

Welcome to the
Mathematics Major
Applied & Computational Mathematics Emphasis
in the College of Computational, Mathematical, and Physical Sciences

College Advisement Center

Website: <https://science.byu.edu/advisement>
Email: science.math.advisement@byu.edu
Phone: 801-422-2674
Office: N-181 ESC



Mathematics Department

Website: <https://math.byu.edu>
Phone: 801-422-2061
Office: 275 TMCB

Faculty Advisor: Email acmeasst@mathematics.byu.edu to set up an appointment with a faculty advisor.

Internship Coordinator – Allie Sensinger

Email: allies@mathematics.byu.edu
Phone: 801-422-5925
Office: 290 TMCB

University Career Services – Lane Muranaka

Website: careers.byu.edu (Handshake--see flyer in packet)
Email: lane_muranaka@byu.edu
Phone: 801-422-9360 (schedule appointment)
Office: 2152A WVB

Mathematics: Applied and Computational Mathematics Emphasis website: acme.byu.edu

Clubs

SIAM—Website: <https://stem.byu.edu/society-for-industrial-and-applied-mathematics>

SACME--Contact: Contact Tyler Jarvis (tyler_jarvis@byu.edu) and check the website: <https://acme.byu.edu/sacme>

Learning outcomes can be found here: <https://learningoutcomes.byu.edu/Courses/program-courses/694432/Mathematics+BS+Applied+and+Computational+Mathematics/1326>

Things to Know

Resources for Graduation Planning

- Flow Charts and Major Academic Plans (MAPs) can be found here: <https://science.byu.edu/advisement/explore-majors-and-minors>.
- Academic advisors in N-181 ESC will help you understand course sequencing and help you plan classes to efficiently fill requirements. They can also help you with study skills and initial career exploration as well as connecting you with correct resources.
- Plan and register from your plan on MyMAP. Your academic advisor can help you understand how to best utilize this resource.
- Evaluate your current program. Periodically major programs are updated. An academic advisor would be happy to review the differences between the programs with you to help you determine what would be best for you.
- Consider meeting with a faculty advisor in your department. Contact info is found on the first page of this packet.

Tutoring Resources and Research

- Volunteer peer tutors are available through Y Serve if you need help with a class. Also, if you excel in a subject, consider serving your fellow students by becoming a tutor. Find out more here: <https://tutoring.byu.edu/>.
- Many departments provide TA Tutorial Labs and research opportunities. Check your department for details:
 - Chemistry and Biochemistry: C-104 BNSN, 801-422-6261, <https://chem.byu.edu/department/faculty/>
 - Computer Science: 3361 TMCB, 801-422-3027, csoffice@cs.byu.edu
 - Geological Sciences: S-389 ESC, 801-422-3918, geology@byu.edu
 - Mathematics: 275 TMCB, 801-422-2061, office@mathematics.byu.edu
 - Mathematics Education: 167 TMCB, 801-422-1735, office@mathed.byu.edu
 - Physics and Astronomy: N-283 ESC, 801-422-4361, physics_office@byu.edu
 - Statistics: 2152 WVB, 801-422-4505, statsec@stat.byu.edu

Prepare Early for a Career

- Check out Careers & Experiential Learning in 1134 WSC and at <https://ucs.byu.edu/>.
- Consider doing an internship.
 - Attend the STEM and Career Fairs held in fall and winter semesters.
 - Talk to your department about internship opportunities.
 - Use LinkedIn and Handshake (see flyer in this packet) to connect with alumni and apply for jobs/internships. BYU Connect is another great resource for networking (connect.byu.edu).
 - Talk with the college Career Director who can help you search for internships as well as assist you with many other career related strategies (see first page of this packet).
- Consider taking StDev 317 (Career Strategies) your junior year.
- Consider taking either Chem 502, CS 502, Geol 502, Math 502, PHSCS 502, or STAT 502 (1-credit Networking Class). Class is held for 1 hour each week.

BS Mathematics: Applied and Computational Mathematics (694432) MAP SHEET

Physical and Mathematical Sciences, Mathematics

For students entering the degree program during the 2024-2025 curricular year

University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR		JUNIOR YEAR	
Requirements	# Classes	Hours	Classes	<u>1st Semester</u>		<u>5th Semester</u>	
Religion Cornerstones				First Year Writing	3.00	MATH 320	3.00
Teachings and Doctrines of the Book of Mormon	1	2.00	REL A 275	MATH 112	4.00	MATH 321	1.00
Jesus Christ and the Everlasting Gospel	1	2.00	REL A 250	UNIV 101	2.00	MATH 344	3.00
Foundations of the Restoration	1	2.00	REL C 225	Religion Cornerstone Class	2.00	MATH 345	1.00
The Eternal Family	1	2.00	REL C 200	GE Arts, Letters, Sciences	3.00	ACME Concentration Requirement	3.00
BYU Foundations for Student Success				Total Hours:	14.00	Religion Cornerstone Class	2.00
Foundations for Student Success	1	2.00	UNIV 101	<u>2nd Semester</u>		GE Arts, Letters, Sciences	3.00
The Individual and Society				CS 111	3.00	Total Hours:	16.00
American Heritage	1 to 2	3.00-6.00	from approved list	MATH 113	4.00	<u>6th Semester</u>	
Global and Cultural Awareness	1	3.00	from approved list	MATH 290	3.00	MATH 322	3.00
Skills				Religion Cornerstone Class	2.00	MATH 323	1.00
First Year Writing	1	3.00	from approved list	American Heritage	3.00	MATH 346	3.00
Advanced Written and Oral Communications	1	3.00	from approved list	Total Hours:	15.00	MATH 347	1.00
Quantitative Reasoning	1	4.00	MATH 112*	SOPHMORE YEAR		GE Arts, Letters, Sciences	3.00
Languages of Learning (Math of Language)	1	4.00	MATH 112*	<u>3rd Semester</u>		GE Religion	2.00
Arts, Letters and Sciences (Complete 6 of 7)				MATH 213	2.00	ACME Concentration Requirement	3.00
Civilization 1	1	3.00	from approved list	MATH 215	1.00	Total Hours:	16.00
Civilization 2	1	3.00	from approved list	MATH 314	3.00	SENIOR YEAR	
Arts	1	3.00	from approved list	GE Arts, Letters, Sciences	3.00	<u>7th Semester</u>	
Letters	1	3.00	from approved list	GE Arts, Letters, Sciences	3.00	MATH 402	3.00
Biological Science	1	3.00-4.00	from approved list	ACME Concentration Requirement	3.00	MATH 403	1.00
Physical Science	2	3.00	from approved list	Total Hours:	15.00	MATH 436	3.00
Social Science	1	3.00	from approved list	<u>4th Semester</u>		MATH 437	1.00
Core Enrichment: Electives				MATH 334	3.00	GE Arts, Letters, Sciences	3.00
Religion Electives	3 to 4	6.00	from approved list	ACME Concentration Requirement	3.00	GE Religion	2.00
Open Electives	Variable	Variable	personal choice	Adv Written and Oral Communication	3.00	ACME Concentration Requirement	3.00
Graduation Requirements:				MATH 341	3.00	Total Hours:	16.00
Minimum residence hours required		30.00		Math 392 (recommended elect)	2.00	<u>8th Semester</u>	
Minimum hours needed to graduate		120.00		Religion Cornerstone Class	2.00	MATH 404	3.00
*These classes fill both university core and program requirements				Total Hours:	16.00	MATH 405	1.00
						MATH 438	3.00
						MATH 439	1.00
						Global & Cultural Awareness	3.00
						GE Religion	2.00
						ACME Concentration Requirement	3.00
						Total Hours:	16.00

Requirement 1 — Complete 7 Courses

Complete the following pre-core requirements before junior year:

C S 111 - Intro to Computer Science 3.0
 MATH 112 - Calculus 1 4.0
 MATH 113 - Calculus 2 4.0
 MATH 290 - Fundamentals of Mathematics 3.0
 MATH 314 - Calculus of Several Variables 3.0
 MATH 334 - Ordinary Differential Equation 3.0
 MATH 341 - Theory of Analysis 1 3.0

Requirement 2 — Complete 1 Requirement**Requirement 2.1 — Complete 2 Courses**

MATH 213 - Elementary Linear Algebra 2.0
 MATH 215 - Computational Linear Algebra 1.0

Requirement 3 — Complete 4 Courses

Complete the following core requirements during fall semester, junior year:

MATH 320 - Algorithm Design & Opt 1 3.0
 MATH 321 - Algorithm Design & Opt 1 Lab 1.0
 MATH 344 - Mathematical Analysis 1 3.0
 MATH 345 - Mathematical Analysis 1 Lab 1.0

Requirement 4 — Complete 4 Courses

Complete the following core requirements during winter semester, junior year:

MATH 322 - Algorithm Design & Opt 2 3.0
 MATH 323 - Algorithm Design & Opt 2 Lab 1.0
 MATH 346 - Mathematical Analysis 2 3.0
 MATH 347 - Mathematical Analysis 2 Lab 1.0

Requirement 5 — Complete 4 Courses

Complete the following core requirements during fall semester, senior year:

MATH 402 - Model Uncertainty & Data 1 3.0
 MATH 403 - Model Uncertainty & Data 1 Lab 1.0
 MATH 436 - Model Dynamics & Control 1 3.0
 MATH 437 - Model Dynamics & Control 1 Lab 1.0

Completion of an internship in the summer term between the junior and senior years is strongly recommended.

Requirement 6 — Complete 4 Courses

Complete the following core requirements during winter semester, senior year:

MATH 404 - Model Uncertainty & Data 2 3.0
 MATH 405 - Model Uncertainty & Data 2 Lab 1.0
 MATH 438 - Model Dynamics & Control 2 3.0
 MATH 439 - Model Dynamics & Control 2 Lab 1.0

Requirement 7 — Obtain confirmation from your advisement center that you have completed the following:

Students are required to complete a concentration in an area to which the mathematical and computational tools that they are learning can be applied. The list of the Approved Concentrations is found at www.acme.byu.edu/?page_id=85.

Requirement 8 — Obtain confirmation from your advisement center that you have completed the following:

Students are required to take either the GRE Mathematics Subject Test or the Mathematics Major Field Test the last semester before they graduate. The results of these tests do not appear on the transcript or affect the GPA. For more information contact the math department.

THE DISCIPLINE:

Mathematics is a means of dealing with order, pattern, and number as seen in the world around us. The abilities to compute, to think logically, and to take a reasoned approach to solving problems are highly valued in society and are characteristics of any educated person. Mathematics is not just a

body of knowledge, but a process of analysis, reasoning, comparison, deduction, generalization, and problem solving.

A mathematician's stock in trade is the ability to solve problems and explain the solutions to others. Having once determined what the right questions are, solving problems involves analyzing both concrete and abstract situations, relating them to mathematical ideas and using mathematical techniques to work toward solutions. Explaining the solution involves pointing out what has been solved and why the solution is valid.

The Applied and Computational Mathematics Emphasis gives students a solid education in mathematics and, in addition, prepares them to apply mathematical theory to problems that arise in other contexts. They will gain experience in problem formulation, data analysis, computation, and interpreting their results in the context in which the problems arose. The concentration requirement provides them with contextual knowledge which will enable them to identify interesting problems and to implement their results.

CAREER OPPORTUNITIES:

Majors in mathematics (BS) prepare for a wide variety of careers. Some enter graduate school or professional schools and prepare for careers in such fields as college teaching, consulting, research and development, law, medicine, and business administration. Others take positions in government agencies, industrial laboratories, information management firms, or business organizations. All of them spend much time communicating with colleagues about the problems they are solving as they continue to learn more mathematics and share mathematical ideas with others.

INTERNSHIP COORDINATOR:

Rynell Lewis
 283 TMCB
 801-422-5925
rlewis@mathematics.byu.edu

MAP DISCLAIMER

While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

DEPARTMENT INFORMATION**FACULTY ADVISOR:**

Darrin Doud
 322 TMCB
 Brigham Young University, Provo, UT 84602
 Telephone: (801) 422-1204

ADVISEMENT CENTER INFORMATION**Computational, Mathematical, & Physical Sciences College
 Advisement Center**

Brigham Young University
 N-181 ESC
 Provo, UT 84602
 Telephone: (801) 422-2674

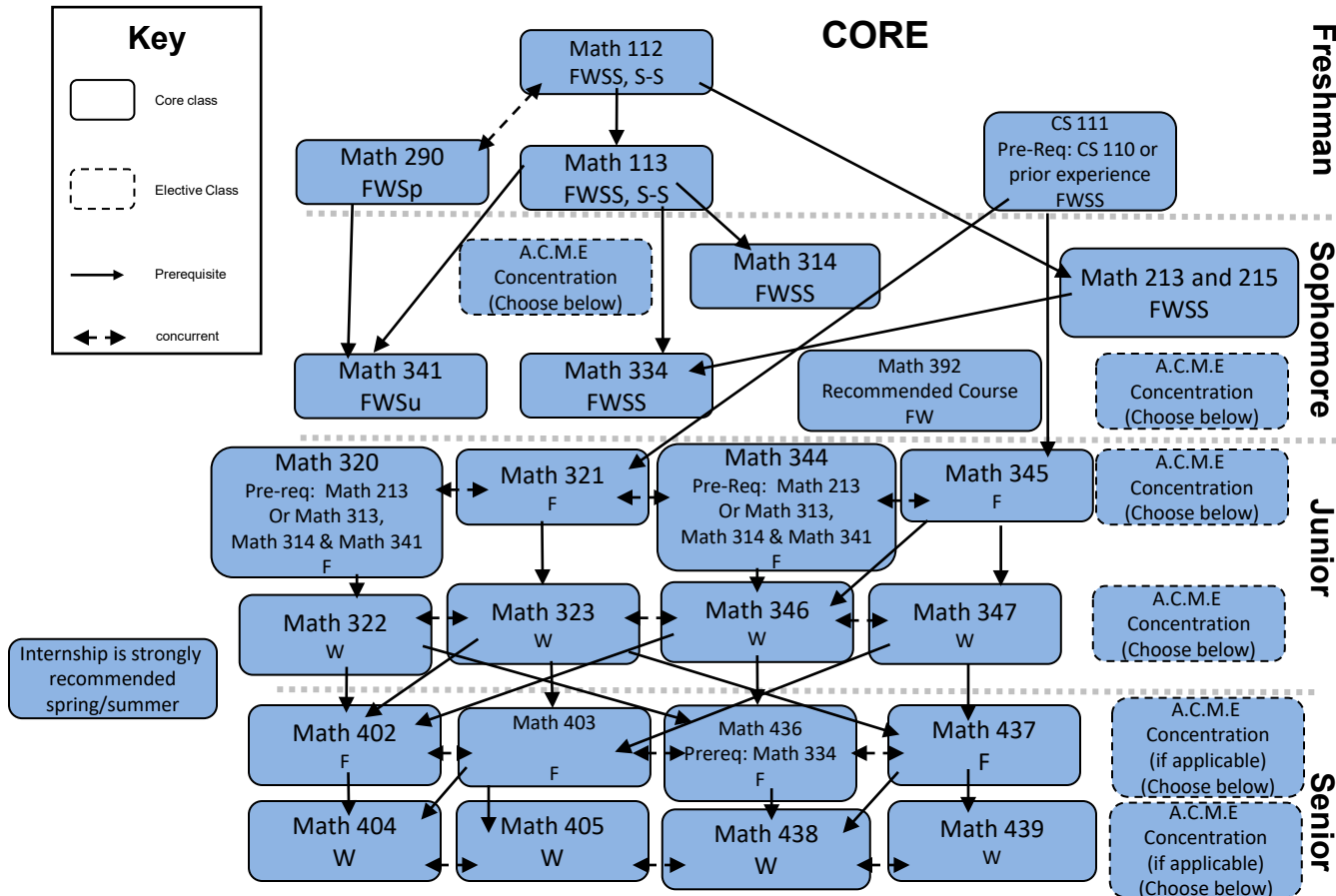
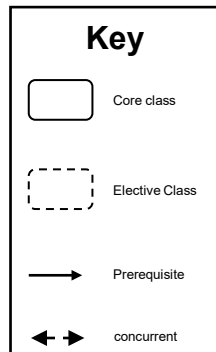
BYU Mathematics:

Applied & Computational Mathematics Emphasis

Requirements / Prerequisites 2024-2025 Academic Year

Major (71-76 Hours)

- Complete the following core requirements: CS 111 or Math 495R (4 credits) as part of EMC2 (<https://math.byu.edu/emc2/>), Math 112, Math 113, Math 290, Math 314, Math 334, Math 341.
- Complete Math 213 and Math 215 (or Math 313).
- Complete the following core courses during fall semester of junior year: Math 320, Math 321, Math 344, Math 345
- Complete the following core courses during winter semester junior year: Math 322, Math 323, Math 346, Math 347.
- An internship in the spring/summer after your junior year is strongly recommended.
- Complete the following core requirements during fall semester of senior year: Math 402, Math 403, Math 436, Math 437.
- Complete the following core classes during winter semester of senior year: Math 404, Math 405, Math 438, Math 439.
- Complete a concentration from list found at <https://acme.byu.edu/concentrations-in-acme>.
- Complete either the GRE Mathematics Subject Test or the Mathematics Major Field Test.



Be sure to work on your concentration early on to ensure you have time to complete it without extending graduation. The most updated list of concentrations can be found here: <https://acme.byu.edu/concentrations-in-acme>.

Dr. Barker or one of the other advisors for ACME are great resources to help you determine which concentration is best for you or whether a customized concentration will better meet your needs. (contact info for setting up an appointment is on the first page of packet).

handshake

BYU's own job board. Employers who want to hire BYU graduates or offer internships to current students post job openings to this website and students apply. Just like LinkedIn, employers can view student profiles and students can network as they apply for jobs and internships

Login to handshake.byu.edu >>> BYU Net ID

**you do not need to create an account, just sign in with you BYU information*



HOW TO MAKE THE MOST OUT OF HANDSHAKE:

1. COMPLETE YOUR PROFILE

- Upload your resume and it will auto-fill in your profile
- Completed profiles tailor your Handshake experience
- Information from your transcript is already uploaded
- Fill in the Summary/Bio section
- Fill in your past jobs and experiences, including all the bullet points you use on your resume
- Add a professional headshot and background photo

Remember: every word in your profile will be searchable by students and employers

4. EXPLORE FELLOW STUDENTS

- “Students” tab
- Search for fellow BYU students to view their profiles and job positions (Facebook stalking... “networking”)

5. ATTEND EVENTS

- The “Events” tab will be your key to attending info sessions, interviews, and Career Fairs
- The “Calendar” tab under “Events” will show you what events are coming soon
- Make sure to save events you are interested in or RSVP so you do not forget to attend
- Spread the word to your friends on social media

6. DOWNLOAD HANDSHAKE APP

- Search: “Handshake” not “Handshake Career Services”
- Input your BYU e-mail address: netID@byu.edu (it will forward emails to the e-mail you have on file with BYU)
- Handshake will send you a link via e-mail to enable your account in the app
- Navigate the app to perform all the functions of the website that have been previously mentioned

7. VISIT THE CAREER STUDIO

- Freshen up your resume, cover letter, or LinkedIn
- Receive networking help
- Practice interviewing with a mock interview
- Meet with a full-time Career Counselor in your field

8. GET A JOB, RING THE BELL

- Once you're hired, stop by the Career Studio to ring our Victory Bell and get a picture for the Victory Board



employers are
5X MORE LIKELY
to view a profile that has
at least one job/skill/organization

2. APPLY FOR JOBS

- Search for job titles, employers, or skills
- Apply for interesting jobs that meet your skill set

3. RESEARCH COMPANIES

- Under the “Jobs” Tab there is an “Employers” Tab
- Search for keywords or locations to find companies that are the right fit for you
- Plan to attend their info sessions on BYU Campus, connect with them at Career Fairs, or set up informational interviews to learn more

Remember: when looking at companies or jobs, Handshake will tell you what other BYU students have worked there. Use this resource to network and discover more information!

71% Employed at Graduation

91% Employed in 3 Months

100% Employed in 6 Months

Math alumni who have worked in academia: **150+** (5.4%)

Mathematics Major

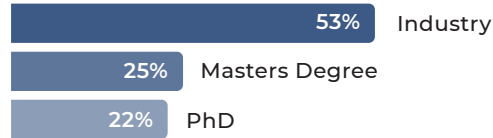
\$70k

Median Starting Salary

40%

of Math majors choose general Math

After graduation, Mathematics students go into:



Graduate Schools

- Berkeley
- BYU
- Columbia
- Cornell
- Dartmouth
- Duke
- MIT
- New York University
- Oxford
- Princeton
- Stanford
- UCLA
- University of Chicago
- University of Michigan
- Univ. of Pennsylvania
- Yale

Grad School Majors

- Computer Science
- Economics
- Finance
- Law
- Mathematics
- Mathematic Teaching
- Medicine
- Statistics

Employers

- Capital One
- Cornerstone Research
- Family Search
- FBI
- Federal Reserve Board
- Fidelity Investments
- General Motors
- Goldman Sachs
- Lawrence Livermore National Lab
- Lucid
- McKinsey & Company
- Microsoft
- NSA
- Qualtrics
- Tampa Bay Rays
- The Church of Jesus Christ of Latter-day Saints
- Vivint
- Zions Bank

Jobs

- Actuarial Analyst
- Bioinformatics
- Biostatistics
- Business Analyst
- Cyber Security
- Data Analyst
- Data Architect
- Economic Analyst
- Financial Analyst
- Management Consulting
- Math Professor
- Math Teacher
- Product Development
- Quantitative Analyst
- Software Engineer
- Software Testing
- Systems Engineer

Applied & Computational Mathematics Emphasis (ACME)

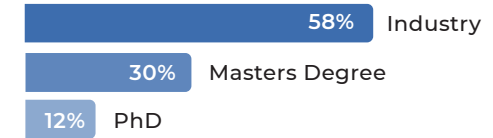
\$85k

Median Starting Salary

60%

of Math majors choose ACME

After graduation, ACME students go into:



Graduate Schools

- Berkeley
- BYU
- Carnegie Mellon
- Duke
- Georgia Tech
- Harvard
- Johns Hopkins
- Northwestern
- Rice
- UCLA
- UNC Chapel Hill
- University of Chicago
- University of Michigan
- UT Austin
- Yale

Grad School Majors

- Computer Science
- Computational Science
- Electrical Engineering
- Economics
- Mathematics
- Math Teaching
- Statistics

Employers

- Amazon
- Ancestry
- Apple
- CIA
- Ernst and Young
- eTrade
- Facebook
- Goldman Sachs
- Google
- Intel
- IHC
- KPMG
- Microsoft
- Morgan Stanley
- NSA
- Raytheon
- Recursive Analytics
- Sandia National Lab
- The Church of Jesus Christ of Latter-day Saints
- Wells Fargo

Jobs

- Actuarial Analyst
- Bioinformatics
- Biomedical Researcher
- Biostatistics
- Cyber Security
- Data Architect
- Data Engineer
- Data Scientist
- Economic Analyst
- Financial Analyst
- Machine Learning Engineer
- Management Consultant
- Math Professor/Teacher
- Product Development
- Quantitative Analyst
- Signal Processing
- Software Engineer
- Software Testing
- Systems Engineer

Why Study Mathematics

- Graduate schools for business, law and medicine view Math graduates as strong candidates because of their analytical and problem solving skills.
- Graduate entrance exam scores are substantially higher on average. LSAT +12.8%, GMAT +13.3%
- Starting salary is substantially higher than average +37.7%
- The median annual wage for mathematicians was \$108,100 in 2021.
- Excellent job placement in Finance, Management Consulting, Computer Science, Cryptography & Security, Biotech and Data Science
 - “The top 15 highest-earning college degrees all have one thing in common: math skills.”
– “Most Lucrative College Degrees” - Julianne Peptone, CNNMoney magazine, July 24 2009.
 - “The mathematical science occupational group is projected to grow the fastest among all STEM occupational groups.”
– U.S. Dept of Labor Statistics, 2021
 - “Overall employment of mathematicians is projected to grow 31 percent from 2021 to 2031, much faster than the average for all occupations.”
– U.S. Bureau of Labor Statistics, 2021

Hard Skills

- Analysis
- Understanding a problem at its root
- Exploring new ways to think about old problems
- Working with a problem until you understand it
- Ability to interpret data
- Programming skills (ACME)

Soft Skills

- Problem Solving
- Analytical Attitude
- Logical Thinking
- Resilience

Pathway to Becoming a Math Major (Traditional or ACME)

The Math major is designed with flexibility and breadth in mind to allow you to create a customized pathway into industry or academia.

Begin with these required classes:

- Math 290- Fundamentals of Mathematics
- Math 112- Calculus 1
- Math 113- Calculus 2
- Math 213/215- Linear Algebra

Reach out to an advisor at: ugradassistant@mathematics.byu.edu for more information.

Interested in ACME?

ACME combines math, programming, and data science. It operates as a cohort in the junior and senior years. It is designed to prepare you to solve real-world problems in industry.

Because ACME is interdisciplinary, talking to an advisor is the best way to see if it's a good fit for you. Email: acmeasst@mathematics.byu.edu to set up an appointment.

Interested in a Math Minor?

Required Classes:

- Math 290- Fundamentals of Mathematics
- Math 112- Calculus 1
- Math 113- Calculus 2
- Math 213/215- Linear Algebra
- Math 314 - Calculus of Several Variables (or Math 302 - Math for Engineering)
- One Elective Math class