# Mathematics

## Mathematics

The Mathematics department is in the College of Science. To find the most up-to-date information, including Program Learning Outcomes for degree programs offered by the Math department, visit their website.

Mathematics department

**DEPARTMENT CHAIR**

**PARRY, Alan** *Assistant Professor*

**FACULTY**

**ABRAMSON, Mark A.** *Associate Professor*
**ANDERSEN, Michael** *Lecturer*
**ANDRIST, Kathryn** *Professor*
**BHATT, Harish** *Assistant Professor*
**BHATTACHARJEE, Debanjan** *Associate Professor*
**FAGAN, Joshua** *Assistant Professor*
**FAUROT, Vivienne** *Associate Professor*
**FEARNLEY, David** *Professor*
**FRANZ, Reinhard O.W.** *Associate Professor*
**HEINY, Erik** *Professor*
**HURDLE, Zachariah** *Assistant Professor*
**ISLAM, Mohammad** *Associate Professor*
**JI, Xiao** *Associate Professor*
**KIDD, John** *Assistant Professor*
**LEE, KC** *Lecturer*
**LEWIS, Scott C.** *Professor*
**LI, Ya** *Professor*
**LING, Chen** *Assistant Professor*
**LING, Jun (Michael)** *Professor*
**MOGILSKI, Wiktor** *Assistant Professor*
**PARRY, Alan** *Assistant Professor*
**POTTER, Matthew** *Lecturer*
**SIMMONS, Skyler C.** *Assistant Professor*
**SIMONS, Joe M.** *Lecturer*
**TAYLOR, Matthew** *Lecturer*
**VAN FRANKENHUIJSEN, Machiel** *Professor*
**VASILEVSKA, Violeta** *Professor*
**WALKER, Christine** *Professor*
**ZHU, Yingxian** *Associate Professor*

# Degrees & Programs

## Mathematics, A.A.

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### *Requirements*

The AA mathematics program is intended to prepare students for the pursuit of a bachelor's degree while also including a year of foreign language training. Those intending to transfer to other institutions should check transferability of courses with the institutions to which they intend to transfer.

**Total Program Credits: 60**

| | | | |
|---|---|---|---|
| General Education Requirements: | | | 37 Credits |
| | ENGL 1010 | Introduction to Academic Writing CC | 3 |
| or | ENGH 1005 | Literacies and Composition Across Contexts CC (5) | |
| | ENGL 2010 | Intermediate Academic Writing CC | 3 |
| | MATH 1210 | Calculus I QL | 4 |
| or | MATH 121H | Calculus I QL (4) | |
| Complete one of the following: | | | 3 |
| | HIST 2700 | US History to 1877 AS (3) | |
| and | HIST 2710 | US History since 1877 AS (3) | |
| | HIST 1700 | American Civilization AS (3) | |
| | HIST 1740 | US Economic History AS (3) | |
| | POLS 1000 | American Heritage SS (3) | |
| | POLS 1100 | American National Government AS (3) | |
| Complete the following: | | | |
| | PHIL 2050 | Ethics and Values IH | 3 |
| | HLTH 1100 | Personal Health and Wellness TE | 2 |
| or | EXSC 1097 | Fitness for Life TE (2) | |
| Distribution Courses | | | |
| | Biology | | 3 |
| | Physical Science | | 3 |
| | Additional Biology or Physical Science | | 3 |
| | Humanities Distribution | | 3 |
| | Fine Arts Distribution | | 3 |
| | Social/Behavioral Science | | 3 |
| Discipline Core Requirements: | | | 10 Credits |
| | MATH 1220 | Calculus II | 4 |
| or | MATH 122H | Calculus II (4) | |
| Complete 6 credits from the following: | | | 6 |
| | MATH 2210 | Calculus III (4) | |
| or | MATH 221H | Calculus III (3) | |
| | MATH 2270 | Linear Algebra (3) | |
| | MATH 2280 | Ordinary Differential Equations (3) | |
| | MATH 290R | Topics in Mathematics (3-5) | |
| | STAT 2050 | Introduction to Statistical Methods (4) | |
| Elective Requirements: | | | 14 Credits |
| | Same Foreign Language | | 8 |
| | Any course 1000 or higher [1] | | 6 |

**Notes:**

1. MATH 1050 and MATH 1060 are required as prerequisites for MATH 1210.

**Graduation Requirements:**

1. Completion of a minimum of 60 semester credits.
2. Overall grade point average of 2.0 (C) or above. (Departments may require a higher GPA.)
3. Residency hours--minimum of 20 credit hours through course attendance at UVU

4. Completion of GE and specified departmental requirements

### Mathematics, A.A.
### *Careers*

1. Knowledge of calculus, differential equations and linear algebra.
2. The ability to communicate mathematics clearly, both verbally and in writing.

### *Related Careers*

- Natural Sciences Managers
- Mathematicians
- Statisticians
- Mathematical Science Occupations, All Other
- Mathematical Science Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

## Mathematics, A.S.

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### *Requirements*

The AA and AS mathematics programs are intended to prepare students for the pursuit of a bachelor's degree. Those intending to transfer to other institutions should check transferability of courses with the institutions to which they intend to transfer. Following are the key knowledge, skill and ability goals of the AA and AS mathematics program: Knowledge of calculus, differential equations and linear algebra. The ability to communicate mathematics clearly, both verbally and in writing.

**Total Program Credits: 60**

| | | | |
|---|---|---|---|
| General Education Requirements: | | | 36 Credits |
| | ENGL 1010 | Introduction to Academic Writing CC | 3 |
| or | ENGH 1005 | Literacies and Composition Across Contexts CC | |
| | ENGL 2010 | Intermediate Academic Writing CC | 3 |
| | MATH 1210 | Calculus I QL | 4 |
| or | MATH 121H | Calculus I QL | |
| Complete one of the following: | | | 3 |
| | HIST 2700 | US History to 1877 AS | |
| and | HIST 2710 | US History since 1877 AS (6) | |
| | HIST 1700 | American Civilization AS (3) | |
| | HIST 1740 | US Economic History AS (3) | |
| | POLS 1000 | American Heritage SS (3) | |
| | POLS 1100 | American National Government AS (3) | |
| Complete the following: | | | |
| | PHIL 2050 | Ethics and Values IH | 3 |
| | HLTH 1100 | Personal Health and Wellness TE | 2 |
| or | EXSC 1097 | Fitness for Life TE (2) | |
| Distribution Courses: | | | |
| | Biology | | 3 |
| | Physical Science | | 3 |
| | Additional Biology or Physical Science | | 3 |
| | Humanities Distribution | | 3 |
| | Fine Arts Distribution | | 3 |
| | Social/Behavioral Science | | 3 |
| Discipline Core Requirements: | | | 10 Credits |
| | MATH 1220 | Calculus II | 4 |
| or | MATH 122H | Calculus II | |
| Complete 6 credits from the following: | | | 6 |
| | MATH 2210 | Calculus III (4) | |
| or | MATH 221H | Calculus III | |
| | MATH 2270 | Linear Algebra (3) | |
| | MATH 2280 | Ordinary Differential Equations (3) | |
| | MATH 290R | Topics in Mathematic (3-5) | |
| | STAT 2050 | Introduction to Statistical Methods (4) | |
| Elective Requirements: | | | 14 Credits |
| | Any course 1000 or higher* | | 14 |

**Notes:**

1. MATH 1050 College Algebra QL and MATH 1060 Trigonometry QL are required as prerequisites for MATH 1210 Calculus I QL.

**Graduation Requirements:**

1. Completion of a minimum of 60 semester credits.
2. Overall grade point average of 2.0 (C) or above. (Departments may require a higher GPA.)
3. Residency hours--minimum of 20 credit hours through course attendance at UVU.
4. Completion of GE and specified departmental requirements.

### Mathematics, A.S.
### *Careers*

| Program Learning Outcomes |
|---|
| 1. Knowledge of calculus, differential equations and linear algebra.<br>2. The ability to communicate mathematics clearly, both verbally and in writing. |

### *Related Careers*

- Natural Sciences Managers
- Mathematicians
- Statisticians
- Mathematical Science Occupations, All Other
- Mathematical Science Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

## Mathematics, Minor

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### *Requirements*

The mathematics minor can be combined with a variety of degrees throughout the university.

**Total Program Credits: 24**

| Matriculation Requirements: |
|---|
| 1. Admitted to a bachelor degree program at UVU. |

| Discipline Core Requirements: | | | 24 Credits |
|---|---|---|---|
| | MATH 1210 | Calculus I QL | 4 |
| or | MATH 121H | Calculus I QL | |
| | MATH 1220 | Calculus II | 4 |
| or | MATH 122H | Calculus II | |
| | MATH 2210 | Calculus III | 4 |
| or | MATH 221H | Calculus III | |
| | MATH 2270 | Linear Algebra | 3 |
| | MATH 2280 | Ordinary Differential Equations | 3 |
| | Choose at least two mathematics courses from the mathematics courses numbered 3210 and above [1] | | 6 |

**Notes:**

1. Elective courses may NOT include MATH 4030, MATH 4040, or MATH 481R.

Graduation Requirements

1. To fulfill the requirements for a mathematics minor, students must achieve a minimum GPA of 2.4 for all attempted work in the seven mathematics courses required for the mathematics minor and have no course grade lower than "C" in any of the seven mathematics courses required for the mathematics minor (substitutions may be granted for some elective courses).

*NOTE: The 6-credit pairs of courses, MATH 3210 Complex Variables and MATH 3400 Partial Differential Equations, or MATH 4610 Introduction to Numerical Analysis I and MATH 4620 Introduction to Numerical Analysis II, are recommended for students pursuing majors in the physical sciences, engineering, or computer science. Another recommended pair for computer science majors is MATH 3300 Foundations of Abstract Algebra and MATH 4340 Introduction to Number Theory.*

### Mathematics, Minor

#### *Careers*

1. Knowledge of calculus, differential equations and linear algebra, plus two elective upper division mathematics courses.
2. The ability to communicate mathematics clearly, both verbally and in writing.

#### *Related Careers*

- Natural Sciences Managers
- Mathematicians
- Statisticians
- Mathematical Science Occupations, All Other
- Mathematical Science Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

## Mathematics - Actuarial Science Emphasis, B.S.

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#### *Requirements*

Mathematics degrees allow for a wide variety of employment options.The following careers are very mathematics centered, though in many cases additional training beyond a mathematics degree (or at least beyond a B.S.Mathematics degree) is needed to qualify for employment in these fields: actuarial work, education, research analysis, cryptology, systems analysis, robotics engineering, design modeling (creating cost efficient models), geomatics engineering, photogrammatism, stock trading, biomathematics, accounting or auditing, population ecology, aspects of forensic analysis and some types of computer programming design.There are also jobs for mathematics graduates in the federal government, mainly in the department of defense.The degree required depends on the type of job in the areas mentioned, and the salary level.

**Total Program Credits: 120**

| Matriculation Requirements: | | | |
|---|---|---|---|
| 1. Completion of MATH 1210 Calculus I Ql and MATH 1220 Calculus II (or equivalent) with an overall GPA of 2.5 or better<br>2. Student must meet with the Math Department advisor and declare an intent to major in Mathematics | | | |
| General Education Requirements: | | | 39 Credits |
| | ENGL 1010 | Introduction to Academic Writing CC | 3 |
| or | ENGH 1005 | Literacies and Composition Across Contexts CC (5) | |
| | ENGL 2010 | Intermediate Academic Writing CC | 3 |
| | MATH 1210 | Calculus I QL | 4 |
| or | MATH 121H | Calculus I QL (4) | |
| Complete one of the following: | | | 3 |
| | HIST 2700 | US History to 1877 AS (3) | |
| and | HIST 2710 | US History since 1877 AS (3) | |
| | HIST 1700 | American Civilization AS (3) | |
| | HIST 1740 | US Economic History AS (3) | |
| | POLS 1000 | American Heritage SS (3) | |
| | POLS 1100 | American National Government AS (3) | |
| Complete the following: | | | |
| | PHIL 2050 | Ethics and Values IH | 3 |
| | HLTH 1100 | Personal Health and Wellness TE (2) | |
| or | EXSC 1097 | Fitness for Life TE | 2 |
| Distribution Courses: | | | |
| | Biology | | 3 |
| | PHYS 2210 | Physics for Scientists and Engineers I PP | 4 |
| | PHYS 2215 | Physics for Scientists and Engineers I Lab | 1 |
| | PHYS 2220 | Physics for Scientists and Engineers II PP (4) (Required for Mathematics and Applied Mathematics Emphasis) | |
| and | PHYS 2225 | Physics for Scientists and Engineers II Lab (1) (Required for Mathematics and Applied Mathematics Emphasis) | |
| or | One other Biology or Physical Science Distribution (Required for Applied Mathematics Emphasis) | | 3 |
| | Humanities | | 3 |
| | Fine Arts | | 3 |
| | Social/Behavioral Science | | 3 |
| Discipline Core Requirements: | | | 31 Credits |

| | | | |
|---|---|---|---|
| Complete the following: | | | |
| | CS 1400 | Fundamentals of Programming | 3 |
| | STAT 2050 | Introduction to Statistical Methods | 4 |
| | STAT 2060 | Introduction to Statistical Computing | 1 |
| | MATH 1220 | Calculus II | 5 |
| or | MATH 122H | Calculus II (5) | |
| | MATH 2210 | Calculus III | 3 |
| or | MATH 221H | Calculus III (3) | |
| | MATH 2270 | Linear Algebra | 3 |
| | MATH 2280 | Ordinary Differential Equations | 3 |
| | MATH 3250 | Introduction to Advanced Calculus WE | 3 |
| | MATH 3300 | Foundations of Abstract Algebra | 3 |
| | MATH 4210 | Advanced Calculus I [1] | 3 |
| Elective Requirements: | | | 21 Credits |
| | Complete 12 credits of upper division electives [2] | | 11 |
| | Complete 9 credits of upper or lower division electives [2] | | 9 |
| Emphasis Requirements: | | | 27 Credits |
| | ECON 2010 | Principles of Economics I SS | 3 |
| | ECON 2020 | Principles of Economics II SS | 3 |
| | ACC 2110 | Principles of Accounting I (3) | |
| and | ACC 2120 | Principles of Accounting II (3) | |
| or | ACC 3000 | Financial Managerial and Cost Accounting Concepts | 3 |
| | FIN 3100 | Principles of Finance | 3 |
| | MATH 3750 | Financial Mathematics | 3 |
| | MATH 4750 | Fundamentals of Actuarial Mathematics | 3 |
| | STAT 4000 | Applied Regression and Time Series WE | 3 |
| | STAT 4710 | Mathematical Statistics-Probability and Statistics | 3 |
| | STAT 4720 | Mathematical Statistics-Statistical Inference | 3 |
| Emphasis Elective Requirements: | | | 3 Credits |
| Complete 3 credits chosen from the following: | | | 3 |
| | MATH 3210 | Complex Variables (3) | |
| | MATH 3320 | Graph Theory and its Applications (3) | |
| | MATH 3400 | Partial Differential Equations (3) | |
| | MATH 3640 | Introduction to Optimization (3) | |
| | MATH 4100 | Differential Geometry of Curves and Surfaces (3) | |
| | MATH 4220 | Advanced Calculus II (3) | |
| | MATH 4250 | Introduction to Dynamical Systems (3) | |
| | MATH 4310 | Introduction to Modern Algebra I (3) | |
| | MATH 4320 | Introduction to Modern Algebra II (3) [3] | |
| | MATH 4330 | Theory of Linear Algebra (3) | |
| | MATH 4340 | Introduction to Number Theory (3) | |
| | MATH 4510 | Foundations of Topology (3) | |
| | MATH 4610 | Introduction to Numerical Analysis I (3) | |
| | MATH 4620 | Introduction to Numerical Analysis II (3) [3] | |
| | MATH 481R | Internship in Mathematics (1-4) | |
| | MATH 489R | Undergraduate Research in Mathematics (1-3) | |
| | MATH 490R | Topics in Mathematics (2-3) | |

**Notes:**

1. Students planning to do graduate work in mathematics should take both of the year-long sequences MATH 4210 Advanced Calculus I, MATH 4220 Advanced Calculus II, and MATH 4310 Introduction to Modern Algebra I, MATH 4320 Introduction to Modern Algebra II, and acquire a reading knowledge of at least one foreign language chosen from French, German, or Russian.
2. Elective courses may NOT include MATH 3100, MATH 3200, MATH 3010, MATH 3030, MATH 4030, or MATH 4040.
3. Requires completion of a prerequisite course, which fulfills elective requirements.

**Graduation Requirements:**

1. Completion of a minimum of 120 semester credits with at least 40 credit hours in upper-division courses.
2. Overall grade point average of 2.0 (C) or above, a minimum GPA of 2.4 in all MATH and STAT courses listed above, with no grade lower than a "C" in all listed PHYS, STAT, and MATH courses (substitutions may be granted for some elective courses).
3. Residency hours-- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of general education and specified departmental requirements.
5. Complete an exit survey administered by the Mathematics Department Advisor.
6. Successful completion of at least one Global/Intercultural course.

## Mathematics - Actuarial Science Emphasis, B.S.

### *Careers*

1. Knowledge of calculus, real analysis, differential equations, linear algebra, probability and statistics, economicsand accounting principles, financial mathematics, actuarial models, regression analysis anda broad knowledge base of other elective topics that could include topics such as optimization,numerical analysis, partial differential equations, and graph theory.
2. The ability toapply risk modeling to solve pricing, reserving, and other actuarial problems, particularly inthe insurance industry, the ability toformulate and understand each risk model, and the ability to pass the two introductory actuarial exams.
3. The ability to communicate mathematics effectively, both verbally and in writing, expressing clear logical explanationsof assumptionsand risk models used to come to conclusions about prices, reserves, and risk measures.

### *Related Careers*

- Natural Sciences Managers
- Mathematicians
- Statisticians
- Mathematical Science Occupations, All Other
- Mathematical Science Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

# Mathematics - Applied Mathematics Emphasis, B.S.

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## *Requirements*

Mathematics degrees allow for a wide variety of employment options.The following careers are very mathematics centered, though in many cases additional training beyond a mathematics degree (or at least beyond a B.S.Mathematics degree) is needed to qualify for employment in these fields: actuarial work, education, research analysis, cryptology, systems analysis, robotics engineering, design modeling (creating cost efficient models), geomatics engineering, photogrammatism, stock trading, biomathematics, accounting or auditing, population ecology, aspects of forensic analysis and some types of computer programming design.There are also jobs for mathematics graduates in the federal government, mainly in the department of defense.The degree required depends on the type of job in the areas mentioned, and the salary level

**Total Program Credits: 120**

| | | | |
|---|---|---|---|
| Matriculation Requirements: | | | |
| 1. Completion of MATH 1210 Calculus I QL and MATH 1220 Calculus II (or equivalent) with an overall GPA of 2.5 or better<br>2. Student must meet with the Math Department advisor and declare an intent to major in Mathematics | | | |
| General Education Requirements: | | | 39 Credits |
| | ENGL 1010 | Introduction to Academic Writing CC | 3 |
| or | ENGH 1005 | Literacies and Composition Across Contexts CC (5.0) | |
| | ENGL 2010 | Intermediate Academic Writing CC | 3 |
| | MATH 1210 | Calculus I QL | 4 |
| or | MATH 121H | Calculus I QL (4) | |
| Complete one of the following: | | | 3 |
| | HIST 2700 | US History to 1877 AS (3) | |
| and | HIST 2710 | US History since 1877 AS (3) | |
| | HIST 1700 | American Civilization AS (3) | |
| | HIST 1740 | US Economic History AS (3) | |
| | POLS 1000 | American Heritage SS (3) | |
| | POLS 1100 | American National Government AS (3) | |
| Complete the following: | | | |
| | PHIL 2050 | Ethics and Values IH | 3 |
| | HLTH 1100 | Personal Health and Wellness TE (2) | |
| or | EXSC 1097 | Fitness for Life TE | 2 |
| Distribution Courses: | | | |
| | Biology | | 3 |
| | PHYS 2210 | Physics for Scientists and Engineers I PP | 4 |
| | PHYS 2215 | Physics for Scientists and Engineers I Lab | 1 |
| | PHYS 2220 | Physics for Scientists and Engineers II (4) (Required for Mathematics and Applied Mathematics Emphasis) | |
| and | PHYS 2225 | Physics for Scientists and Engineers II Lab (1) (Required for Mathematics and Applied Mathematics Emphasis) | |
| or | One other Biology or Physical Science Distribution (Required for Applied Mathematics Emphasis) | | 3 |
| | Humanities | | 3 |
| | Fine Arts | | 3 |
| | Social/Behavioral | | 3 |
| Discipline Core Requirements: | | | 31 Credits |
| Complete the following: | | | |
| | CS 1400 | Fundamentals of Programming | 3 |
| | STAT 2050 | Introduction to Statistical Methods | 4 |
| | STAT 2060 | Introduction to Statistical Computing | 1 |
| | MATH 1220 | Calculus II | 4 |
| or | MATH 122H | Calculus III (4) | |
| | MATH 2210 | Calculus III | 4 |
| or | MATH 221H | Calculus III (4) | |
| | MATH 2270 | Linear Algebra | 3 |
| | MATH 2280 | Ordinary Differential Equations | 3 |
| | MATH 3250 | Introduction to Advanced Calculus WE | 3 |
| | MATH 3300 | Foundations of Abstract Algebra | 3 |
| | MATH 4210 | Advanced Calculus I [1] | 3 |
| Elective Requirements: | | | 21 Credits |
| | Complete 12 credits of upper division electives [2] | | 12 |
| | Complete 9 credits of upper or lower division electives [2] | | 9 |
| Emphasis Requirements: | | | 20 Credits |
| Complete all of the following: | | | |
| | CS 1410 | Object Oriented Programming | 3 |
| | STAT 3040 | Probability and Statistics for Engineering and the Sciences | 3 |
| | MATH 3210 | Complex Variables | 3 |
| | MATH 3400 | Partial Differential Equations | 3 |
| | MATH 4610 | Introduction to Numerical Analysis I | 3 |
| | MATH 4620 | Introduction to Numerical Analysis II | 3 |
| | MATH 4999 | Mathematics Capstone WE | 2 |
| Emphasis Elective Requirements: | | | 10 Credits |
| Complete 10 credits chosen from the following: | | | 10 |
| | MATH 3320 | Graph Theory and its Applications (3) | |
| | MATH 3640 | Introduction to Optimization (3) | |
| | MATH 3750 | Financial Mathematics (3) | |
| | MATH 4100 | Differential Geometry of Curves and Surfaces (3) | |
| | MATH 4220 | Advanced Calculus II (3) | |
| | MATH 4250 | Introduction to Dynamical Systems (3) | |
| | MATH 4310 | Introduction to Modern Algebra I (3) | |
| | MATH 4320 | Introduction to Modern Algebra II (3) [3] | |
| | MATH 4330 | Theory of Linear Algebra (3) | |

| | | | |
|---|---|---|---|
| | MATH 4340 | Introduction to Number Theory (3) | |
| | MATH 4510 | Foundations of Topology (3) | |
| | MATH 4750 | Fundamentals of Actuarial Mathematics (3) | |
| | MATH 481R | Internship in Mathematics (1-4) | |
| | MATH 489R | Undergraduate Research in Mathematics (1-3) | |
| | MATH 490R | Topics in Mathematics (2-3) | |
| | MATH 5510 | General Topology (3) | |
| | PHYS 3300 | Mathematical Physics (3) | |
| | PHYS 3310 | Advanced Mathematical Physics (3) [3] | |
| | PHYS 3330 | Computational Physics (3) [3] | |
| | STAT 4000 | Applied Regression and Time Series WE (3) | |
| | STAT 4710 | Mathematical Statistics-Probability and Statistics (3) | |
| | STAT 4720 | Mathematical Statistics-Statistical Inference (3) [3] | |

**Notes:**

1. Students planning to do graduate work in mathematics should take both of the year-long sequences MATH 4210 Advanced Calculus I, MATH 4220 Advanced Calculus II, and MATH 4310 Introduciton to Modern Algebra I, MATH 4320 Introduction to Modern Algebra II, and acquire a reading knowledge of at least one foreign language chosen from French, German, or Russian.
2. Elective courses may NOT include MATH 3100, MATH 3200, MATH 3010, MATH 3030, MATH 4030, or MATH 4040.
3. Requires completion of a prerequisite course, which fulfills elective requirements.

**Graduation Requirements:**

1. Completion of a minimum of 120 semester credits with at least 40 credit hours in upper-division courses.
2. Overall grade point average of 2.0 (C) or above, a minimum GPA of 2.4 in all MATH and STAT courses listed above, with no grade lower than a "C" in all listed PHYS, STAT, and MATH courses (substitutions may be granted for some elective courses).
3. Residency hours-- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of general education and specified departmental requirements.
5. Complete an exit survey administered by the Mathematics Department Advisor.
6. Successful completion of at least one Global/Intercultural course.

## Mathematics - Applied Mathematics Emphasis, B.S.

### *Careers*

1. Knowledge of calculus, real and complex analysis, differential equations, linear and abstract algebra, basic probability, and a broad knowledge base of other elective topics including topology, geometry, number theory, numerical analysis and statistics.
2. An awareness of how to apply and model real situations with mathematics, and the ability to formulate and understand logical arguments.
3. The ability to communicate mathematics effectively, both verbally and in writing, expressing clear logical proofs of mathematical hypotheses and constructing well defined counterexamples to false statements.

### *Related Careers*

- Natural Sciences Managers
- Mathematicians
- Statisticians
- Mathematical Science Occupations, All Other
- Mathematical Science Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

## Mathematics - Mathematics Emphasis, B.S.

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**Total Program Credits: 120**

| | | | |
|---|---|---|---|
| Matriculation Requirements: | | | |
| 1. Completion of MATH 1210 Calculus I QL and MATH 1220 Calculus II (or equivalent) with an overall GPA of 2.5 or better<br>2. Student must meet with the Math Department advisor and declare an intent to major in Mathematics | | | |
| General Education Requirements: | | | 39 Credits |
| | ENGL 1010 | Introduction to Academic Writing CC | 3 |
| or | ENGH 1005 | Literacies and Composition Across Contexts CC (5) | |
| | ENGL 2010 | Intermediate Academic Writing CC | 3 |
| | MATH 1210 | Calculus I QL | 4 |
| or | MATH 121H | Calculus I QL (4) | |
| Complete one of the following: | | | 3 |
| | HIST 2700 | US History to 1877 AS (3) | |
| and | HIST 2710 | US History since 1877 AS (3) | |
| | HIST 1700 | American Civilization AS (3) | |
| | HIST 1740 | US Economic History AS (3) | |
| | POLS 1000 | American Heritage SS (3) | |
| | POLS 1100 | American National Government AS (3) | |
| Complete the following: | | | |
| | PHIL 2050 | Ethics and Values IH | 3 |
| | HLTH 1100 | Personal Health and Wellness TE (2) | |
| or | EXSC 1097 | Fitness for Life TE | 2 |
| Distribution Courses | | | |
| | Biology | | 3 |

| | | | |
|---|---|---|---|
| | PHYS 2210 | Physics for Scientists and Engineers I PP | 4 |
| | PHYS 2215 | Physics for Scientists and Engineers I Lab | 1 |
| Complete one of the following: | | | 3 |
| | PHYS 2220 | Physics for Scientists and Engineers II PP (4) (Required for Mathematics and Applied Mathematics Emphasis) | |
| and | PHYS 2225 | Physics for Scientists and Engineers II Lab (1) (Required for Mathematics and Applied Mathematics Emphasis) | |
| or | One other Biology or Physical Science Distribution (Required for Applied Mathematics Emphasis) | | 3 |
| | Humanities | | 3 |
| | Fine Arts | | 3 |
| | Social/Behavioral Science | | 3 |
| Discipline Core Requirements: | | | 31 Credits |
| Complete the following: | | | |
| | CS 1400 | Fundamentals of Programming | 3 |
| | STAT 2050 | Introduction to Statistical Methods | 4 |
| | STAT 2060 | Introduction to Statistical Computing | 1 |
| | MATH 1220 | Calculus II | 4 |
| or | MATH 122H | Calculus II (4) | |
| | MATH 2210 | Calculus III | 4 |
| or | MATH 221H | Calculus III (4) | |
| | MATH 2270 | Linear Algebra | 3 |
| | MATH 2280 | Ordinary Differential Equations | 3 |
| | MATH 3250 | Introduction to Advanced Calculus WE | 3 |
| | MATH 3300 | Foundations of Abstract Algebra | 3 |
| | MATH 4210 | Advanced Calculus I [1] | 3 |
| Elective Requirements: | | | 21 Credits |
| | Complete 12 credits of upper division electives [2] | | 12 |
| | Complete 9 credits of upper or lower division electives [2] | | 9 |

| | | | |
|---|---|---|---|
| Emphasis Requirements: | | | 14 Credits |
| | MATH 3210 | Complex Variables | 3 |
| | MATH 4220 | Advanced Calculus II | 3 |
| | MATH 4310 | Introduction to Modern Algebra I | 3 |
| | MATH 4330 | Theory of Linear Algebra | 3 |
| | MATH 4999 | Mathematics Capstone WE | 2 |
| Emphasis Elective Requirements: | | | 16 Credits |
| Complete 12 credits chosen from the following: At least one course must be from MATH 3400, MATH 4320, or MATH 4510 | | | 12 |

| | | | |
|---|---|---|---|
| | MATH 3310 | Discrete Mathematics (3) | |
| | MATH 3320 | Graph Theory and its Applications (3) | |
| | MATH 3400 | Partial Differential Equations (3) | |
| | MATH 3640 | Introduction to Optimization (3) | |
| | MATH 4100 | Differential Geometry of Curves and Surfaces (3) | |
| | MATH 4250 | Introduction to Dynamical Systems (3) | |
| | MATH 4320 | Introduction to Modern Algebra II (3) | |
| | MATH 4340 | Introduction to Number Theory (3) | |
| | MATH 4510 | Foundations of Topology (3) | |
| | MATH 4610 | Introduction to Numerical Analysis I (3) | |
| | MATH 4620 | Introduction to Numerical Analysis II (3) [3] | |
| | MATH 481R | Internship in Mathematics (1-4) | |
| | MATH 489R | Undergraduate Research in Mathematics (1-3) | |
| | MATH 490R | Topics in Mathematics (2-3) | |
| | MATH 5510 | General Topology (3) | |
| | STAT 4300 | Stochastic Processes (3) | |
| | STAT 4710 | Mathematical Statistics-Probability and Statistics (3) | |
| | STAT 4720 | Mathematical Statistics-Statistical Inference (3) [3] | |
| | Complete 4 additional credits of general electives [4] | | 4 |

**Notes:**

1. Students planning to do graduate work in mathematics should take both of the year-long sequences MATH 4210 Advanced Calculus I, MATH 4220 Advanced Calculus II, and MATH 4310

Introduction to Modern Algebra I, MATH 4320 Introduction to Modern Algebra II, and acquire a reading knowledge of at least one foreign language chosen from French, German, or Russian.
2. Elective courses may NOT include MATH 3100, MATH 3200, MATH 3010, MATH 3030, MATH 4030, or MATH 4040.
3. Requires completion of a prerequisite course, which fulfills elective requirements.
4. Elective courses may NOT include MATH 3100, MATH 3200, MATH 3010, MATH 3030, MATH 4030, or MATH 4040.

**Graduation Requirements:**

1. Completion of a minimum of 120 semester credits with at least 40 credit hours in upper-division courses.
2. Overall grade point average of 2.0 (C) or above, a minimum GPA of 2.4 in all MATH and STAT courses listed above, with no grade lower than a "C" in all listed PHYS, STAT, and MATH courses (substitutions may be granted for some elective courses).
3. Residency hours-- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of general education and specified departmental requirements.
5. Complete an exit survey administered by the Mathematics Department Advisor.
6. Successful completion of at least one Global/Intercultural course.

## Mathematics - Mathematics Emphasis, B.S.

### *Careers*

1. Knowledge of calculus, real and complex analysis, differential equations, linear and abstract algebra, basic probability, and a broad knowledge base of other elective topics including topology, geometry, number theory, numerical analysis and statistics.
2. An awareness of how to apply and model real situations with mathematics, and the ability to formulate and understand logical arguments
3. The ability to communicate mathematics effectively, both verbally and in writing, expressing clear logical proofs of mathematical hypotheses and constructing well defined counterexamples to false statements.

### *Related Careers*

- Natural Sciences Managers
- Mathematicians
- Statisticians
- Mathematical Science Occupations, All Other
- Mathematical Science Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

## Mathematics Education, B.S.

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### *Requirements*

The Secondary Education – Mathematics major is designed for students who plan to teach Mathematics at middle, junior or high school level or for graduate studies in the field. The degreewill prepare students to become state certified to teach the subject at any secondary level and help to address shortages of secondary math educators in Utah. Graduates will not only understand the art of teaching but also have a deep content knowledge of Mathematics. Graduates of this program are able to accurately interpret and translate pictorial and descriptive information into mathematical statements; solve problems quantitatively and communicate results clearly; demonstrate understanding of numeric, algebraic and geometric reasoning; and, demonstrate computational skills in areas of applied mathematics.

**Total Program Credits: 120**

| | | | |
|---|---|---|---|
| Matriculation Requirements: | | | |
| 1. Completion of MATH 1210 Calculus I QL, MATH 1220 Calculus II, and MATH 2210 Calculus III with a 3.0 GPA.<br>2. Completion of STAT 2040 Principles of Statistics QL with a grade of "B-" or higher.<br>3. ENGL and MATH QL courses must have a grade C or higher.<br>4. GPA of 3.0 or higher with no grade lower than a C in content area courses.<br>5. Completion of all General Education requirements and 70% of content area courses.<br>6. Pass LiveScan Criminal Background Check. | | | |
| General Education Requirements: | | | 38 Credits |
| | ENGL 1010 | Introduction to Academic Writing CC | 3 |
| or | ENGH 1005 | Literacies and Composition Across Contexts CC (5) | |
| | ENGL 2010 | Intermediate Academic Writing CC | 3 |
| | STAT 2040 | Principles of Statistics QL [1] | 4 |
| Complete one of the following: | | | 3 |
| | HIST 2700 | US History to 1877 AS (3) | |
| and | HIST 2710 | US History since 1877 AS (3) | |
| | HIST 1700 | American Civilization AS (3) | |
| | HIST 1740 | US Economic History AS (3) | |
| | POLS 1000 | American Heritage SS (3) | |
| | POLS 1100 | American National Government AS (3) | |
| Complete the following: | | | |
| | PHIL 2050 | Ethics and Values IH | 3 |
| | HLTH 1100 | Personal Health and Wellness TE | 2 |
| or | EXSC 1097 | Fitness for Life TE (2) | |
| Distribution Courses | | | |
| | Biology | | 3 |
| | PHYS 2210 | Physics for Scientists and Engineers I PP | 4 |
| | PHYS 2215 | Physics for Scientists and Engineers I Lab | 1 |
| | Additional Biology or Physical Science [2] | | 3 |
| | Humanities Distribution | | 3 |
| | Fine Arts Distribution | | 3 |
| | Social/Behavioral Science | | 3 |
| Discipline Core Requirements: | | | 50 Credits |
| | MATH 1210 | Calculus I [1] | 4 |
| or | MATH 121H | Calculus I (5) | |
| | MATH 1220 | Calculus II | 4 |
| or | MATH 122H | Calculus II (5) | |
| | MATH 2210 | Calculus III | 4 |
| or | MATH 221H | Calculus III (3) | |
| | MATH 2270 | Linear Algebra | 3 |
| | MATH 2280 | Ordinary Differential Equations | 3 |

| | | | |
|---|---|---|---|
| | MATH 3000 | History of Mathematics WE | 3 |
| | MATH 3010 | Methods of Secondary School Mathematics Teaching | 3 |
| | MATH 3030 | Algebra for Secondary Mathematics Teaching | 3 |
| | MATH 3100 | Foundations of Geometry | 3 |
| | MATH 3200 | Foundations of Analysis | 3 |
| | MATH 3300 | Foundations of Abstract Algebra | 3 |
| | MATH 4030 | Geometry for Secondary Mathematics Teaching | 3 |
| | MATH 4040 | Statistics and Probability for Secondary Mathematics Teaching | 3 |
| | STAT 3040 | Probability and Statistics for Engineering and the Sciences | 3 |
| | Complete 5 credits of any courses 1000 or higher | | 5 |
| Professional Education Core Requirements [3] | | | 32 Credits |
| | EDSC 1010 | Introduction to Education | 2 |
| | EDSC 3000 | Educational Psychology | 3 |
| | EDSC 325G | Equitable Technology Integration GI | 2 |
| | EDSP 340G | Exceptional Students GI | 2 |
| | EDSC 4200 | Classroom Management I | 2 |
| | EDSC 4250 | Classroom Management II | 2 |
| | EDSC 4440 | Content Area Literacies | 3 |
| | EDSC 445G | Multicultural Instruction ESL GI | 3 |
| | EDSC 455G | Secondary Curriculum Instruction and Assessment GI | 3 |
| | EDSC 4850 | Student Teaching Secondary | 8 |
| | EDSC 4990 | Teacher Performance Assessment Project WE | 2 |

**Notes:**

1. According to student placement, pre-requisites may be required
2. PHYS 2220 Physics for Scientists and Engineers II PP recommended
3. Must be completed with a grade of B- or higher

**Graduation Requirements:**

1. Completion of a minimum of 120 semester credits with at least 40 credit hours in upper-division courses.
2. Overall Grade of 3.0 (B) or above with no grade lower than a C or better in MATH or STAT courses and no grade lower than a B- in EDSC or EDSP courses.
3. Residency hours -- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of GE and specified departmental requirements.
5. Completion of Math Department Exit Survey.
6. Successful completion of at least one Global/Intercultural course.

## Mathematics Education, B.S.

### *Careers*

1. Understand deeply the mathematics they will teach in the future; become familiar with the National Council of Teachers of Mathematics (NCTM) Principles andStandards for School Mathematics;
2. Apply national and state standards for mathematics education to develop content-appropriate lessons;
3. Use and compare different assessment techniques; develop adisposition favoring continual gathering and use of information about their students' mathematical understandings;
4. Appropriately and responsibly use technology to enhance opportunities for students' mathematical thinking;
5. Understand the development of mathematics through numerous and variedexperiences related to the cultural, historical, and scientific evolution of mathematics;
6. Learn to usetheir mathematics and pedagogy knowledge flexibly in authentic situations through field experienceswith secondary students under the supervision of highly qualified, experienced teachers and university supervisors.

### *Related Careers*

- Mathematical Science Teachers, Postsecondary
- Education Teachers, Postsecondary
- Middle School Teachers, Except Special and Career/Technical Education
- Secondary School Teachers, Except Special and Career/Technical Education

## Statistics, B.S.

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### *Requirements*

The Department of Mathematics is pleased to offer a B.S. degree in Statistics. Statisticians assist in the collection and analysis of data thus providing decision makers information on which to base decisions. Knowledge of statistics and data handling helps students in almost every discipline. There are many opportunities in the job market for students with a degree in Statistics, and the program is ideal as preparation for a graduate degree in Statistics in any major university. The degree offers a wide variety of applied and theoretical courses in statistics, including statistical computing using both SAS and R programming.

**Total Program Credits: 120**

| Matriculation Requirements: | | | |
|---|---|---|---|
| 1. Completion of MATH 1210 Calculus I QL and MATH 1220 Calculus II (or equivalent) with an overall GPA of 2.5 or better<br>2. Student must meet with the math department advisor and declare an intent to major in statistics. | | | |
| General Education Requirements: | | | 39 Credits |
| | ENGL 1010 | Introduction to Academic Writing CC | 3 |
| or | ENGH 1005 | Literacies and Composition Across Context CC (5) | |
| | ENGL 2010 | Intermediate Academic Writing CC | 3 |
| | MATH 1210 | Calculus I QL | 4 |
| or | MATH 121H | Calculus I QL (5) | |
| Complete one of the following: | | | 3 |
| | HIST 2700 | US History to 1877 AS (3) | |
| and | HIST 2710 | US History since 1877 AS (3) | |
| | HIST 1700 | American Civilization AS (3) | |
| | HIST 1740 | US Economic History AS (3) | |
| | POLS 1000 | American Heritage SS (3) | |
| | POLS 1100 | American National Government AS (3) | |
| Complete the following: | | | |

| | | | |
|---|---|---|---|
| | PHIL 2050 | Ethics and Values IH | 3 |
| | HLTH 1100 | Personal Health and Wellness TE | 2 |
| or | EXSC 1097 | Fitness for Life (2) | |
| Distribution Courses: | | | |
| | Biology | | 3 |
| | PHYS 2210 | Physics for Scientists and Engineers I PP (co-requisite lab required) (4) | 4 |
| | PHYS 2215 | Physics for Scientists and Engineers I Lab | 1 |
| | One other Biology or Physical Science Distribution | | 3 |
| | Humanities Distribution | | 3 |
| | Fine Arts Distribution | | 3 |
| | Social/Behavioral Science | | 3 |
| Discipline Core Requirements: | | | 49 Credits |
| | CS 1400 | Fundamentals of Programming | 3 |
| | CS 1410 | Object Oriented Programming | 3 |
| | MATH 1220 | Calculus II | 4 |
| or | MATH 122H | Calculus II (5) | |
| | MATH 2210 | Calculus III | 4 |
| or | MATH 221H | Calculus III (3) | |
| | MATH 2270 | Linear Algebra | 3 |
| | STAT 2050 | Introduction to Statistical Methods | 4 |
| | STAT 4000 | Applied Regression and Time Series WE | 3 |
| | STAT 4100 | Design of Experiment | 3 |
| | STAT 4400 | Multivariate Analysis WE | 3 |
| | STAT 4710 | Mathematical Statistics-Probability and Statistics | 3 |
| | STAT 4720 | Mathematical Statistics-Statistical Inference | 3 |
| Complete three of the following: | | | 9 |
| | STAT 4200 | Survey Sampling (3) | |
| | STAT 4300 | Stochastic Processes (3) | |
| | STAT 4500 | Nonparametric Statistics (3) | |
| | STAT 4600 | Statistical Process Control (3) | |
| | Complete 9 hours of upper level MATH or STAT courses | | 9 |
| Elective Requirements: | | | 33 Credits |
| | Complete 9 credits of upper division electives[1] | | 9 |
| | Complete 24 credits of upper or lower division electives[1] | | 24 |

**Notes:**

1. Elective courses may NOT include MATH 3100, MATH 3200, MATH 3010, MATH 3030, MATH 4030, or MATH 4040.

**Graduation Requirements:**

1. Completion of a minimum of 120 semester credits with at least 40 credit hours in upper-division courses.
2. Overall grade point average of 2.0 (C) or above, a minimum GPA of 2.4 in all MATH and STAT courses listed above, with no grade lower than a "C" in all listed MATH and STAT courses (substitutions may be granted for some elective courses).
3. Residency hours- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of GE and specified departmental requirements.
5. Complete an exit survey administered by the Mathematics Department Advisor.
6. Successful completion of at least one Global/Intercultural course.

## Statistics, B.S.

### *Careers*

1. Demonstrate depth and breadth of understanding of statistics in core and elective areas through careful analysis.
2. Apply statistical reasoning and analysis in content specific (scientific) areas.
3. Communicate results of statistical analyses to a wide audience.
4. Use modern statistical software to support statistical analyses and promote understanding.

### *Related Careers*

- Natural Sciences Managers
- Actuaries
- Statisticians
- Survey Researchers
- Mathematical Science Teachers, Postsecondary