

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: 801-422-7884
Office: 242 TMCB

Internship Coordinator – Rynell Lewis

Email: rlewis@mathematics.byu.edu
Phone: 801-422-5925
Office: 283 TMCB

University Career Services – Lane Muranaka

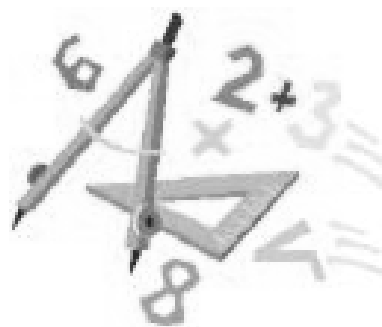
Website: careers.byu.edu (Handshake--see flyer in packet)
Email: lane_muranaka@byu.edu
Phone: 801-422-9360, or 801-422-2674 (schedule appointment)
Office: N221-J ESC

STEM Alliance--Connect with STEM employers, mentors, and clubs: stemalliance.byu.edu

Clubs

SIAM—Contact: Check the website <http://siam.byu.edu>.

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/flowcharts>.
- 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 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 University Career Services in 2590 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 per week for eight non-consecutive weeks throughout the semester.

BS in Mathematics (694420) MAP Sheet

Physical and Mathematical Sciences, Mathematics

For students entering the degree program during the 2022-2023 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:							
Requirements	#Classes	Hours	Classes	FRESHMAN YEAR		JUNIOR YEAR	
Religion Cornerstones				1st Semester		5th Semester	
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				2nd Semester		6th Semester	
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		7th Semester	
Letters	1	3.0	from approved list	3rd Semester		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		Total Hours	15.0
Open Electives	Variable	Variable	personal choice	general electives	4.0	8th Semester	
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (4 hours overlap)				Total Hours	15.0	MATH elective 3	3.0
Graduation Requirements:				4th Semester		MATH elective 4	3.0
Minimum residence hours required		30.0		MATH 334	3.0	Arts	3.0
Minimum hours needed to graduate		120.0		MATH 341	3.0	General Electives	6.0
				Letters	3.0	Total Hours	15.0
				STAT 201 or 251	3.0		
				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.			

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2022-2023 Program Requirements (53.5 Credit Hours)

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 405 - Modeling with Uncertainty and Data 2 Laboratory	1.0
MATH 113 - Calculus 2	4.0	MATH 406R - Topics in Mathematics	3.0
MATH 191 - Seminar in Mathematics 1	0.5	MATH 410 - Introduction to Numerical Methods	3.0
MATH 290 - Fundamentals of Mathematics	3.0	MATH 411 - Numerical Methods	3.0
MATH 314 - Calculus of Several Variables	3.0	MATH 425 - Mathematical Biology	3.0
MATH 334 - Ordinary Differential Equations	3.0	MATH 431 - Probability Theory	3.0
MATH 341 - Theory of Analysis 1	3.0	MATH 435 - Mathematical Finance	3.0
MATH 342 - Theory of Analysis 2	3.0	MATH 436 - Modeling with Dynamics and Control 1	3.0
MATH 352 - Introduction to Complex Analysis	3.0	MATH 437 - Modeling with Dynamics and Control 1 Laboratory	1.0
MATH 371 - Abstract Algebra 1	3.0	MATH 438 - Modeling with Dynamics and Control 2	3.0
MATH 413 - Advanced Linear Algebra	3.0	MATH 439 - Modeling with Dynamics and Control 2 Laboratory	1.0
REQUIREMENT 2 Complete 1 option		MATH 447 - Introduction to Partial Differential Equations	3.0
OPTION 2.1 Complete 1 course		MATH 450 - Combinatorics	3.0
MATH 313 - (Not currently offered)		MATH 451 - Introduction to Topology	3.0
OPTION 2.2 Complete 2 courses		MATH 465 - Differential Geometry	3.0
MATH 213 - Elementary Linear Algebra	2.0	MATH 473 - Group Representation Theory	3.0
MATH 215 - Computational Linear Algebra	1.0	MATH 485 - Mathematical Cryptography	3.0
		MATH 487 - Number Theory	3.0
REQUIREMENT 3 Complete 1 course		MATH 495R - Readings in Mathematics	2.0v
C S 111 - Introduction to Computer Science	3.0	MATH 510 - Numerical Methods for Linear Algebra	3.0
REQUIREMENT 4 Complete 1 course		MATH 511 - Numerical Methods for Partial Differential Equations	3.0
STAT 201 - Statistics for Engineers and Scientists	3.0	MATH 513R - Advanced Topics in Applied Mathematics	3.0
STAT 251 - Introduction to Bayesian Statistics	3.0	MATH 521 - Methods of Applied Mathematics 1	3.0
REQUIREMENT 5 Complete 12.0 hours from the following course(s)		MATH 522 - Methods of Applied Mathematics 2	3.0
C S 235 - Data Structures and Algorithms	3.0	MATH 525 - Network Theory	3.0
MATH 300 - (Math-MthEd) History and Philosophy of Mathematics	3.0	MATH 532 - Complex Analysis	3.0
MATH 355 - Graph Theory	3.0	MATH 534 - Introduction to Dynamical Systems 1	3.0
MATH 362 - (Math-MthEd) Survey of Geometry	3.0	MATH 536 - Applied Discrete Probability	3.0
MATH 372 - Abstract Algebra 2	3.0	MATH 540 - Linear Analysis	3.0
MATH 380 - Mathematical Foundations of Data Science	3.0	MATH 541 - Real Analysis	3.0
MATH 402 - Modeling with Uncertainty and Data 1	3.0	MATH 547 - Modeling and Analysis of Partial Differential Equations	3.0
MATH 403 - Modeling with Uncertainty and Data 1 Laboratory	1.0	MATH 553 - Foundations of Topology 1	3.0
MATH 404 - Modeling with Uncertainty and Data 2	3.0	MATH 554 - Foundations of Topology 2	3.0
		MATH 561 - Introduction to Algebraic Geometry 1	3.0
		MATH 562 - Introduction 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 - Introduction to Algebraic Number Theory	3.0
		MATH 587 - Introduction to Analytic Number Theory	3.0
		REQUIREMENT 6	
		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 Complete 3 courses	
		ECON 110 - Economic Principles and Problems	3.0
		PHSCS 121 - Introduction to Newtonian Mechanics	3.0
		PHSCS 220 - Introduction to Electricity and 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	

BS in Mathematics (694420)

2022-2023

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

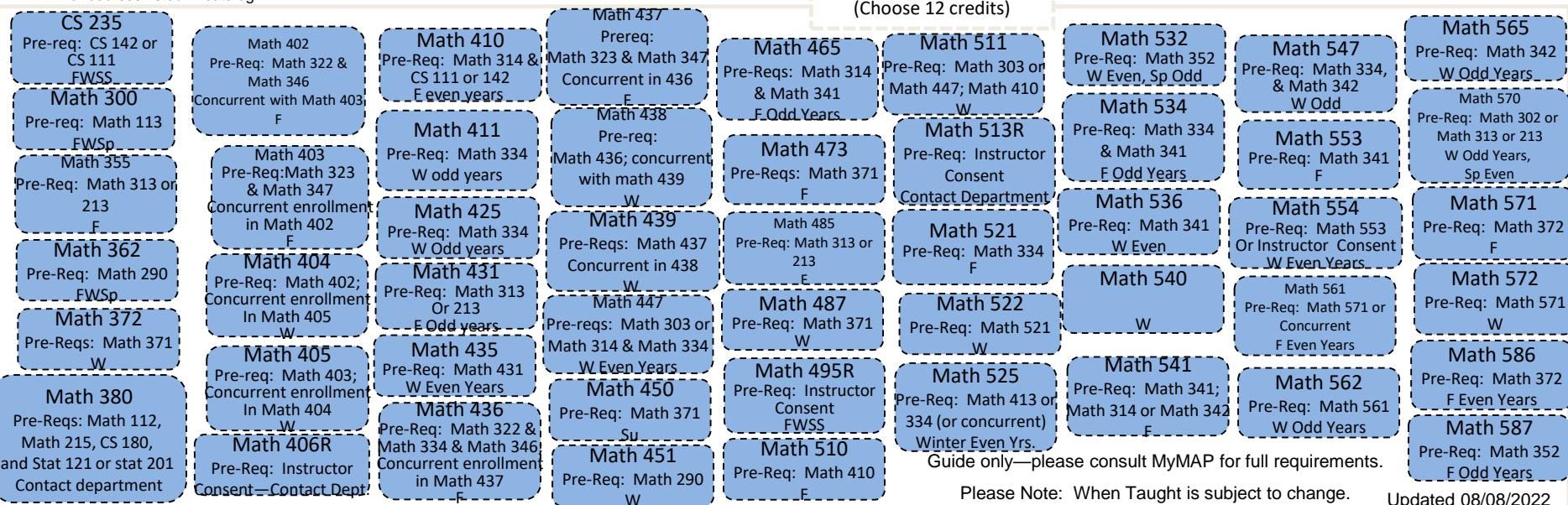
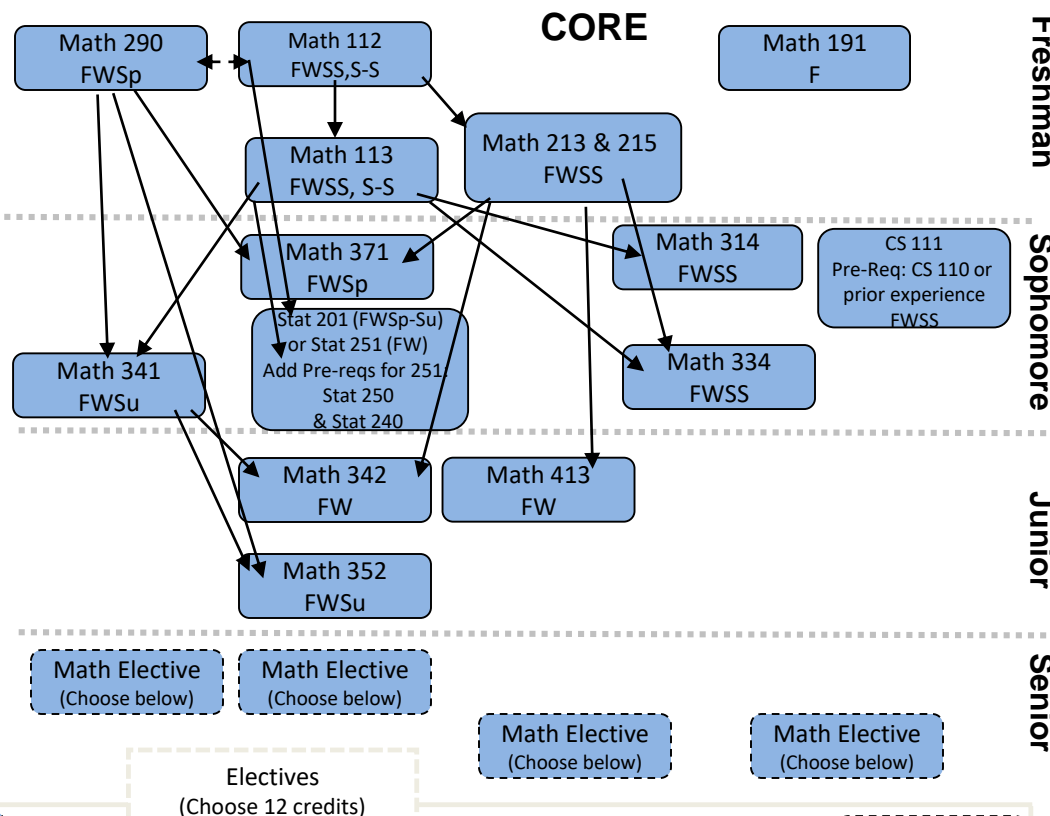
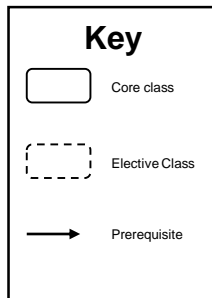
2022-2023 Academic Year

Major (53.5 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 (or math 313).
- 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 355, Math 362, Math 372, Math 380, Math 402, 403, 404, 405, 406R, 410, 411, 425, 431, 435, 436, 437, 438, 439, 447, 450, 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 either math 313 or 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 352, Math 355, Math 362, Math 371, Math 372, Math 380, or any approved 400 or 500 level minor courses listed in catalog.



Guide only—please consult MyMAP for full requirements.

Please Note: When Taught is subject to change.

Updated 08/08/2022

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!

Careers in Mathematics

A degree in mathematics opens doors to a vast number of possible careers. Employers value mathematics majors for their problem-solving skills in general, as well as their specific subject matter expertise. For many careers in mathematics, additional expertise, such as experience in computer programming or statistics can be very valuable.

In 2009, CareerCast.com evaluated 200 professions to determine the best and the worst. Their conclusion: by their criteria, mathematician is the best of the 200 professions (lumberjack was the worst). For the full list, and a description of the criteria that they used, see the report at <https://www.wsj.com/articles/SB123119236117055127>

The website WeUseMath.org lists over 40 careers using mathematics, along with their median salary. Among them are:

Actuary: median salary \$93,680 per year

Biostatistician: median salary \$77,860 per year

Budget Analyst: median salary: \$71,590 per year

Foreign Exchange Trader: median salary \$154,786 per year

At www.siam.org/careers/thinking/profiles.php, you can read descriptions of the careers of mathematicians working in industry. These included a statistical analyst for the Boston Children's Hospital, a data scientist for Staples Digital Solutions, a Global Strategy and Freight Trading Analyst for Philips 66, a senior director for operations research for Moody's analytics, and many others.

Job Growth in Mathematics

According to the US Bureau of Labor Statistics, "Employment of mathematicians is projected to grow 21 percent from 2014 to 2024, much faster than the average for all occupations. Businesses will need mathematicians to analyze the increasing volume of digital and electronic data."

Note that the average projected employment growth for all occupations between 2014 and 2024 is 6.5%.

If "math occupations" is interpreted more generally, the forecast is even better. The Bureau says "Employment of math occupations is projected to grow 28 percent from 2014 to 2024, which will result in about 42,900 new jobs. Growth is anticipated as businesses and government agencies continue to emphasize the use of big data, which math occupations can analyze. Math occupations had a median annual wage of \$81,750 in May 2016, which was higher than the median annual wage for all occupations of \$37,040."

What have BYU Math Majors Done?

Some recent jobs that BYU graduates with a major in mathematics have received are:

Technical Services, Epic Systems, Madison, WI
Data Scientist, Apple, San Francisco, CA
Quantitative Analyst, Magnetar Capital Associate Consultant, Bain and Company
Business Analyst, Capital One
Analyst, Goldman Sachs, Salt Lake City
Systems Engineer, Raytheon Missile Systems, AZ

In addition, many BYU mathematics graduate students go on to graduate school in mathematics, economics, computer science, finance, or other fields, at universities such as BYU, Northwestern University, University of Texas at Austin, Cornell University, MIT, Duke University, Purdue, Boston, University, and others.