Majors in Mathematics
Advising Information

December 9, 2024

This manual is written to provide some useful information for TCU Math Majors. While we will try to keep it as up-to-date and correct as possible, the official TCU Undergraduate Catalog is the official source for full and complete information about all TCU undergraduate programs.

Contents

1 Why should I be a math major?

In 2019, the US News & World Reports 100 Best Jobs ranking placed Statistician at number #2, Mathematician at number #17, Actuary at #33, and many other technical math-related jobs in the top 100. Math is a gateway to dozens of rewarding careers, some of which use math in direct, obvious ways, and other of which build on skills learned in math classrooms. You can find out more about careers in math by stopping by the department office to look at some of our career books or by going to our Careers in Mathematics website, which is a portal to many other math job sites: `https://mathematics.tcu.edu/current-undergraduate-students/careers-in-mathematics/`.

2 BS or BA?

The TCU Department of Mathematics offers two Bachelor's degrees, the Bachelor of Arts and the Bachelor of Science. Either can be taken as a major in Mathematics or a major in Actuarial Science.

- The **Bachelor of Arts (BA)** is a broader degree overall. It requires fewer courses in math, but Bachelor of Arts students at TCU must earn a minor and demonstrate competency in a foreign language. This degree is appropriate for students seeking careers in both mathematical and non-mathematical industries, and it also prepares students to become elementary and secondary mathematics teachers.

- The **Bachelor of Science (BS)** involves a deeper study of mathematics. BS majors do not need to do a minor or take a foreign language, but they do take a more demanding mathematics curriculum that requires more mathematics courses and at much higher levels. The BS degree has a much stronger emphasis on proof writing and abstract mathematics. This degree is appropriate for students planning to go on to graduate school in mathematics or related fields, and for anyone who wants a more challenging mathematical experience at TCU.

  The Bachelor of Science allows a choice of two tracks:

  - Track 1 focuses more heavily on "pure" or "abstract" mathematics, such as number theory and abstract algebra.
  - Track 2 focuses more heavily on applied mathematics, such as numerical analysis and courses with more use of computational technology.

Both the BA and the BS can be taken as a major in **Actuarial Science**. This is designed to prepare students for careers in insurance, risk analysis, pension management, financial planning, and other related areas.

2.1 Quick comparison

Math BA: 28 hours of Math, a minor, a 4th semester in a foreign language, 3 associated requirements

Math BS: 46 hours of Math, 3 associated requirements

Math BA, Actuarial Science: 31 hours of Math, a minor, a 4th semester in a foreign language, 10 associated requirements

Math BS, Actuarial Science: 46 hours of Math, 10 associated requirements

3 Requirements for math majors

3.1 University requirements

The following are graduation requirements for all TCU students. For more details about those requirements concerning whether courses may be taken elsewhere for transfer credit or must be completed at TCU, see Section 3.1.2.

- 120 total semester hours (starting for Dec. 2022 graduates, down from 124)
- 42 semester hours at the 30000 level or above taken at TCU
- 58 semester hours taken at TCU
- all courses in the last semester before graduation completed at TCU
- 12 semester hours in the major at the 30000 level or above completed at TCU
- for those pursuing minors, 6 semester hours in the minor at the 30000 level or above completed at TCU
- the TCU Core Curriculum; see Section 3.1.1 for a brief summary and `http://www.core.tcu.edu/` for full information
- C- or better in all courses counted toward your Math major and a 2.0 or better GPA in all Math courses
- a cumulative GPA of at least 2.0

3.1.1 The TCU core

For full information about the TCU Core Curriculum, see `http://www.core.tcu.edu/`. The following just provides some brief reminders:

- Students must complete a course for each row (the HMVV curriculum) and column (the HMV curriculum) of the main core diagram, as well as for each item in the separate Essential Competencies list. Courses may count for more than one of these. For example, a course may count for both a row and a column, both a row and an Essential Competency, etc. A course may even count for all three. But a course cannot count for multiple requirements of the same type.
- A maximum of two courses from any subject can be applied to the row (HMVV) requirements.
- The Cultural Awareness, Global Awareness, and Citizenship/Social Values columns cannot be completed by transfer credit — they must be taken at TCU.
- The Writing Emphasis essential competencies cannot be completed by transfer credit — they must be taken at TCU.
- A listing of courses approved to meet each requirement can be found at the TCU core website `http://www.core.tcu.edu/`. There is also a tool to find classes that simultaneously fulfill multiple requirements at `http://classes.tcu.edu/`.
- Note that most Writing Emphasis classes are upper-division courses that will require prerequisites. Since Math does not offer many Writing Emphasis courses, you should plan to take multiple courses in at least one other department.

3.1.2 Transfer credit notes

General information about transferring course credits to TCU can be found at `https://admissions.tcu.edu/apply/transfer/course-transferability.php` and at `http://www.reg.tcu.edu/transfercredit.asp`. Below is a summary of some of the most important information.

- Once a student is enrolled at TCU, any transfer credits must be approved *in advance* by the department chair and dean. This includes summer courses and on-line courses taken at other colleges. Instructions for making such requests can be found at `https://registrar.tcu.edu/current-students/student-records/transfer-credit-request.php`. Course not approved in advance may not be counted at TCU.
- Once a student is enrolled at TCU, no more than four classes (maximum of 16 hours), except those earned in an approved study abroad program, may be transferred from other schools.
- At least 58 semester hours of academic credit must be completed at TCU (this can include study abroad credits earned through courses labeled International Residential Study).
- The last semester of academic credit must be completed in residence at TCU (this can include study abroad credits earned through courses labeled International Residential Study). Taking transfer courses in what is planned to be your last semester at TCU will delay graduation to the following semester.
- Transfer credits not from study abroad courses appear on the TCU transcript with a grade of T. These courses are not computed in the GPA.
- At least 12 semester hours in the major at the 30000 level or above must be completed at TCU.
- For those pursuing minors, at least 6 semester hours in the minor at the 30000 level or above must be completed at TCU.

- If, prior to coming to TCU, a student has taken a course at another university that is equivalent to a 4-hour TCU course, such as Calculus I, but the other university only considers it a 3-hour course, the department chair can waive the difference in hours so that student do not have to make up that missing hour toward a Math major or minor. You should contact the Chair of the Math Department to request this. (This is a Math Department policy - it may not apply in other departments.)

- From the university catalog regarding how repeated courses are counted in the GPA: If a course taken at TCU is repeated at TCU, the official grade is the last letter grade made, although all grades appear on the transcript. Only the last letter grade earned in the repeated course will be used in computing the GPA. If a course is taken at TCU and then repeated at another institution, or if a course is taken at another institution and then repeated at TCU, only the grade earned at TCU is used to compute the student's GPA. Credit for any given course, regardless of where it was taken, may be counted only once.

3.2 The Math BA

3.2.1 Requirements

The Math BA requires a minimum of 28 semester hours of courses in Mathematics.
The student must take the following mathematics courses:

- MATH 10524 Calculus I
- MATH 20123 Discrete Mathematics I
- MATH 20524 Calculus II
- MATH 30224 Linear Algebra
- MATH 30524 Calculus III
- At least 9 hours of elective mathematics courses at or above the 30000 level

The student must take one of the following programming courses:

- COSC 10403 Introduction to Programming (this is a prerequisite for COSC 20203)
- COSC 10503 Introduction to Programming for Engineering and Science
- COSC 10603 Introduction to Python for Data Analytics
- ENGR 10573 Applied Programming Matlab
- PHYS 20323 Scientific Analysis & Modeling

The student must take two of the following science courses:

- PHYS 20474 Physics I or PHYS 20475 Physics I for Majors
- PHYS 20484 Physics II
- COSC 20203 Techniques in Programming
- COSC 40403 Analysis of Algorithms
- COSC 40423 Deep Learning
- ECON 31223 Intermediate Microeconomics: A Mathematical Approach
- ECON 40313 Econometrics
- ECON 40323 Time Series Econometrics

Students pursuing a BA degree must also complete a minor in another subject and demonstrate competency in a foreign language (see Section 6, below).

3.2.2 General tips

- For a student pursuing a Bachelor of Arts (BA) in mathematics, the recommended sequence for the first four semesters is MATH 10524, MATH 20524, MATH 30224, and MATH 30524. MATH 20123 and one of the programming courses listed above should also be taken in the first year.

- Credit is not allowed for both MATH 10283 and MATH 10524.

- Students should be careful to take the correct Physics courses. Only PHYS 20474 Physics I, PHYS 20475 Physics I for Majors, and PHYS 20484 Physics II satisfy requirements for the Math major.

- Students must earn a grade of C- or better in each mathematics course for that course to count toward a mathematics degree. Students must also have a 2.0 average or better across all Math courses (whether they count toward the major or not) in order to graduate with a degree in mathematics.
- Students must earn a grade of D- or better in each associated requirement (non-Math courses that are required for the major).
- For a course to count toward the above requirements, it must be taken for a grade if possible, not Pass/No Credit. Courses that must be taken Pass/No Credit, such as internship courses, may still count toward the major or minor.

3.3 The Math BA in Actuarial Science

3.3.1 Requirements

The Math BA in Actuarial Science requires a minimum of 31 semester hours of courses in Mathematics. The student must take the following mathematics courses:

- MATH 10524 Calculus I
- MATH 20123 Discrete Mathematics I
- MATH 20524 Calculus II
- MATH 30224 Linear Algebra
- MATH 30524 Calculus III
- MATH 30603 Interest Theory
- MATH 30803 Probability
- MATH 30853 Statistics
- MATH 40603 Actuarial Mathematics

The student must take the following Economics and Business courses:

- ECON 10223 Introductory Microeconomics
- ECON 10233 Introductory Macroeconomics
- One of the following Intermediate Microeconomics courses:
  - ECON 30223 Intermediate Microeconomics
  - ECON 31223 Intermediate Microeconomics: A Mathematical Approach
- ECON 30233 Intermediate Macroeconomics
- ACCT 20353 Fundamentals of Accounting
- ACCT 40163 Accounting for Decision Making and Control
- FINA 30153 Financial Management

The student must take one of the following programming courses:

- COSC 10403 Introduction to Programming (this is a prerequisite for COSC 20203)
- COSC 10503 Introduction to Programming for Engineering and Science
- COSC 10603 Introduction to Python for Data Analytics
- ENGR 10573 Applied Programming Matlab
- PHYS 20323 Scientific Analysis & Modeling

The student must take two of the following science courses:

- PHYS 20474 Physics I or PHYS 20475 Physics I for Majors
- PHYS 20484 Physics II
- COSC 20203 Techniques in Programming
- COSC 40403 Analysis of Algorithms
- COSC 40423 Deep Learning
- ECON 31223 Intermediate Microeconomics: A Mathematical Approach
- ECON 40313 Econometrics
- ECON 40323 Time Series Econometrics

Students pursuing a BA degree must also complete a minor in another subject and demonstrate competency in a foreign language (see Section 6 below).

3.3.2 General tips

- All actuarial students need to work closely with an advisor to plan course schedules.
- Note that ECON 31223 can be applied to satisfy associated requirements from two of the above lists.
- Almost all actuarial BAs also take Interest theory II, which is needed to pass Exam FM.
- Almost all actuarial BAs minor in Economics, and many take at least one Writing Emphasis class in Economics.
- Credit is not allowed for both MATH 10283 and MATH 10524.
- Students should be careful to take the correct Physics courses. Only PHYS 20474 Physics I, PHYS 20475 Physics I for Majors, and PHYS 20484 Physics II satisfy requirements for the Math major.
- Students must earn a grade of C- or better in each mathematics course for that course to count toward a mathematics degree. Students must also have a 2.0 average or better across all Math courses (whether they count toward the major or not) in order to graduate with a degree in mathematics.
- Students must earn a grade of D- or better in each associated requirement (non-Math courses that are required for the major).
- For a course to count toward the above requirements, it must be taken for a grade if possible, not Pass/No Credit. Courses that must be taken Pass/No Credit, such as internship courses, may still count toward the major or minor.

3.4 The Math BS

3.4.1 Requirements

The Math BS requires a minimum of 46 semester hours of courses in Mathematics.
All BS students must take the following mathematics courses:

- MATH 10524 Calculus I
- MATH 20123 Discrete Mathematics I
- MATH 20524 Calculus II
- MATH 30053 Introduction to Mathematical Proof
- MATH 30224 Linear Algebra
- MATH 30524 Calculus III

Students pursuing **Track 1** must take the following additional mathematics courses

- MATH 30803 Probability
- MATH 50253 Abstract Algebra I
- MATH 50503 Real Analysis I
- An additional 15 hours of Math courses at or above the 30000 level

Students pursuing **Track 2** must take the following additional mathematics courses

- MATH 30613 Differential Equations
- MATH 30853 Statistics
- An additional 12 hours of Math courses from the following list, including at least one of the computationally-focused courses MATH 40223 or MATH 40663 or MATH 40853 or MATH 40883:
  - MATH 30803 Probability
  - MATH 40103 Graph Theory
  - MATH 40223 Applied Linear Algebra
  - MATH 40553 Modern Fourier Analysis
  - MATH 40653 Game Theory
  - MATH 40643 Dynamical Systems
  - MATH 40663 Numerical Analysis
  - MATH 40853 Regression & Time Series
  - MATH 40883 Predictive Modeling
  - MATH 50403 Complex Analysis
  - MATH 50503 Real Analysis I
  - MATH 50613 Partial Differential Equations
  - MATH 50623 Applied Mathematics I
- An additional 6 hours of Math courses at or above the 30000 level (this may include taking extra courses from the list of options above).

All BS students must take one of the following programming courses:

- COSC 10403 Introduction to Programming (this is a prerequisite for COSC 20203)
- COSC 10503 Introduction to Programming for Engineering and Science
- COSC 10603 Introduction to Python for Data Analytics
- ENGR 10573 Applied Programming Matlab
- PHYS 20323 Scientific Analysis & Modeling

All BS students student must take two of the following science courses:

- PHYS 20474 Physics I or PHYS 20475 Physics I for Majors
- PHYS 20484 Physics II
- COSC 20203 Techniques in Programming
- COSC 40403 Analysis of Algorithms
- COSC 40423 Deep Learning
- ECON 31223 Intermediate Microeconomics: A Mathematical Approach
- ECON 40313 Econometrics
- ECON 40323 Time Series Econometrics

3.4.2 General tips

- Students and advisors should plan carefully to meet the Track 2 requirement of either MATH 40223 or MATH 40663. These courses are only offered in alternating years, and each has several prerequisites, including having completed an introductory programming course.
- Students planning to do graduate work in mathematics are strongly recommended to work closely with an advisor to plan their upper-division electives.
- Credit is not allowed for both MATH 10283 and MATH 10524.
- Students should be careful to take the correct Physics courses. Only PHYS 20474 Physics I, PHYS 20475 Physics I for Majors, and PHYS 20484 Physics II satisfy requirements for the Math major.

- Students must earn a grade of C- or better in each mathematics course for that course to count toward a mathematics degree. Students must also have a 2.0 average or better across all Math courses (whether they count toward the major or not) in order to graduate with a degree in mathematics.
- Students must earn a grade of D- or better in each associated requirement (non-Math courses that are required for the major).
- For a course to count toward the above requirements, it must be taken for a grade if possible, not Pass/No Credit. Courses that must be taken Pass/No Credit, such as internship courses, may still count toward the major or minor.

3.5 The Math BS in Actuarial Science

3.5.1 Requirements

The Math BS requires a minimum of 46 semester hours of courses in Mathematics.

All BS students must take the following mathematics courses:

- MATH 10524 Calculus I
- MATH 20123 Discrete Mathematics I
- MATH 20524 Calculus II
- MATH 30224 Linear Algebra
- MATH 30524 Calculus III
- MATH 30603 Interest Theory
- MATH 30623 Interest Theory II
- MATH 30803 Probability
- MATH 30853 Statistics
- MATH 40603 Actuarial Mathematics

Students pursuing **Track 2** must take the following additional mathematics courses

- At least one of
  - MATH 40853 Regression & Time Series
  - MATH 40883 Predictive Modeling
- An additional 6 hours of Math courses at or above the 30000 level (this may include taking extra courses from the list of options above).

All actuarial BS students must take the following Economics and Business courses:

- ECON 10223 Introductory Microeconomics
- ECON 10233 Introductory Macroeconomics
- One of the following Intermediate Microeconomics courses:
  - ECON 30223 Intermediate Microeconomics
  - ECON 31223 Intermediate Microeconomics: A Mathematical Approach
- ECON 30233 Intermediate Macroeconomics
- ACCT 20353 Fundamentals of Accounting
- ACCT 40163 Accounting for Decision Making and Control
- FINA 30153 Financial Management

All BS students must take one of the following programming courses:

- COSC 10403 Introduction to Programming (this is a prerequisite for COSC 20203)
- COSC 10503 Introduction to Programming for Engineering and Science
- COSC 10603 Introduction to Python for Data Analytics
- ENGR 10573 Applied Programming Matlab
- PHYS 20323 Scientific Analysis & Modeling

All BS students student must take two of the following science courses:

- PHYS 20474 Physics I or PHYS 20475 Physics I for Majors
- PHYS 20484 Physics II
- COSC 20203 Techniques in Programming
- COSC 40403 Analysis of Algorithms
- COSC 40423 Deep Learning
- ECON 31223 Intermediate Microeconomics: A Mathematical Approach
- ECON 40313 Econometrics
- ECON 40323 Time Series Econometrics

3.5.2 General tips

- All actuarial students need to work closely with an advisor to plan course schedules.
- Note that ECON 31223 can be applied to satisfy associated requirements from two of the above lists.
- Students and advisors should plan carefully to meet the Track 2 requirement of either MATH 40223 or MATH 40663. These courses are only offered in alternating years, and each has several prerequisites, including having completed an introductory programming course.
- Almost all actuarial BAs minor in Economics, and many take at least one Writing Emphasis class in Economics.
- Credit will not be granted for both MATH 10283 and MATH 10524.
- Students should be careful to take the correct Physics courses. Only PHYS 20474 Physics I, PHYS 20475 Physics I for Majors, and PHYS 20484 Physics II satisfy requirements for the Math major.
- Students planning to do graduate work in mathematics are strongly recommended to work closely with an advisor to plan their upper-division electives.
- Students must earn a grade of C- or better in each mathematics course for that course to count toward a mathematics degree. Students must also have a 2.0 average or better across all Math courses (whether they count toward the major or not) in order to graduate with a degree in mathematics.
- Students must earn a grade of D- or better in each associated requirement (non-Math courses that are required for the major).
- For a course to count toward the above requirements, it must be taken for a grade if possible, not Pass/No Credit. Courses that must be taken Pass/No Credit, such as internship courses, may still count toward the major or minor.

4 Math Minors

This document is primarily intended for Math majors. Information about Math minors is included here for reference.

4.1 The Math Minor

The Math Minor requires a minimum of 18 semester hours of courses in Mathematics.
The student must take the following mathematics courses:

- MATH 10524 Calculus I
- MATH 20524 Calculus II
- MATH 30224 Linear Algebra
- An additional 6 credit hours from among MATH 20123 (Discrete Mathematics I) or MATH courses at or above the 30000 level.

The student must take one of the following programming courses:

- COSC 10403 Introduction to Programming (this is a prerequisite for COSC 20203)
- COSC 10503 Introduction to Programming for Engineering and Science
- COSC 10603 Introduction to Python for Data Analytics
- ENGR 10573 Applied Programming Matlab

Students must earn a grade of C- or better in each mathematics course for that course to count toward a mathematics minor.

Credit is not allowed for both MATH 10283 and MATH 10524.

4.2 The Minor in Actuarial Mathematics

The Minor in Actuarial Mathematics requires a minimum of 18 semester hours of courses in Mathematics. The student must take the following mathematics courses:

- MATH 10524 Calculus I
- MATH 20524 Calculus II
- MATH 30524 Calculus III
- One of the following two six-hour sequences:
  - MATH 30603 Interest Theory
  - MATH 30623 Interest Theory II

  or
  - MATH 30803 Probability
  - MATH 40603 Actuarial Mathematics

The student must also take the following Economics courses:

- ECON 10223 (Introductory Microeconomics)
- ECON 10233 (Introductory Macroeconomics)

Students must earn a grade of C- or better in each mathematics course for that course to count toward a mathematics minor.

Credit is not allowed for both MATH 10283 and MATH 10524.

5 Credit and placement

5.1 Credit for TCU Math courses

In addition to transfer credits from other colleges (see Section 3.1.2), students may receive credit for certain TCU Math courses based on high school exam scores, as follows. Credit for these courses also satisfies the Mathematical Reasoning portion of TCU's Core Curriculum.

- MATH 10043 Elementary Statistics: Any of the following:
  - Score of 3 or higher on the AP Statistics Exam
  - Score of 6 or 7 for an International Baccalaureate Applications & Interpretations course (Standard Level or Higher Level)
- MATH 10283 Applied Calculus: Score of 3 or higher on the AP Calculus AB Exam
- Math 10054 Precalculus with Trigonometry: Score of 4 or higher on the AP Precalculus Exam
- MATH 10524 Calculus I: Any of the following:
  - Score of 4 or higher on the AP Calculus AB Exam
  - Score of 3 or higher on the AP Calculus BC Exam

  - Score of 65 or higher on the College-Level Examination Program (CLEP) calculus test
  - Score of 6 or 7 for an International Baccalaureate Analysis & Approaches Higher Level course
- MATH 20524 Calculus II: Score of 5 on the AP Calculus BC exam; in this case, the student receives credit for both MATH 10524 and MATH 20524

Credit awarded in this way will be treated equivalently to transfer credits. They will show up on the transcript with a grade of T. This grade will not count in GPA computations.

To receive these credits, exam scores should be sent to the Admissions office. For more information and restrictions, visit `https://admissions.tcu.edu/apply/freshman/college-credits/credit-by-exam.php`.

5.2 Placement into TCU Math courses

The following sections describe the requirements for placing into various math courses. For requirements involving transfers or test scores, official copies of transcripts and/or scores should be sent to the TCU Office of Admissions. If transcripts and/or scores will not be available or processed in time to register for courses for the semester, please send screen shots demonstrating scores to the chair of the Math Department as soon as possible; official documents will still need to be sent to Admissions but the chair can help you register in the meantime.

5.2.1 How to place into MATH 10283 Applied Calculus

To enroll in MATH 10283 Applied Calculus, students must meet one of the following requirements:

- A grade of C- or better in, or transfer credit equivalent to, MATH 10054 Precalculus with Trigonometry or MATH 10273 Applied Precalculus
- A score of 3 or higher on the AP Precalculus exam
- High school Precalculus and a score of 600 or higher on the SAT math exam or an ACT math score of 24 of higher
- A sufficient score on the Calculus Placement Test, which can be found at `https://cse.tcu.edu/mathematics/undergraduate/placement-test.php`

5.2.2 How to place into MATH 10524 Calculus I

To enroll in MATH 10524 Calculus I, students must meet one of the following requirements:

- A grade of C- or better in, or transfer credit equivalent to, MATH 10054 Precalculus with Trigonometry
- Score of 3 or higher on either the AP Calculus AB or AP Calculus BC exam
- A score of 4 or higher on the AP Precalculus exam (which will also grant credit for Math 10054 Precalculus with Trigonometry)
- Score of 560 or higher on the SAT Subject Test (SAT II), Mathematics Level 1 (IC) [Note: this test is no longer offered]
- Score of 520 or higher on the SAT Subject Test (SAT II), Mathematics Level 2 (IIC) [Note: this test is no longer offered]
- A sufficient score on the Calculus Placement Test, which can be found at `https://cse.tcu.edu/mathematics/undergraduate/placement-test.php`

Copies of satisfactory AP or SAT Subject Test scores must be provided or be on file with the TCU Registrar in order to use these as prerequisites to register for MATH 10524. A student awaiting scores may choose to take the Calculus Placement Exam.

5.2.3 How to place into MATH 20524 Calculus II

To place into MATH 20524 Calculus II, the student must meet the requirements to receive credit for MATH 10524 Calculus I. In particular, to enroll in MATH 20524 Calculus II, students must meet one of the following requirements:

- A grade of C- or better in, or transfer credit equivalent to, MATH 10524 Calculus I
- Score of 4 or higher on the AP Calculus AB Exam
- Score of 3 or higher on AP Calculus BC Exam

5.2.4 How to place into classes beyond MATH 20524 Calculus II

To place into classes that require MATH 20524 Calculus II as a prerequisite, the student must meet the requirements to receive credit for MATH 20524 Calculus II. In particular, students must meet one of the following requirements:

- A grade of C- or better in, or transfer credit equivalent to, MATH 20524 Calculus II
- Score of 5 on the AP Calculus BC exam

6 FAQ

Should I do a BA or a BS? That's largely up to you based on your own future plans and interests. See Section 2 as a good place to start. Students should be aware that the BS can be very demanding mathematically, and it is a good idea for all BS students to keep their options open to switch to a BA as they progress. Students who struggle at all with any of the 10000- or 20000-level math classes are strongly encouraged to pursue a BA.

Do I have an advisor? Do I need to meet with my advisor before registering for courses? All students who officially register as seeking a Math major will be assigned an advisor within a few weeks. Your advisor will appear on my.tcu, but if you don't see it, contact the Department of Mathematics office.

For students majoring in the College of Science and Engineering, advising each semester is mandatory prior to registering for courses for the next semester. If you have not yet met with your advisor, a "hold" will appear on your account to prevent you from registering. If you have advisors in multiple majors, it is possible that just one of those advisors can release all of your holds, but meeting with your Math advisor is still strongly recommended. Your advisor will help to make sure you are taking the right courses to graduate on time, though ultimately this is your responsibility.

Each student is assigned a time that class registration opens for him or her based on seniority; this time can also be found on your my.tcu. You should contact your advisor to make an advising appointment at least a week or two before your registration date. Your advisor may contact you first to set up an advising time, but if not, don't be shy about reaching out to your advisor. That's what they're there for.

How many courses should I be taking? Full time university enrollment is 12 credit hours per semester. However, to graduate in four years, students must take an average of 15.5 hours per semester. Thus students typically take around 5 courses per semester, possibly more depending on the number of credit hours for each course. Before the first day of classes for a semester, a student cannot enroll in more than 17 semester hours, though the student can add an 18th hour on the first day of classes. A coarse load of more than 18 hours requires the permission of an academic dean. Students taking more than 18 hours will have to pay additional tuition for the extra hours. Students in their graduating semester can register for 18 hours before the first day of classes by contacting the dean's office.

What should I take when? You should work with your advisor on the exact details of your schedule, including planning ahead. Students are strongly encouraged to make a tentative scheduling plan all the way through graduation as soon as possible, though with the recognition that plans will evolve over time.

Here are some additional general guidelines and advice, though they may not be possible for all students:

- A link to a list of planned Future Course Offerings for the next several years can be found at `https://mathematics.tcu.edu/current-undergraduate-students/`. Students should note carefully that not every course is offered every year and carefully plan prerequisites accordingly.
- All math majors should take MATH 10524 (Calculus I), MATH 20524 (Calculus II), and MATH 20123 (Discrete Mathematics I) in their first year.
- Majors with an actuarial concentration should also take ECON 10223 (Introductory Microeconomics) and ECON 10233 (Introductory Macroeconomics) in their first year.

- BS majors should complete MATH 30224 (Linear Algebra) and MATH 30053 (Introduction to Proof) by the end of the sophomore year. Note that MATH 20123 and MATH 20524 are prerequisites for MATH 30053, and MATH 10524 and either MATH 20123 or MATH 20524 are prerequisites for MATH 30224.

General pacing (not including associated requirements):

- Math BA - approximately two MATH courses per year
- Math BS - approximately six MATH courses in the first two years and eight math classes in the next two years

What are "associated requirements"? For Math Majors, associated requirements are the courses that are required for your major but not MATH courses. This includes the various Computer Science, Physics, Economics, Accounting, and Finance courses listed as required above for our various majors. In some cases only a D- is required for an associated requirement to count toward the major. However, for many associated requirements a C- is needed to take a subsequent course that may also be an associated requirement for the major. Students earning below a C- in an associated requirement should check very carefully and consult with their advisor before deciding to move on without retaking it.

Which programming course should I take? All math majors must take one of COSC 10403, COSC 10503, COSC 10603, ENGR 10573, or PHYS 20323. Here is some additional information to consider when choosing from among these courses:

- COSC 10403 Introduction to Programming is the introductory course taken by Computer Science majors and a prerequisite for further Computer Science courses including COSC 20203, which can be used to fulfill another of the associated requirements for a math degree. You should take this if you plan to take future programming courses. The programming language for this courses is Java.
- COSC 10503 Introduction to Programming for Engineering and Science is typically taken by Engineering majors. The programming language for this courses is usually C.
- COSC 10603 Introduction to Python for Data Analytics is a newer course offered by the Computer Science program. It is recommended for actuarial students who are not pursuing a minor in computer science or other students interested more in data analysis.
- ENGR 10573 Applied Programming Matlab is the introductory programming course primarily taken by Engineering students. The Math Department discourages this choice for students who are not Engineering majors.
- PHYS 20323 Scientific Analysis & Modeling is taken primarily by Physics majors and focuses primarily on computations for physics using Python.

Which core classes should I take? Most math majors satisfy their Mathematical Reasoning requirement with a course in the calculus sequence, and some satisfy one of their Writing Emphasis courses with MATH 50073 History of Math. Some students fulfill a Writing Emphasis requirement with MATH 40000 Undergraduate Research, which is the course associated with writing and Honors thesis. Beyond that, Math Majors take core courses according to their own interests. A good tool for finding courses that satisfy core requirements, including "double dipping" and "triple dipping," can be found at `https://classes.tcu.edu/`. Note that most Writing Emphasis courses are 30000 level courses and so typically require some previous courses in a discipline. Thus students not planning to do undergraduate research should plan to take several courses in one particular department besides Math.

Additionally, majors with an actuarial concentration will fulfill two of their Social Sciences requirements by taking ECON 10223 Introductory Microeconomics and 10233 Introductory Macroeconomics. Many actuarial students also take a Writing Emphasis course in Economics toward completing an Economics minor.

Non-actuarial majors may also benefit from taking Economics courses: both ECON 10223 Introductory Microeconomics and ECON 10233 Introductory Macroeconomics fulfill a Social Science requirement for the Core Curriculum, and either, along with a calculus course, can serve as a prerequisite for ECON 31223 Intermediate Microeconomics: A Mathematical Approach, which would count as an associated requirement toward the math major. Furthermore, the requirements for ECON 40313 Econometrics, which also counts as a Math associate requirement, requires only one microeconomics course (at any level), one macroeconomics course (at any level), and one statistics course as its prerequisites. So a reasonable sequence for any Math major is ECON 10233 Introductory Macroeconomics, ECON 31223 Intermediate Microeconomics: A Mathematical Approach, MATH 30853 Statistics, and ECON 40313 Econometrics. This sequence would include a Social Science Core credit, one upper level course toward the Math major, and two associated requirements toward the Math major.

Which non-math courses should I not take? For the most part, there are not many courses that would be a bad idea for a math major. However, the following courses can be problematic:

- PHYS 10154 General Physics I with Lab: While this course will grant a Natural Science credit toward the core, students cannot receive credit for both this course and PHYS 20474 Physics I with Lab: Mechanics or PHYS 20475 Physics I for Majors. As Physics 20474 or 20475 can be used to fulfill an associated requirement toward the Math major, it is better for Math students to take Physics 20474 or 20475 unless they are absolutely certain they plan to fulfill their associated requirements with non-Physics courses.
- Any other Physics courses with the intent of satisfying the Natural Science core requirement. To satisfy the Core Curriculum Natural Science requirement, students must take natural science courses in two different subject areas. So if you already plan to take PHYS 20474 Physics I, PHYS 20475 Physics I for Majors, and/or PHYS 20484 Physics II as associated requirements toward the Math major, another Physics course will not contribute to the core requirement. In that case you will need to take a Natural Science course in another department. (Of course in general students are welcome to take as much Physics as they want - just be aware that you can't have two both count toward the core and you may want save the Natural Science core credit for one that also counts toward the Math major.)
- Students intending to take Economics courses to fulfill their associated requirements will earn some Social Sciences core credit through those courses. Thus students should be careful not to take too many other Social Science courses that might lead to an unnecessary excess of Social Sciences core credit.

Which math classes count for the TCU Core? The following math courses satisfy TCU's Mathematical Reasoning core requirement. Note, however, that none of the first three courses listed contribute to any math major:

- MATH 10033 Topics in Mathematics
- MATH 10043 Elementary Statistics
- MATH 10283 Applied Calculus
- MATH 10524 Calculus I
- MATH 20123 Discrete Mathematics I
- MATH 20524 Calculus II

The following math courses satisfy TCU's Writing Emphasis core requirement. Students will need two Writing Emphasis courses to graduate, though relatively few students do undergraduate research and so students should not necessarily expect they will take MATH 40000 and should plan accordingly.

- MATH 40000 Undergraduate Research
- MATH 50073 History of Mathematics

Do I have to do a minor? All students pursuing a BA degree, including a BA in Actuarial Science, must also complete a minor of their choice. BS students do not need a minor.

Actuarial students will come close to completing a minor in Economics through their actuarial coursework. Students who take the four required actuarial courses in Economics will be only two 30000 level courses shy of an Economics minor. Those also taking ECON 40313 Econometrics as one of their associated requirements will be only one 30000 level course shy of an Economics minor.

Even for non-actuarial students, an Economics minor may work well, as a sequence of ECON 10223, 10233, and 40313 will get you halfway toward an Economics minor while also satisfying a math major associated requirement (ECON 40313) and two Social Sciences core requirements (ECON 10223, 10233). Economics also offers many Writing Emphasis core classes.

The Computer Science and Physics departments also offer several minors that overlap with Math major associated requirements. Computer Science only has Writing Emphasis courses for those doing advanced projects, but Physics 30493 Physics III Modern Physics is a Writing Emphasis course that would count toward most Physics minors.

Do I have to take a foreign language? There is no foreign language requirement for the BS degree, though it is a requirement for students who wish to be considered for Phi Beta Kappa honors.

For the BA degree, the student must demonstrate competency in a foreign language equivalent to the completion of one of the following:

- COSD 40383 American Sign Language II
- CHIN 20063 Intermediate Chinese II
- FREN 20063 Fourth Semester College French
- GERM 20063 Intermediate German
- GREE 20063 Fourth Semester College Greek [Hellenistic]
- ITAL 20063 Fourth Semester College Italian
- JAPN 20063 Fourth Semester College Japanese
- SPAN 20203 Intermediate Spanish II
- SPAN 20213 Intensive Intermediate Spanish II

This requirement may be satisfied by either satisfactory completion of coursework taken at or transferred to TCU or by presenting satisfactory scores on recognized standardized tests (i.e. AP, CLEP or SAT II). Required scores on standardized tests may be found in the Credit by Exam booklet. For languages not currently taught at TCU, six semester hours at the sophomore level, transferred to TCU from another accredited institution, may be used to satisfy this requirement. Students may also provide evidence of competency in the non-English language by successfully completing one academic year in a secondary or post-secondary institution in which the language of instruction is other than English, for which the student will receive 12 hours of credit.

For language placement, students should see the web sites of the Department of Modern Languages at `https://addran.tcu.edu/modern-language-studies/academics/` or the Department of Spanish and Hispanics Studies at `https://addran.tcu.edu/spanish-hispanic-studies/index.php`.

For further information about applying native language skills to the foreign language requirement, contact Mike Butler, Associated Dean of AddRan College.

Can I retake a course? Yes. However students wishing to retake a course should bear a few important points in mind:

- If a student retakes a course, the last letter grade earned at TCU is the one that counts for TCU's internal GPA computations.
- All attempts at a course and corresponding grades will continue to appear on the student's transcript. Graduate schools or companies may recompute your GPA differently from TCU's internal GPA; in particular, they may factor in all grades for repeated courses.

- If you pass a course but then retake it and get a lower grade, including an F, that last grade stands. In particular, if you retake a course you previous passed and get an F, that course will no longer count toward your degree requirements until you take it again and earn an acceptable grade.
- If you have transfer credit for a course and retake it at TCU, the TCU grade replaces the transfer credit completely, even if the TCU grade is an F.
- If you take a course at TCU and then retake it elsewhere (which requires transfer credit approval) and earn an acceptable grade, the transfer credit will appear on your transcript and it will count toward degree requirements, but it will not replace the original grade. The original TCU grade will still be used for internal GPA computations.

Can I take courses Pass/No Credit? While TCU allows students to take some courses Pass/No Credit (P/NC), there are some important rules about this:

- Courses that can be taken for a grade must be taken for a grade (not P/NC) in order for them to count toward your major, your minor, or your associated requirements. In the math major, only internship courses must be taken P/NC; these will still count for the major.
- The P/NC option can only be used twice with the exception that internship courses are automatically P/NC and do not count toward the P/NC limit.
- P/NC can be used for foreign language courses, subject to the above limit.
- For more information, see `https://registrar.tcu.edu/current-students/enrollment/grading.php#accd23e65-passno-credit`.

What should I do if I get sick or have a personal or family emergency? For small issues that disrupt only one or two assignments, you should contact your instructors immediately. Make-up policies in such cases are up to the instructor and should be covered in the course syllabus. For slightly longer term issues, students are encouraged to work with Campus Life. Campus Life can sometimes serve as an intermediary to verify your situation to your instructors, but you will still need to work with your instructors and should contact them as soon as possible. For more long term serious situations, you may consider petitioning the dean's office for a "Q grade." A Q grade is essentially a medical withdrawal from a course. You will not receive credit for courses with Q grades, but they also will not count against your GPA. Note that typically a dean will require that you take a Q grade for all your courses in a semester. Only in extremely exceptional circumstances will a dean grant a Q grade for a single course. For Math majors, the relevant dean to discuss possible Q grades with is Associate Dean Dick Rinewalt.

How do double majors work? No course may be applied to more than one set of major or minor requirements, though "associated requirements" for one major or minor may be counted toward another major or minor. With this in mind, students may earn a single degree with multiple majors provided they have fulfilled all of the requirements for all of the degrees without violating the above restriction.

To earn a double degree, which is considered two separate undergraduate degrees, a student must successfully complete 30 hours in the degree with the lower number of credit hours in addition to those counted toward the bachelor's degree that requires the higher number of credit hours. The above restriction about courses (except associated requirements) not counting toward multiple majors continues to apply.

What if I want to teach primary or secondary school math? You may want to consider a double major in Mathematics and Educational Studies or a Minor in Educational Studies. The Educational Studies programs are run by the College of Education. For more information, go to `https://coe.tcu.edu/academics/majors-minors/educational-studies.php`. You can also find some information below in Section 9.

How do courses for actuarial majors correspond to Society of Actuaries exams? The sequence MATH 30603 and MATH 30623 (Interest Theory I and II) prepares students to take Exam FM-Financial Mathematics.

The sequence MATH 30803 (Probability) and MATH 40603 (Actuarial Mathematics) prepares students to take Exam P-Probability.

I want to take a study abroad course, what do I need to do? Study abroad courses for Math major credit must be approved by the department chair. Approved study abroad courses will appear on the transcript as an International Residential Study course with the site and content also listed. Students should be aware that courses in other countries, especially in Europe, may be much more difficult than the comparable American version of the same course and also that students *cannot* retake courses to replace their study abroad grades.

For more information go to `https://studyabroad.tcu.edu/`.

Can I take an in-person or online course at another university? It is possible to take courses, including online courses, at another university, though there are several restrictions. These can be found above in Section 3.1.2. For study abroad courses, see just above.

Generally, the Department of Mathematics discourages students from taking courses at other universities that will apply toward a Math major or minor, as courses taken elsewhere, especially online or at junior colleges, are often poor preparation for taking subsequent courses at TCU.

What if I'm transferring in credit for a course that's equivalent to a TCU course but with fewer hours? Do I have to make up those hours? This situation can arise if, prior to coming to TCU, a student has taken a course at another university that is equivalent to a 4-hour TCU course, such as Calculus I, but the other university only considers it a 3-hour course. In this case, the department chair can waive the difference in hours. You should contact the Chair of the Math Department to request this. =

Can I get course credit for an internship? Yes! Students can get internship credit with either MATH 40801 Mathematics Internship or MATH 40621 Actuarial Internship. The internship must include a minimum of 90 work hours appropriate to the field and must be approved in advanced by the chair of the Math Department. For MATH 40801, the student must have completed at least five Mathematics courses counting toward a Mathematics major with at least a 2.75 GPA. For MATH 40621, the students must have a 2.75 GPA in the major and have completed either MATH 30603 or MATH 40603. These internship courses must be taken pass/no credit and count for one credit. They may be repeated for a total of up to 3 credit hours. If the internship class is taken in the summer, you will need to pay for the one credit hour to enroll in this class. If your internship class is during the school year, whether or not you incur an additional tuition fee depends on how many hours you are taking. International students taking an internship must coordinate the class paperwork with the Office of International Students as well as with the Mathematics Department.

How do I get involved with math research? Students interested in doing undergraduate research should ask a faculty member to serve as a mentor well in advance of the semester they intend to do begin doing research. Typically you should establish your mentor early in your junior year. We are currently working on a system to match students who don't have a faculty member in mind with one with a project - please stand by.

Students who plan to write a thesis (including to obtain Departmental Honors) typically take Math 30000 or Math 31000 at some point during their junior year or in the first semester of their senior year and then take Math 40000, which is a Writing Emphasis course, the semester they write up their results. Additional research can be done through Math 40970.

Students should be aware that research may span several semesters, including summers, and they may have semesters working on their research projects during which they do not take an associated course.

How do I write an Honors thesis/obtain Departmental Honrors? For those pursuing Departmental Honors, this requires being a BS major and membership in the Honors College, which can be applied for if you meet the GPA requirements. For more details about Departmental Honors, see the documents from the Honors College in the Appendix to this manual in Section 8.

Do I need to fill out any forms to graduate? Yes! You should fill out an Intent to Graduate form about a year before your planned graduation date. This gives the dean's office time to check to make sure everything is in order. You can find this form at `https://cse.tcu.edu/current-undergraduate-students/intent-to-graduate/`.

7 Common prerequisites involving non-math courses

The math degree requires certain courses outside the major. Be aware of the following prerequisites for those classes:

- ECON 40313 Econometrics (which can be used to fill an associated requirement for Math majors) requires MATH 30853 Statistics.
- COSC 20203 Techniques in Programming (which can be used to fill an associated requirement for Math majors) requires COSC 10403 Introduction to Programming.
- COSC 10503 Introduction to Programming for Engineering and Science requires MATH 10524 Calculus I before or concurrently.
- PHYS 20474 Physics I or PHYS 20475 Physics I for Majors (which can be used to fill an associated requirement for Math majors) require MATH 10524 Calculus I before or concurrently.
- PHYS 20484 Physics II (which can be used to fill an associated requirement for Math majors) requires MATH 20524 Calculus II before or concurrently. It also requires PHYS 20474, PHYS 20475 Physics I for Majors, or PHYS 20473/20471.
- ECON 30223 Intermediate Microeconomics requires a previous 3-hour ECON course and MATH 10283 or MATH 10524.
- ECON 30233 Intermediate Macroeconomics requires a previous 3-hour ECON course.
- ACCT 40163 Accounting for Decision Making & Control requires ACCT 20353.
- FINA 30153 Financial Management requires ACCT 20353.

8 Appendix: Departmental Honors

Revised 09.30.19

Departmental Honors:
Overview of Goals and Duties

To earn Departmental Honors, students in the John V. Roach Honors College must complete a research or creative project in their major (or, with permission, in the student's minor or area of emphasis). Students design and carry out a research project or creative work under the guidance of a faculty mentor, typically over two semesters. Students enroll in designated Departmental Honors courses during these two semesters, earning 1-3 credit hours per course. Senior students present their projects in a public forum and publish their finished works in the archives of the Mary Couts Burnett Library.

As its name suggests, "Departmental Honors" is a collaborative partnership between academic departments (and their associated colleges and schools) and the John V. Roach Honors College. The principal duties of all partners in the Departmental Honors process – students, supervising professors, committee members, department chairs, and colleges and schools – are as follows:

Departmental Honors students

First steps

- Talk to your Honors advisor about your upper-division Honors options: Departmental Honors vs. University Honors
- Declare your intent to pursue Departmental Honors (via the Honors College survey and by telling your Honors advisor)
- Find a professor in your major who is willing to supervise your project; or, if you wish to pursue a project in your minor or area of emphasis, start by seeking permission from the unit head (department chair or program director), then, if permission is granted, find a professor in your minor or area of emphasis who is willing to supervise your project
- Talk to your supervising professor about the course requirements for Departmental Honors in their department or program

Phase 1 (typically during junior year or first semester of senior year)

- Enroll in the first required Departmental Honors course
- Work with your supervising professor to identify 1-2 committee members (the required number varies by unit)
- Submit a Departmental Honors Registration Form to the Honors College
- Complete the requirements for the first Departmental Honors course

Phase 2 (typically during second semester of senior year)

- Complete the requirements for the second Departmental Honors course
- Present your project in a public forum (in a venue and format determined by your college or school)
- Two weeks before final exam week, submit a complete working draft of your project to the Honors College (via the Honors College online submission system)
  [Please note: the purpose of this deadline is to guarantee that faculty committees and students have at least two weeks to complete a final round of feedback and revision; however, the Honors College strongly encourages supervising professors to set earlier deadlines, to better facilitate the feedback/revision process.]
- On the Monday of final exam week, submit your final document to the Honors College (via the online submission system)

Supervising professors

- Help the student identify a meaningful and tractable topic, determine appropriate methods of inquiry, identify 1-2 additional committee members (the required number varies by unit), and develop a realistic timeline for completion
- Assist the student as necessary in securing IRB/IACUC approval for projects involving human/live animal subjects
- Help the student understand/enact the iterative *process* of inquiry by setting appropriate deadlines for completion of parts or drafts of the project and by providing timely feedback at each stage – and by establishing clear expectations about when work is to be shared with the full committee (vs. submitted only to the supervising professor)
- Advise the student on formal details of the final product: organizational structure, formatting conventions, and citation style (per the conventions of your discipline)
- Attend the public presentation of the student's project
- Two weeks before the final submission deadline, after the student submits a full working draft to the Honors College (via the online submission system), inspect the document to verify that a full working draft has indeed been submitted, then communicate your "yes" or "no" to the Honors College via the online system
- Before the deadline for final submission to the Honors College, provide final feedback on the student's penultimate draft (in collaboration with the other member(s) of the student's committee), then review the final revised version of the student's project to make sure the student has made a credible effort to address all faculty feedback
- During final exam week (no later than 5:00 pm Wednesday), after the student has submitted his or her final project to the Honors College, indicate your summary assessment – either to grant or deny approval – of the student's Departmental Honors work via the online system, along with any comments you wish to add
- Determine the student's course grade at the end of each semester's work, in consultation with the other member(s) of the student's committee

Committee members

- Help the student understand/enact the iterative process of inquiry by providing formative feedback at various stages of the project (per deadlines and expectations set by the supervising professor)
- Attend the public presentation of the student's project
- Two weeks before the final submission deadline, after the student submits a full working draft to the Honors College (via the online submission system), inspect the document to verify that a full working draft has indeed been submitted, then communicate your "yes" or "no" to the Honors College via the online system
- After the student submits the final project to the Honors College on the Monday of final exam week, review the document and then submit your comments and summary assessment – either to grant or deny approval of the student's Departmental Honors work – via the online system
- Provide input to the supervising professor regarding the student's course grade at the end of each semester's work

Department chairs

- Make sure the required sequence of Departmental Honors courses is clearly understood by students and faculty members in your unit
- Sign off on students' Departmental Honors Registration Forms, to ensure that the composition of each student's committee is consistent with departmental norms/guidelines and appropriate faculty workloads
- Maintain open communication with the Honors College, including suggestions of ways that Honors might better support Departmental Honors students and faculty mentors

Colleges and Schools

- Provide a public forum for student presentations (in a format determined by each college or school) during the spring semester but no later than the first week of April (in advance of Honors Week)
- Organize a process to determine which student(s) will represent the college or school in the final round of the annual Boller Award competition during Honors Week (a campus-wide competition for the best Departmental Honors presentation)[1]
- Designate a faculty or staff liaison to communicate with the Honors College about the public forum for Departmental Honors presentations in the college or school and about the Boller Award process, including timely communication of the name(s) of the college or school's Boller Finalist(s) – no later than the Wednesday before Honors Week
- Designate one faculty member to serve as a judge (and a second faculty member to serve as an alternate judge) for the final round of the annual Boller Award competition during Honors Week

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[1] Each college/school is represented by at least one student in the Boller Finals; additional slots are allocated – up to an overall limit of 12 – based on the number and composition of students completing Departmental Honors during that academic year.

John V. Roach Honors College

- Provides each department with updated lists of students who have declared an intent to pursue Departmental Honors
- Provides modest stipends to supervising professors
- Communicates general goals and expectations for all Departmental Honors projects
- Via the Honors College website, provides resources to assist students, faculty committees, and department chairs (sample projects, answers to FAQ, instructions for scheduling Departmental Honors courses, and other helpful documents)
- Works with colleges and schools to coordinate public presentations of students' work
- Welcomes faculty and student feedback on how to enhance the Departmental Honors process

9 Appendix: Educational Studies in Mathematics Education

Educational Studies in Mathematics Education Double Major: Student Information

What do I need to know about the double major with Educational Studies in Mathematics Education?

- *You will pair your major in mathematics major with an educational studies major in mathematics education.*
- *Your bachelor's degree will still be housed in the College of Science and Engineering.*
- *You will earn your Texas certification to teach secondary mathematics (grades 7-12).*

What can I expect in my Mathematics Education coursework?

- *You will enhance and expand your mathematical knowledge through learning specific research-based methods for the teaching and learning of mathematics.*
- *You will engage in authentic planning, teaching, and learning from middle and high school mathematics curricular materials.*
- *You will have the opportunity to observe, implement, and evaluate lessons in several field placements in middle and high school mathematics classrooms.*

What can I expect in my General Education coursework?

- *You will participate in coursework related to learning about adolescent development, managing and engaging students from diverse communities, and how to embed technology into your teaching practice.*
- *The coursework will provide a foundation for you to excel when you enter the classroom as an educator.*

What are my career options if I double major in Educational Studies in Mathematics Education?

- *You will be prepared to teach in a variety of diverse settings including urban, suburban, and rural public and private schools.*
- *You will be also be prepared to work in non-traditional settings such as museums, after school programs, juvenile detention centers, or programs for at-risk students.*

Do I need to take extra coursework?

- *No, you will complete 124 credit hours of coursework to fulfill the requirements for both majors.*
- *Your coursework will include your core, mathematics, and education classes.*

For further information, contact one of the Mathematics Education program faculty members below.

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