

**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**

1. 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).
2. In addition to the graduation requirements listed in the UTRGV 2015-2017 Undergraduate Catalog, demonstration of proficiency in a language other than English is required at the undergraduate level equivalent to a minimum of six credit hours. Proficiency can be demonstrated by a college credit

exam, a placement test approved through the UTRGV Department of Writing and Language Studies, and/or up to six credit hours of college-level language coursework.