



# WEBER STATE UNIVERSITY

## APPLIED MATH MAJOR COURSE REQUIREMENTS

### APPLIED MATHEMATICS MAJOR BS

<b>Program Prerequisite</b>	Not required for Mathematics and Applied Mathematics majors. <i>Mathematics Teaching majors must meet the Teacher Education admission and licensure requirements (see Teacher Education Department).</i>
<b>Advisement and Admission Requirements</b>	All Mathematics majors should see the Mathematics Department to be assigned an advisor. They should meet with their advisors at least once a year to help plan their programs and check on their progress. Declare your program of study with your advisor. There are no special admission or application requirements for the Regular or Applied Mathematics emphases. <i>Mathematics Teaching majors must meet the Teacher Education admission and licensure requirements.</i>
<b>Grade Requirement</b>	A grade of "C" or better in courses required for this major ("C-" is not acceptable), in addition to an overall 2.0 GPA and a 2.0 GPA in mathematics classes number 1210 or above.
<b>Credit Hour Requirements</b>	A Total of 120 credit hours is required for graduation; 31-46 of these are required within the major. A total of 40 upper division credit hours is required (courses numbered 3000 and above); at least nine credit hours of upper division mathematics must be completed at Weber State University.
<b>Minor Requirement</b>	None (required only for the regular Mathematics major).

### Major Course Requirements for Applied Mathematics BS Degree

The Applied mathematics Program provides an opportunity for WSU students to apply mathematics to different fields. The program requires 19 credit hours of core lower division mathematics courses, a minimum of 12 credit hours of upper division applied mathematics courses and additional upper division courses in specified fields, including mathematics, so the total upper division credit hours reaches at least 40. To design a specific program different from the following tracks, students must get approval from a Mathematics Department advisor. It is highly recommended that students planning on graduate work in Applied Mathematics take MATH 4210/4220 Introductory Real Analysis I/II. See the Mathematics Department for counseling.

#### Lower Division Mathematics Courses Required for All Tracks (19 credit hours)

- MATH 1200 Mathematics Computer Laboratory (1) Su, F, Sp (Prerequisite—MATH 1050 and 1060, or MATH 1080, or Co-requisite MATH 1210)
- MATH 1210 Calculus I (4) Su, F, Sp (Prerequisite—MATH 1050 and 1060, or MATH 1080)
- MATH 1220 Calculus II (4) Su, F, Sp (Prerequisite—MATH 1210)
- MATH 2210 Calculus III (4) Su, F, Sp (Prerequisite—MATH 1220)
- MATH 2270 Elementary Linear Algebra (3) F, Sp (Prerequisite—MATH 1220)
- MATH 2280 Ordinary Differential Equations (3) F, Sp (Prerequisite—MATH 1220)

### WEBER STATE UNIVERSITY MATHEMATICS DEPARTMENT

801-626-6095 office 801-626-6427 fax math@weber.edu www.weber.edu/mathematics

# 1. Regular Mathematics Track

*A traditional diversified program in applied mathematics.*

## Required Upper Division Mathematics Courses (12 credit hours)

- MATH 3410 Probability and Statistics I (3) *F* (Prerequisite—MATH 1220)
- MATH 3550 Introduction to Mathematics Modeling (3) *F* or *Sp* alt years (Prereq—MATH 2210 and MATH 2270 or 2280)
- MATH 3710 Boundary Value Problems (3) *F* (Prerequisite MATH 2210 and MATH 2280) or
  - MATH 3280 Dynamical Systems (3) *Sp* alternate years (Prerequisite—MATH 2270 and MATH 2280)
- MATH 4610 Numerical Analysis I (3) *F* alternate years (Prerequisite—MATH 2270 and ability to use programming lang)
- **Complete at least an additional 12 credit hours of upper division Mathematics courses (3000 or above).**
- **Support courses required (6-10 credit hours)** - Complete two calculus based courses outside the Mathematics Department, for example PHYS 2210 Physics for Scientists and Engineers I (5), ECON 3030 Managerial Economics (3), CHEM 3400 Molecular Symmetry and Applied Math for Physical Chemistry (3), etc.

# 2. Computer Mathematics Track

*Computer scientists work as theorists, researchers, or inventors. They use innovation to solve complex problems and create or apply new technology. The areas of computer science research range from complex theory to hardware design to programming-language design. Some researchers work on projects such as developing and advancing uses of virtual reality, extending human-computer interaction, or designing robots.*

## Additional Required Lower Division Courses (16 credit hours)

- CS 1400 Fundamentals of Programming (4) *Su, F, Sp* (Prerequisite/Co-requisite CS 1030 and NTM 2300)
- CS 1410 Object-Oriented Programming (4) *Su, F, Sp* (Prerequisite CS 1400)
- CS 2420 Introduction to Data Structures and Algorithms (4) *Su, F, Sp* (Prereq CS 1410 and Co-requisite MATH 1080 or MATH 1050/1060)
- MATH 1630 Discrete Mathematics Applied to Computing (4) (Prerequisites MATH 1050 or 1080, and CS 1400 or ability to program in a contemporary computer language and the consent of the instructor)

## Required Upper Division Mathematics Courses (15 credit hours)

- MATH 3410 Probability and Statistics I (3) *F* (Prerequisite—MATH 1220)
- MATH 3550 Introduction to Mathematics Modeling (3) *F* or *Sp* alt years (Prereq—MATH 2210 and MATH 2270 or 2280)
- MATH 3610 Graph Theory (3) *F* alternate years (Prerequisite—MATH 1220)
- MATH 4610 Numerical Analysis I (3) *F* alternate years (Prerequisite—MATH 2270 and ability to use programming lang)
- MATH 4620 Numerical Analysis II (3) *Sp* alternate years (Prerequisite—MATH 4610) or
  - MATH 3620 Enumeration (3) *Sp* alternate years (Prerequisite—MATH 1220)
- **Complete at least an additional 25 credit hours of upper division courses in Computer Science or Mathematics. At least six of these credits must be in Computer Science.**

# 3. Physical Mathematics Track

## Required Upper Division Mathematics Courses (18 credit hours)

*Complete six of the following courses:*

- MATH 3280 Dynamical Systems (3) *Sp* alternate years (Prerequisite—MATH 2270 and MATH 2280)
- MATH 3410 Probability and Statistics I (3) *F* (Prerequisite—MATH 1220)
- MATH 3550 Introduction to Mathematics Modeling (3) *F* or *Sp* alt years (Prereq—MATH 2210 and MATH 2270 or 2280)
- MATH 3710 Boundary Value Problems (3) *F* (Prerequisite MATH 2210 and MATH 2280)
- MATH 3810 Complex Variables (3) *F* or *Sp* alternate years (Prerequisite—MATH 2210)
- MATH 4610 Numerical Analysis I (3) *F* alternate years (Prerequisite—MATH 2270 and ability to use programming lang)
- MATH 4710 Partial Differential Equations (3) *Sp* alternate years (Prerequisite—MATH 3710)
- **Complete at least an additional 22 credit hours of upper division Mathematics, Chemistry, Geosciences, or Physics courses. At least six of these credit hours must be outside Mathematics.**

## 4. Engineering Mathematics Track

Engineers typically enter the occupation with a bachelor's degree in mathematics or an engineering specialty, but some basic research positions may require a graduate degree. Most engineering programs involve a concentration of study in an engineering specialty, along with courses in both mathematics and the physical and life sciences. Engineers offering their services directly to the public must be licensed. Continuing education to keep current with rapidly changing technology is important for engineers.

### Required Upper Division Mathematics Courses (18 credit hours)

Complete six of the following courses:

- MATH 3280 Dynamical Systems (3) *Sp alternate years (Prerequisite—MATH 2270 and MATH 2280)*
- MATH 3410 Probability and Statistics I (3) *F (Prerequisite—MATH 1220)*
- MATH 3550 Introduction to Mathematical Modeling (3) *F or Sp alt years (Prereq—MATH 2210 and MATH 2270 or 2280)*
- MATH 3710 Boundary Value Problems (3) *F (Prerequisite MATH 2210 and MATH 2280)*
- MATH 3810 Complex Variables (3) *F or Sp alternate years (Prerequisite—MATH 2210)*
- MATH 4610 Numerical Analysis I (3) *F alternate years (Prerequisite—MATH 2270 and ability to use programming lang)*
- MATH 4620 Numerical Analysis II (3) *Sp alternate years (Prerequisite—MATH 4610)*
- MATH 4710 Partial Differential Equations (3) *Sp alternate years (Prerequisite—MATH 3710)*
- **Complete at least an additional 22 credit hours of upper division Mathematics courses or upper division courses from the Engineering Technology programs. At least six of these credit hours must be outside of Mathematics.**

## 5. Actuarial/Financial Mathematics Track

An actuary is a business professional who deals with the financial impact of risk and uncertainty. Actuaries apply mathematical and statistical theories to solve real business problems. Actuaries assemble and analyze data to estimate the probability and likely cost of an event such as death, sickness, injury, disability, or loss of property. They also address financial questions; including those involving the way a company should invest its resources to maximize its return on investments. "Actuaries are in high demand, and they are highly paid for the services they render."

### Required Upper Division Mathematics Courses (15 credit hours)

- MATH 3410 Probability and Statistics I (3) *F (Prerequisite—MATH 1220)*
- MATH 3420 Probability and Statistics II (3) *F, Sp (Prerequisite—MATH 2210 and MATH 3410)*

And complete three of the following courses:

- MATH 3550 Introduction to Mathematics Modeling (3) *F or Sp alt years (Prereq—MATH 2210 and MATH 2270 or 2280)*
- MATH 3710 Boundary Value Problems (3) *F (Prerequisite MATH 2210 and MATH 2280)*
- MATH 4610 Numerical Analysis I (3) *F alternate years (Prerequisite—MATH 2270 and ability to use programming lang)*
- MATH 4710 Partial Differential Equations (3) *Sp alternate years (Prerequisite—MATH 3710)*

**Complete at least an additional 25 credit hours of upper division Mathematics courses or courses from the list below offered by the John B. Goddard School of Business and Economics:**

- ACTG 3110 Intermediate Financial Accounting I (3) *Su, F, Sp (Prerequisite—ACTG 2020)*
- ACTG 3120 Intermediate Financial Accounting II (3) *Su, F, Sp (Prereq—Business Foundations, ACTG 3110, BSAD 2899)*
- ECON 3030 Managerial Economics (3) *(Prerequisites—MATH 1050, QUAN 2600, QUAN 3610)*
- ECON 4010 Intermediate Microeconomic Theory I (3) *F, Sp (Prerequisites—ECON 2010, ECON 2020, and BSAD 2899 or ECON 2899)*
- ECON 4020 Intermediate Macroeconomic Theory II (3) *F, Sp (Prerequisites—ECON 2010, ECON 2020 and QUAN 2400 or ECON 3030 and BSAD 2899 or ECON 2899)*
- ECON 4550 Introduction to Econometrics (3) *F (Prerequisites—ECON 2010, ECON 2020, QUAN 2400 or ECON 3030 and QUAN 3610)*
- ECON 4560 Mathematical Economics (3) *Sp (Prereq—ECON 4010, ECON 4020, QUAN 2400, QUAN 3610 or ECON 3030)*
- FIN 3200 Financial Management (3) *Su, F, Sp (Prerequisites—Business Foundations, BSAD 2899, QUAN 3610)*
- FIN 3300 Investments (3) *Su, F, Sp (Prerequisites—Business Foundations, BSAD 2899, FIN 3200)*
- FIN 4400 Financial Problems—Corporate Finance (3) *F, Sp (Prereq—Business Foundations, BSAD 2899, FIN 3200)*
- MGMT 3010 Organizational Behavior and Management (3) *Su, F, Sp*
- MKTG 3010 Marketing Concepts and Practices (3) *Su, F, Sp*
- QUAN 3610 Business Statistics II (3) *Su, F, Sp (Prerequisite QUAN 2600)*

## 6. Natural/Life Sciences Mathematics Track

### Required Upper Division Mathematics Courses (12 credit hours)

- MATH 3410 Probability and Statistics I (3) *F* (Prerequisite—MATH 1220)
- MATH 3550 Introduction to Mathematics Modeling (3) *F* or *Sp* alt years (Prereq—MATH 2210 and MATH 2270 or 2280)
- MATH 3710 Boundary Value Problems (3) *F* (Prerequisite MATH 2210 and MATH 2280) or
  - MATH 3280 Dynamical Systems (3) *Sp* alternate years (Prerequisite—MATH 2270 and MATH 2280)
- MATH 4610 Numerical Analysis I (3) *F* alternate years (Prerequisite—MATH 2270 and ability to use programming lang)
- **Complete at least an additional 28 credit hours of upper division Mathematics, Botany, Microbiology, or Zoology courses. At least six of these credit hours must be outside Mathematics.**

## Careers in Mathematics

### Science Graduates are in Demand

Every year, the demand for science graduates continues to grow. Dozens of industries are experiencing rapid growth in science, technology, engineering and mathematics (STEM) related jobs. These jobs are being created much faster than they can be filled. From the president's State of the Union address to the latest article from industry blogs, everyone is trying to figure out how to fill the need for these highly skilled jobs.

### Mathematics Jobs are in Many Industries

**Statisticians** use the power of math and probability theory to answer questions that affect the lives of millions of people. They tell educators which teaching method works best, tell policy-makers what levels of pesticides are acceptable in fresh fruit, tell doctors which treatment works best, tell builders which type of paint is the most durable. They are employed in virtually every type of industry imaginable, from engineering, manufacturing, and medicine to animal science, food production, transportation, and education.

**Applied mathematicians** use theories and techniques, such as mathematical modeling, to solve practical problems. For example, they may analyze the effectiveness of new drugs or the aerodynamic characteristics of new automobiles.

**Theoretical mathematicians** identify unexplained issues and seek to resolve them. Although they often strive to increase basic knowledge without considering its practical use, the knowledge they develop has been an important part of many scientific and engineering achievements.

# \$101,360

The **median annual wage** of mathematicians was \$101,360 in 2012. That works out to be **\$48.73** per hour. Check out the occupational handbook (<http://www.bls.gov/ooh/Math/Mathematicians.htm>) for more information on the job outlook for mathematicians.

Learn more about Mathematician jobs

[Mathematical Association of America](http://maa.org/careers/) (<http://maa.org/careers/>)

[American Mathematical Society](http://ams.org/profession/career-info/early-careers/early-careers) (<http://ams.org/profession/career-info/early-careers/early-careers>)

["When will I use math?"](http://weusemath.org/) (<http://weusemath.org/>)