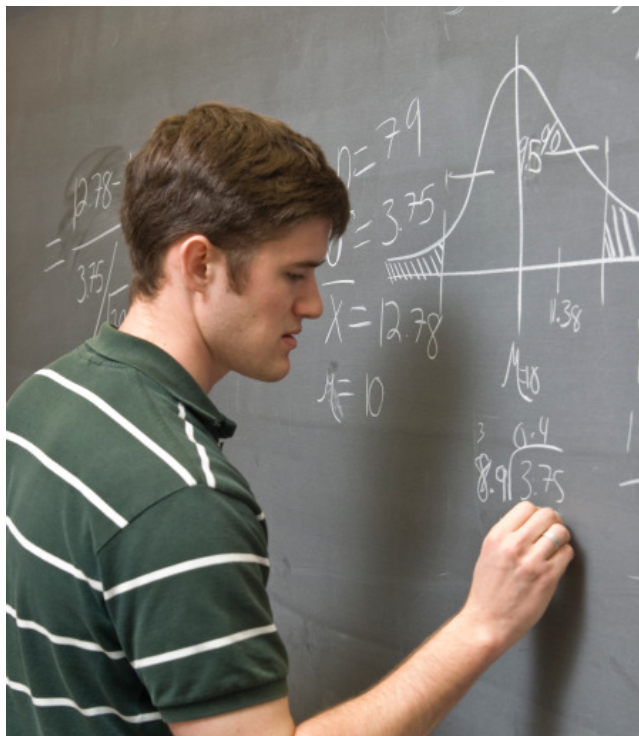


Department of

# Mathematics



Jackie Nygaard, Department Chair

Kent Bessey, David Brown, Greg Cameron, Larry Chilton, Paul Cox, Ryan Cromar, Brad Garner, Troy Goodsell, Shane Goodwin, Ann Marie Harmon, John Hathaway, Daris Howard, Paul Johanson, Craig Johnson, Bonnie Moon, Jackie Nygaard, Susan Orme, Richard Pieper, Danae Romrell, Jason Rose, Garrett Saunders, Curtis Nelson, Curtis Martin, Matt Webb, Heidi Turner, Elaine Wagner, Ben Woodruff

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The Department of Mathematics offers a variety of programs—a Bachelor of Science in Applied Mathematics, a Bachelor of Science in Mathematics Education, and a Bachelor of Science in Biostatistic. In addition to our majors, we offer minors in mathematics, math education (for those majoring in Physics or chemistry), and two different minors in statistics—one for math/science majors, and one for non-math/science majors.

## BS in Applied Mathematics (650)

Majoring in applied mathematics at BYU-Idaho will help you enhance your problem-solving skills, sharpen your ability to reason logically, apply mathematics to problems which have real world implications, and improve your ability to communicate difficult ideas. Corporations, government agencies, research labs, and other employers will value the traits you will gain as a mathematics major. Employees in applied mathematics jobs are typically well compensated.

The demand for people with mathematics training is so great that many undergraduates are able to receive extra funds (through the Smart Grant) to encourage them to complete their rigorous training. When you finish, your degree in applied mathematics could prepare you for a career as an educator, researcher, engineer, software developer, business manager, statistician, biostatistician, physicist, actuary, lawyer, etc. Government agencies such as the National Security Agency, Central Intelligence Agency, Treasury Department, and the Commerce Department hire mathematicians to do everything from break codes to detect who is cheating on their taxes.

## Biostatistics (651)

The biostatistics major combines statistics, computer science, and a cluster selected from biology in either natural resources, neuroscience, or biotechnology. As a biostatistics major, students will study statistics in depth including experimental design, statistical tools, and data analysis techniques. In addition to the statistics, they will develop the computer programming and machine learning techniques to prepare them for working with today's big data. Students will also gain specialized knowledge in biology. Majoring in biostatistics will prepare graduates for entry-level employment in industry as an assistant. Excelling in the program will prepare students for graduate school if they choose to pursue an advanced degree in either Statistics or Biostatistics. Most employment opportunities in biostatistics do require a graduate degree.

## BS in Mathematics Education Composite (852)

The Math Education major is designed to help students become qualified mathematics instructors in secondary education programs. Qualified mathematics instructors greatly influence our children's success in becoming informed and capable members of society. Consequently, such instructors are a vital part of every secondary education program. As technology continues to advance and influence our daily lives, the demand for quality mathematics instruction has increased. This high demand has caused a shortage of qualified instructors. Hence, graduates skilled in secondary mathematics instruction have little difficulty finding employment in education.

To provide students with the experiences necessary to become exceptional teachers, the Mathematics Education program is a composite education major, so students will major and minor in mathematics. Students preparing to be mathematics teachers will focus on the following areas: a rigorous understanding of mathematical concepts, applying the principles of the BYU-Idaho Learning model to mathematics instruction, implementing a variety of teaching pedagogies, using technology appropriately for instruction, learning to communicate mathematical concepts well, and developing professional behaviors. Emphasis on becoming true disciples of Jesus Christ permeates and enhances all of these student experiences. Students who fully participate in and master these objectives will leave BYU-Idaho able to deliver high quality mathematics instruction at public or private secondary institutions.

## Mission Statement

The Department of Mathematics fully supports the University's Mission Statement. The specific mission of the Department is to:

1. Prepare students to work confidently and competently with the quantitative elements of modern life.
2. Provide students studying Mathematics or related disciplines with the knowledge, skills, and experiences necessary to excel in their careers.
3. Foster a culture of personal and professional development among the department's faculty and staff.

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To achieve this mission, the following outcomes will be measured:

All students will:

- Demonstrate knowledge of the mathematical principles underlying provident living practices.
- Use quantitative information to make logical decisions.
- Apply multiple tools to the solution of real world problems with quantitative elements.

Students majoring in disciplines related to Mathematics will:

- Appropriately apply mathematical concepts and techniques to problems in their discipline.

Students majoring in Mathematics will:

- Communicate technical information and ideas effectively.
- Solve real world problems by applying diverse problem solving approaches.

Prospective Mathematics teachers will:

- Conduct themselves professionally.
- Have a foundational understanding of the concepts they will teach.
- Use a variety of pedagogies and reflect on their application and effectiveness.
- Use a variety of technologies and reflect on their potential to improve learning.

Students majoring in Applied Mathematics will:

- Be prepared for professional opportunities or graduate studies.

### BS in Applied Mathematics (650)

<b>Introductory Applied Math Module</b> <i>Take these courses your first 2 semesters:</i> CS 124                   3 MATH 113               3 MATH 341               3 <hr style="width: 50%; margin-left: 0;"/> 9  <i>Take 1 course:</i> MATH 221A             3 MATH 221B             3 MATH 221C             3 MATH 330               3 <hr style="width: 50%; margin-left: 0;"/> 3	<b>Applied Math Module 1</b> <i>Take these courses:</i> MATH 214               3 MATH 281               3 MATH 301               3 MATH 316               4 <hr style="width: 50%; margin-left: 0;"/> 13  <b>Applied Math Module 2</b> <i>Take these courses:</i> MATH 411               3 MATH 441               3 MATH 461               3 <hr style="width: 50%; margin-left: 0;"/> 9	<i>Take 1 course:</i> MATH 423               3 MATH 463               3 MATH 472               3 MATH 495R             3 <hr style="width: 50%; margin-left: 0;"/> 3  <b>Applied Math Module 3</b> <i>Take 2 courses:</i> MATH 412               3 MATH 442               3 MATH 462               3 <hr style="width: 50%; margin-left: 0;"/> 6	<i>Take 1 course:</i> MATH 412               3 MATH 423               3 MATH 425               3 MATH 442               3 MATH 462               3 MATH 463               3 MATH 472               3 MATH 488R             3 MATH 495R             3 <hr style="width: 50%; margin-left: 0;"/> 3  <b>Internship/Senior Project</b> <i>Take 3 credits:</i> MATH 498R             1-3 MATH 499R             1-3 <hr style="width: 50%; margin-left: 0;"/> 3	<b>Program Notes:</b>  • <i>No Double Counting of Major Courses</i>  • <i>Students must maintain a minimum grade of C- in their major courses</i>	
<b>Credit Requirements:</b>					
	Foundations           40				
	Major                   49				
	Elective               31				
	Total                   120				
		<b>Tracks Available:</b>			
			Fall-Winter           Yes		
			Winter-Spring       Yes		
			Spring-Fall           Yes		

### BS in Biostatistics (651)

<b>Statistics Courses</b> <i>Take these courses:</i> MATH 221B             3 MATH 215               4 MATH 325               3 MATH 326               3 MATH 327               3 MATH 341               3 MATH 423               3 MATH 425               3 MATH 411               3 MATH 488R             3 <hr style="width: 50%; margin-left: 0;"/> 31	<b>Biology Courses</b> <i>Complete 1 Cluster:</i>			<b>Computer Science Courses</b> <i>Take these courses:</i> CIT 225                 3 CS 124**               3 CS 241                   4 CS 450                   3 <hr style="width: 50%; margin-left: 0;"/> 13
	<b>Natural Resources</b> <i>Take this course:</i> BIO 202                 4  <i>Take 9 credits:</i> BIO 225                 3 BIO 302                 4 BIO 307                 3 BIO 351                 3 BIO 423                 3 GEOG 230               3 <hr style="width: 50%; margin-left: 0;"/> 13	<b>Neuroscience</b> <i>Take these courses:</i> BIO 240                 4 BIO 485                 4  <i>Take 4 credits:</i> BIO 180                 4 BIO 264                 3 BIO 264L               1 BIO 265                 3 BIO 265L               1 <hr style="width: 50%; margin-left: 0;"/> 12	<b>Biotechnology</b> <i>Take these courses:</i> BIO 180                 4 BIO 375                 3 BIO 377                 3  <i>Take 1 course:</i> BIO 376                 3 CHEM 481               3 <hr style="width: 50%; margin-left: 0;"/> 13	<b>Interdisciplinary Courses</b> <i>Take these courses:</i> IDS 398R               1-3 IDS 499                 2 <hr style="width: 50%; margin-left: 0;"/> 3
<b>Program Notes:</b>				
• <i>No Double Counting of Concentration Courses</i>				
• <i>Students must maintain a minimum grade of C- in their Major Courses</i>				
• <i>**CS 124 is a prerequisite to CIT 225</i>				
<b>Credit Requirements:</b>				
	Foundations           40			
	Major                   59			
	Elective               21			
	Total                   120			
		<b>Tracks Available:</b>		
			Fall-Winter           Yes	
			Winter-Spring       Yes	
			Spring-Fall           Yes	

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### BS in Mathematics Education Composite (852)

Education Courses	Math Courses	cont. from previous column	Program Notes:
<i>Take these courses:</i>	<i>Take these courses:</i>	MATH 350	<p>• Students must maintain a minimum grade of C- in their major courses</p>
ED 200           2	MATH 113       3	MATH 440       3	
ED 304           3	MATH 190       1	MATH 450       2	
ED 361           3	MATH 205       3	MATH 490       2	
ED 461           3	MATH 206       2	48	
ED 492           10	MATH 214       3		
SPED 360        2	MATH 214E     1		
23	MATH 221B     3		
<i>Complete one option:</i>	MATH 241       2	<i>Take these courses:</i>	
<i>Option 1</i>	MATH 242       2	ED 242           2	
FDMAT 112      4	MATH 280       3	ED 448           3	
	MATH 281       3	5	
<i>Option 2</i>	MATH 282       2		
FDMAT 112 and	MATH 285       3		
MATH 109       9	MATH 325       3		
	MATH 340       3		
<i>Option 3</i>	MATH 340L     1		
FDMAT 112 and	<i>cont. next column</i>		
FDMAT 110 and			
MATH 111       9			
4			

Credit Requirements:	Tracks Available:
Foundations       40	Fall-Winter       Yes
Major               57	Winter-Spring    Yes
Education Core    23	Spring-Fall       Yes
Total               120	

### Minor in Mathematics (119)

Introductory Applied Math	Applied Math Module 1	Take 1 course:	Program Notes:
<i>Take these courses:</i>	<i>Take these courses:</i>	MATH 411       3	<p>• Students must maintain a minimum grade of C- in their Minor Courses</p> <p>• *FDMAT 112 needs to be taken to satisfy a major requirement as well as the Foundations Quantitative Reasoning requirement.</p>
FDMAT 112*      4	MATH 214       3	MATH 423       3	
MATH 113        3	MATH 316       4	MATH 425       3	
MATH 341        3	7	MATH 441       3	
10		MATH 461       3	
<i>Take 1 course:</i>		MATH 463       3	
MATH 221A       3		MATH 472       3	
MATH 221B       3		3	
MATH 221C       3			
MATH 330        3			
3			

Credit Requirements:	Tracks Available:
Total               23	Fall-Winter       Yes
	Winter-Spring    Yes
	Spring-Fall       Yes

### Minor in Mathematics Education (120)

Core Courses	Take 1 course:	Program Notes:	
<i>Take these courses:</i>	MATH 221A     3	<p>• No Double Counting of Minor Courses</p> <p>• Students must maintain a minimum grade of C- in their Minor Courses</p> <p>• This minor is only available to students who are Chemistry Education or Physics Education majors. These majors require the Calculus sequence in their majors and are able to start at the 214E level.</p>	
MATH 205        3	MATH 221B     3		
MATH 206        2	MATH 221C     3		
MATH 214E      1	3		
MATH 241        2			
MATH 285        3			
MATH 340        3			
MATH 340L      1			
MATH 490        2			
17			

Credit Requirements:	Tracks Available:
Total               20	Fall-Winter       Yes
	Winter-Spring    Yes
	Spring-Fall       Yes

**Mathematics**

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<b>Minor in Statistics</b> <b>For Non-Math/Science Majors (232)</b>			
<b>Introductory Statistics Module</b> <i>Take 1 course:</i> MATH 221A           3 MATH 221B           3 MATH 221C           3 MATH 330            3 <hr style="width: 50%; margin-left: 0;"/> 3 <i>Complete one option:</i>  <b>Option 1</b> FDMAT 112           4  <b>Option 2</b> FDMAT 112 and MATH 109            9  <b>Option 3</b> FDMAT 112 and FDMAT 110 and MATH 111            9  <b>Option 4</b> MATH 119            4 <hr style="width: 50%; margin-left: 0;"/> 4	<i>Take these courses:</i> MATH 241 or 341    2 MATH 325            3 MATH 326            3 <hr style="width: 50%; margin-left: 0;"/> 8 <i>Take 1 course:</i> MATH 327            3 MATH 425            3 MATH 488R          3 <hr style="width: 50%; margin-left: 0;"/> 3	<i>Take 1 course:</i> BIO 377              3 BIO 379              3 CHILD 400           3 ECON 388            3 ESS 497              3 HS 391                2 MATH 423            3 PSYCH 302           3 SOC 400              3 CIT 225               3 MATH 327            3 MATH 425            3 MATH 488R          3 <hr style="width: 50%; margin-left: 0;"/> 2	<i>Program Notes:</i>  •Students must maintain a minimum grade of C- in their Minor Courses.
<b>Credit Requirements:</b>  Total                    20		<b>Tracks Available:</b>  Fall-Winter        Yes Winter-Spring     Yes Spring-Fall        Yes	

<b>Minor in Statistics</b> <b>For Math/Science Majors (233)</b>			
<b>Introductory Statistics Module</b> <i>Take 1 course:</i> MATH 221A           3 MATH 221B           3 MATH 221C           3 MATH 330            3 <hr style="width: 50%; margin-left: 0;"/> 3 <i>Take 1 course:</i> MATH 214            3 MATH 215            4 <hr style="width: 50%; margin-left: 0;"/> 3	<i>Take these courses:</i> MATH 325            3 MATH 326            3 MATH 341            3 MATH 423            3 MATH 425            3 <hr style="width: 50%; margin-left: 0;"/> 15	<i>Take 1 course:</i> MATH 327            3 MATH 488R          3 <hr style="width: 50%; margin-left: 0;"/> 3	<i>Program Notes:</i>  •No Double Counting of Minor Courses  •Students must maintain a minimum grade of C- in their Minor Courses
<b>Credit Requirements:</b>  Total                    24		<b>Tracks Available:</b>  Fall-Winter        Yes Winter-Spring     Yes Spring-Fall        Yes	

## Mathematics

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### Applied Math Concentration (D 119)

<b>Introductory Applied Math Module</b> <i>Take these courses:</i> FDMAT 112*     4 MATH 113         3 MATH 341         3 <hr style="width: 50%; margin-left: 0;"/> 10  <i>Take 1 course:</i> MATH 221A     3 MATH 221B     3 MATH 221C     3 MATH 330       3 <hr style="width: 50%; margin-left: 0;"/> 3	<b>Applied Math Module 1</b> <i>Take these courses:</i> MATH 214         3 MATH 301         3 MATH 316         4 <hr style="width: 50%; margin-left: 0;"/> 10	<b>Applied Math Module 2</b> <i>Take 3 courses:</i> MATH 411 or 412   3 MATH 423           3 MATH 441 or 442   3 MATH 461 or 462   3 MATH 463           3 MATH 472           3 <hr style="width: 50%; margin-left: 0;"/> 9  <b>Interdisciplinary Module</b> <i>Take these courses:</i> IDS 398R           1-3 IDS 499             2 <hr style="width: 50%; margin-left: 0;"/> 3	<b>Recommended Electives</b> These courses would be beneficial to students completing the Applied Math Concentration but are not required:  CS 124               3 CS 165               3	<b>Program Notes:</b> • <i>No Double Counting of Concentration Courses</i>  • <i>Students must maintain a minimum grade of C- in their Concentration Courses</i>  • <i>*FDMAT 112 needs to be taken to satisfy a major requirement as well as the Foundations Quantitative Reasoning requirement.</i>
<b>Credit Requirements:</b>		<b>Tracks Available:</b>		
Total                                  35		Fall-Winter            Yes Winter-Spring        Yes Spring-Fall             Yes		

### Statistics Concentration (D 133)

<b>Introductory Applied Math Module</b> Complete either Option 1 or Option 2  <b>Option 1</b> <i>Take 1 course:</i> MATH 221A     3 MATH 221B     3 MATH 221C     3 <hr style="width: 50%; margin-left: 0;"/> 3  <i>Take these courses:</i> MATH 119       4 MATH 241       2 MATH 325       3 <hr style="width: 50%; margin-left: 0;"/> 9	<b>Option 2</b> <i>Take 1 course:</i> MATH 221A     3 MATH 221B     3 MATH 221C     3 <hr style="width: 50%; margin-left: 0;"/> 3  <i>Take these courses:</i> MATH 215       4 MATH 325       3 MATH 341       3 <hr style="width: 50%; margin-left: 0;"/> 10	<b>Statistics Module 1</b> <i>Take 12 credits:</i> MATH 326         3 MATH 327         3 MATH 423         3 MATH 425         3 <hr style="width: 50%; margin-left: 0;"/> 12	<b>Statistics Module 2</b> <i>Take 6 credits from one of the following groups:</i> MATH 461           3 MATH 462           3 or CS 124               3 CS 165               3 or MATH 411           3 MATH 488R         3 <hr style="width: 50%; margin-left: 0;"/> 6  <b>Interdisciplinary Module</b> <i>Take these courses:</i> IDS 398R           1-3 IDS 499             2 <hr style="width: 50%; margin-left: 0;"/> 3	<b>Program Notes:</b> • <i>No Double Counting of Concentration Courses</i>  • <i>Students must maintain a minimum grade of C- in their Concentration Courses</i>  • <i>Students are strongly encouraged to take FDMAT 112 to satisfy their Foundation quantitative reasoning requirement and to satisfy the prerequisite of MATH 215.</i>
<b>Credit Requirements:</b>		<b>Tracks Available:</b>		
Total                                  33		Fall-Winter            Yes Winter-Spring        Yes Spring-Fall             Yes		

### Mathematics Predefined Clusters

<b>General Mathematics</b> 6200 <i>Take at least 12 credits from Mathematics courses numbered 112 or higher:</i>  <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;"></td> <td style="text-align: right; border-top: 1px solid black;"><b>Total Credits</b></td> <td style="text-align: right; border-top: 1px solid black;"><b>12</b></td> </tr> </table> <b>Statistics</b> 6203 <i>Take 1 course:</i> MATH 221A    Business Statistics                                  3 MATH 221B    Biostatistics    3 MATH 221C    Social Science Statistics                                  3 <i>Take these courses:</i> MATH 325    Intermediate Statistics Methods                                  3 MATH 326    Experimental Design    3 <i>Take 3 credits:</i> BIO 377        Techniques in Biochemistry and Molecular Biology                                  3 BIO 379        Range/Wildlife Inventory, Analysis, and Tech                                  3 CHILD 400    Research and Evaluation    3 ECON 388     Introduction to Econometrics    3 ESS 497        Exercise Physiology Research    3 HS 391        Research Methods and Program Evaluation                                  2 MATH 327     Introduction to Bayesian Statistics    3 MATH 423     Probability and Statistics    3 MATH 425     Applied Linear Regression    3 PSYCH 302    Research Methods    3 SOC 400       Sociological Analysis    3 <hr style="width: 50%; margin-left: 0;"/> <b>Total Credits</b> 12		<b>Total Credits</b>	<b>12</b>	<b>Physical Science and Mathematics</b> 6800 <i>Take 12 credits from at least 2 of the following areas:</i> <b>Chemistry</b> Take any Chemistry class numbered 105 or higher                                  0-10 (CHEM 150 and CHEM 153 cannot be taken with CHEM 351 and/or CHEM 352)  <b>Physics</b> Take any Physics class numbered 105 or higher                                  0-10  <b>Geology</b> Take any Geology class numbered 111 and 111L or higher                                  0-10  <b>Mathematics</b> Take any Mathematics class numbered 111 or higher                                  0-10 <hr style="width: 50%; margin-left: 0;"/> <b>Total Credits</b> 12
	<b>Total Credits</b>	<b>12</b>		

# Mathematics

Brigham Young University–Idaho 2016-2017

## Course Descriptions

## Credits\*

### FDMAT 108 Math for the Real World

(3:3:0:0)

Prerequisites: (ACT Math score of at least 18) or (SAT math score of at least 430) or (ALEKS test score of at least 38) or (MATH 100B with a grade of C or higher) or (MATH 100G, MATH 100L, or MATH 101 with a grade of B or higher)

This course prepares students to understand, analyze, and solve real-life problems that require quantitative reasoning. Topics include the meaning of probabilities, how to read, critique, and apply statistical information found in news reports, public policy debates, consumer reports, and other daily life and professional situations; the use of mathematical models in describing, understanding, and making predictions about real world phenomena; and the mathematics of budgeting, loans, and investments. Topics will be illustrated by examples and applications from daily life and natural phenomena. Math for the Real World is to inspire students to act wisely when faced with quantitative challenges in collegiate coursework, employment, and daily living.

(Fall, Winter, Spring)

### FDMAT 110 College Algebra

(3:3:0:0)

Prerequisite: MATH 101 with a B or higher, or an ACT Math score of at least 23, or an SAT Math score of at least 540, or an ALEKS score of at least 53

This course includes the study of elementary analysis of functions having discrete or connected domains. Methods of solving equations. Systems of equations and matrices. Strong connections to real world applications of functions and matrices will be made. Students who will take Calculus are strongly encouraged to take Math 109 instead of FDMAT 110.

(Fall, Winter, Spring)

### FDMAT 112 Calculus I

(4:4:1:0)

Prerequisites: MATH 109 or (FDMAT 110 and MATH 111) or ACT 27 or SAT 620 or ALEKS 85

This course includes the study of limits, continuity, derivatives, integrals, and transcendental functions. Properties and applications of the above.

(Fall, Winter, Spring)

### MATH 100A Arithmetic

(1:0:3:0)

A study of arithmetic and applications using arithmetic. This course is only for those needing a review of elementary school arithmetic including signed numbers, fractions, decimals, and percents.

(Fall, Winter, Spring)

### MATH 100B Beginning Algebra

(2:0:2:0)

The arithmetic of integers and rational numbers as well as an introduction to algebra will be studied. This course is recommended for those needing basic algebra before taking progressively higher math courses.

(Fall, Winter, Spring)

### MATH 100G Personal Finance

(3:3:0:0)

Prerequisite: ENG 106

Part of the Pathway program, this course covers a review of arithmetic of decimals and fractions, introduction to variables, evaluating formulas, solving linear equations, graphing linear equations in two variables, exponent rules, and financial applications in spreadsheets. This is a pre-requisite for FDMAT 108.

(Fall, Winter, Spring)

### MATH 100L English Language and Personal Finance

(5:5:0:0)

Prerequisite: GS 120L

As part of the Pathway program for students that speak English as a second language, this course has English language development components related to arithmetic. This course content reviews arithmetic of decimals and fractions, introduction to variables, evaluating formulas, solving linear equations, graphing linear equations in two variables, exponent rules, and financial applications in spreadsheets. This is a pre-requisite for FDMAT 108.

(Fall, Winter, Spring)

### MATH 101 Intermediate Algebra

(3:3:0:0)

This course will cover the fundamental operations of algebra, properties of exponents, solving linear, fractional, radical and quadratic equations, graphing linear, and quadratic functions. Math 101 may not be taken for credit if FDMAT 110 has been completed with a grade of B: or higher.

(Fall, Winter, Spring)

### MATH 109 Precalculus

(5:5:0:0)

Prerequisite: MATH 101 or ACT 23 or SAT 540 or ALEKS 55

This course includes a combination of College Algebra and Trigonometry. It is intended to prepare students for Calculus or other math and science courses. Elementary analysis of functions having discrete or connected domains, methods of solving equations, and systems of equations and matrices will be explored. Triangle relationships, graphs of periodic functions, trigonometric identities, inverse trigonometric functions, and applications of trigonometry will also be covered.

(Fall, Winter, Spring)

### MATH 111 Trigonometry

(2:2:0:0)

Prerequisites: MATH 101 or FDMAT 110 or ACT 23 or SAT 540 or ALEKS 55

This course covers trigonometric functions, triangle relationships, graphs, identities, inverse trigonometric functions, complex numbers, and applications. Applications of trigonometry will be emphasized throughout the course.

(Fall, Winter, Spring)

### MATH 113 Calculus II

(3:3:1:0)

Prerequisite: FDMAT 112

This course includes the study of techniques of integration, infinite sequences and series, polar coordinates, and parametric curves will be explored.

(Fall, Winter, Spring)

### MATH 119 Calculus for Business and Life Science

(4:4:1:0)

Prerequisites: FDMAT 110 or MATH 109 or ACT 26 or SAT 600 or ALEKS 70

This course includes the study of single and multi-variable calculus designed primarily for students in biology, agriculture, and business. Topics include derivatives, integrals, and applications.

(Fall, Winter, Spring)

### MATH 190 Tutoring Mathematics

(1:1:0:0)

Prerequisite: FDMAT 112

This course gives math education majors a mid-level practicum experience working with secondary level students. Within the course, participants will discover whether or not they really want to pursue a secondary education degree. During this practicum experience, participants will tutor junior high school students, discuss and use best practices in tutoring, and improve their presentation skills by completing a theater workshop.

(Fall, Winter, Spring)

### MATH 205 Fundamentals of Number Theory

(3:3:0:0)

Prerequisite: FDMAT 108

Co-requisites: FDMAT 112 or MATH 119

This course is for Secondary Education Mathematics Majors and Minors and Elementary Education majors. Systems of numeration, operations on whole numbers, integers and rational numbers, the real number system, and other topics from number theory are included.

(Fall, Winter, Spring)

### MATH 206 Elementary Geometry

(2:2:0:0)

Prerequisite: FDMAT 108

Co-requisites: FDMAT 112 or MATH 119

This course is for Secondary Education Mathematics majors and minors and Elementary Education majors. Concepts of geometry in two and three dimensions will be discussed.

(Fall, Winter, Spring)

### MATH 214 Multivariable and Vector Calculus

(3:4:0:0)

Prerequisite: MATH 113

This course includes the study of vectors, vector geometry, quadric surfaces, alternative coordinate systems, vector-valued functions, partial derivatives, gradient, optimization, multiple integration, vector fields, integral theorems of vector calculus, and applications will be studied. Math 214 and 215 cannot both be taken for credit.

(Fall, Winter, Spring)

### MATH 214E Teaching Calculus

(1:1:0:0)

Concurrent Requisites: MATH 214

This course is for math education majors. Students will deepen their understanding of calculus concepts by learning techniques for teaching limits, derivatives, and integrals to secondary students that develop conceptual understanding.

(Fall, Winter, Spring)

## Mathematics

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<p><b>MATH 215 Multivariable Calculus</b> (4:4:1:0) Prerequisite: FDMAT 112 In this course students will study polar coordinates, parametric curves, vectors, vector geometry, vector-valued functions, partial derivatives, gradient, optimization, multiple integration, vector fields, and operations on scalar and vector fields. Emphasis will be on methods and applications. Math 215 and Math 214 cannot both be taken for credit. (Fall, Winter, Spring)</p>	<p><b>MATH 285 Mathematics Connections</b> (3:3:0:0) Prerequisite: MATH 280 Designed for future teachers to build understanding of the connections between the mathematics courses they are currently taking and the mathematics they will be teaching. It will include a study of current research in best mathematics teaching practices and how to implement modern standards. (Fall, Winter, Spring)</p>
<p><b>MATH 221A Business Statistics</b> (3:2:2:0) Course equivalent to MATH 221B and MATH 221C Prerequisite: FDMAT 108 or FDMAT 112 or MATH 119 or ECON 215 Course Requirement: 15 Credits In this course business students will study graphical representation of data, measure of center and spread, elementary probability, sampling distributions, correlation and regression, statistical inference involving means, proportions, and contingency tables. (Fall, Winter, Spring)</p>	<p><b>MATH 301 Foundations of Math</b> (3:3:0:0) Prerequisites: MATH 113 or MATH 215 Co-requisite: MATH 281 In this course students will develop mathematical communication skills. Topics include mathematical proof, set theory, mathematical induction, logical reasoning, elementary number theory, and properties of relations and functions. (Winter, Spring)</p>
<p><b>MATH 221B Biostatistics</b> (3:2:2:0) Course equivalent to MATH 221A and MATH 221C Prerequisite: FDMAT 108 or FDMAT 112 or MATH 119 or ECON 215 Course Requirement: 15 Credits In this course students will study graphical representations of data, measures of center and spread, elementary probability, sampling distributions, correlations and regression, statistical inference involving means, proportions, and contingency tables, odds ratio and relative risk. (Fall, Winter, Spring)</p>	<p><b>MATH 316 Differential Equations with Linear Algebra</b> (4:4:1:0) Prerequisite: MATH 214 or MATH 215 This course will explore matrices, determinants, eigenvalues and eigenvectors, first and second order ordinary differential equations, power series and Fourier series methods, Laplace transforms, and systems of linear ordinary differential equations. Emphasis will be on methods and applications. (Fall, Winter, Spring)</p>
<p><b>MATH 221C Social Science Statistics</b> (3:2:2:0) Course equivalent to MATH 221A and MATH 221B Prerequisite: FDMAT 108 or FDMAT 112 or MATH 119 or ECON 215 Course Requirement: 15 Credits In this course students will study graphical representation of data, measures of center and spread, elementary probability, sampling distributions, correlation and regression, statistical inference involving means, proportions, and contingency tables. (Fall, Winter, Spring)</p>	<p><b>MATH 325 Intermediate Statistics</b> (3:3:0:0) Prerequisites: MATH 221A or MATH 221B or MATH 221C or Math 330 or ECON 278 Z tests, t tests and chi-squared tests as well as their nonparametric equivalents, ANOVA for one or more factors, multiple linear regression, and logistic regression—all using the R software. (Fall, Winter, Spring)</p>
<p><b>MATH 241 Linear Algebra I</b> (2:2:0:0) Prerequisites: FDMAT 112 or MATH 119 or ECON 215 Concurrent Requisite: MATH 242 This course introduces and explores some of the major concepts of matrix analysis through solving significant real world problems. (Winter, Spring)</p>	<p><b>MATH 326 Experimental Design</b> (3:3:0:0) Corequisite: MATH 325 This course is designed to explore various experimental designs, to analyze data from these designs, and to consider optimal experimental designs. Students will design and conduct major-specific projects. (Fall, Spring)</p>
<p><b>MATH 242 Linear Algebra II</b> (2:2:0:0) Concurrent Requisite: MATH 241 This course introduces and explores some of the major concepts of vector spaces and linear transformations through solving significant real world problems. (Winter, Spring)</p>	<p><b>MATH 327 Introduction to Bayesian Statistics</b> (3:3:0:0) Prerequisites: (FDMAT 112 or MATH 119) and MATH 325 This course will cover topics such as the scientific method, conditional probability, Bayes' Theorem, multiple integrals, probability distributions, prior/posterior distributions, hypothesis testing, credible intervals, conjugate distributions (beta-binomial, Poisson-gamma, normal-normal), MCMC methods (i.e. Gibbs sampling), and comparison to frequentist methodologies. (Fall, Spring)</p>
<p><b>MATH 280 Problem Solving</b> (3:3:0:0) Prerequisite: MATH 113 and MATH 205 and MATH 206 Investigate problem solving techniques and approaches using real world and common core assessment problems. Experience best practices for teaching problem solving in a secondary level classroom. (Fall, Winter)</p>	<p><b>MATH 330 Engineering Statistics</b> (3:3:0:0) Prerequisite: FDMAT 112 This course is an introduction to statistical methods for science and engineering. Review of basic statistical concepts of central tendency, dispersion of data, probability laws, hypothesis testing, and confidence intervals will be conducted. This course introduces statistical process control, design of experiments, statistical tolerance analysis, and concepts of six sigma quality. (Fall, Winter, Spring)</p>
<p><b>MATH 281 Introduction to Applied Mathematics</b> (3:3:0:0) Total Course Fees: \$15.00 Prerequisites: FDMAT 112 or MATH 119 This course consists of mathematical modeling concepts applied to areas such as biology, physics, chemistry, game theory, and economics. The course may include guest lecture, field trips, and interdisciplinary projects. (Fall, Spring)</p>	<p><b>MATH 340 Discrete Mathematics</b> (3:3:0:0) Prerequisites: MATH 205 and MATH 285 and MATH 113 Concurrent Requisite: MATH 340L This course includes the study of topics from graph theory, combinatorics and logic. (Fall, Spring)</p>
<p><b>MATH 282 Modeling with Differential Equations</b> (2:2:0:0) Total Course Fees: \$25.00 Prerequisite: MATH 281 This course introduces and explores some of the major concepts of differential equations, numerical solutions techniques, solutions, using symbolic mathematics software, phase planes and bifurcations. (Fall, Spring)</p>	<p><b>MATH 340L Technical Writing Lab</b> (1:0:2:0) Concurrent Requisite: MATH 340 This course focuses on creating and editing technical documents and how to typeset mathematics and mathematical figures using a computer. (Fall, Spring)</p>
<p><b>MATH 285 Mathematics Connections</b> (3:3:0:0) Prerequisite: FDMAT 112 This course covers systems of linear equations, matrices, determinants, eigenvalues and eigenvectors, vectors, vector spaces, linear transformations, and applications. (Fall, Winter, Spring)</p>	<p><b>MATH 341 Linear Algebra</b> (3:3:0:0) Prerequisite: FDMAT 112 This course covers systems of linear equations, matrices, determinants, eigenvalues and eigenvectors, vectors, vector spaces, linear transformations, and applications. (Fall, Winter, Spring)</p>

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<b>MATH 350 Geometry</b> (3:3:0:0) Prerequisite: MATH 340 This course consists of the axiomatic treatment of finite geometries, transformation geometry, and Euclidean and non-Euclidean geometries with emphasis on the historical significance of the Parallel Postulate. (Winter, Spring)	<b>MATH 461 Real Analysis I</b> (3:3:0:0) Prerequisites: MATH 301 and (MATH 214 or MATH 215) and (MATH 316 or MATH 341) This course involves rigorous treatment of calculus. Limits, continuity, differentiation, integration, and metric properties of Euclidean spaces will be explored. (Fall)
<b>MATH 399R Mathematical Competitions</b> (1:0:1:0) Repeatable Course: May earn maximum of 4 credits Prerequisite: FDMAT 112 This is a hands-on problem solving course to prepare and practice for the Putnam Exam and other mathematical competitions. (Fall, Winter)	<b>MATH 462 Real Analysis II</b> (3:3:0:0) Prerequisite: MATH 461 This course consists of analysis in the context of metric spaces. Applications involving such tools as approximation, Fourier analysis, and multivariate optimization will be explored. (Winter)
<b>MATH 411 Numerical Analysis</b> (3:3:0:0) Prerequisites: CS 124 and (MATH 316 or MATH 341) This course covers basic error analysis, complexity of algorithms, roots, interpolation, least squares approximation, curve fitting, numerical differentiation and integration, and systems of linear equations. (Fall)	<b>MATH 463 Complex Analysis</b> (3:3:0:0) Prerequisites: MATH 316 This course consists of arithmetic, algebra, and calculus operations and concepts applied to complex numbers and functions of a single complex variable. (Winter)
<b>MATH 412 Numerical Analysis II</b> (3:3:0:0) Prerequisite: MATH 411 and MATH 316 This course covers methods of solving complex problems using numerical analysis and computer simulation. A variety of computing tools will be employed to study significant problems of current interest. Topics may include graph theory, cryptography, random number generation, queuing theory, discrete optimization, parameter fitting, finite element analysis, numerical PDE methods, etc. (Winter)	<b>MATH 472 Introduction to Partial Differential Equations</b> (3:3:0:0) Prerequisite: MATH 316 This course consists of solving linear homogeneous and nonhomogeneous second-order partial differential equations with homogeneous and nonhomogeneous boundary conditions by separation of variables. The Sturm-Liouville theory and applications of partial differential equations to diffusion, wave, and other phenomena will be covered, along with Fourier series and their applications to solving partial differential equations and solving first-order partial differential equations using the method of characteristics. This course is an introduction to the finite-element and finite-difference methods. (Winter)
<b>MATH 423 Probability and Statistics</b> (3:3:0:0) Prerequisites: (MATH 214 or MATH 215) and (MATH 221A or MATH 221B or MATH 221C or MATH 330) This course is intended for mathematics majors, economics majors, and statistics minors. This is an introduction to probability and mathematical statistics. Topics include: probability theory, random variables, multiple integration, discrete and continuous distributions, limit theorems, estimation, hypothesis testing, and power. (Winter)	<b>MATH 488 Statistical Consulting</b> (3:3:0:0) Repeatable Course: May earn a maximum of 2 enrollments Prerequisites: MATH 325 and (MATH 326 or MATH 425) This is a hands-on introduction to statistical consulting. Students will apply skills developed in other statistical courses to provide consulting services to researchers at BYU-Idaho. Students will continue to develop the written and oral communication skills needed to discuss technical statistical content with other researchers. Projects address needs at all stages of the research process. Student activity will be closely monitored by a statistician. This course provides a foundation upon which a student with interest in statistics can provide meaningful service and enhance their skills. (Fall, Winter, Spring)
<b>MATH 425 Applied Linear Regression</b> (3:3:0:0) Prerequisites: MATH 325 and (MATH 241 or MATH 341) and (MATH 119 or MATH 214 or MATH 215) This course is designed to explore fundamentals of regression, theory of regression models, residuals and residual analysis, multiple regression, remediation, transformations, and ANOVA. Students will use R for statistical analyses. (Winter)	<b>MATH 490 Secondary Education Math Teaching Methods</b> (2:2:0:0) Co-requisites: MATH 440 and MATH 450 and MATH 350 This course must be taken the semester before student teaching. The course is designed to help pre-service secondary mathematics teachers apply research-based teaching strategies that lead students to discover, create, appreciate, and utilize mathematics. Students will have many opportunities to teach, prepare lesson plans, learn how to organize and manage classrooms, and gain a knowledge of state and professional standards for secondary mathematics teachers. (Fall, Winter, Spring)
<b>MATH 440 Modern Algebra</b> (3:3:0:0) Prerequisites: MATH 301 or MATH 340 This course is for secondary education majors and minors. Number theory, division algorithm, primes, GCD, LCM, proof, rings, integral domains, fields, polynomials, Fundamental Theorem of Algebra, groups, isomorphisms, and how these topics apply to the secondary school mathematics curriculum. (Fall, Spring)	<b>MATH 495R Topics in Mathematics</b> (3:3:0:0) Repeatable Course: May earn maximum of 9 credits Prerequisite: MATH 301 Course Requirement: Instructor Approval Required The content of this course will be determined by the department and the instructor, based on student need and interest. Possible subjects that will be explored are Number Theory, Topology, Stochastic Processes, and Actuarial Science. (Fall)
<b>MATH 441 Abstract Algebra I</b> (3:3:0:0) Prerequisites: MATH 301 and MATH 341 This course is an introduction to groups, rings, fields, vector spaces, and applications. (Fall)	<b>MATH 498R Internship</b> (1-3:0:0:0) Repeatable Course: May earn maximum of 15 credits Internship Fees: \$81.50 (LDS) \$163 (non-LDS) per credit Exempt from tuition, but charged this independent course fee This course consists of practical experience working in a math intensive industry. (Fall, Winter, Spring)
<b>MATH 442 Abstract Algebra II</b> (3:3:0:0) Prerequisite: MATH 441 This course consists of additional exposure to groups, rings, fields, vector spaces, and applications. (Winter)	<b>MATH 499R Senior Project in Mathematics</b> (1-3:1:0:0) Repeatable Course: may earn maximum of 15 credits Course Requirement: Instructor Approval Required Content tailored to individual needs and interests of the students. Investigation and/or application of mathematical principles under the guidance of a faculty member. (Fall, Winter, Spring)
<b>MATH 450 History of Mathematics</b> (2:2:0:0) Prerequisite: MATH 350 This course is intended for students majoring in Mathematics Education. An overview of the development of mathematics and its interaction with society will be covered. (Fall, Spring)	