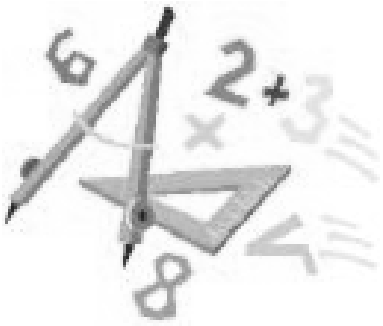
Welcome to the

Mathematics Major
Applied & Computational Mathematics Emphasis

in the College of Physical and Mathematical 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

STEM Alliance--Connect with STEM employers, mentors, and clubs: https://stem.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-100 BNSN, 801-422-3667, https://www.chem.byu.edu/
  - 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 Job Search Class). Class is held for 1 hour each week.

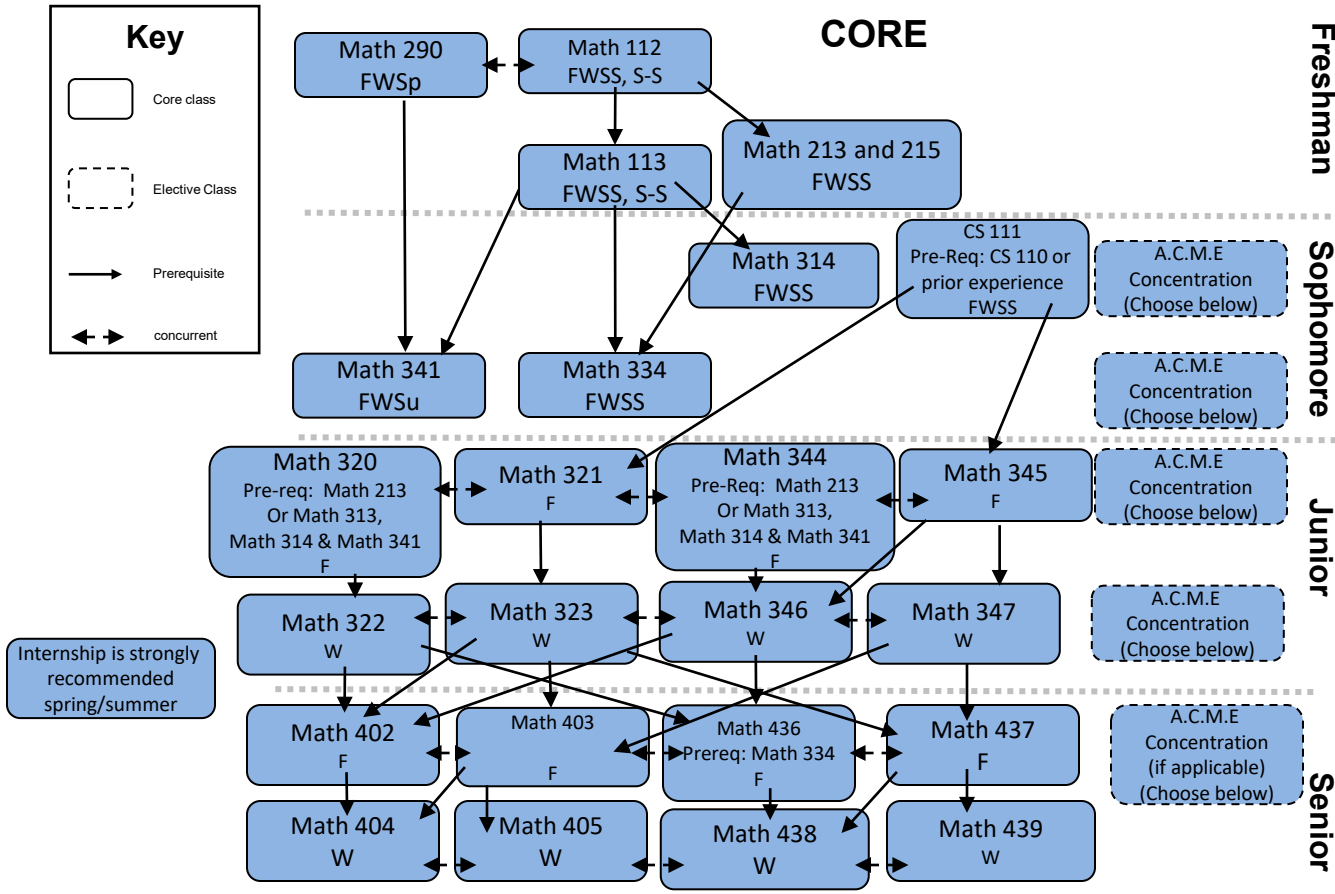
BYU Mathematics:

Applied & Computational Mathematics Emphasis

Requirements / Prerequisites
2023-2024 Academic Year

Major (71-76 Hours)

1. 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.
2. Complete Math 213 and Math 215 (or Math 313).
3. Complete the following core courses during fall semester of junior year: Math 320, Math 321, Math 344, Math 345
4. Complete the following core courses during winter semester junior year: Math 322, Math 323, Math 346, Math 347.
5. An internship in the spring/summer after your junior year is strongly recommended.
6. Complete the following core requirements during fall semester of senior year: Math 402, Math 403, Math 436, Math 437.
7. Complete the following core classes during winter semester of senior year: Math 404, Math 405, Math 438, Math 439.
8. Complete a concentration from list found at https://acme.byu.edu/concentrations-in-acme.
9. Complete either the GRE Mathematics Subject Test or the Mathematics Major Field Test.



Complete a Concentration

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).

Note: When Taught is subject to change. Guide only—please consult MyMAP for full requirements.

Updated 07/12/2023

BS in Mathematics: Applied and Computational Mathematics (694432) MAP Sheet

Physical and Mathematical Sciences, Mathematics

For students entering the degree program during the 2023-2024 curricular year.

University Core and Graduation Requirements

University Core Requirements:

Requirements	#Classes	Hours	Classes
Religion Cornerstones			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250
Foundations of the Restoration	1	2.0	REL C 225
The Eternal Family	1	2.0	REL C 200
The Individual and Society			
American Heritage	1-2	3-6.0	from approved list
Global and Cultural Awareness	1	3.0	from approved list
Skills			
First Year Writing	1	3.0	from approved list
Advanced Written and Oral Communications	1	3.0	from approved list
Quantitative Reasoning	1	4.0	MATH 112* or 113*
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*
Arts, Letters, and Sciences			
Civilization 1	1	3.0	from approved list
Civilization 2	1	3.0	from approved list
Arts	1	3.0	from approved list
Letters	1	3.0	from approved list
Biological Science	1	3-4.0	from approved list
Physical Science	1	3.0	from approved list
Social Science	1	3.0	from approved list
Core Enrichment: Electives			
Religion Electives	3-4	6.0	from approved list
Open Electives	Variable	Variable	personal choice

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (4 hours overlap)

Graduation Requirements:

Minimum residence hours required	30.0
Minimum hours needed to graduate	120.0

Suggested Sequence of Courses

FRESHMAN YEAR

1st Semester

First-year Writing	3.0
MATH 112	4.0
MATH 290	3.0
Biological Science	3.0
Religion Cornerstone course	2.0
Total Hours	**15.0**

2nd Semester

American Heritage	3.0
PHY S 100	3.0
MATH 113	4.0
MATH 213	2.0
MATH 215	1.0
Religion Cornerstone course	2.0
Total Hours	**15.0**

SOPHOMORE YEAR

3rd Semester

MATH 314	3.0
C S 111	3.0
Social Science	3.0
Religion Cornerstone course	2.0
A.C.M.E. Concentration requirement	3.0
Total Hours	**14.0**

4th Semester

MATH 334	3.0
A.C.M.E. Concentration requirement	3.0
Civilization 1	3.0
MATH 341	3.0
Religion Cornerstone course	2.0
Total Hours	**14.0**

JUNIOR YEAR

5th Semester

MATH 320	3.0
MATH 321	1.0
MATH 344	3.0
MATH 345	1.0
Advanced Written & Oral Communication	3.0
A.C.M.E. Concentration requirement	3.0
Religion elective	2.0
Total Hours	**16.0**

6th Semester

MATH 322	3.0
MATH 323	1.0
MATH 346	3.0
MATH 347	1.0
Civilization 2	3.0
Religion Elective	2.0
A.C.M.E. Concentration requirement	3.0
Total Hours	**16.0**

An internship or mentored research project is strongly recommended.

SENIOR YEAR

7th Semester

MATH 402	3.0
MATH 403	1.0
MATH 436	3.0
MATH 437	1.0
Letters	3.0
A.C.M.E. Concentration requirement	3.0
Total Hours	**14.0**

8th Semester

MATH 404	3.0
MATH 405	1.0
MATH 438	3.0
MATH 439	1.0
Religion Elective	2.0
Global & Cultural Awareness	3.0
Arts	3.0
Total Hours	**16.0**

Note: Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.

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

Physical and Mathematical Sciences College Advisement Center
Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674

Handshake: BYU's Online Job Board

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 yor 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

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!

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

BYU MATH

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:

- 53% Industry
- 25% Masters Degree
- 22% PhD

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:

- 58% Industry
- 30% Masters Degree
- 12% PhD

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

For more information on careers, internships, and job placements contact: **allies@mathematics.byu.edu**

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