

# Applied and Computational Mathematics, Data Analytics Emphasis, BS

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## Program Description

The Bachelor of Science Degree in Applied and Computational Mathematics (ACM) provides students with a new reason to major in mathematical sciences by emphasizing applied mathematics and mathematical modeling. Students will learn to apply mathematics to real world problems arising in various settings, as they master new mathematical techniques. ACM students will have the option to specialize in a desired field through emphases in Actuarial Science, Data Analytics, or Scientific Computing. The Data Analytics emphasis will provide an interdisciplinary approach by collaborating with programs in Mathematics, Computer Science, Statistics, Business, and Data Analytics. Students will develop the knowledge and skills necessary for a broad array of employment opportunities in the growing and evolving field of Data Analytics, including those within corporations, service industries, government agencies, political organizations, consulting firms, nonprofit organizations, marketing and advertising agencies, and media companies.

## Program Curriculum

**120 credits**

### Utah Tech General Education Requirements

All Utah Tech General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to Utah Tech's minimum General Education standards in American Institutions, English, and Mathematics.

General Education Core Requirements ([catalog.utahtech.edu/programs/generaleducation/#gerequirementstext](http://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext))

Code	Title	Hours
English		3-7
Mathematics		3-5
American Institutions		3-6
Life Sciences		3-10
Physical Sciences		3-5
Fine Arts		3
Literature/Humanities		3
Social & Behavioral Sciences		3

### Applied and Computational Mathematics Core Requirements

Code	Title	Hours
CS 1400	Fundamentals of Programming	3
CS 1410	Object Oriented Programming	3
MATH 1210	Calculus I (MA)	4
MATH 1220	Calculus II (MA)	4
MATH 2200 or CS 2100	Discrete Mathematics Discrete Structures	3
MATH 2210	Multivariable Calculus (MA)	4
MATH 2270	Linear Algebra	3
MATH 2280	Ordinary Differential Equations	3
MATH 3400	Probability & Statistics	3
MATH 3700	Mathematical Modeling I	4
MATH 4250	Programming for Scientific Computation	4
MATH 4800	Industrial Careers in Mathematics	3

MATH 4890R	Independent Research	1
MATH 4900	Senior Capstone Seminar (ALUR)	3

## Applied and Computational Mathematics Data Analytics Emphasis Elective Requirements

Code	Title	Hours
Choose 4 of the following courses:		
CS 3005	Programming in C++	3
FIN 4380	Financial Modeling and Decision Making	3
IT 4510	Ethical Hacking & Network Defense	3
MATH 3100	Euclidean / Non-Euclidean Geom	3
MATH 3150	Introduction to Partial Differential Equations	3
MATH 3120	Transition to Advanced Mathematics	3
MATH 3200	Introduction to Analysis I	3
MATH 3500	Numerical Analysis	3
MATH 3900	Number Theory	3
MATH 3905	Cryptography and Codes	3
MATH 4000	Abstract Algebra I	3
MATH 4005	Quantum Computing and Cryptography	3
MATH 4010	Abstract Algebra II	3
MATH 4100	Introduction to Topology	3
MATH 4200	Introduction to Complex Analysis	3
MATH 4330	Linear Algebra II	3
MATH 4550	Scientific Computation	3
MATH 4890R	Independent Research	1-3
MGMT 4040	Quantitative Decision Analysis	3
XSCI 3800	Measurement & Evaluation in Physical Exercise & Sports	3

## Data Analytics Emphasis Requirements

Code	Title	Hours
COMM 1020	Public Speaking	3
MATH 2050	Applied Statistics with Programming	3
MATH 3050	Stochastic Modeling and Applications	3
MATH 3450	Statistical Inference	3
ISA 2010	Introduction to Business Data Analytics	3
ISA 3020	SQL & Python for Analytics	3
ISA 4060	Big Data Analytics	3
ISA 4070	Data Visualization and Storytelling	3
IT 1100	Introduction to Unix/Linux	3
IT 2300	Database Design & Management	3
IT 2400	Intro to Networking	3
IT 4310	Database Administration	3

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## Graduation Requirements

1. Complete a minimum of 120 college-level credits (1000 and above).
2. Complete at least 40 upper-division credits (3000 and above).
3. Complete at least 30 upper-division credits at Utah Tech for institutional residency
4. Grade C or higher (not C-) required in each Core Discipline Requirement, Mathematics Required Elective, and Mathematics Program Requirement course.

## Graduation Plan

### 1st Year

Fall Semester	Hours Spring Semester	Hours
MATH 1210	4 MATH 1220	4
ENGL 1010	3 MATH 2270	3
General Education (Fine Arts) (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)	3 CS 1400	3
General Education (Physical Science) (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)	3 ENGL 2010	3
	General Education (Literature & Humanities) (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)	3
	<b>13</b>	<b>16</b>

### 2nd Year

Fall Semester	Hours Spring Semester	Hours
MATH 2210	4 MATH 2280	3
MATH 2200 or CS 2100	3 IT 2300	3
IT 1100	3 IT 2400	3
CS 1410	3 ISA 2010	3
MATH 2050	3 General Education (GE Social & Behavioral Sciences) (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)	3
	<b>16</b>	<b>15</b>

### 3rd Year

Fall Semester	Hours Spring Semester	Hours
MATH 3050	3 MATH 4250	4
MATH 3400	3 ISA 4070	3
ISA 4060	3 IT 4310	3
MATH 3700	4 MATH 4890R	1
ISA 3020	3 General Education (American Institutions) (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)	3
	<b>16</b>	<b>14</b>

### 4th Year

Fall Semester	Hours Spring Semester	Hours
MATH 3450	3 MATH 4900	3
MATH 4800	3 Program Elective 3	3
Program Elective 1	3 Program Elective 4	3
Program Elective 2	3 General Education (Life Sciences) (catalog.utahtech.edu/programs/generaleducation/#gerequirementstext)	3
COMM 1020	3 General Elective	2
	<b>15</b>	<b>14</b>

**Total Hours 119**

## **BS Applied and Computational Mathematics Program Learning Outcomes**

At the successful conclusion of this program, students will be able to:

1. Integrate mathematical techniques in solving computational problems.
2. Design mathematical models to solve real-world problems.
3. Communicate in mathematical language through the use of accurate notation and terminology.
4. Formulate and analyze mathematical concepts using technology as appropriate.
5. Author effective communication in a variety of formats for a range of audiences.