

School of Natural Sciences and Mathematics

Mathematics (B.S.)

Mathematics is both a profession and an indispensable tool for many types of work. As a tool, mathematics is a universal language that has been crucial in formulating and expressing ideas not only in science and engineering, but also in many other areas such as business and the social sciences. As probably the oldest and most basic science, it provides the key to understanding the major technological achievements of our time.

Of equal importance, knowledge of mathematics may help provide a student with the type of uncompro and clear-sighted thinking useful in considering the problems of many other disciplines. The Mathematics degree program encompasses mathematics, statistics, and applied mathematics.

Applied mathematics and statistics continue to enjoy a rapid growth. Students have the opportunity of applying their expertise to any of a number of fields of application. For the student to be more effective in such applications, Mathematics also offers degree programs allowing additional emphasis in the areas of applied science, computer science, electrical engineering, and management.

Those interested in obtaining both a B.S. in Mathematics and Teacher Certification in the state of Texas should consult the [UT Dallas Teacher Development Center](#) or the [UTeach office](#) for specific requirements as soon as possible after formal admission to the University. See the Teacher Education Certification Program section of the catalog for additional information.

The Mathematics degree program also prepares students for graduate studies. An accelerated B.S./M.S. Track program is available which provides the opportunity for undergraduate students to satisfy some of the requirements of the master's degree while they are completing the bachelor's degree in Mathematics.

Faculty

Professors: Larry P. Ammann, Michael Baron, Sam Efromovich, Matthew J. Goeckner, M. Ali Hooshmand, Wieslaw Krawcewicz, Patrick L. Odell (Emeritus), Istvan Ozsvath, Viswanath Ramakrishna, Ivor Roberts (Emeritus), Robert Serfling, Janos Turi, John W. Van Ness (Emeritus)

Associate Professors: Zalman I. Balanov, Pankaj Choudhary, Mieczyslaw Dabkowski

Assistant Professors: Yan Cao, Tobias Hagge, Qiongxia Song

Clinical Associate Professor: Natalia Humphreys

Research Assistant Professor: Qingwen Hu

Senior Lecturers III: David L Lewis, Paul Stanford, Bentley T Garrett,

Senior Lecturers II: Manjula Foley, Yuly Koshevnik, Joanna Robinson, William Monte Scott

Senior Lecturers I: Mohammad Akbar, Diana Cogan, Malgorzata Dabkowska, Anatoly Eydzelzon, Richard Ketchersid, Brady McCary, Jigarkumar Patel, Michael Tseng

Adjunct Professors: Jose Carlos Gomez Larranage, Adolfo Sanchez Valenzuela

Affiliated Faculty: Herve Abdi (BBS), Raimund J. Ober (ECS/EE), Alain Bensoussan (JSOM), Titu Andreescu (ECS/SME), John Wiorowski (JSOM)

The Program in Mathematics

Students seeking a degree in Mathematics may specialize in Mathematics, Statistics, or Applied Mathematics, and receive a B.S. degree. Each specialization allows some flexibility in electives so that students can better adapt their degree plans to their educational goals.

Mathematics Specialization: For students interested in a career in mathematics and for students interested in continuing on to graduate work in mathematics, applied mathematics, math education, and related areas.

Statistics Specialization: For students interested in probability and statistical models and their use in analysis and decision-making and for students interested in continuing on to graduate work in statistics, biostatistics, actuarial science, and other statistics related areas.

Applied Mathematics Specialization: For students interested in mathematics for the purpose of using it broadly in various areas of application and for students interested in continuing on to graduate work in applied mathematics and related areas.

The [UTeach option](#) may be added to the BS degree in Mathematics. UTeach Dallas Option degree programs are streamlined to allow students to complete both a rigorous Bachelor of Science or Bachelor of Arts degree and all course work for middle or high school teacher certification in four years. Teaching Option degrees require deep content knowledge combined with courses grounded in the latest research on mathematics and science education. While most graduates go on to classroom teaching, UTeach alums are also prepared to enter graduate school and to work in discipline related industry.

Bachelor of Science in Mathematics

Degree Requirements (120 semester credit hours)

All majors with specialization in either Mathematics or Statistics are strongly urged to meet with assigned departmental advisors every semester.

I. Core Curriculum Requirements¹: 42 semester credit hours

Communication (6 semester credit hours)

3 semester credit hours Communication ([RHET 1302](#))

3 semester credit hours Communication Elective ([NATS 4310](#) or [MATH 4390](#) or [MATH 4391](#))

Social and Behavioral Sciences (15 semester credit hours)

6 semester credit hours Government ([GOVT 2301](#) and [GOVT 2302](#))

6 semester credit hours American History

3 semester credit hours Social and Behavioral Science Elective

Humanities and Fine Arts (6 semester credit hours)

3 semester credit hours Fine Arts ([ARTS 1301](#))

3 semester credit hours Humanities ([HUMA 1301](#))

Mathematics and Quantitative Reasoning (6 semester credit hours)

6 semester credit hours Calculus ([MATH 2417](#) and 2419)³

Science (9 semester credit hours)

Mathematics/Applied Mathematics Specialization

[PHYS 2125](#) Physics Laboratory I

[PHYS 2126](#) Physics Laboratory II

[PHYS 2325](#) Mechanics

or [PHYS 2421](#) Honors Physics I - Mechanics and Heat

[PHYS 2326](#) Electromagnetism and Wave

or [PHYS 2422](#) Honors Physics II - Electromagnetism and Waves

And an additional science course approved by the assigned departmental advisor.

Statistics Specialization

[PHYS 2325/2125](#) Mechanics with Laboratory and [PHYS 2326/2126](#) Electromagnetism and Waves with Laboratory

or [PHYS 2421](#) Honors Physics I - Mechanics and Heat with Laboratory and [PHYS 2422](#) Honors Physics II - Electromagnetism and Waves with Laboratory

or [CHEM 1311/1111](#) and [CHEM 1312/1112](#) General Chemistry I and II with Laboratory

And an additional science course approved by the assigned departmental advisor.

II. Major Requirements: 48 semester credit hours

Major Preparatory Courses (15 semester credit hours)

[CS 1337](#)⁴ Computer Science I

[MATH 2417](#) Calculus I^{3, 5}

[MATH 2418](#)⁴ Linear Algebra

[MATH 2419](#) Calculus II^{3, 5}

[MATH 2420](#)⁴ Differential Equations with Applications

[MATH 2451](#)⁴ Multivariable Calculus with Applications

Major Core Courses (21 semester credit hours)

[MATH 3310](#) Theoretical Concepts of Calculus

[MATH 3311](#) Abstract Algebra I

[MATH 3379](#) Complex Variables

[MATH 4301](#) Mathematical Analysis I

[MATH 4302](#) Mathematical Analysis II

[MATH 4334](#) Numerical Analysis

[NATS 4310](#) Advanced Writing in the Natural Sciences and Mathematics²

[STAT 4351](#) Probability

Major Related Courses (12 semester credit hours)

Applied Mathematics Specialization

[MATH 4341](#) Topology

[MATH 4355](#) Methods of Applied Mathematics

[MATH 4362](#) Partial Differential Equations

[STAT 4382](#) Stochastic Processes

Mathematics Specialization

[MATH 3312](#) Abstract Algebra II

[MATH 3380](#) Differential Geometry

[MATH 4341](#) Topology

3 semester credit hours upper-division guided elective⁶

Statistics Specialization

[STAT 3355](#) Data Analysis for Statisticians and Actuaries

[STAT 4352](#) Mathematical Statistics

[STAT 4382](#) Stochastic Processes

3 semester credit hour upper-division guided elective⁶

III. Elective Requirements: 30 semester credit hours

Advanced Electives (6 semester credit hours)

All students are required to take at least six semester credit hours of advanced electives in their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites.

Free Electives (24 semester credit hours)

Both lower- and upper-division courses may count as electives, but the student must complete at least 51 semester credit hours of upper-division credit to qualify for graduation.

BS in Actuarial Sciences

The department offers a BS in Actuarial Sciences (see the program within this catalog for additional information).

Mathematics or Statistics with Computer Science Emphasis

Applied Mathematics Specialization or Statistics Specialization together with following courses:

[CS 2305](#) Discrete Mathematics for Computing I

[CS 2336](#) Computer Science II

[CS 3305](#) Discrete Mathematics for Computing II

[CS 3376](#) C/C++ Programming in a UNIX Environment

[CS 3345](#) Data Structures and Introduction to Algorithmic Analysis

[CS 4337](#) Organization of Programming Languages

[CS 3340](#) Computer Architecture

Mathematics or Statistics with Electrical Engineering Emphasis

Applied Mathematics Specialization or Statistics Specialization together with following courses:

[EE 3101](#) Electrical Network Analysis Laboratory

[EE 3111](#) Electronic Circuits Laboratory

[EE 3120](#) Digital Circuits Laboratory

[EE 3301](#) Electrical Network Analysis

[EE 3311](#) Electronic Circuits

[EE 3320](#) Digital Circuits

[EE 4301](#) Electromagnetic Engineering I

Mathematics or Statistics with Management Emphasis

Mathematics Specialization, Applied Mathematics Specialization or Statistics Specialization together with following courses:

[ACCT 2301](#) Introductory Financial Accounting

[ACCT 2302](#) Introductory Management Accounting

[BLAW 2301](#) Business and Public Law

[FIN 3320](#) Business Finance

[MIS 3300](#) Introduction to Management Information Systems

[OBHR 3310](#) Organizational Behavior

NOTE: Students transferring into Mathematics at the upper division level are expected to have completed all of the 1000- and 2000- level mathematics core course requirements.

Bachelor of Science in Mathematics with UTeach Option

Degree Requirements (120 semester credit hours)

I. Core Curriculum Requirements¹: 42 semester credit hours

Communication (6 semester credit hours)

3 semester credit hours Communication ([RHET 1302](#))

3 semester credit hours Communication Elective ([NATS 4390/NATS 4399](#))²

Social and Behavioral Sciences (15 semester credit hours)

6 semester credit hours Government ([GOVT 2301](#) and [GOVT 2302](#))

6 semester credit hours American History

3 semester credit hours Social and Behavioral Science Elective

Humanities and Fine Arts (6 semester credit hours)

3 semester credit hours Fine Arts ([ARTS 1301](#))

3 semester credit hours Humanities ([HUMA 1301](#))

Mathematics and Quantitative Reasoning (6 semester credit hours)

6 semester credit hours Calculus ([MATH 2417](#) and 2419)³

Science (9 semester credit hours)

Mathematics/Applied Mathematics Specialization

[PHYS 2125](#) Physics Laboratory I

[PHYS 2126](#) Physics Laboratory II

[PHYS 2325](#) Mechanics

or [PHYS 2421](#) Honors Physics I - Mechanics and Heat

[PHYS 2326](#) Electromagnetism and Waves

or [PHYS 2422](#) Honors Physics II - Electromagnetism and Waves and an additional acceptable science course

Statistics Specialization

[PHYS 2325/2125](#) Mechanics with Laboratory and [PHYS 2326/2126](#) Electromagnetism and Waves with Laboratory

or [PHYS 2421](#) Honors Physics I - Mechanics and Heat with Laboratory and [PHYS 2422](#) Honors Physics II - Electromagnetism and Waves with Laboratory

or [CHEM 1311/1111](#) and [CHEM 1312/1112](#) General Chemistry I and II with Laboratory and an additional acceptable science course

II. Major Requirements: 50 semester credit hours

Major Preparatory Courses (17 semester credit hours beyond core curriculum)

[CS 1337](#)⁴ Computer Science I

[MATH 2417](#) Calculus I³

[MATH 2418](#)⁴ Linear Algebra

[MATH 2419](#) Calculus II³

[MATH 2420](#)⁴ Differential Equations with Applications

[MATH 2451](#)⁴ Multivariable Calculus with Applications

Major Core Courses (21 semester credit hours beyond core curriculum)

[MATH 3310](#) Theoretical Concepts of Calculus

[MATH 3311](#) Abstract Algebra I

[MATH 3379](#) Complex Variables

[MATH 4301](#) Mathematical Analysis I

[MATH 4302](#) Mathematical Analysis II

[MATH 4334](#) Numerical Analysis

[NATS 4390/4399](#) Research Methods²

[STAT 4351](#) Probability

Major Related Courses (12 semester credit hours)

Applied Mathematics Specialization

[MATH 4341](#) Topology

[MATH 4355](#) Methods of Applied Mathematics

[MATH 4362](#) Partial Differential Equations

[STAT 4382](#) Stochastic Processes

Mathematics Specialization

[MATH 3312](#) Abstract Algebra II

[MATH 3321](#) Geometry⁷

[MATH 4341](#) Topology

3 semester credit hours upper-division guided elective⁶

Statistics Specialization

[STAT 3355](#) Data Analysis for Statisticians and Actuaries

[STAT 4352](#) Mathematical Statistics

[STAT 4382](#) Stochastic Processes

3 semester credit hour upper-division guided elective⁶

III. Elective Requirements: 28 semester credit hours

Advanced Electives (6 semester credit hours)

All students are required to take at least six semester credit hours of advanced electives in their major field of study. These must be either upper-division classes or lower-division classes that have prerequisites. UTeach courses can fulfill this requirement.

UTeach Requirements (18 semester credit hours beyond core curriculum and advanced elec

[NATS 1141](#) UTeach Step 1

[NATS 1143](#) UTeach Step 2

[NATS 3341](#) Knowing and Learning in Mathematics and Science

[NATS 3343](#) Classroom Interactions

[HIST 3328](#) History and Philosophy of Science and Medicine

[NATS 4390/4399](#) Research Methods²

[NATS 4341](#) Project-Based Instruction

[NATS 4694](#) UTeach Student Teaching, 8-12 Science and Mathematics

or [NATS 4696](#) UTeach Student Teaching, 4-8 Science and Mathematics

[NATS 4141](#) UTeach Student Teaching Seminar

[MATH 3303](#) Introduction to Mathematical Modeling

Free Electives (4 semester credit hours)

Both lower- and upper-division courses may count as electives, but the student must complete at least 51 semester credit hours of upper-division credit to qualify for graduation.

Minor in Mathematics

Students not majoring in Mathematics or Statistics may obtain a minor in Mathematics or Statistics by satisfying the following requirements: 18 semester credit hours of mathematics or statistics, 12 semester credit hours of which must be chosen from the following courses:

Mathematics Minor: [MATH 3310](#), [MATH 4334](#) and two more upper-division mathematics courses that satisfy degree requirements by students in Mathematics.

Statistics Minor: [STAT 4351](#), [STAT 4352](#) and two more upper-division mathematics courses that satisfy degree requirements by students in Statistics.

Fast Track Baccalaureate/Master's Degrees

For students interested in pursuing graduate studies in Mathematics, the Mathematics Department offers an accelerated B.S. / M.S. Fast Track that involves taking graduate courses instead of several advanced undergraduate courses. Acceptance into the Fast Track is based on the student's attaining a GPA of 3.200 in all mathematics classes and being within 30 semester credit hours of graduation. Fast Track students may, during their senior year, take 15 graduate semester credit hours that may be used to complete the baccalaureate degree. After admission to the graduate program, these 15 graduate semester credit hours may also satisfy requirements for the master's degree. Fast Track programs are offered in mathematics with specializations in applied mathematics and statistics.

1. Curriculum Requirements can be fulfilled by other approved courses from accredited institutions of higher education. The courses listed in parentheses are recommended as the most efficient way to satisfy both Core Curriculum and Major Requirements at UT Dallas.
2. A Major course requirement that also fulfills a Core Curriculum requirement. If semester credit hours are counted in the Core Curriculum, students must complete additional coursework to meet the minimum requirements for graduation. Course selection assistance is available from the undergraduate advisor.
3. Two semester credit hours of Calculus are counted as electives; six semester credit hours are counted in Core Curriculum.
4. Indicates a prerequisite class to be completed before enrolling in upper-division classes.
5. MATH 2417 and 2419 requirements can be fulfilled by completing MATH 2413, 2414, and 2415.
6. Approval of Mathematics department advisor required.
7. Another MATH course, i.e. MATH 3380, may be substituted if MATH 3321 is not offered.

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