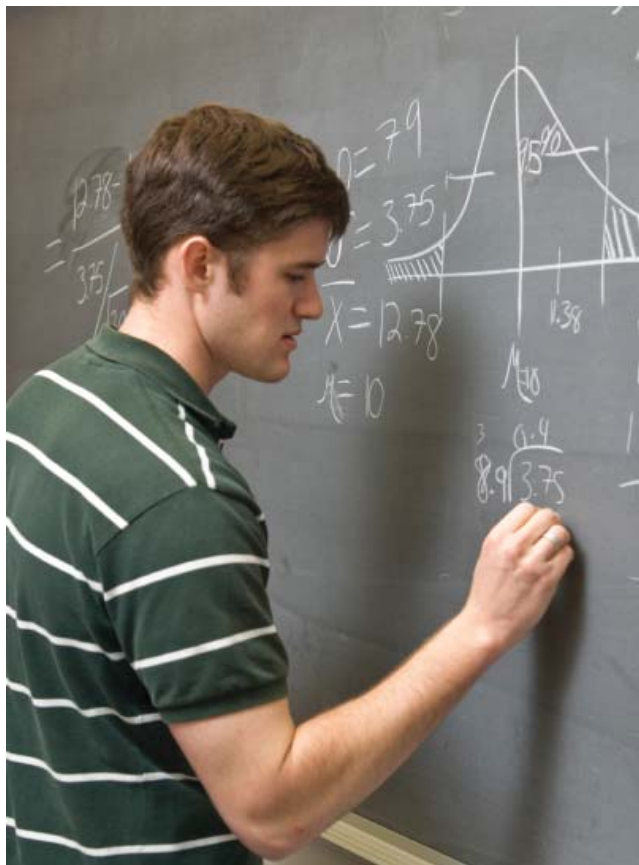


Department of

Mathematics



Ann Marie Harmon, Department Chair

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Jennifer Gohr, Secretary (208) 496-7521
<http://www.byui.edu/mathematics>*

The Department of Mathematics offers two degree programs – a Bachelor of Science in Applied Mathematics and a Bachelor of Science in Mathematics Education.

Applied Mathematics

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, and employees in the jobs are typically well compensated. The demand for people with mathematics training is so great that many undergraduates are given 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.

Mathematics Education

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 careers in education.

In order to provide students with the experiences necessary to become exceptional teachers, the Mathematics Education program focuses 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 that 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 of Mathematics 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.

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.

Mathematics

Brigham Young University-Idaho 2013-2014

BS in Applied Mathematics (650)

Take required Foundations courses

Major Requirements

Students must maintain a minimum grade of C- in their major courses

Introductory Applied Math Module	Applied Math Module 2	Applied Math Module 3	Internship/Senior Project	Program Notes:
<i>Take these courses your first 2 semesters:</i>	<i>Take these courses:</i>	<i>Take 2 courses:</i>	<i>Take 3 credits:</i>	<i>No Double Counting of Major Courses.</i>
CS 124 3	MATH 411 3	MATH 412 3	MATH 498R 1-3	
MATH 221B 3	MATH 441 3	MATH 442 3	MATH 499R 1-3	
MATH 113 3	MATH 461 3	MATH 462 3	3	
MATH 341 3	9	6		
12	<i>Take 1 course:</i>	<i>Take 1 course:</i>		
	MATH 423 3	MATH 412 3		
	MATH 463 3	MATH 423 3		
	MATH 472 3	MATH 425 3		
	MATH 495R 3	MATH 442 3		
Applied Math Module 1		MATH 462 3		
<i>Take these courses:</i>		MATH 463 3		
MATH 214 3		MATH 472 3		
MATH 281 3		MATH 495R 3		
MATH 301 3		3		
MATH 316 4		3		
13				

Total Major Credits=49

Additional Elective Credits Required for Graduation=31

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

BS in Mathematics Education (850)

Take required Foundations courses

Major Requirements

Students must maintain a minimum grade of C- in their major courses

Education Module:	Introductory Math Education Module	Math Education Module 1	Math Education Module 2	Program Notes:
<i>Take these courses:</i>	<i>Take these courses during your first 2 semester:</i>	<i>Take these courses:</i>	<i>Take these courses:</i>	<i>* Note to students: FDMAT 112 needs to be taken to satisfy a major requirement as well as partially satisfy the Foundations Quantitative Reasoning requirement. Full completion of Foundations will also require FDMAT 108T.</i>
ED 200 2	FDMAT 112* 4	MATH 190 1	MATH 350 3	
ED 304 3	MATH 114 4	MATH 206 2	MATH 440 3	
ED 361 3	MATH 205 3	MATH 241 2	MATH 450 2	
ED 461 3	MATH 221B 3	MATH 242 2	MATH 490 2	
ED 492 10	14	MATH 271 2	10	
SPED 360 2		MATH 340 3		
23		MATH 340L 1		
		13		

Total Major Credits=37

Education Core Credits=23

Education Majors Require an Education Minor for Graduation

This major is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Mathematics

Brigham Young University-Idaho 2013-2014

Actuarial Concentration (D 118)

Concentration Requirements

No Double Counting of Concentration Courses - Students must maintain a minimum grade of C- in their Concentration Courses

Introductory Actuarial Module <i>Take these courses:</i> ACCTG 201 3 ECON 150 3 ECON 151 3 <hr style="width: 50px; margin-left: 0;"/> 9 <i>Take this course:</i> ECON 215 4 OR <i>Take these courses:</i> MATH 119 4 MATH 241 2 <hr style="width: 50px; margin-left: 0;"/> 4	Actuarial Module 1 <i>Take these courses:</i> B 410 3 ECON 388 3 ECON 453 3 <hr style="width: 50px; margin-left: 0;"/> 9 <i>Take 1 course:</i> ECON 278 3 MATH 221A 3 <hr style="width: 50px; margin-left: 0;"/> 3	Actuarial Module 2 <i>Take these courses:</i> ECON 455 3 MATH 423 3 <hr style="width: 50px; margin-left: 0;"/> 6 Interdisciplinary Module <i>Take these courses:</i> IDS 398R 1-3 IDS 499 2 <hr style="width: 50px; margin-left: 0;"/> 3	Recommended Electives These courses would be beneficial to students completing the Actuarial Concentration but are not required: B 401 3 B 411 3	Program Notes:
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Total Concentration Credits=34

This Concentration is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Applied Math Concentration (D 119)

Concentration Requirements

No Double Counting of Concentration Courses - Students must maintain a minimum grade of C- in their Concentration Courses

Introductory Applied Math Module <i>Take these courses:</i> FDMAT 112* 4 MATH 113 3 MATH 221B 3 MATH 341 3 <hr style="width: 50px; margin-left: 0;"/> 13	Applied Math Module 1 <i>Take these courses:</i> MATH 214 3 MATH 301 3 MATH 316 4 <hr style="width: 50px; margin-left: 0;"/> 10	Applied Math Module 2 <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: 50px; margin-left: 0;"/> 9 Interdisciplinary Module <i>Take these courses:</i> IDS 398R 1-3 IDS 499 2 <hr style="width: 50px; margin-left: 0;"/> 3	Recommended Electives These courses would be beneficial to students completing the Applied Math Concentration but are not required: CS 124 3 CS 165 3	Program Notes: * Note to students: FDMAT 112 needs to be taken to satisfy a major requirement as well as partially satisfy the Foundations Quantitative Reasoning requirement. Full completion of Foundations will also require FDMAT 108T.
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Total Concentration Credits=35

This Concentration is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Mathematics

Brigham Young University–Idaho 2013-2014

Statistics Concentration (D 133)

Concentration Requirements

No Double Counting of Concentration Courses - Students must maintain a minimum grade of C- in their Concentration Courses

Introductory Applied Math Module Choose either Option 1 or Option 2		Statistics Module 1	Statistics Module 2	<i>Program Notes:</i>
Option 1 <i>Take 1 course:</i> MATH 221A 3 MATH 221B 3 MATH 221C 3 <u>3</u> 3 <i>Take these courses:</i> MATH 119 4 MATH 241 2 MATH 325 3 <u>3</u> 9	Option 2 <i>Take 1 course:</i> MATH 221A 3 MATH 221B 3 MATH 221C 3 <u>3</u> 3 <i>Take these courses:</i> MATH 215 4 MATH 325 3 MATH 341 3 <u>3</u> 10	<i>Take these courses:</i> MATH 326 3 MATH 327 3 MATH 425 3 <u>3</u> 9 <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 <u>3</u> 2	<i>Take these courses:</i> MATH 461 3 MATH 462 3 <u>3</u> 6 OR <i>Take these courses:</i> CS 124 3 CS 165 3 <u>3</u> 6 Interdisciplinary Module <i>Take these courses:</i> IDS 398R 1-3 IDS 499 2 <u>2</u> 3	

Total Concentration Credits=32

This Concentration is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Minor in Mathematics (119)

Minor Requirements

Students must maintain a minimum grade of C- in their Minor Courses

Introductory Applied Math	Applied Math Module 1	<i>Program Notes:</i>
<i>Take these courses:</i> FDMAT 112* 4 MATH 113 3 MATH 221B 3 MATH 341 3 <u>3</u> 13	<i>Take these courses:</i> MATH 214 3 MATH 316 4 MATH 423 3 <u>3</u> 10	

Total Minor Credits=23

This minor is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Mathematics

Brigham Young University-Idaho 2013-2014

Minor in Mathematics Education (120)

Minor Requirements

No Double Counting of Minor Courses - Students must maintain a minimum grade of C- in their Minor Courses

Core Courses <i>Take these courses:</i> FDMAT 112* 4 MATH 205 3 MATH 206 2 MATH 241 2 MATH 242 2 MATH 340 3 MATH 340L 1 <hr style="width: 50%; margin-left: 0;"/> 17	<i>Take 1 course:</i> MATH 221A 3 MATH 221B 3 MATH 221C 3 <hr style="width: 50%; margin-left: 0;"/> 3	Program Notes: *Note to students: FDMAT 112 needs to be taken to satisfy a major requirement as well as partially satisfy the Foundations Quantitative Reasoning requirement. Full completion of Foundations will also require FDMAT 108T.
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Total Minor Credits=20

This minor is available on the following tracks:

Fall-Winter---- YES Winter-Spring---- YES Spring-Fall---- YES

Statistics Minor

For Non-Math/Science Majors (232)

Minor Requirements

Students must maintain a minimum grade of C- in their Minor Courses

Introductory Statistics Module <i>Take 1 course:</i> 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 MATH 326 3 MATH 327 3 MATH 425 3 <hr style="width: 50%; margin-left: 0;"/> 18	<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 <hr style="width: 50%; margin-left: 0;"/> 2	Program Notes:
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Total Minor Credits=23

This minor is available on the following tracks:

Fall-Winter---- YES Winter-Spring---- YES Spring-Fall---- YES

Mathematics

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**Statistics Minor
For Math/Science Majors (233)**

Minor Requirements

No Double Counting of Minor Courses - Students must maintain a minimum grade of C- in their Minor Courses

Introductory Statistics Module <i>Take 1 course:</i> MATH 221B 3 MATH 221C <u>3</u> 3 <i>Take 1 course</i> MATH 214 3 MATH 215 <u>4</u> 3	<i>Take these courses:</i> MATH 325 3 MATH 341 <u>3</u> 6	Statistics Module 2 <i>Take these courses:</i> MATH 326 3 MATH 327 3 MATH 423 3 MATH 425 <u>3</u> 12	<i>Program Notes:</i>
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Total Minor Credits=24

This minor is available on the following tracks:

Fall-Winter---- YES

Winter-Spring---- YES

Spring-Fall---- YES

Mathematics Pre-approved Cluster

General Mathematics Cluster	6200
<i>Take at least 12 credits from Mathematics courses numbered 112 or higher:</i>	
Total Credits	12

Statistics Cluster	6203
<i>Take 1 course:</i>	
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 Ecological and Wildlife Tech	3
CHILD 400 Research and Evaluation	3
ECON 388 Introduction to Econometrics	3
ESS 497 Exercise Science Seminar	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	<u>3</u>
Total Credits	12

Mathematics

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Course Descriptions

Credits*

FDMAT 108 Math for the Real World

(3:3:0)

Prerequisites: Students must have an ACT Math score of at least 18 or an SAT math score of 430 or ALEK test score of 120 or MATH 100B with a B or MATH 101 with a B or MATH 100G with a B

This class 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 loans and investments. Other topics may be included as time permits. All topics will be illustrated by examples and applications from current events, daily life, business, and natural phenomena.
(Fall, Winter, Spring)

FDMAT 108T Test Out Option for FDMAT 108

(1:0:0)

Prerequisites: FDMAT 110; FDMAT 112; FDMAT 109; MATH 113; MATH 119; MATH 215; ECON 215

This pass/fail online-based course allows students who have already had a Foundations mathematics course, to explore the contemporary topics of finance math, linear and exponential modeling, probability, and statistical reasoning. It will satisfy the BYU-Idaho Foundations quantitative reasoning requirement and contains the most vital topics of the traditional 3.0-credit FDMAT 108. Completion of the course includes passing both a financial mathematics exam and statistical reasoning exam along with a financial life-planning spreadsheet project. Students may take FDMAT 108T one time only. Failure of FDMAT 108T would require the students to take the traditional 3.0 credit FDMAT 108 course to complete the foundations quantitative reasoning requirement.
(Fall, Winter, Spring)

FDMAT 110 College Algebra

(3:3:0)

Course Requirement: Students must have an ACT Math score of at least 18 or an SAT math score of 430 to register for this course.

Prerequisites: MATH 101

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 be going on to take Calculus are strongly encouraged to take Math 109 instead of Math 110.
(Fall, Winter, Spring)

FDMAT 112 Calculus 1

(4:4:1)

Course Requirement: Students must have an ACT Math score of at least 18 or an SAT math score of 430 to register for this course.

Prerequisites: (FDMAT 109; MATH 109) OR (FDMAT 110 and MATH 111)

Limits, continuity, derivatives, integrals, and transcendental functions. Properties and applications of the above.
(Fall, Winter, Spring)

MATH 100G Personal Finance

(3:3:0)

Prerequisites: GS 120; GS 120L

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

(5:0:0)

Prerequisites: GS 120; 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 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 100A Arithmetic

(1:0:3)

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

(2:0:3)

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

(Fall, Winter, Spring)

MATH 101 Intermediate Algebra

(3:3:0)

Fundamental operations of algebra, properties of exponents, solving linear, rational, 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)

Course Requirement: Students must have an ACT Math score of at least 18 or an SAT math score of 430 to register for this course.

Prerequisites: MATH 101

Combination of College Algebra and Trigonometry. 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. Systems of equations and matrices. Triangle relationships, graphs of periodic functions, trigonometric identities, inverse trigonometric functions, and applications of trigonometry.

(Fall, Winter, Spring)

MATH 111 Trigonometry

(2:2:0)

Course Requirement: Students must have an ACT Math score of at least 18 or an SAT math score of 430 to register for this course.

Prerequisites: MATH 101; FDMAT 110

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 2

(3:3:1)

Prerequisites: FDMAT 112 or MATH 112 with a grade of C- or better

Techniques of integration, infinite sequences and series, polar coordinates, and parametric curves.

(Fall, Winter)

MATH 114 Calculus 2 for Education Majors

(4:4:0)

Prerequisites: FDMAT 112 or MATH 112 with a grade of C- or better

Techniques of integration, infinite sequences and series, polar coordinates, parametric curves, introduction to multi-variable and vector calculus.

(Fall, Spring)

MATH 119 Calculus for Business and Life Science

(4:4:1)

Prerequisites: (FDMAT 110; MATH 110) or (MATH 109; FDMAT 109)

A one-semester terminal course 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)

Prerequisites: FDMAT 112 or MATH 112 with a grade of C- or better

This course gives math education majors a mid-level practicum experience working with secondary level students. We hope that 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)

Prerequisites: FDMAT 108 or FDMAT 108T

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)

Prerequisites: FDMAT 108 or FDMAT 108T

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

(Fall, Winter, Spring)

Mathematics

Brigham Young University–Idaho 2013-2014

<p>MATH 214 Multivariable/Vector Calculus (3:3:1) Prerequisites: MATH 113 or MATH 114 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. Math 214 and 215 cannot both be taken for credit. (Fall, Winter)</p>	<p>MATH 316 Differential Equations with Linear Algebra (4:4:1) Prerequisites: MATH 214 or MATH 215 Matrices, determinants, eigen values and eigenvectors, first and second order ordinary differential equations, power series and Fourier series methods, Laplace transforms, systems of linear ordinary differential equations. Emphasis on methods and applications. Math 316 and Math 371 cannot both be taken for credit. (Fall, Winter, Spring)</p>
<p>MATH 215 Multivariable Calculus (4:4:1) Prerequisites: FDMAT 112 with a grade of C- or better 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 on methods and applications. Math 215 and Math 214 cannot both be taken for credit. (Fall, Winter, Spring)</p>	<p>MATH 325 Intermediate Statistics (3:3:0) Prerequisites: FDMAT 221 or FDMAT 222 or FDMAT 223 Various nonparametric procedures, ANOVA and ANCOVA with two or more factors, multiple near regression, modules to develop various skill sets: a) principles of experimental design, six-sigma, and quality control, b) odds ratio/relative risk, chi-square, and logistic regression analyses, c) basic time series and forecasting models. (Fall, Winter, Spring)</p>
<p>MATH 221A Business Statistics (3:3:0) Prerequisites: FDMAT 108 or FDMAT 108T 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>MATH 326 Experimental Design (3:3:0) Prerequisites: FDMAT 221 or FDMAT 222 or FDMAT 223 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>MATH 221B Biostatistics (3:3:0) Prerequisites: FDMAT 108 or FDMAT 108T 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>MATH 327 Introduction to Bayesian Statistics (3:3:0) Prerequisites: (FDMAT 112 with a grade of C- or better or MATH 119) and (FDMAT 222 or FDMAT 223) Topics include: 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>MATH 221C Social Science Statistics (3:3:0) Prerequisites: FDMAT 108 or FDMAT 108T 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>MATH 330 Engineering Statistics (3:3:0) Prerequisites: FDMAT 112 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. (Fall, Winter, Spring)</p>
<p>MATH 241 Linear Algebra 1 (2:2:0) Prerequisites: FDMAT 112 with a grade of C- or better Introduces and explores some of the major concepts of matrix analysis through solving significant real world problems. (Winter, Spring)</p>	<p>MATH 340 Discrete Mathematics (3:3:0) Prerequisites: MATH 114 and MATH 205 To be taken concurrently with MATH 340L. (Fall, Spring)</p>
<p>MATH 242 Linear Algebra 2 (2:2:0) Prerequisites: MATH 241 Introduces and explores some of the major concepts of vector spaces and linear transformations through solving significant real world problems. (Winter, Spring)</p>	<p>MATH 340L Technical Writing Lab (1:0:2) Training in how to create and edit technical documents and how to typeset mathematics and mathematical figures using a computer. To be taken concurrently with MATH 340. (Fall, Spring)</p>
<p>MATH 271 Elementary Differential Equation (2:2:0) Prerequisites: MATH 113 or MATH 114 Introduces and explores some of the major concepts of differential equations and dynamic systems through solving significant real world problems. (Fall, Spring)</p>	<p>MATH 341 Linear Algebra (3:3:0) Prerequisites: FDMAT 112 Systems of linear equations, matrices, determinants, eigenvalues and eigenvectors, vectors, vector spaces, linear transformations, and applications. (Fall, Winter, Spring)</p>
<p>MATH 281 Introduction to Applied Mathematics (3:3:0) Total Course Fee: \$20.00 Prerequisites: FDMAT 112 with a grade of C- or better or MATH 119 Mathematical modeling concepts applied to areas such as biology, physics, chemistry, game theory, and economics. May include guest lecture, field trips, and interdisciplinary projects. (Fall)</p>	<p>MATH 350 Geometry (3:3:0) Prerequisites: MATH 340 Axiomatic treatment of finite geometries, transformation geometry, Euclidean and non-Euclidean geometries with emphasis on the historical significance of the Parallel Postulate. (Winter, Spring)</p>
<p>MATH 301 Introduction to Analysis (3:3:0) Prerequisites: MATH 113 or MATH 114 Achieving maturity in mathematical communication. Topics include introduction to mathematical proof, analysis of proof, set theory, mathematical induction, logical reasoning, elementary number theory, and properties of relations and functions. (Winter)</p>	<p>MATH 399R Mathematical Competitions (1:0:1) Repeatable Course: may earn maximum of 4 credits Prerequisites: FDMAT 112 A hands-on problem solving course to prepare and practice for the Putnam Exam and other mathematical competitions. (Fall, Winter)</p>
	<p>MATH 411 Numerical Analysis (3:3:0) Prerequisites: CS 124 and MATH 316 Basic error analysis, complexity of algorithms, roots, interpolation, least squares approximation, curve fitting, numerical differentiation and integration, and systems of linear equations. (Fall)</p>

Mathematics

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MATH 412 Scientific Computing

(3:3:0)

Prerequisites: MATH 411

Numerical solution of ODEs and PDEs. Convergence and stability analysis. Emphasis on applications

(Winter, even years)

MATH 423 Probability and Statistics

(3:3:0)

Prerequisites: (FDMAT 221 or FDMAT 222 or FDMAT 223 or FDMAT 224) and (MATH 214 or MATH 215)

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)

MATH 425 Applied Linear Regression

(3:3:0)

Prerequisites: (FDMAT 222 or FDMAT 223) and (MATH 325) and (MATH 241 or MATH 341) and (MATH 214 or MATH 215 or MATH 119)

Designed to explore fundamentals of regression, theory of regression models, residual and residual analysis, multiple regression, remediation, transformations, and ANOVA. Students will use SPSS for statistical analyses.

(Winter)

MATH 440 Modern Algebra

(3:3:0)

Prerequisites: MATH 301 or MATH 240 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)

MATH 441 Abstract Algebra 1

(3:3:0)

Prerequisites: MATH 301 and MATH 341

Introduction to groups, rings, fields, vector spaces, and applications.

(Fall, odd years)

MATH 442 Abstract Algebra 2

(3:3:0)

Prerequisites: MATH 441

Additional exposure to groups, rings, fields, vector spaces, and applications.

(Winter, even years)

MATH 450 History of Mathematics

(2:2:0)

Prerequisites: MATH 350

Intended for those students majoring in Mathematics Education. Presents an overview of the development of mathematics and its interaction with society.

(Fall, Spring)

MATH 461 Real Analysis 1

(3:3:0)

Prerequisites: MATH 301 and MATH 316 and MATH 341

Rigorous treatment of the calculus. Limits, continuity, differentiation, integration, and metric properties of Euclidean spaces.

(Fall, even)

MATH 462 Real Analysis 2

(3:3:0)

Prerequisites: MATH 461

Analysis in the context of metric spaces. Applications involving such tools as approximation, Fourier analysis, and multivariate optimization.

(Winter, odd years)

MATH 463 Complex Analysis

(3:3:0)

Prerequisites: (MATH 214 or MATH 215) and MATH 301

Arithmetic, algebra and calculus operations and concepts applied to complex numbers and functions of a single complex variable.

(Winter, odd years)

MATH 472 Introduction to Partial Differential Equations

(3:3:0)

Prerequisites: MATH 316

Solving linear homogeneous and nonhomogeneous second-order partial differential equations with homogeneous and nonhomogeneous boundary conditions by separation of variables. Sturm-Liouville theory. Applications of partial differential equations to diffusion, wave, and other phenomena. Fourier series and their applications to solving partial differential equations. Solving first-order partial differential equations using the method of characteristics. Introduction to the finite-element and finite-difference methods.

(Winter)

MATH 490 Secondary Education Mathematics Teaching Methods

(2:2:0)

Prerequisites: (MATH 350 or MATH 302) and MATH 440 and MATH 450

Math 490 must be taken the semester before student teaching. This 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)

MATH 495R Topics in Mathematics

(3:3:0)

Repeatable Course: may earn maximum of 9 credits

Prerequisites: MATH 301

The content of this class will be determined by the department and the instructor, based on student need and interest. Possible subjects are Number Theory, Topology, Stochastic Processes, and Actuarial Science.

(Fall)

MATH 498R Internship

(1-3:0:0)

Repeatable Course: may earn maximum of 15 credits

Course requirement: Instructor Authorization

Practical experience working in a math intensive industry. Students will write a report and give an oral presentation summarizing their projects.

(Fall, Winter, Spring)

MATH 499R Senior Project in Mathematics

(1-3:3:0)

Repeatable Course: may earn maximum of 15 credits

Course requirement: Instructor Authorization

Content tailored to individual needs and interests of the students. Investigation and/or application of mathematical principles under the guidance of a faculty member. Students will write a report and give an oral presentation summarizing their projects

(Fall, Winter, Spring)

