach program, not the Department of Mathematics, and students seeking teaching certification should be sure to talk to an advisor from the UTeach program.



## WHERE CAN YOU GET HELP WITH YOUR CLASSES?

**Your Instructor's Office Hours** – Every instructor sets aside several hours a week to help students. You will find the times on the syllabus for your class. If you come to the office and your instructor looks busy, don't leave. If no student comes to office hours, faculty will find work to fill up the time, but the time is set aside for you.

However, you should keep in mind that the time is reserved for all students in the class. You won't get a private tutoring session. So, come prepared. If you have questions about material in class, have your questions ready. If you need help with your homework, bring your attempts. Often you will be making a minor mistake, and if the instructor can see your work, he or she can quickly resolve your problem.

If you want to meet with your professor but can't make it to office hours, you should email the professor and let them know so you can agree on a time to meet. Your professor's email address is listed in the course syllabus and can be found here on pages 1 – 3.

When emailing a professor, remember to be polite, clear, and concise. Use the correct title and name for the greeting (go with whatever they have told you; if you're not sure, "Professor [Last Name]" is always a safe bet), and sign the email with your full name. Also, be sure to state which class you are taking. Your professor may be teaching more than one section. Here's a sample email to a professor:

Dear Professor [your professor's last name],

I am in your 9:05 MWF Calculus class. I am having a little trouble understanding how to use the chain rule when finding derivatives. If you have some time in the next week or so, I would like to meet with you to look at a few problems to clarify this. I will be available from 1 - 5 next Tuesday and 10:30 - 12 Monday and Wednesday. Thank you for your time!

**Mathematics Learning Center (MLC)** – The MLC (RBN 4021) provides free tutoring Monday through Friday. Primarily, tutors can help with classes through MATH 2414 Calculus II. You can work on your homework in the MLC and then call over the tutor for help. Or, work with a study group and call over a tutor when the group has questions. You can find the MLC schedule at <https://uttyler.instructure.com/courses/11806>. You will need to create an MLC Canvas account. Or contact Dr. Koslover at [dkoslover@uttyler.edu](mailto:dkoslover@uttyler.edu) to create an account for you.

If you need help with a higher-level course, there will often be tutors or other students in the MLC that can help. However, you may need to try at different times during the day to find someone knowledgeable in your class's material.

**Supplemental Instruction (SI)** – Many courses through Calculus II are assigned a Supplemental Instructor. SI is a series of weekly peer-assisted study sessions in courses identified by previous students as difficult. The sessions are guided by an SI leader and are proven to be effective. UT Tyler students participating in SI have consistently demonstrated higher grades and course completion rates.

**SI sessions are:**

- ☐ Designed to help improve study skills with the goal of improving grades.
- ☐ A collaborative effort among classmates to compare notes, discuss important concepts, develop strategies to study the subject, and test themselves before the professor does.
- ☐ FREE and voluntary for students who want to improve their understanding of course material and content.

If your class is assigned an SI leader, the leader will visit your class and give you information on when sessions will be held. If your class is not assigned an SI leader, you can attend sessions for other classes, but the material may be presented a day or two out of sync from when it is presented in your class. In this case, you can find information about where SI sessions will be held at <https://www.uttyler.edu/si/>.

**The PASS (Patriot Academic Success Services) Tutoring Center** is a free walk-in tutoring center, with an individual appointment option, for current UT Tyler students. Currently support for 20 courses is being offered in a variety of subjects. The subject areas and courses were chosen from those with historically high failure and withdrawal rates at UT Tyler.

For appointments: Please go to [www.uttyler.edu/tutoring/upswing/](http://www.uttyler.edu/tutoring/upswing/) or email the tutoring center ([tutoring@uttyler.edu](mailto:tutoring@uttyler.edu)) with the course name and number you wish to be tutored in as well as the preferred appointment availability (within the time frame of our open office hours) and you will be contacted. When visiting the center, make sure to bring your textbook and any notes you may have, so the tutors can best serve you.

You can make appointments for up to 60 minutes.

**Math courses supported by the PASS Tutoring Center**

- ☐ College Algebra – MATH 1314
- ☐ Statistics – MATH 1342
- ☐ Precalculus – MATH 2312
- ☐ Calculus I – MATH 2413
- ☐ Calculus II – MATH 2414
- ☐ Ordinary Differential Equations – MATH 3305

# BEYOND TAKING CLASSES

## Departmental Undergraduate Research Opportunities

Research in mathematics involves taking a deep dive into a subject to understand it better, ask new and innovative questions, and prove new theorems expanding our knowledge of the field. There are a few ways that undergraduate students can participate in this type of research at UT Tyler, and several of our former students have chosen to do so with a lot of success. In addition to giving you a deeper understanding of a subject and an opportunity to contribute something new to mathematics, doing undergraduate research can strengthen your résumé or CV, which is especially important if you are planning to attend graduate school.

Below are some examples of the topics investigated by UT Tyler students in the past, along with their faculty advisor. These topics come from Combinatorics, Graph Theory, Algebra, and Topology. Several of these research topics resulted in published academic papers.

- ❑ Groupoid Equivalence for Graph Groupoids (LaLonde)
- ❑ Pattern-restricted Quasi-Stirling Permutations (Archer)
- ❑ Inverse Semigroups of Self-Similar Graph Actions (Milan)
- ❑ Uniformly Most Reliable Two-Terminal Graphs (Graves)
- ❑ Polynomials associated with integer partitions (Dawsey)
- ❑ Graph Splines and the Universal Difference Property (Anders)

## Research and Internship Opportunities Beyond the University

There is now a wide variety of research opportunities and internships available for STEM students. STEM stands for science, technology, engineering, and mathematics. Some of these opportunities are with government agencies, some take place on university campuses, and others are in the corporate sector. You should take advantage of one or more of these programs while you are an undergraduate. The experience will help you decide what you want to do after graduation, and it will look great on your résumé. If you plan to go to graduate school but can't decide between a master's degree and a doctorate, a research experience can really help make that decision.

Note that some of the programs listed below offer fall and spring options in addition to summer options. There are typically more applicants for summer spots, so if you apply for summer and aren't accepted, consider applying again but for the fall or spring.

Below are research opportunities for STEM majors.

- ☐ [Department of Energy National Laboratories](#)
- ☐ [Department of the Navy Laboratories](#)
- ☐ [MD Anderson Summer Program in Cancer Research](#)
- ☐ [NASA](#)
- ☐ [National Institute for Standards and Technologies](#) (NIST)
- ☐ [National Science Foundation's Research Experiences for Undergraduates](#) (REU)
- ☐ [Student Programs in Intelligence Careers](#)
- ☐ [University of Texas System's Louis Stokes Alliance for Minority Participation](#) (LSAMP)

Listed below are Fortune 500 companies with internship programs in the DFW metroplex.

- ☐ American Airlines
- ☐ AT&T
- ☐ Game Stop
- ☐ JC Penney
- ☐ Southwest Airlines
- ☐ Texas Instruments

There are nineteen Fortune 500 companies headquartered in Houston and two in The Woodlands. This is more than any other US city except NYC. The companies listed below are Fortune 500 companies with internship programs in Houston.

- ☐ Anadarko
- ☐ ConocoPhillips
- ☐ Halliburton
- ☐ Phillips 66

The following Fortune 500 companies have internship opportunities in San Antonio.

- ☐ Andeavor (also in El Paso)
- ☐ USAA (also in Plano)
- ☐ Valero

For additional corporate internship opportunities, consult one of the UT Tyler Career Success Coaches.

- ☐ Dawn Dearion, [ddearion@uttyler.edu](mailto:ddearion@uttyler.edu)
- ☐ Pamela Rodriguez, [prodriguez@uttyler.edu](mailto:prodriguez@uttyler.edu)
- ☐ Mark Stark, [mstark@uttyler.edu](mailto:mstark@uttyler.edu)
- ☐ Amy Russo, [arusso@uttyler.edu](mailto:arusso@uttyler.edu)

## Clubs

**Math Club** is a student led organization where you can sit back and enjoy math without any homework. We meet every other week on Wednesdays at 12:20 – 1:15 PM. During a typical week we have a speaker give a talk on topics of general interest to the mathematics community. Most talks are fully understandable by students who have taken first year calculus, but even if you haven't taken calculus yet, you will be able to understand most of the material. We also provide a free lunch.

Other Math Club activities include a Welcome Back Ice Cream Social, a pre-Thanksgiving potluck, math game days, an annual Calculus Bee, and a Senior Send-off. Everyone is welcome to join us for any event, although some may require an RSVP. If you are interested in planning events or being an officer in the Math Club contact the faculty advisor Dr. Vandehey at [jvandehey@uttyler.edu](mailto:jvandehey@uttyler.edu).

For information about upcoming events go to <https://uttyler.instructure.com/courses/25468> and sign-up for a Canvas Math Club account. (Or contact Dr. Koslover at [dkoslover@uttyler.edu](mailto:dkoslover@uttyler.edu) to create an account for you.) Or watch for posters in the hallways of the Math Department.

**Women in Math and Science (WIMS)** at UT Tyler is a student organization supporting women in biology, chemistry, mathematics, physics, and related fields. WIMS is a community of UT Tyler students and faculty that hosts events each semester to foster fellowship and to encourage research and participation in mathematics and science. Events include inviting female mathematical scientists to speak at UT Tyler about their experiences, careers, and research; participating in community outreach, for example at the Discovery Science Place (<https://www.discoveryscienceplace.org/>) to inspire girls to learn, appreciate, and enjoy math and science from a young age; and organizing group study sessions, movie nights, arts and crafts, and other fun activities. Contact Dr. Dawsey at [mdawsey@uttyler.edu](mailto:mdawsey@uttyler.edu) for more information.

## Competitions

### **The Putnam Exam**

The William Lowell Putnam Mathematical Competition is an annual event for undergraduate college students taking place on the first Saturday of December. The competition consists of two 3-hour sessions, one in the morning and one in the afternoon. Each session consists of 6 challenging but fun mathematical problems. UT Tyler fields a team of competitors each year. The team has weekly practice sessions during the fall semester to work practice problems and discuss problem solving strategies. Contact Dr. David Milan at [dmilan@uttyler.edu](mailto:dmilan@uttyler.edu) for more information about the Putnam team.

### **Simiode and COMAP Math Modeling Competitions**

Both the Simiode Challenge and COMAP Mathematical Contest in Modeling (CMCM) involve undergraduates solving open-ended mathematical problems in teams. The Simiode Challenge is an annual exam in which teams of undergraduates are tasked with modeling real-world problems using differential equations. Each team presents their solution to a panel of judges who score the work based on the strategy and accuracy of the model and how well the model is communicated. Contact Dr. Regan Beckham at [rbeckham@uttyler.edu](mailto:rbeckham@uttyler.edu) for more information.

COMAP's Mathematical Contest in Modeling is an international contest in which undergraduate students work in teams to apply mathematical concepts to real-world problems. Each team chooses one of six open-ended problems and writes a comprehensive solution. A number of prizes and awards are given to the top teams, and participation in the contest is an impressive résumé credential. The contest takes place in February. Contact Dr. David Milan at [dmilan@uttyler.edu](mailto:dmilan@uttyler.edu) for more information.

# WHAT CAN YOU DO WITH YOUR MATH DEGREE?

There are many careers available to college graduates with mathematics degrees. Employers understand that math is not an easy major, and a degree in math is valued for the critical thinking skills that come with it beyond anything else. It's like having a degree in how to think and problem solve!

Listed below are careers that our UT Tyler math graduates have pursued.

- ☐ Actuary
- ☐ Auditor
- ☐ Accounting Assistant
- ☐ Chartered Financial Analyst
- ☐ Commercial/Consumer Lending Assistant
- ☐ Data Scientist
- ☐ Director of Administration
- ☐ Farmer
- ☐ Financial Advisor
- ☐ Financial Analyst
- ☐ Mapping Specialist in Engineering Operations
- ☐ Oil & Gas Lawyer
- ☐ Pay Analyst
- ☐ Perioperative Business Analyst
- ☐ Petroleum Analyst
- ☐ Pilot in the US Navy
- ☐ Product Integrator in Business Performance
- ☐ Production Manager in Agriculture
- ☐ Project Analyst
- ☐ Project Coordinator
- ☐ Senior Category Manager in Accounting
- ☐ Service and Warranty Analyst
- ☐ Software Developer
- ☐ Software Development Consultant
- ☐ Software Engineer

Of course, you can also teach with a math degree! Many of our B.S. Mathematics graduates teach high school. If you want to teach at a community college, you will also need a master's degree. If you want to teach at a university, you'll need at least a master's degree and likely a PhD. Listed below are some of the high schools, colleges, and universities where our former students teach.

- ☐ Eanes Westlake High School of Austin
- ☐ Early College High School of Tyler
- ☐ Emmanuel College of Boston
- ☐ Georgia Tech University
- ☐ Gilmer High School
- ☐ Hallsville High School
- ☐ Hawkins High School
- ☐ Kilgore College
- ☐ Lone Star College
- ☐ Malakoff High School
- ☐ Pine Tree High School
- ☐ St. Edwards University
- ☐ Tyler Junior College
- ☐ University of Oklahoma
- ☐ University of Texas at Tyler
- ☐ Virginia Tech University
- ☐ Whitehouse High School



## WHAT IF I WANT TO FURTHER MY EDUCATION?

As a math major, you will have many opportunities to further your education after finishing your bachelor's degree! A math degree is the gateway to many areas of graduate study, including statistics, pure math, applied math, data analytics, actuarial science, biomedical statistics, mathematical physics, education, and applied engineering and mechanics. Pairing a math degree with the required prerequisites also forms a solid foundation for law school, medical school, and other professional health programs.

Listed below are some of the universities our math students have attended for graduate work in mathematics and other closely related fields.

- ☐ Kansas State University
- ☐ New Mexico State University
- ☐ University of North Texas
- ☐ Ohio University
- ☐ Oregon State University
- ☐ Tufts University
- ☐ University of California, Los Angeles
- ☐ University of Houston
- ☐ University of Illinois at Urbana-Champaign
- ☐ University of Nebraska
- ☐ University of Oklahoma
- ☐ University of Texas at Dallas
- ☐ University of Texas at San Antonio
- ☐ University of Texas at Tyler
- ☐ University of Utah

Keep in mind that law schools accept students from ANY undergraduate major. The coursework involved in a math degree is excellent training for the Law School Admissions Test (LSAT). According to the 2018 Law School Admissions Council's Report, among all majors, the average score on the LSAT was highest for mathematics. For pre-law advising, contact Dr. Eric Lopez at [elopez@uttyler.edu](mailto:elopez@uttyler.edu).

A mathematics degree is also excellent preparation for the Medical College Admissions Test (MCAT). Data from the Association of American Medical Colleges shows that, among all majors, the average score on the MCAT was highest for mathematics. We're winning on both the LSAT and the MCAT! If you have your eye on medical school, make sure you fulfill all the required prerequisite courses. For pre-med advising or to join the UT Tyler Pre-Med Academy, contact [pmed@uttyler.edu](mailto:pmed@uttyler.edu).

## AWARDS TO WHICH YOU CAN ASPIRE

### **Pi Mu Epsilon National Mathematics Honor Society**

Pi Mu Epsilon is a non-secret organization whose purpose is the promotion of scholarly activity in mathematics among students in academic institutions. It aims to do this by 1) electing members on an honorary basis according to their proficiency in mathematics, 2) engaging in activities designed to promote the mathematical and scholarly development of its members, and 3) taking any other measures which will further the purpose stated above.

A chapter of Pi Mu Epsilon may be chartered only in an academic institution whose standards are excellent in all liberal arts departments and particularly in mathematics. In order to qualify for a Chapter, the petitioning institution must be of university grade as indicated by the high quality of its faculty, academic standards, and equipment; and must be capable of conserving the standards of the society and spreading its scholarly spirit and ideals.

To qualify for membership in Pi Mu Epsilon, you must have taken Calculus I and II, and at least two courses beyond those. Your overall GPA must be at least 3.0 and your math GPA must be at least 3.0. Courses currently in progress don't count.

### **The Cranford Award**

In honor of Dr. Robert Cranford's thirty-two years of outstanding dedication to the UT Tyler Mathematics Department as the Chair, the Mathematics Department established the Cranford Scholar Award.

Each year the mathematics faculty chooses from among the eligible mathematics majors one who is not only a superior scholar but who also has contributed to the UT Tyler mathematics community. This encompasses attributes such as class participation, research projects, and Math Club activities. The winner receives a prize from the Math Club and has their name engraved on a plaque located by the elevators.

All mathematics majors planning to graduate in the given calendar year whose GPA is 3.0 or higher and who have earned all A's and B's in mathematics courses are automatically eligible for consideration.

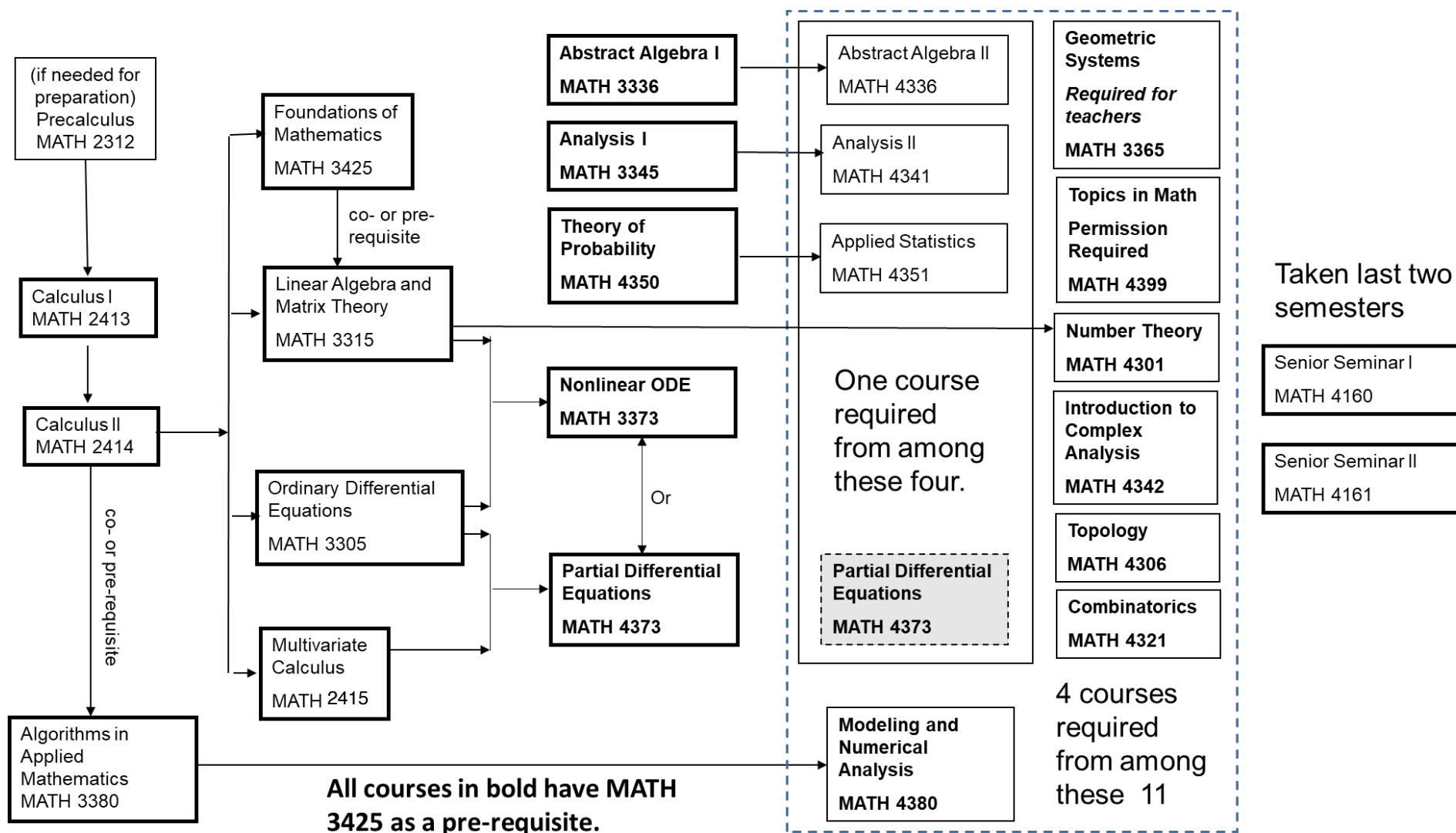
# MATHEMATICS DEGREE CHECKLIST

## Requirements to graduate:

1. All math majors must take every course at levels 1 and 2.
2. All math majors must take 4 courses at level 3, only including one of Nonlinear ODE and PDE.
3. All math majors must take 4 courses at level 4, at least one of which must be 4336, 4341, 4351, or 4373.
4. Students taking both 3373 and 4373 may count one at level 3 and one at level 4.
5. All majors must take both 4160 and 4161.
6. This amounts to 15 courses (43 hours) in the upper division. Transferring level 3 or 4 courses numbered at the 2000 level from junior colleges will waive the requirement for that course but require that you take additional courses numbered  $\geq 3000$  to obtain the required 42 upper division hours needed to graduate.

Level	Course Number	Name	Prereqs	Offered
1	Math/Honors 2413	Calculus I	2312	F(H), S, Su
1	Math/Honors 2414	Calculus II	2413	F, S(H)
2	Math/Honors 2415	Multivariate Calculus	2414	F(H), S
2	Math 3305	Ordinary Differential Eqs	2414	F, S
2	Math 3380	Algorithms in Applied Math	Coreq 2414	S
2	Math 3425	Foundations of Mathematics	2414	F, S
2	Math 3315	Linear Algebra	Coreq 3425	F
3	Math 3336	Abstract Algebra I	3425	S
3	Math 3345	Analysis I	3425	F
3	Math 4350	Probability Theory	3425	F
3/4	Math 3373	Nonlinear ODE	3425, 3305, 3315	S
3/4	Math 4373	Partial Differential Eqs	3425, 3305, 2415	F (even)
4	Math 4336	Abstract Algebra II	3336	F (odd)
4	Math 4341	Analysis II	3345	S (odd)
4	Math 4351	Applied Statistics	4350	S (odd)
4	Math 3365	Geometric Systems	3425	S
4	Math 4301	Number Theory	3425	F (even)
4	Math 4306	Topology	3345	S (even)
4	Math 4321	Combinatorics	3425	S (odd)
4	Math 4342	Intro to Complex Analysis	3345	F (odd)
4	Math 4380	Modeling & Numerical Analysis	3380, 3425	F (periodically)
4	Math 4399	Topics in Mathematics	3425, Permission	Periodically
SS	Math 4160	Senior Seminar I	Final 2 Semesters	F, S
SS	Math 4161	Senior Seminar II	4160	F, S

# MATHEMATICS DEGREE FLOWCHART



# RECOMMENDED 4-YEAR CURRICULUM

For students ready for Calculus I

## Freshman Year

Fall Semester				Credit Hours	Spring Semester				Credit Hours
			Core Communication 1	3				Core Communication 2	3
MATH	2413		Calculus I	4	MATH	2414		Calculus II	4
PHIL	2303		Intro to Logic	3				Core Creative Arts	3
			Core Social/Behavior Sci	3	MATH	3380		Algorithms in Applied Math	3
			Core Human Expression	3				Core STEM*	3
			<b>Total Semester Hours</b>	<b>16</b>				<b>Total Semester Hours</b>	<b>16</b>

## Sophomore Year

MATH	2415	Multivariate Calculus	4	MATH	3336	Abstract Algebra I	3
MATH	3315	Linear Algebra	3	MATH	3305	Ordinary Differential Eqs	3
MATH	3425	Foundations of Math	4			Minor or Elective Course(s)	6
HIST	1301	US History I	3	HIST	1302	US History II	3
		<b>Total Semester Hours</b>	<b>14</b>			<b>Total Semester Hours</b>	<b>15</b>

## Junior Year

MATH	3345	Real Analysis I	3	MATH	3373	Advanced ODEs	3
MATH	4350	Theory of Probability	3	MATH		Upper Level Math Elective	3
POLS	2305	Intro American Govt	3	POLS	2306	Introductory Texas Politics	3
PHYS	2325	University Physics I with	4	PHYS	2326	University Physics II with	4
	2125	Lab			2126	Lab	
		Minor or Elective Course(s)	3			Minor or Elective Course(s)	3
		<b>Total Semester Hours</b>	<b>16</b>			<b>Total Semester Hours</b>	<b>16</b>

## Senior Year

MATH	4160	Senior Seminar I	1	MATH	4161	Senior Seminar II	1
MATH		Upper Level Math Elective	3	MATH		Upper Level Math Elective	3
MATH		Upper Level Math Elective	3			Minor or Elective Course(s)	10
		Minor or Elective Course(s)	6			<b>Total Semester Hours</b>	<b>14</b>
		<b>Total Semester Hours</b>	<b>13</b>				

**Total Hours must equal at least 120 hours.**

\*Do not select Physics I or II for STEM course.

Every student should consult the academic requirements section of [my.utttyler.edu](http://my.utttyler.edu) to confirm general university requirements (in residence hours, total hours, upper division elective hours, etc.)

[See an advisor for more details](#)

# RECOMMENDED 4-YEAR CURRICULUM

For students ready for Calculus I and pursuing a teaching credential

## Freshman Year

Fall Semester				Credit Hours	Spring Semester				Credit Hours
		Core Communication I		3					
MATH	2413	Calculus I		4	MATH	2414	Calculus II		4
PHIL	2303	Intro to Logic		3	MATH	3380	Algorithms in Applied Math		3
POLS	2305	Intro American Govt		3	POLS	2306	Introductory Texas Politics		3
		Core Human Expression		3			Core Communication 2		3
							Core STEM*		3
EDUT	1170	St 1: Inquiry Approach		1					
EDUT	2170	St 2: Inquiry-Based Lessons		1					
<b>Total Semester Hours</b>				<b>18</b>	<b>Total Semester Hours</b>				<b>16</b>

## Sophomore Year

MATH	3425	Foundations of Math	4	MATH	2415	Multivariate Calculus	4
MATH	3315	Linear Algebra	3	MATH	3305	Ordinary Differential Eqs	3
		Core Creative Arts	3	MATH	3336	Abstract Algebra I	3
HIST	1301	US History I	3	CHEM	3370	Perspectives on Sci & Math	3
EDUT	3370	Knowing and Learning Math & Science	3	HIST	1302	US History II	3

## Junior Year

MATH	3345	Real Analysis I	3
MATH	4350	Theory of Probability	3
		Core Social/Behavior Sci	3
BIOL	1306	General Biology I	3
EDUT	3371	Classroom Interactions**	3
Total Semester Hours			15

MATH	3373	Advanced ODEs	3
MATH	3365	Geometric Systems	3
MATH		Upper Level Math Elective	3
MATH		Upper Level Math Elective	3
MATH	4160	Senior Seminar I	1
BIOL	1307	General Biology II	3
Total Semester Hours			16

## Senior Year

MATH	4161	Senior Seminar II	1	EDUC	4640	Clinical Teaching	6
MATH	_____	Upper Level Math Elective	3	EDUT	4170	Apprentice Teaching Sem	<u>1</u>
CHEM	3360	Research Methods	3				
	_____	Minor or Elective Course(s)	6				
EDUC	4370	Project-Based Instruction**	<u>3</u>				

**Total Hours must equal at least 120 hours.**

\*Do not select Biol I or II for STEM course.

\*\*EDUT 3371 and EDUC 4370 may be taken in the opposite order

Every student should consult the academic requirements section of [my.utttyler.edu](http://my.utttyler.edu) to confirm general university requirements (in residence hours, total hours, upper division elective hours, etc.)

[See an advisor for more details.](#)

# RECOMMENDED 4-YEAR CURRICULUM

## For Math and Computer Science Double Majors

### Freshman Year

Fall Semester				Credit Hours	Spring Semester				Credit Hours
			Core Communication 1	3				Core Communication 2	3
MATH	2413		Calculus I	4	MATH	2414		Calculus II	4
PHIL	2303		Intro to Logic	3				Core Creative Arts	3
COSC	1336		Programming Fundamentals	3	MATH	3380		Algorithms in Applied Math	3
			Core Human Expression	3	COSC	1337		Object Oriented Paradigm	3
			<b>Total Semester Hours</b>	<b>16</b>				<b>Total Semester Hours</b>	<b>16</b>

### Sophomore Year

MATH	2415		Multivariate Calculus	4	MATH	3336		Abstract Algebra I	3
MATH	3425		Foundations of Math	4	MATH	3305		Ordinary Differential Eqs	3
MATH	3315		Linear Algebra	3	COSC	2315		Computer Organization	3
COSC	2336		Data Structure & Algorithm	3	COSC	4315		Information & Knowledge	3
HIST	1301		US History I	3	COSC	4385		Database Mgmt Concepts	3
			<b>Total Semester Hours</b>	<b>17</b>				<b>Total Semester Hours</b>	<b>15</b>

### Junior Year

MATH	3345		Real Analysis I	3	MATH	3373		Advanced ODEs	3
MATH	4350		Theory of Probability	3	MATH			Upper Division Elective	3
COSC	3345		Computer Architecture	3	COSC	3355		Operating Systems	3
PHYS	2325		University Physics 1 with	4	PHYS	2326		University Physics II with	4
	2125		Lab			2126		Lab	
COSC			Upper Division Elective	3	POLS	2306		Introductory Texas Politics	3
			<b>Total Semester Hours</b>	<b>16</b>				<b>Total Semester Hours</b>	<b>16</b>

### Senior Year

MATH	4160		Senior Seminar I	1	MATH	4161		Senior Seminar II	1
MATH			Upper Division Elective	3	MATH			Upper Division Elective	3
COSC	3325		Algorithm Analy & Found.	3	COSC	3315		Social & Prof Issues	3
COSC	4336		Software Development	3	COSC			Upper Division Elective	3
COSC	4360		Net-Centric Computing	3	COSC			Upper Division Elective	3
			Lab Science III		COSC	4395		Capstone Project	3
			<b>Total Semester Hours</b>	<b>17</b>				<b>Total Semester Hours</b>	<b>16</b>

### Summer Courses (may be taken any summer)

ECON	2301		Principles of Macroecon.	3	POLS	2305		Introductory Amer Govt	3
	Or								
	2302		Principles of Micro econ						
HIST	1302		US History II	3	MANA	3370		Business Writing & Present	3
								<b>Total Summer Hours</b>	<b>12</b>

See an advisor for more details.

## UNDERGRADUATE MATH MAJOR COURSES

**MATH 2312 - Precalculus** [TCCN: MATH 2312]: A survey of college algebra, trigonometry and analytical geometry to prepare students for calculus. Topics include algebraic functions and their graphs, exponential and logarithmic functions, trigonometric functions and identities, two- and three-dimensional analytical geometry. Credit not given for both MATH 2312 and MATH 1316. Prerequisite: Appropriate score on ACT, SAT or TSI.

**MATH 2413 - Calculus I** [TCCN: MATH 2413]: A study of functions, limits, continuity, differentiation of algebraic and trigonometric functions, applications of the derivative, definite and indefinite integrals with applications. Prerequisite: Satisfactory math score on SAT, ACT or THEA and "C" or better in MATH 1316, or passing score on departmental trigonometry test, or "C" or better in MATH 2312.

**MATH 2414 - Calculus II** [TCCN: MATH 2414]: A study of differentiation and integration of transcendental functions, polar coordinates, techniques of integration, sequences, series, indeterminate forms, improper integrals. Prerequisite: MATH 2413.

**MATH 2415 - Multivariate Calculus**: Vector calculus in Euclidean  $n$ -space, functions of several variables, partial differentiation and multiple integration. Prerequisite: MATH 2414.

**MATH 3305 - Ordinary Differential Equations**: Study of ordinary differential equations. Emphasis is given to equations of the first order, linear equations, and solution by series. Prerequisite: MATH 2414.

**MATH 3315 - Linear Algebra and Matrix Theory**: Study of finite dimensional vector spaces and linear transformations. Emphasis is given to the basic theory of matrices. Co- or Prerequisite: MATH 3425. Students may not receive credit for both MATH 3315 and MATH 3203.

**MATH 3336 - Abstract Algebra I**: Study of groups, rings, fields, and vector spaces. Prerequisite: MATH 3425.

**MATH 3345 - Real Analysis I**: Study of metric spaces, sequences, series, continuous functions, differentiation, and integration. Prerequisite: MATH 2414 and MATH 3425.

**MATH 3365 - Geometric Systems**: Study of Euclidean and non-Euclidean geometries. Prerequisite: MATH 3425.

**MATH 3373 - Advanced Ordinary Differential Equations**: This course explores topics in applied mathematics as they pertain to the physical sciences. Topics include linear and nonlinear systems, phase plane analysis, study of bifurcations, transform methods, mechanics, and chaos, with a focus on theoretical development and physical application. Prerequisite: MATH 3305, MATH 3203 or MATH 3315, MATH 3425.

**MATH 3380 - Algorithms in Applied Mathematics**: Study of applications selected from descriptive statistics, combinatorics, numerical methods, and matrices utilizing the computer. Prerequisite: MATH 2413.

**MATH 3425 - Foundations of Mathematics**: Study of elementary logic, intermediate set theory, relations, functions and countable number systems. Prerequisite: MATH 2414.

**MATH 4160 - Senior Seminar I**: Reviews and integrates concepts from different branches of mathematics in the curriculum. Prerequisite: The student must be within 3 semesters of graduation with a B.S. in mathematics.

**MATH 4161 - Senior Seminar II**: This "capstone" course is designed to evaluate what the student has learned as a math major at UT Tyler and to give the student an opportunity to explore additional mathematical ideas from start to finish outside the classroom with a faculty mentor. Prerequisite: MATH 4160.



**MATH 4195-4395 - Undergraduate Research:** Directed mathematical research on a problem of mutual interest to a student and a mathematics faculty member. An oral presentation and a written report are required at the conclusion of this course. May be repeated for a maximum of six credit hours. Prerequisite: Approval of department chair.

**MATH 4199-4399 - Independent Study:** Independent study in specific areas of mathematics not covered by organized undergraduate courses. A maximum of six credit hours for independent study courses may be applied toward an undergraduate degree. Prerequisite: Consent of department chair.

**MATH 4301 - Number Theory:** A study of the theory of numbers including divisibility, prime numbers, factorization, the Euclidean algorithm, congruences, the Chinese Remainder Theorem, diophantine equations, quadratic residues, quadratic reciprocity, and other topics to be selected by the instructor. Prerequisite: MATH 3425 and MATH 3315.

**MATH 4306 – Topology:** Study of metric spaces and topological spaces with emphasis on compactness, connectedness, covering properties, separation and metrization. Prerequisite: MATH 3345.

**MATH 4321 - Combinatorics/Graph Theory:** Study of combinatorial structures and techniques. Topics may include: graph theory, coloring problems, planarity, paths and cycles, networks, permutations, combinations, recursion, inclusion-exclusion, ordered sets, partial orders, and directed graphs. Prerequisite: MATH 3425 with a C or better.

**MATH 4336 - Abstract Algebra II:** A continuation of MATH 3336 focusing on rings, fields, and vector spaces. Prerequisite: MATH 3336.

**MATH 4341 - Real Analysis II:** Continuation of MATH 3345. Study of metric spaces, sequences, series, continuous functions, differentiation and integration. Prerequisite: MATH 3345.

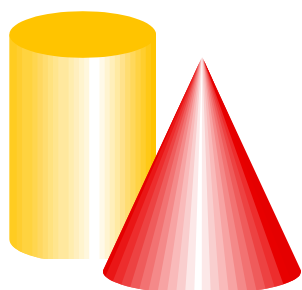
**MATH 4342 - Introduction to Complex Variables:** Study of functions of a complex variable. Emphasis is given to analytic functions, differentiation, integration, and series expansions. Prerequisite: MATH 3425 and MATH 3404.

**MATH 4350 - Theory of Probability:** Study of mathematical probability theory. Emphasis is given to combinatorial analysis, axioms of probability, conditional probability, random variables, density functions, distribution functions, moments, and limit theorems. Prerequisite: MATH 2414 and MATH 3425.

**MATH 4351 - Applied Statistics:** Emphasis on statistical thinking and real world applications. Topics include: experimental design, sampling distributions, confidence intervals, hypothesis testing, regression and correlation, analysis of variance, chi-squared tests, and non-parametric methods. Prerequisite: MATH 4350.

**MATH 4373 - Partial Differential Equations:** Development of mathematical ideas needed to solve problems in the physical sciences, involving partial differential equations. Topics include heat conduction, wave propagation and Laplace equations, use of separation of variables and transform methods to solve boundary value problems, and the development of Sturm-Liouville Theory. Prerequisite: MATH 3305, MATH 3203 or MATH 3315, and MATH 3404.

**MATH 4380 - Modeling and Numerical Analysis:** Study of the development of mathematical models focusing on the numerical analysis which forms the basis for the models. Prerequisite: MATH 3380.



# Add a Math Minor!



**For many majors, it only takes one additional class!**

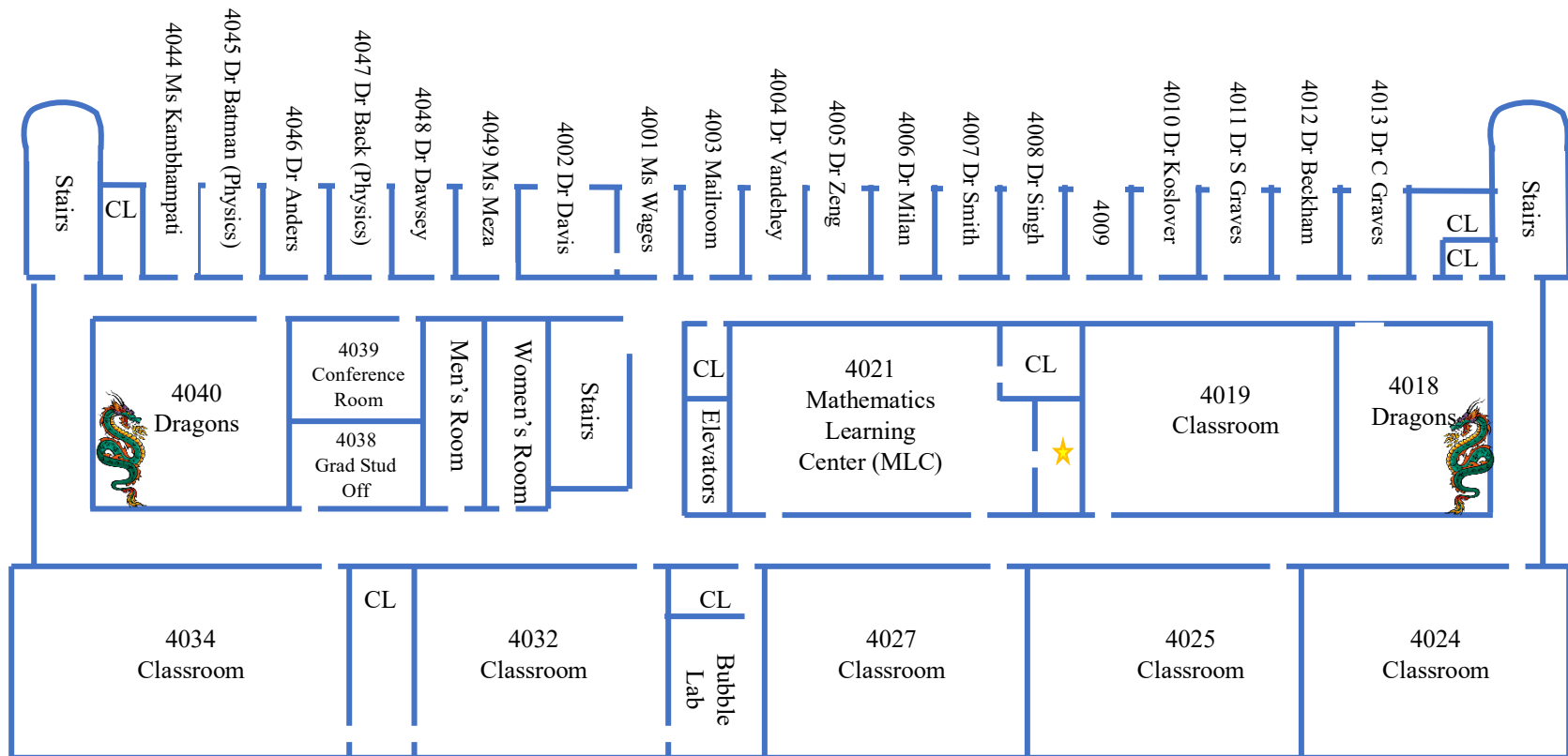
If your major is	Requirements for your major that count toward a math minor	Additional courses to add a math minor
<b>Chemistry</b>	MATH 2413, MATH 2414	MATH 3425 Foundations of Math Two more upper-level courses*
<b>Biochemistry</b>	MATH 2413, MATH 2414, MATH 2415	MATH 3425 Foundations of Math Two more upper-level courses*
<b>Education 4-8 Math Certification</b>	MATH 2413, MATH 3203	MATH 2414 Calculus II MATH 3425 Foundations of Math (in place of MATH 2330) One more course*
<b>Computer Science</b>	MATH 2413, MATH 2414, MATH 3203, MATH 3351	MATH 3425 Foundations of Math (in place of MATH 2330) One more course*
<b>Chemical Engineering</b>	MATH 2413, MATH 2414, MATH 2415, MATH 3305, MATH 3351	MATH 3425 Foundations of Math
<b>Civil Engineering</b>	MATH 2413, MATH 2414, MATH 2415, MATH 3305, MATH 3351	MATH 3425 Foundations of Math
<b>Electrical Engineering</b>	MATH 2413, MATH 2414, MATH 2415, MATH 3203, MATH 3305, MATH 3351	MATH 3425 Foundations of Math
<b>Mechanical Engineering</b>	MATH 2413, MATH 2414, MATH 2415, MATH 3203 or MATH 3315, MATH 3305, MATH 3351	MATH 3425 Foundations of Math

\* Must have a total of 18 credits for minor

To get a math minor, you must complete 18 credits in math, 9 of these in upper level courses. You must take MATH 2413, MATH 2414, and MATH 3425. You may pick the remaining courses from among MATH 2415, MATH 3203, MATH 3305, MATH 3336, MATH 3345, MATH 3351, MATH 3365, MATH 3373, MATH 3380, MATH 4306, MATH 4321, MATH 4336, MATH 4341, MATH 4342, MATH 4350, MATH 4351, MATH 4380.

Contact a math advisor for more information.

Department of Mathematics  
4<sup>th</sup> Floor Raitliff Building North (RBN)  
Old Glory Parkway



★ Math Major Lounge by Day, Adjunct Offices by Night

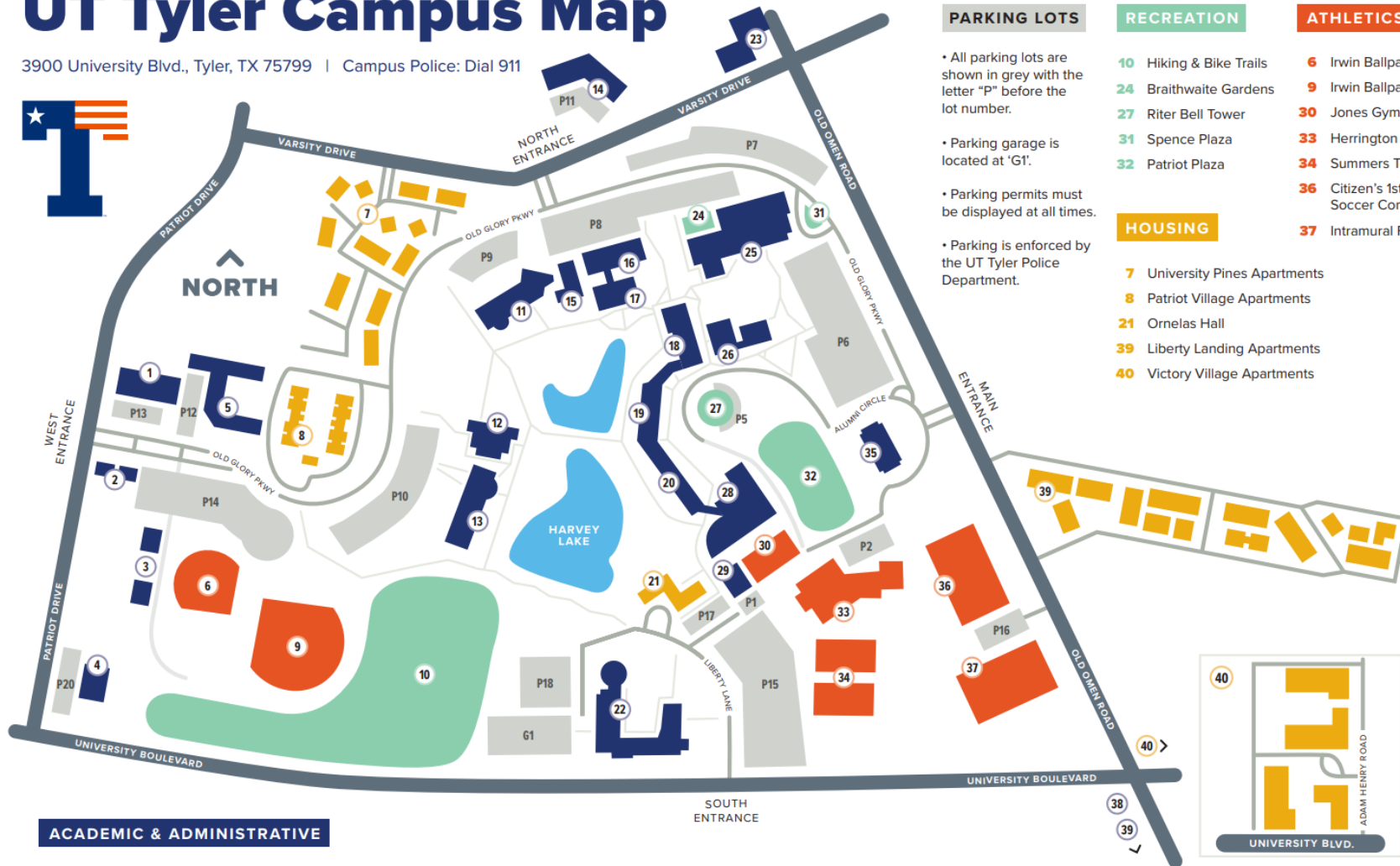
Adjunct Faculty – Ms Armstrong, Ms Camp, Mr Chappa, Mr A. Davis, Ms Mayo, Dr Ragland, Mr Rehman, Mr Webster (4021)

Post-doctoral Faculty – Dr Lebowitz-Lockard, Dr Gupta (4038)

Graduate Student Instructor – Mr Lynn, Ms Melton (4038)

# UT Tyler Campus Map

3900 University Blvd., Tyler, TX 75799 | Campus Police: Dial 911



## ACADEMIC & ADMINISTRATIVE

- |  |   |  |
|--|---|--|
| 1 Physical Plant, Mail Services (PHY)                      | 14 University Service Center (USC)<br>Campus Police   | 22 Soules College of Business (COB)  |
| 2 BAQE Houses (AX4)  | 15 Utility Plant, Campus Utilities (PPN)  | 23 Auxiliary Buildings (AX1) (AX2)   |
| 3 Modular Buildings (MB1) (MB3)                            | 16 Ratliff Building North (RBN)<br>College of Engineering   | 25 R. Don Cowan Fine and Performing Arts Center (FAC)<br>Center for the Musical Arts (CMA) |
| 4 University Health Clinic (UHC)                           | 17 Ratliff Building South (RBS)<br>College of Engineering   | 26 David G. and Jacqueline M. Braithwaite Building (BRB)<br>College of Nursing             |
| 5 Fine Arts Complex (ARC)                                  | 18 Biology, Education & Psychology Building (BEP)<br>College of Education and Psychology, Biology | 28 University Center (UC)  |
| 11 College of Arts and Sciences (CAS)                      | 19 Hudnall-Pirtle-Roosth Building (HPR)   | 29 Utility Plant, Campus Utilities (PPS)   |
| 12 Robert R. Muntz Library (LIB)                           | 20 Stewart Hall (STE)   | 35 Alumni House  |
| 13 W.T. Brookshire Hall (WTB)<br>Fisch College of Pharmacy |   | 38 Ornelas Activity Center (OAC)   |
|  |   | 39 University Academy (UA)   |

## PARKING LOTS

- All parking lots are shown in grey with the letter "P" before the lot number.
- Parking garage is located at 'G1'.
- Parking permits must be displayed at all times.
- Parking is enforced by the UT Tyler Police Department.

## RECREATION

- 10 Hiking & Bike Trails
- 24 Braithwaite Gardens
- 27 Riter Bell Tower
- 31 Spence Plaza
- 32 Patriot Plaza

## HOUSING

- 7 University Pines Apartments
- 8 Patriot Village Apartments
- 21 Ornelas Hall
- 39 Liberty Landing Apartments
- 40 Victory Village Apartments

## ATHLETICS

- 6 Irwin Ballpark (Softball)
- 9 Irwin Ballpark (Baseball)
- 30 Jones Gym (PHE)
- 33 Herrington Patriot Center (HPC)
- 34 Summers Tennis Courts
- 36 Citizen's 1st Bank Perkins Soccer Complex
- 37 Intramural Field

