

Graduate Degrees

The department offers degree programs leading to the Master of Arts and Master of Journalism. For information, consult the *Graduate Catalog* and confer with the journalism graduate studies director.

NT Daily

The award-winning *North Texas Daily*, UNT's student newspaper, provides practical experience for students in all sequences of the Department of Journalism. The Student Publications Committee selects the editor each term/semester, and staff jobs are open to any UNT student. The *Daily* is published four days a week in the fall and spring term/semesters and once a week in the summer. The *Daily* has been providing news and entertainment to UNT students since 1948. For more information, contact the *Daily's* adviser at (940) 565-2205, or visit the *Daily's* web site at www.ntdaily.com.

Courses of Instruction

All Courses of Instruction are located in one section at the back of this catalog.

Course and Subject Guide

The "Course and Subject Guide," found in the Courses of Instruction section of this book, serves as a table of contents and provides quick access to subject areas and prefixes.

Department of Mathematics

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Neal Brand, Chair

Faculty

Professors Alikakos, Brand, Jackson, Johnson, Kallman, Kung, Lewis, Mauldin, Neuberger, Urbanski, Zamboni. *Associate Professors* Allen, Anghel, Bator, Brozovic, Cherry, Clark, Conley, Douglass, Gao, Iaia, Liu, Monticino, Quintanilla, Weller. *Assistant Professors* Allaart, Betelu, Richter, Sari, Shepler. *Lecturers* Grether, Teel.

Introduction

The department offers programs of study leading to the BA, MA, MS and PhD degrees with a major in mathematics, and the BSM. Its faculty is dedicated to excellence in scholarship and teaching. The faculty supports a strong program of instruction and research, having as its core a solid foundation of mathematical theory that furnishes the tools necessary to address and solve crucial problems in maintaining, improving and protecting the world. The program also promulgates mathematics as a discipline in its own right, a body of pure knowledge with exceptional power, enabling its practitioners and those who diligently study it to be adaptable and effective forces in the workplace.

Students who earn degrees in mathematics readily obtain jobs with high-technology companies and in business, industry, government and teaching. Salaries and working conditions compare with those of engineers and scientists.

Students who plan to major in mathematics, physics, chemistry, biology or computer science should have had four years of mathematics in high school, including pre-calculus. Students who are required to take mathematics as part of their degree program in college should have had at least two years of algebra and one year of geometry in high school.

Required Placement and Testing

The Department of Mathematics enforces prerequisites for MATH 1100, 1190, 1350, 1400, 1650 and 1680. Students not meeting prerequisites for courses in which they enroll will be at risk of being administratively dropped from their mathematics classes.

Students who have successfully completed the prerequisites described below will be asked on the first day of class to provide proof in the form of:

- a. a grade report, transcript, or Degree Audit Reporting System (DARS) printout reflecting the transfer course,
- b. an AP or CLEP score report, or
- c. a UNT mathematics department permit form.

Students who cannot provide this proof must pass a placement exam and provide a copy of the results to the instructor.

Prerequisites

- MATH 1100: MATH 1010 with a passing grade, or a UNT mathematics department permit form. A passing THEA mathematics score does not substitute for the MATH 1010 prerequisite.
- MATH 1190, 1350, 1400, 1650, 1680: MATH 1100 or equivalent with grade of C or better, or a UNT mathematics department permit form. MATH 1350 or MATH 1351 does not satisfy the College of Arts and Sciences degree requirement.

Permit Forms

UNT mathematics department permit forms may be obtained in advance of, or during, the first week of classes from the Department of Mathematics during specified office hours.

Programs of Study

The department offers undergraduate and graduate programs in the following areas:

- Bachelor of Arts,
- Master of Arts,
- Master of Science, and
- Doctor of Philosophy, all with a major in mathematics; and
- Bachelor of Science in Mathematics.

Bachelor of Arts

Degree Requirements

1. **Hours Required and General/College Requirements:** A minimum of 128 semester hours, of which 42 must be advanced, and fulfillment of degree requirements for the Bachelor of Arts degree as specified in the “General University Requirements” in the Academics section of this catalog and the College of Arts and Sciences requirements.

2. **Major Requirements:** 34 hours of mathematics courses as follow: MATH 1710, 1720, 2510, 2520, 2700, 2730, 3510 and 4610, plus 9 hours numbered above 3150.

3. **Other Course Requirements:** Four laboratory science courses are required. Two of these must be either BIOL 1710/1730 and 1720/1740 or GEOG 1710 and GEOL 1610. The other two courses must be either PHYS 1710/1730 and 2220/2240 or CHEM 1410/1430 and 1420/1440. Equivalent honors courses can also be used to satisfy this requirement.

Proficiency in a foreign language equivalent to 2050 is required. Students wishing to pursue careers in elementary or secondary education are encouraged to choose Spanish for the foreign language requirement. Students intending to pursue a graduate degree in mathematics are encouraged to study French, German or Russian.

4. **Minor Requirements:** A minor of at least 18 hours (6 advanced).

5. **Electives:** See four-year plan.

6. **Other Requirements:** Bachelor’s degree candidates in mathematics must present a grade point average of at least 2.0 on all mathematics courses above 3150.

BA with a Major in Mathematics

Following is one suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.

FRESHMAN YEAR

FALL	HOURS
ENGL 1310, College Writing I*	3
LANG 2040, Foreign Language (intermediate, see major requirements)**	3
MATH 1710, Calculus I Natural/Life Sciences (see major requirements)**	4
Social and Behavioral Sciences*	<u>3</u>
Total	17

SPRING	HOURS
ENGL 1320, College Writing II*	3
LANG 2050, Foreign Language (intermediate, see major requirements)**	3
MATH 1720, Calculus II Natural/Life Sciences (see major requirements)**	4
Communication**	<u>3</u>
Total	16

SOPHOMORE YEAR**FALL**

	HOURS
MATH 2510, Real Analysis I	3
MATH 2730, Multivariable Calculus	3
PSCI 1040, American Government*	3
Humanities*	3
Physical Science (see major requirements)**	<u>4</u>
Total	16

SPRING

	HOURS
MATH 2520, Real Analysis II	3
MATH 2700, Linear Algebra and Vector Geometry	3
PSCI 1050, American Government*	3
Physical Science (see major requirements)**	4
Visual and Performing Arts*	<u>3</u>
Total	16

JUNIOR YEAR**FALL**

	HOURS
HIST 2610, United States History to 1865*	3
MATH 3510, Introduction to Abstract Algebra I	3
MATH (above 3150)	3
Minor	3
Minor (advanced)	<u>3</u>
Total	15

SPRING

	HOURS
HIST 2620, United States History Since 1865*	3
MATH (above 3150)	3
Literature**	3
Minor	3
Minor (advanced)	<u>3</u>
Total	15

SENIOR YEAR**FALL**

	HOURS
MATH 4610, Probability	3
Cross-Cultural, Diversity and Global Studies*	3
Minor (advanced)	3
Elective (advanced)	3
Elective (advanced)	3
Elective (advanced)	<u>3</u>
Total	18

SPRING

	HOURS
MATH (above 3150)	3
Elective (advanced)	3
Elective (advanced)	3
Minor (advanced)	3
Wellness*	<u>3</u>
Total	15

*See the University Core Curriculum section of this catalog for approved list of course options.

** See Arts and Sciences degree requirements section of this catalog for approved list of course options.

Actual degree plans may vary depending on availability of courses in a given semester.

Some courses may require prerequisites not listed.

Students may wish to use opportunities for electives to complete a minor of their choice or secondary education courses for teacher certification.

Bachelor of Science in Mathematics Degree Requirements

1. **Hours Required and General/College Requirements:** A minimum of 128 semester hours, of which 42 must be advanced, and fulfillment of degree requirements for the Bachelor of Science degree as specified in the "General University Requirements" in the Academics section of this catalog and the College of Arts and Sciences requirements.

2. **Major Requirements:** 40 hours of math courses: MATH 1710, 1720, 2510, 2520, 2700, 2730, 3410, 3510 and 4500, plus 12 hours numbered above 3150.

3. **Other Course Requirements:** Four laboratory science courses are required. Two of these must be either BIOL 1710/1730 and 1720/1740, or GEOG 1710 and GEOL 1610. The other two courses must be either PHYS 1710/1730 and 2220/2240, or CHEM 1410/1430 and 1420/1440. Equivalent honors courses can also be used to satisfy this requirement.

Students may complete either of two options to satisfy the College of Arts and Sciences foreign language requirement:

Option I: Proficiency in a foreign language equivalent to 1020 is required. Students wishing to pursue careers in elementary or secondary education are encouraged to choose Spanish for the foreign language requirement. Students intending to pursue a graduate degree in mathematics are encouraged to study French, German or Russian.

Option II: Complete 6 hours of technical writing courses from the following: ENGL 2700, 4180, 4190 and 4250.

4. **Minor Requirements:** A minor of 18 hours (6 advanced) in one of the following areas of study: biology, chemistry, computer science, economics, physics or engineering technology.

5. **Other Requirements:** Bachelor's degree candidates in mathematics must present a grade point average of at least 2.0 on all mathematics courses above 3150.

6. **Electives:** See four-year plan.

See the undergraduate adviser for a degree plan during the first year of study at UNT.

Students taking mathematics courses at the 2000 level or above are expected to be competent in computer programming, using languages such as BASIC, C, C++, Fortran, PASCAL or Java. This competency can be obtained through completion of CSCE 1020 or 1030 or consent of the department.

BS in Mathematics

Following is **one** suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.

FRESHMAN YEAR

FALL	HOURS
ENGL 1310, College Writing I*	3
LANG 1010, Foreign Language (elementary, or Option II, see major requirements)**	3-4
MATH 1710, Calculus I	4
Natural/Life Sciences (see major requirements)*	4
Social and Behavioral Sciences*	3
Total	17-18

SPRING	HOURS
ENGL 1320, College Writing II*	3
LANG 1020, Foreign Language (elementary, or Option II, see major requirements)**	3-4
MATH 1720, Calculus II	3
Communication**	3
Natural/Life Sciences (see major requirements)*	4
Total	16-17

SOPHOMORE YEAR

FALL	HOURS
MATH 2510, Real Analysis I	3
MATH 2730, Multivariable Calculus	3
PSCI 1040, American Government* Humanities*	3
Physical Science (see major requirements)**	4
Total	16

SPRING	HOURS
MATH 2520, Real Analysis II	3
MATH 2700, Linear Algebra and Vector Geometry	3
PSCI 1050, American Government*	3
Physical Sciences (see major requirements)	4
Visual and Performing Arts*	3
Total	16

JUNIOR YEAR

FALL	HOURS
HIST 2610, United States History to 1865*	3
MATH 3510, Introduction to Abstract Algebra I	3
MATH (above 3150)	3
Minor (advanced)	3
Minor	3
Total	15

SPRING	HOURS
HIST 2620, United States History Since 1865*	3
MATH 3410, Differential Equations I	3
MATH 4500, Introduction to Topology	3
Literature**	3
Minor	3
Minor (advanced)	3
Total	18

SENIOR YEAR

FALL	HOURS
MATH (above 3150)	3
MATH (above 3150)	3
Cross-Cultural, Diversity and Global Studies*	3
Elective (advanced)	3
Minor (advanced)	3
Total	15

SPRING	HOURS
MATH (above 3150)	3
Elective (advanced)	3
Elective (advanced)	3
Elective	2
Minor (advanced)	3
Wellness*	3
Total	17

*See the University Core Curriculum section of this catalog for approved list of course options.

** See Arts and Sciences degree requirements section of this catalog for approved list of course options.

Actual degree plans may vary depending on availability of courses in a given semester.

Some courses may require prerequisites not listed.

Students may wish to use opportunities for electives to complete a minor of their choice or secondary education courses for teacher certification.

Minor in Mathematics

Students planning to minor in mathematics should consult the undergraduate adviser of the Department of Mathematics. A minor consists of at least 18 hours and usually includes MATH 1710, 1720, 1780 or 2700, and 2730 or 2770, plus 6 advanced hours. Neither MATH 1350 nor 1351 may be included in the minor, except for elementary education majors.

Teacher Certification

The College of Arts and Sciences encourages students to explore teaching at the secondary level as a career option. The student's academic adviser in the Dean's Office for Undergraduates and Student Advising in GAB, Room 220, can assist students with specific requirements for teacher certification in Mathematics. Upon completion of this program, students will be prepared to sit for the certification examinations in Mathematics. Students should

consult with the mathematics faculty adviser for additional certification options.

Requirements utilizing a BA degree: MATH 1710, 1720, 2510, 2520, 2700, 2730, 3350, 3510, 4060, 4520 and 4610. MATH 3400 and 4650 are recommended upper-division elective courses. *See major for additional course work and GPA requirements.*

Requirements utilizing a BS degree: MATH 1710, 1720, 2510, 2520, 2700, 2730, 3350, 3410, 3510, 4060, 4500, 4520 and 4610. MATH 3400 and 4650 are recommended upper-division elective courses. *See major for additional course work and GPA requirements.*

Students must also complete the required 21 hours in upper-level education courses (EDSE 3800, 3830, 4060, 4070, 4108, 4118, 4840) and meet all GPA requirements to apply for state certification. In order to enroll for the first required education course, the student must make application to the certification program in the College of Education in Matthews Hall, Room 105.

All state certification requirements and information on required examinations is available on the web site of the State Board for Educator Certification (SBE), www.sbec.state.tx.us.

Graduate Degrees

The department offers degree programs leading to the Master of Arts, Master of Science and Doctor of Philosophy. For information, consult the *Graduate Catalog*.

Scholarships and Financial Assistance

The department administers five scholarship funds: the E. H. Hanson Scholarship, the Roger L. Perry Memorial Scholarship, the Mildred Masters McCarty Scholarship, the John Ed Allen Scholarship and the John W. Neuberger Scholarship. Jobs as tutors and graders also are available for mathematics majors. Contact the mathematics department office for information and application forms.

Courses of Instruction

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Music

The Bachelor of Arts with a major in music is offered in the College of Arts and Sciences.

Bachelor of Arts with a Major in Music

Degree Requirements

- Hours Required and General/College Requirements:** A minimum of 128 semester hours, of which 42 must be advanced, and fulfillment of degree requirements for the Bachelor of Arts degree as specified in the "General University Requirements" in the Academics section of this catalog and the College of Arts and Sciences requirements.
- Major requirements:** 44 hours of music including MUTH 1400, 1410, 1500, 1510, 2400, 2410, 2500, 2510, 3410 and 3420; MUMH 1600, 3500, 3510, and 3 hours of 4000-level music history (MUMH); plus 4 semester hours in applied music performance, concentration level (MUAC).
- Other Course Requirements:** None.
- Minor:** Optional.
- Electives:** See four-year plan.
- Other requirements:** Students must pass the Piano Proficiency Examination and the Theory Proficiency Examination, and must complete 8 hours of music laboratory courses.

BA with a Major in Music

*Following is **one** suggested four-year degree plan. Students are encouraged to see their adviser each semester for help with program decisions and enrollment. Students are responsible for meeting all course prerequisites.*

FRESHMAN YEAR

FALL	HOURS
ENGL 1310, College Writing I*	3
LANG 2040, Foreign Language (intermediate)**	3
MATH (above College Algebra, except 1350)**	3
MULB, Music Laboratory	1
MUMH 1600, Music in Human Imagination (may be used to satisfy the Visual and Performing Arts requirement*)	3
MUTH 1400, Theory I	2
MUTH 1410, Aural Skills I	2
Total	17