

Welcome to the

Mathematics Major

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-181ESC



Mathematics Department

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

Faculty Advisor – Pace Nielsen

Email: pace@mathematics.byu.edu
Phone: 801-319-1463
Office: 242 TMCB

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

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>.

Learning outcomes can be found here: <https://learningoutcomes.byu.edu/Courses/program-courses/694420/Mathematics+BS+/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.

BS in Mathematics (694420) MAP Sheet

Physical and Mathematical Sciences, Mathematics

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



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:							
Requirements	#Classes	Hours	Classes	FRESHMAN YEAR		JUNIOR YEAR	
Religion Cornerstones				<u>1st Semester</u>		<u>5th Semester</u>	
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	First-year Writing	3.0	MATH 342	3.0
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	MATH 112	4.0	MATH 413	3.0
Foundations of the Restoration	1	2.0	REL C 225	MATH 191	0.5	Advanced Written & Oral Communication	3.0
The Eternal Family	1	2.0	REL C 200	MATH 290	3.0	Civilization 1	3.0
The Individual and Society				Biological Science	3.0	Religion elective	2.0
American Heritage	1-2	3-6.0	from approved list	Religion Cornerstone course	2.0	General electives	1.0
Global and Cultural Awareness	1	3.0	from approved list	Total Hours	15.5	Total Hours	15.0
Skills				<u>2nd Semester</u>		<u>6th Semester</u>	
First Year Writing	1	3.0	from approved list	American Heritage	3.0	MATH 352	3.0
Advanced Written and Oral Communications	1	3.0	from approved list	Social Science	3.0	Physical Science	3.0
Quantitative Reasoning	1	4.0	MATH 112* or 113*	MATH 113	4.0	Civilization 2	3.0
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*	MATH 213	2.0	Religion elective	2.0
Arts, Letters, and Sciences				MATH 215	1.0	General Electives	4.0
Civilization 1	1	3.0	from approved list	Religion Cornerstone course	2.0	Total Hours	15.0
Civilization 2	1	3.0	from approved list	Total Hours	15.0	SENIOR YEAR	
Arts	1	3.0	from approved list	SOPHOMORE YEAR		<u>7th Semester</u>	
Letters	1	3.0	from approved list	<u>3rd Semester</u>		MATH elective 1	
Biological Science	1	3-4.0	from approved list	MATH 314	3.0	MATH elective 2	3.0
Physical Science	1	3.0	from approved list	MATH 371	3.0	Global & Cultural Awareness	3.0
Social Science	1	3.0	from approved list	CS 111	3.0	Religion elective	2.0
Core Enrichment: Electives				Religion Cornerstone course	2.0	General Electives	4.0
Religion Electives	3-4	6.0	from approved list	General Education courses, university requirements, and/or general electives	4.0	Total Hours	15.0
Open Electives	Variable	Variable	personal choice	Total Hours	15.0	<u>8th Semester</u>	
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (4 hours overlap)				<u>4th Semester</u>		MATH elective 3	
				MATH 334	3.0	MATH elective 4	3.0
				MATH 341	3.0	Arts	3.0
				Letters	3.0	General Electives	6.0
				STAT 201 or 251	3.0	Total Hours	15.0
				Religion Cornerstone course	2.0		
				General Electives	0.5		
				Total Hours	14.5		
				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.			
Graduation Requirements:							
Minimum residence hours required		30.0					
Minimum hours needed to graduate		120.0					

Program Requirements

Grades of C- or below will not be acceptable in major courses.

Requirement 1 — Complete 11 Courses

Core requirements:

MATH 112 - Calculus 1 4.0

MATH 113 - Calculus 2 4.0

MATH 191 - Seminar in Mathematics 1 0.5

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

MATH 342 - Theory of Analysis 2 3.0

MATH 352 - Intro to Complex Analysis 3.0

MATH 371 - Abstract Algebra 1 3.0

MATH 413 - Advanced Linear Algebra 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 1 Course

CS 111 - Intro to Computer Science 3.0

Requirement 4 — Complete 1 of 2 Courses

STAT 201 - Stat for Engineers & Scientist 3.0

STAT 251 - Intro to Bayesian Statistics 3.0

Requirement 5 — Complete 12 hours

CS 235 - Data Structures 3.0

MATH 300 - History & Philosophy of Math 3.0

MATH 350 - Combinatorics & Graph Theory 3.0

MATH 362 - Survey of Geometry 3.0

MATH 372 - Abstract Algebra 2 3.0

MATH 380 - Mathematics of Data Science 3.0

MATH 402 - Model Uncertainty & Data 1 3.0

MATH 403 - Model Uncertainty & Data 1 Lab 1.0

MATH 404 - Model Uncertainty & Data 2 3.0

MATH 405 - Model Uncertainty & Data 2 Lab 1.0

MATH 406R - Topics in Mathematics - *You may take once* 3.0

MATH 410 - Intro to Numerical Methods 3.0

MATH 411 - Numerical Methods 3.0

MATH 425 - Mathematical Biology 3.0

MATH 431 - Probability Theory 3.0

MATH 435 - Mathematical Finance 3.0

MATH 436 - Model Dynamics & Control 1 3.0

MATH 437 - Model Dynamics & Control 1 Lab 1.0

MATH 438 - Model Dynamics & Control 2 3.0

MATH 439 - Model Dynamics & Control 2 Lab 1.0

MATH 447 - Intro Partial Differential Eqs 3.0

MATH 451 - Introduction to Topology 3.0

MATH 465 - Differential Geometry 3.0

MATH 473 - Group Representation Theory 3.0

MATH 485 - Mathematical Cryptography 3.0

MATH 487 - Number Theory 3.0

MATH 495R - Readings in Math - *You may take once* 0.5v

MATH 510 - Num Methods for Linear Algebra 3.0

MATH 511 - Num Methods for Partial Diff 3.0

MATH 513R - Adv Topics in Applied Math - *You may take once* 3.0

MATH 521 - Classical Applied Mathematics 3.0

MATH 522 - Mathematics of Deep Learning 3.0

MATH 525 - Network Theory 3.0

MATH 532 - Complex Analysis 3.0

MATH 534 - Intro to Dynamical Systems 1 3.0

MATH 536 - Applied Discrete Probability 3.0

MATH 540 - Linear Analysis 3.0

MATH 541 - Real Analysis 3.0

MATH 547 - Modeling and Analysis of PDEs 3.0

MATH 553 - Foundations of Topology 1 3.0

MATH 554 - Foundations of Topology 2 3.0

MATH 561 - Intro to Algebraic Geometry 1 3.0

MATH 562 - Intro to Algebraic Geometry 2 3.0

MATH 565 - Differential Geometry 3.0

MATH 570 - Matrix Analysis 3.0

MATH 571 - Algebra 1 3.0

MATH 572 - Algebra 2 3.0

MATH 586 - Intro Algebraic Number Theory 3.0

MATH 587 - Intro to Analytic Number Thry 3.0

Requirement 6 — 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 tests are ETS (Educational Testing Service) standardized assessment

tests of undergraduate mathematics. Go to ETS Math Subject Test

(<http://www.ets.org/gre/subject/about/content/mathematics>) or ETS Major

Field Tests (<http://www.ets.org/mft/about/content/mathematics>) for a test

description and sample problems. These tests do not appear on the

transcript or affect the GPA.

Students must participate in an exit interview before graduation.

Recommended Courses are not required to complete the program

ECON 110 - Econ Principles & Problems 3.0

PHSCS 121 - Intro to Newtonian Mechanics 3.0

PHSCS 220 - Intro Electricity & Magnetism 3.0

Note 1: The courses recommended above can be used to fill General

Education requirements.

Note 2: Students who continue toward graduate work should complete

Math 372 or Math 473, as well as Math 541 and Math 553.

Note 3: Students who do not plan to pursue a Ph.D. in mathematics are

strongly encouraged to complete CS 235.

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 to 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.

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:

Pace Nielsen

318 TMCB

Brigham Young University, Provo, UT 84602

Telephone: (801) 422-7884

ADVISEMENT CENTER INFORMATION

Physical and Mathematical Sciences College Advisement Center

Brigham Young University

N-181 ESC

Provo, UT 84602

Telephone: (801) 422-2674

BYU Mathematics

Requirements / Prerequisites

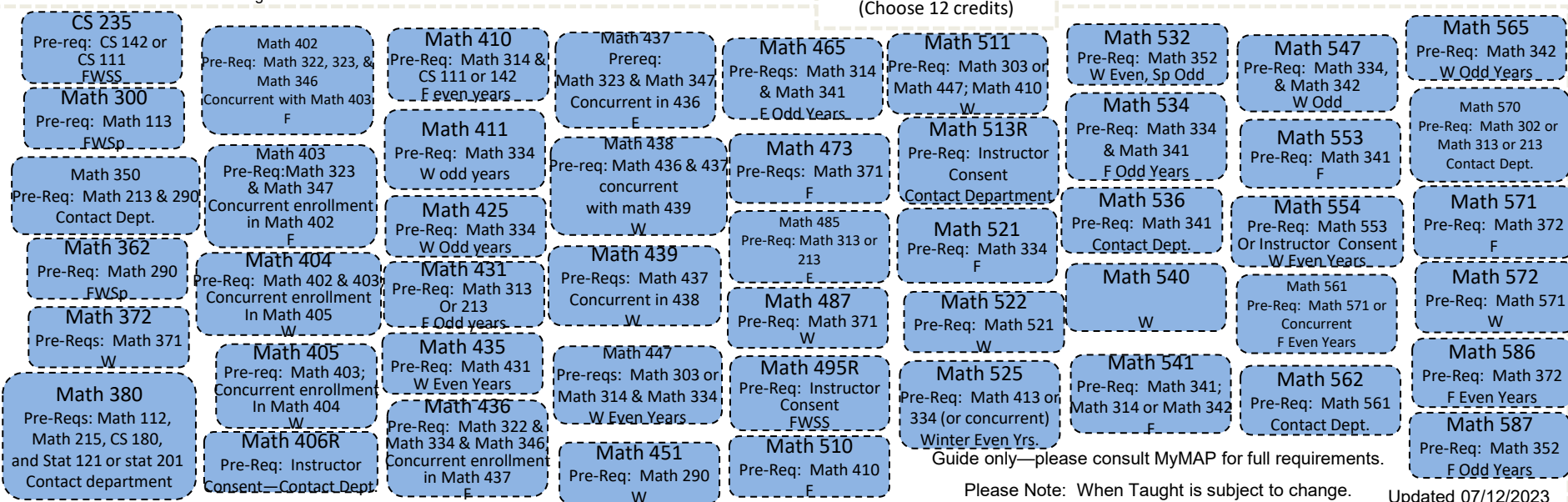
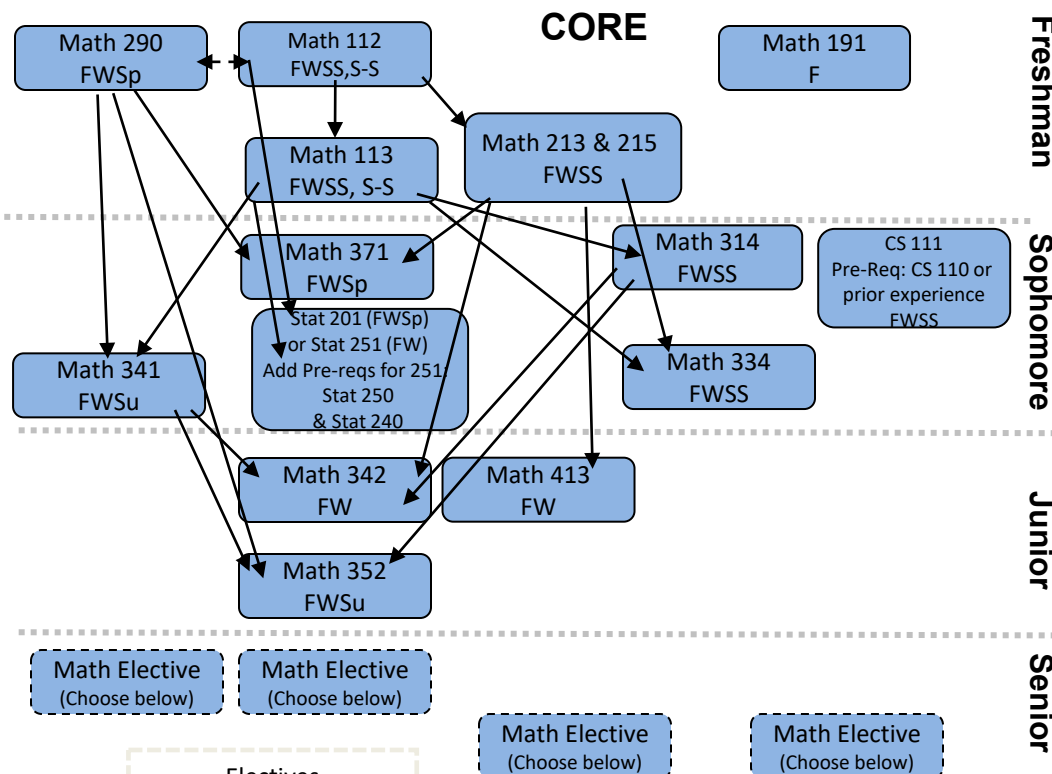
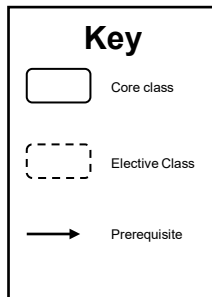
2023-2024 Academic Year

Major (54.5 Hours)

- Grades of C- or below will not be acceptable in major courses.
- Complete the following core requirements: Math 112, Math 113, Math 191, Math 290, Math 314, Math 334, Math 341, Math 342, Math 352, Math 371, Math 413
- Complete Math 213 and 215
- Complete the following course: CS 111
- Complete one of the following courses: Stat 201 or Stat 251
- Complete up to 12 hours from the following options
CS 235, Math 300, Math 350, Math 362, Math 372, Math 380, Math 402, 403, 404, 405, 406R, 410, 411, 425, 431, 435, 436, 437, 438, 439, 447, 451, 465, 473, 485, 487, 495R, 510, 511, 513R, 521, 522, 525, 532, 534, 536, 540, 541, 547, 553, 554, 561, 562, 565, 570, 571, 572, 586, 587
- Complete either the GRE Mathematics Subject Test or the Mathematics Major Field Test the last semester before graduation.
- Complete an exit interview.
- Students who continue to graduate work should complete Math 372 or Math 473, and Math 541, and math 553.
- Students who do not plan to pursue a PhD in Mathematics are strongly encouraged to complete CS 235.

Minor (20-21 Hours)

- Grades of a C- or below will not be accepted.
- Complete the following courses: Math 112, Math 113, Math 290.
- Complete math 213.
- Complete one of the following courses: Math 302 or Math 314.
- Complete 4 credits of the following courses: Math 215, Math 303, Math 334, Math 341, Math 342, Math 350, Math 352, Math 362, Math 371, Math 372, Math 380, or any approved 400 or 500 level minor courses listed in catalog.



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

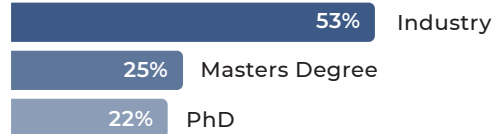
\$70k

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)

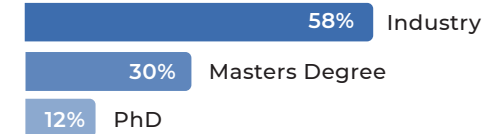
\$85k

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