Bachelor of Science in Mathematics

The Bachelor of Science (BS) in Mathematics prepares students for careers in academia, technology, business and the sciences. In addition to a strong mathematics core curriculum, this degree offers the opportunity to explore how mathematics is applied through concentrations in statistics, finance, physics, computer science, pre-data science, or another approved discipline as a bridge to a future career.

Admission Requirements

- Complete the Admission Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/).

Graduation Requirements

- Complete the General University Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/).
- Complete the General Education Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/).
- Take a standardized test of knowledge of mathematics approved by the mathematics faculty for the purpose of evaluating program effectiveness. There is no minimum score required for graduation. This test will normally be taken during the senior year.
- Complete a portfolio demonstrating their mathematics knowledge. There is no grade for this requirement. The portfolio will normally be submitted in the semester of graduation.
- Complete the following major requirements:

Code	Title	Credits
Core Courses		
MATH A251	Calculus I	4-6
or MATH A251F	F.A.T. Calculus I	
MATH A252	Calculus II	4-6
or MATH A252F	F.A.T. Calculus II	
MATH A253	Calculus III	4
MATH A264	Introduction to the Mathematics Major	1
MATH A265	Fundamentals of Mathematics	3
MATH A306	Discrete Methods	3
MATH A314	Linear Algebra	3
MATH A401	Introduction to Real Analysis	3
MATH A405	Introduction to Abstract Algebra	3
Analysis and Topology		
Select one of the following:		3
MATH A410	Introduction to Complex Analysis	
MATH A430	Concepts of Topology	
MATH A431	Introduction to Differential Geometry	
Applied Math		
Select one of the following:		3
MATH A302	Ordinary Differential Equations	
MATH A432	Partial Differential Equations	
MATH A426	Numerical Analysis	
PHYS A456	Nonlinear Dynamics and Chaos	
Statistics		
Select one of the following: [2]		3-4
MATH A371	Stochastic Processes	
MATH A407	Mathematical Statistics	
STAT A307	Probability and Statistics [2]	
STAT A308	Intermediate Statistics for the Sciences [2]	
STAT A402	Scientific Sampling [2]	
STAT A403	Regression Analysis [2]	
STAT A404	Analysis of Variance	
STAT A407	Time Series Analysis	
STAT A408	Multivariate Statistics	
STAT A410	Statistical Methods	
Other Mathematics Course		
Select one of the following: [2]		3
MATH A305	Introduction to Geometries	
MATH A309	Introduction to Number Theory	
MATH A420	Historical Mathematics	
MATH A490	Selected Topics in Mathematics [1]	
Select 6 additional credits from the four categories above. [2]		**6**
Select from one of the following options:		**12-20**
Option 1: Statistics (12 credits)		
Complete 12 additional credits not already selected from the statistics list above		
Option 2: Physics (14 credits)		
PHYS A211	General Physics I	
PHYS A211L	General Physics I Laboratory	
PHYS A212	General Physics II	
PHYS A212L	General Physics II Laboratory	
Complete 6 additional credits of PHYS courses at the 300-level or higher		
Option 3: Computer Science (16 credits)		
CSCE A101	Introduction to Computer Science	
CSCE A201	Computer Programming I	
Complete 9 additional credits of CSCE courses at the 200-level or higher		
Option 4: Finance (18 credits)		
BA A325	Corporate Finance	
BADA A110	Computer Concepts in Business	

ECON A227	Introductory Statistics for Economics and Business	
Complete 9 credits of upper-division finance courses from the list below:		
BA A380	Investment Management	
BA A385	Intermediate Financial Management	
BA A427	International Finance	
BA A451	Advanced Investment Strategies	
BA A452	Financial Derivatives	
Option 5: Pre-Data Science (20 credits) [2]		
CSCE A101	Introduction to Computer Science	
CSCE A201	Computer Programming I	
CSCE A211	Computer Programming II	
CSCE A311	Data Structures and Algorithms	
CSCE A360	Database Systems	
Complete one of the following courses not already selected from a list above:		
CSCE A415	Machine Learning	
CSCE A462	Data Mining	
STAT A407	Time Series Analysis	
STAT A408	Multivariate Statistics	
Option 6: Concentration in another discipline involving mathematics (15 credits) [3]		
Complete 15 credits from a departmentally-approved list, of which 6 credits must be upper-division.		
Mathematics Capstone Experience		**1**
Select from one of the following options.		
MATH A495A	Mathematics Practicum [1]	
MATH A495B	Mathematics or Statistics Internship [1]	
MATH A496	Advanced Readings in Mathematics [1]	
MATH A498	Individual Research [1]	
Total		**59-72**

[1] *A maximum of 6 credits of MATH A490, MATH A495A, MATH A495B, MATH A496 and MATH A498 may be applied to the degree requirements.*

[2] *If completing Option 5 (Pre-Data Science), STAT A307 is required to complete the Statistics degree requirement, STAT A308 is required to complete the "Other Mathematics Course" requirement (this course is not listed above because it is not a choice for students pursuing other Options), and STAT A402 and STAT A403 are required to complete the 6 additional credits requirement.*

[3] *Completion of Option 6 requires consultation with an advisor and a proposal for the choice of discipline and courses that is subject to approval by the Department of Mathematics & Statistics. Students considering Option 6 should be aware that additional prerequisites for courses that are accepted for Option 6 may result in a total credit count that exceeds 15 credits.*

A minimum of 120 credits is required for the degree, of which 39 credits must be upper-division.

Honors in Mathematics

The Bachelor of Science (BS) in Mathematics recognizes distinguished achievement by conferring programmatic honors in mathematics.
In order to receive honors in mathematics, a student must meet the following requirements:

- Meet the requirements for Graduation with Honors (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/academicstandardsregulations/graduation/) as outlined in the catalog;
- Meet the requirements for a BS in Mathematics;
- Earn a minimum cumulative GPA of 3.50 in the major requirements;
- Complete a minimum of 12 upper-division credits required for the major in residence.

Program Student Learning Outcomes

Students graduating with a Bachelor of Science (BS) in Mathematics will be able to:

- Demonstrate knowledge of the techniques of modern mathematical subjects including all of algebra, analysis, discrete mathematics, and probability and statistics.
- Demonstrate an ability to solve problems using skills such as deductive logic, data analysis, computation, modeling, connections, and other mathematical techniques.
- Demonstrate an ability to create mathematical proofs.
- Demonstrate an ability to read, write, and speak about mathematics.
- Demonstrate cognizance of their mathematical knowledge, of mathematics around them, and of the benefit of continued study of mathematics.
- Demonstrate an understanding of the connections between mathematics and another discipline relying significantly on mathematics and recognize mathematical ideas embedded in other contexts.

Sample Plan

The academic plan below is one pathway through the degree/certificate. It includes all requirements, taking into account recommendations from program faculty. Each student's plan may vary according to their initial course placement (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/academicstandardsregulations/courseplacement/), intended course load, additional majors and/or minors, and their placement into required prerequisite courses. Any change in the plan below can have an unforeseen impact on the rest of the plan. **Therefore, it is very important to meet with your academic advisor to verify your personal academic plan.**

Please review the following terms, definitions, and resources associated with the sample academic plan below.

- Each course in the far left column links to a pop-up bubble with a course description, prerequisite requirements, and associations with university requirements. For example, if a course fulfills a general education requirement, you will see that in the pop-up bubble.
- **GER**: indicates a General Education Requirement (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/). GERs that also count toward degree/certificate requirements appear as a specific course in the plan. For these courses, "GER" is not indicated explicitly in the table, but if you click on the course, you will see the course's GER status in the pop-up bubble.
- **Program Elective**: indicates a specific course selection determined by program faculty to fulfill a degree/certificate requirement. Students should seek assistance from their academic advisor.
- **Elective**: indicates an open selection of 100-400 level university courses to fulfill elective credits needed to meet the minimum total credits toward the degree/certificate.
- **Upper Division Program Elective**: indicates a specific 300-400 level course selection determined by the program faculty to fulfill a degree/certificate requirement. Students should seek assistance from their academic advisor.
- **Upper Division Elective**: indicates an open selection of 300-400 level courses to fulfill elective credits needed to meet the minimum total credits toward the degree/certificate. These courses must be upper division in order to meet General University Requirements for the particular degree/certificate type.

Course	Title	Credits
First Year		
Fall		
MATH A251	Calculus I	4
WRTG A111	Writing Across Contexts	3
GER Natural Sciences Lecture (recommend BIOL A102)		3
GER Oral Communication Skills		3
Elective		1
	Credits	**14**
Spring		
MATH A252	Calculus II	4
MATH A264	Introduction to the Mathematics Major	1
GER Fine Arts		3
GER Natural Sciences Lab		1
GER Natural Sciences Lecture		3
GER Written Communication Skills (recommend WRTG A213)		3
	Credits	**15**
Second Year		
Fall		
MATH A253	Calculus III	4
MATH A371 or MATH A407 or STAT A307 or STAT A308 or STAT A402 or STAT A403 or STAT A404 or STAT A407 or STAT A408 or STAT A410	Stochastic Processes or Mathematical Statistics or Probability and Statistics or Intermediate Statistics for the Sciences or Scientific Sampling or Regression Analysis or Analysis of Variance or Time Series Analysis or Multivariate Statistics or Statistical Methods	3
GER Alaska Native-Themed		3
GER Humanities		3
GER Social Sciences		3
	Credits	**16**
Spring		
MATH A265	Fundamentals of Mathematics	3
MATH A314	Linear Algebra	3
GER Diversity & Inclusion		3
GER Humanities		3
Elective		3
	Credits	**15**
Third Year		
Fall		
MATH A306	Discrete Methods	3
MATH A401	Introduction to Real Analysis	3
Upper Division Program Elective (Analysis & Topology)		3
Upper Division Program Elective (Statistics)		3
Upper Division Program Elective [1]		3
	Credits	**15**
Spring		
MATH A405	Introduction to Abstract Algebra	3
GER Social Sciences		3
Upper Division Program Elective (Applied Math)		3
Upper Division Program Elective (Statistics)		3
Upper Division Program Elective [1]		3
	Credits	**15**
Fourth Year		
Fall		
Elective		2
Elective		3
Elective		3
GER Integrative Capstone		3

Mathematics Capstone Experience (MATH A495A, MATH A495B, MATH A496, or MATH A498)	1
Upper Division Program Elective (Statistics)	3
Credits	**15**
Spring	
Elective	3
Elective	3
Elective	3
Upper Division Program Elective (Other Mathematics Course)	3
Upper Division Program Elective (Statistics)	3
Credits	**15**
Total Credits	**120**

[1] *Choose 3 additional credits (6 credits in total) from the Analysis and Topology, Applied Math, Statistics, or Other Mathematics Course categories.*