

Degree Type – Bachelor of Science (BS)
Degree Title – Mathematics

Mathematics is both an exact science and a highly creative endeavor; a field of study that develops problem-solving skills and a passion for inquiry. Mathematics majors are surprisingly attractive to many professional branches in our society, particularly intelligence, technology, finance, security, engineering and physics. Mathematics Majors with Teacher Certification are attractive to the growing demand for teachers in high schools, middle schools and elementary schools. A BS in Mathematics will prepare the graduate for a competitive position in society and provide the necessary preparation graduate for an exciting and rewarding teaching position and for graduate studies.

STUDENT LEARNING OUTCOMES:

1. **Demonstrate in-depth knowledge of Mathematics, its scope, application, history, problems, methods, and usefulness to mankind both as a science and as an intellectual discipline.**
2. **Demonstrate a sound conceptual understanding of Mathematics through the construction of mathematically rigorous and logically correct proofs.**
3. **Identify, formulate, and analyze real world problems with statistical or mathematical techniques.**
4. **Utilize technology as an effective tool in investigating, understanding, and applying mathematics.**
5. **Communicate mathematics effectively to mathematical and non-mathematical audiences in oral, written, and multi-media form.**

For Middle School and Secondary School Concentrations:

- a. **Demonstrate pedagogical content knowledge by successfully completing all state teacher certification requirements.**

A – GENERAL EDUCATION CORE – 42 HOURS

Students must fulfill the General Education Core requirements. The courses listed below satisfy both degree requirements and General Education core requirements.

Required

Mathematics – 3 hours

MATH 2413 Calculus I (or MATH 2487 Honors) three-hour lecture

Recommended

Social and Behavioral Sciences – 3 hours

Choose from:

ECON 1301 Introduction to Economics

ECON 2301 Principles of Macroeconomics

Life and Physical Sciences – 6 hours

PHYS 2425 Physics for Scientist and Engineers I three-hour lecture

PHYS 2426 Physics for Scientist and Engineers II three-hour lecture

Integrative and Experiential Learning – 5 hours

PHYS 2425 Physics for Scientists and Engineers I one-hour lab

PHYS 2426 Physics for Scientists and Engineers II one-hour lab

Choose one:

CSCI/CMPE 1370 Engineering Computer Science I (or CSCI/CMPE 1378 Honors)

CSCI 1380 Computer Science I (or CSCI 1387 Honors)

B – MAJOR REQUIREMENTS – 78 HOURS MINIMUM (51 advanced minimum)**1 – Mathematics Core – 33 hours (21 advanced)**

MATH 2413 Calculus I (or MATH 2487 Honors) one-hour lecture
 MATH 2414 Calculus II (or MATH 2488 Honors)
 MATH 2415 Calculus III
 MATH 2318 Linear Algebra
 MATH 3341 Differential Equations
 MATH 3350 Introduction to Mathematical Proof
 MATH 3352 Modern Geometry I
 MATH 3363 Modern Algebra I
 MATH 3372 Real Analysis I
 MATH 4337 Probability and Statistics I
 MATH 4390 Mathematics Project

2 – Concentrations – 45 hours minimum (27 advanced minimum)**a – Applied Mathematics – 45 hours (33 advanced)****i – Applied Mathematics Core – 9 hours (9 advanced)**

MATH 3331 Applied Statistics I
 MATH 3343 Introduction to Mathematical Software
 MATH 3349 Numerical Methods

ii – Advanced Mathematics Electives – 18 hours (18 advanced)

Choose from:

MATH 3332 Applied Statistics II
 MATH 3345 Linear Optimization
 MATH 3347 Elementary Cryptology
 MATH 3361 Applied Discrete Mathematics
 MATH 4342 Complex Variables
 MATH 4344 Boundary Value Problems
 MATH 4346 Integral Transforms

iii – Free Electives – 18 hours (6 advanced)**b – Pure Mathematics – 45 hours (33 advanced)****i – Pure Mathematics Core – 12 hours (12 advanced)**

MATH 3349 Numerical Methods
 MATH 3365 Number Theory
 MATH 4342 Complex Variables
 MATH 4355 Topology

ii – Advanced Mathematics Electives – 15 hours (15 advanced)

Choose one:

MATH 3341 Differential Equations
 MATH 3345 Linear Optimization
 MATH 3349 Numerical Methods
 MATH 3361 Applied Discrete Mathematics

Choose two:

MATH 4352 Modern Geometry II
 MATH 4359 Differential Geometry
 MATH 4364 Modern Algebra II
 MATH 4367 Advanced Linear Algebra
 MATH 4373 Real Analysis II

Choose two 4000 level Mathematics courses.

iii – Free Electives – 18 hours (6 advanced)**c – Secondary School – 46 hours (44 advanced)****i – Secondary Mathematics Core – 25 hours (25 advanced)**

MATE 3317 Perspectives in Mathematics and Science
 MATE 3321 Functions and Modeling
 MATE 3322 Secondary Mathematics in a Technological Environment
 MATE 4329 Research Methods in Secondary Mathematics
 MATE 4423 Advanced Studies in Secondary Mathematics
 MATH 3326 History of Math
 MATH 3361 Applied Discrete Mathematics
 MATH 3365 Number Theory

ii – UTeach Certification – 21 hours (19 advanced)

Area of Certification: Mathematics (7-12)

UTCH 1101 Inquiry Approaches to Teaching
 UTCH 1102 Inquiry-Based Lesson Design
 UTCH 3301 Knowing and Learning in Mathematics and Science
 UTCH 3302 Classroom Interactions
 UTCH 3303 Project-Based Instruction
 UTCH 4601 Apprentice Teaching
 UTCH 4101 Apprentice Teaching Seminar
 READ 4305 Content Area Literacy

d – Middle School – 48 hours (40 advanced)**i – Middle School Mathematics Core – 27 hours (21 advanced)**

MATH 1350 Fundamentals of Mathematics I
 MATH 1351 Fundamentals of Mathematics II
 MATE 3301 Fundamentals of Middle School Mathematics
 MATE 3302 Fundamentals of Measurement and Geometry I
 MATE 3303 Fundamentals of Measurement and Geometry II
 MATE 3304 Fundamentals of Algebraic Structures
 MATE 3317 Perspectives in Mathematics and Science
 MATE 3321 Functions and Modeling
 MATE 4319 Research Methods in Middle School Mathematics

ii – UTeach Certification – 21 hours (19 advanced)

Area of Certification: Mathematics (4-8)

UTCH 1101 Inquiry Approaches to Teaching
 UTCH 1102 Inquiry-Based Lesson Design
 UTCH 3301 Knowing and Learning in Mathematics and Science
 UTCH 3302 Classroom Interactions
 UTCH 3303 Project-Based Instruction
 UTCH 4601 Apprentice Teaching
 UTCH 4101 Apprentice Teaching Seminar
 READ 4305 Content Area Literacy

e – Statistics – 45 hours (30 advanced)**i – Statistics Core – 24 hours (21 advanced)**

MATH 1342 Elementary Statistical Methods (or MATH 1387 Honors)
 MATH 3331 Applied Statistics I
 MATH 3332 Applied Statistics II
 MATH 3334 Sampling
 MATH 3335 Applied Regression

MATH 3343 Introduction to Mathematical Software
 MATH 3349 Numerical Methods
 MATH 4338 Probability and Statistics II

ii – Advanced Mathematics Electives – 3 hours (3 advanced)

Choose 3 advanced hours of MATH.

iii – Free Electives – 18 hours (6 advanced)

f – Science and Engineering – 45 hours (27 advanced)

i – Science and Engineering Core – 27 hours (21 advanced)

Choose 27 hours, of which 21 must be advanced, from the College of Engineering and Computer Science and College of Science (excluding MATH and MATE).

ii – Free Electives – 18 hours (6 advanced)

g – Economics – 45 hours (27 advanced)

i – Economics Core – 24 hours (18 advanced)

ECON 2301 Principles of Macroeconomics
 ECON 2302 Principles of Microeconomics
 ECON 3341 Econometrics
 ECON 3342 Business and Economics Forecasting
 ECON 3351 Macroeconomic Theory
 ECON 3352 Microeconomic Theory
 ECON 4361 Studies in Economics
 MATH 3343 Introduction to Mathematical Software

ii – Advanced Mathematics Electives – 3 hours (3 advanced)

Choose 3 advanced hours of MATH.

iii – Free Electives – 18 hours (6 advanced)

TOTAL CREDIT HOURS FOR GRADUATION (MINIMUM) – 120 HOURS

TOTAL ADVANCED HOURS (MINIMUM) – 48 HOURS

ADMISSION, PROGRESSION, AND GRADUATION REQUIREMENTS, if applicable:

Progression requirements

Admission to the College of Education is required for participation in Apprentice Teaching and Seminar (UTCH 4101, 4601). Students unable to be admitted to UTCH 4601 and UTCH 4101 will be required to substitute advanced hours (3 hours for Secondary School concentration; 4 hours for Middle School concentration), as recommended by advisor.

Graduation requirements

The student must complete all these major course requirements and all MATH and MATE courses with grades of 'C' or better and have with a GPA for the major of 2.5 or better (2.75 or better for Middle School and Secondary School Concentrations).