

# MATHEMATICS

College of Natural Science and Mathematics  
Department of Mathematics and Statistics  
907-474-7332 or 474-5374  
[www.uaf.edu/dms/](http://www.uaf.edu/dms/)

## BA, BS Degrees

Minimum Requirements for Degrees: 120 credits

The number of new fields in which professional mathematicians find employment grows continually. This department prepares students for careers in industry, government and education.

In addition to the major programs, the department provides a number of service courses in support of other programs within the university. Current and detailed information on mathematics degrees and course offerings is available from the department.

The department maintains a math lab which is available for assistance to all students studying mathematics at the baccalaureate level.

The Department of Mathematics and Statistics also offers a minor in statistics (see separate listings).

## Major — BA or BS Degree

- Complete the following pre-major requirement:  
Students must be ready to matriculate into MATH F200X before they will be allowed to declare mathematics as their major.
- Complete the general university requirements (page 131) to include a total of 39 upper-division credits, in any field, to satisfy the general university requirements for baccalaureate degrees.
- Complete the BA or BS degree requirements. (See page 135 – 136. As part of the BS degree requirements, complete PHYS F103X and PHYS F104X, or PHYS F211X and PHYS F212X.)
- Complete the following program (major) requirements:

|                                               |   |
|-----------------------------------------------|---|
| MATH F200X—Calculus I**                       | 4 |
| MATH F201X—Calculus II**                      | 4 |
| MATH F202X—Calculus III                       | 4 |
| MATH F215—Introduction to Mathematical Proofs | 3 |
| MATH F314—Linear Algebra                      | 3 |
- Complete one of the following options:  
**Mathematics Option**
  - Complete the following:

|                                          |   |
|------------------------------------------|---|
| MATH F401W—Introduction to Real Analysis | 3 |
| MATH F405W—Abstract Algebra              | 3 |
| MATH F490O—Senior Seminar                | 2 |
  - Complete at least 21 additional credits of electives.\* Acceptable elective courses include any math or statistics course at the 300-level or above, and CS F201. At least 15 credits must be math courses (for exceptions see below\*\*\*). Following are some suggested elective packages.
    - Pure math:

|                                       |   |
|---------------------------------------|---|
| MATH F305—Geometry                    | 3 |
| MATH F320—Topics in Combinatorics (3) |   |
| or MATH F321—Number Theory (3)        | 3 |
| MATH F404—Topology                    | 3 |
| MATH F422—Complex Analysis            | 3 |
| Additional elective credits           | 9 |
    - Applied math:

|                                            |   |
|--------------------------------------------|---|
| MATH F302—Differential Equations           | 3 |
| MATH F421—Applied Analysis                 | 4 |
| MATH F422—Introduction to Complex Analysis | 3 |
| MATH F460—Mathematical Modeling            | 3 |
- Complete two of the following:

|                                |   |
|--------------------------------|---|
| MATH F307—Discrete Mathematics | 3 |
| MATH F310—Numerical Analysis   | 3 |
| STAT F300—Statistics           | 3 |

## Statistics Option

- Complete the following:

|                                                                |   |
|----------------------------------------------------------------|---|
| ENGL F314W,O/2—Technical Writing (3)                           |   |
| or ENGL F414W—Research Writing (3)                             | 3 |
| CS F201—Computer Science I (3)                                 |   |
| or NRM F338—Introduction to Geographic Information Systems (3) | 3 |
| MATH F371—Probability                                          | 3 |
| MATH F401W—Introduction to Real Analysis (3)                   |   |
| or MATH F405W—Abstract Algebra (3)                             | 3 |
| MATH F408—Mathematical Statistics                              | 3 |
| STAT F300—Statistics                                           | 3 |
| STAT F401—Regression and Analysis of Variance                  | 4 |
| STAT F402—Scientific Sampling                                  | 3 |
| STAT F454—Statistical Consulting Seminar                       | 1 |
| Additional elective credits 300-level or above                 | 3 |
  - Minimum credits required .....120
  - \* Students must earn a C- grade or better in each course.
  - \*\* Satisfies core or BA or BS degree requirements.
  - \*\*\* In some cases, courses with strong mathematical content from other disciplines may be used as electives. Such an elective package must be approved by an advisor in the Department of Mathematics and Statistics. The requirement that at least 15 credits be math courses still applies.
  - \*\*\*\* We strongly recommend that prospective secondary science teachers seek advising from the UAF School of Education early in your undergraduate degree program, so that you can be appropriately advised of the State of Alaska requirements for teacher licensure. You will apply for admission to the UAF School of Education's post-baccalaureate teacher preparation program, a one-year intensive program, during your senior year. Note: All mathematics majors — including double majors — must have an advisor from the Department of Mathematics and Statistics.
- Note: In addition to meeting all the general requirements for the specific degree, certain mathematics courses are required of all mathematics majors. At least 12 approved mathematics credits at the 300-level or above must be taken while in residence on the Fairbanks campus. All electives must be approved by the department.

## Requirements for mathematics teachers (grades 7 - 12):\*\*\*\*

- Complete the following:

|                                                                     |       |
|---------------------------------------------------------------------|-------|
| CS F201—Computer Science I                                          | 3     |
| MATH F305—Geometry                                                  | 3     |
| MATH F306—Introduction to the History and Philosophy of Mathematics | 3     |
| MATH F320—Topics in Combinatorics (3)                               |       |
| or MATH F321—Number Theory (3)                                      |       |
| or MATH F307—Discrete Mathematics (3)                               | 3     |
| STAT F300—Statistics (3)                                            |       |
| or MATH F371—Probability (3)                                        |       |
| and MATH F408 —Mathematical Statistics (3)                          | 3 - 6 |
- Complete two of the following:

|                                            |   |
|--------------------------------------------|---|
| MATH F302—Differential Equations           | 3 |
| MATH F310—Numerical Analysis               | 3 |
| MATH F421—Applied Analysis                 | 4 |
| MATH F422—Introduction to Complex Analysis | 3 |
| MATH F460—Mathematical Modeling            | 3 |

## Minor

- Complete the following:

|                         |   |
|-------------------------|---|
| Math F200X—Calculus I   | 4 |
| Math F201X—Calculus II  | 4 |
| Math F202X—Calculus III | 4 |

At least 9 additional credits from MATH F215, STAT F300, any F300- or F400-level MATH course; or electives approved by a mathematics advisor .....9
  - Minimum credits required .....21
- Note: Courses completed to satisfy this minor can be used to simultaneously satisfy other major or general distribution requirements.

# Baccalaureate Core Requirements

## Communication . . . . . 9 Credits

- ENGL F111X—Introduction to Academic Writing.....(3)  
*ENGL F190H may be substituted.*

Complete one of the following:

- ENGL F211X—Academic Writing about Literature.....(3)
- ENGL F213X—Academic Writing about the Social and Natural Sciences.....(3)

Complete one of the following:

- COMM F131X—Fundamentals of Oral Communication: Group Context.....(3)
- COMM F141X—Fundamentals of Oral Communication: Public Context.....(3)

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## Perspectives on the Human Condition . . . . . 18 Credits

Complete all of the following four courses:

- ANTH F100X/SOC F100X—Individual, Society and Culture.....(3)
- ECON F100X or PS F100X—Political Economy.....(3)
- HIST F100X—Modern World History.....(3)
- ENGL/FL F200X—World Literature.....(3)

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Complete one of the following three courses:

- ART/MUS/THR F200X—Aesthetic Appreciation: Interrelationship of Art, Drama and Music.....(3)
- HUM F201X—Unity in the Arts.....(3)
- ANS F202X—Aesthetic Appreciation of Alaskan Native Performance.....(3)

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Complete one of the following six courses:

- BA F323X—Business Ethics.....(3)
- COMM F300X—Communicating Ethics.....(3)
- JUST F300X—Ethics and Justice.....(3)
- NRM F303X—Environmental Ethics and Actions.....(3)
- PS F300X—Ethics and Society.....(3)
- PHIL F322X—Ethics.....(3)

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Or complete 12 credits from the above courses plus one of the following:

- Two semester-length courses in a single Alaska Native language or other non-English language
- Three semester-length courses (9 credits) in American Sign Language taken at the university level.

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## Mathematics . . . . . 3 Credits

Complete one of the following:

- MATH F103X—Concepts and Contemporary Applications of Mathematics.....(3)
  - MATH F107X—Functions for Calculus\*.....(4)
  - MATH F161X—Algebra for Business and Economics\*\*.....(3)
  - STAT F200X—Elementary Probability and Statistics.....(3)
- \* No credit may be earned for more than one of MATH F107X or F161X.

Or complete one of the following:\*

- MATH F200X—Calculus I\*\*.....(4)
- MATH F201X—Calculus II.....(4)
- MATH F202X—Calculus III.....(4)
- MATH F262X—Calculus for Business and Economics.....(4)
- MATH F272X—Calculus for Life Sciences.....(4)

\* Or any math course having one of these as a prerequisite

\*\* No credit may be earned for more than one of Math F200X, F262X or F272.

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## Natural Sciences . . . . . 8 Credits

Complete any two (4-credit) courses.

- ATM F101X—Weather and Climate of Alaska.....(4)
- BIOL F100X—Human Biology.....(4)
- BIOL F101X—Biology of Sex.....(4)
- BIOL F103X—Biology and Society.....(4)
- BIOL F104X—Natural History.....(4)
- BIOL F115X—Fundamentals of Biology I.....(4)
- BIOL F116X—Fundamentals of Biology II.....(4)
- BIOL F120X—Introduction to Human Nutrition.....(4)
- BIOL F213X—Human Anatomy and Physiology I.....(4)
- BIOL F214X—Human Anatomy and Physiology II.....(4)
- CHEM F100X—Chemistry in Complex Systems.....(4)
- CHEM F103X—Basic General Chemistry.....(4)
- CHEM F104X—Beginnings in Biochemistry.....(4)
- CHEM F105X—General Chemistry.....(4)
- CHEM F106X—General Chemistry.....(4)
- GEOG F111X—Earth and Environment: Elements of Physical Geography.....(4)
- GEOS F100X—Introduction to Earth Science.....(4)
- GEOS F101X—The Dynamic Earth.....(4)
- GEOS F106X—Life and the Age of Dinosaurs.....(4)
- GEOS F112X—History of Earth and Life.....(4)
- GEOS F120X—Glaciers, Earthquakes and Volcanoes.....(4)
- GEOS F125X—Humans, Earth and Environment.....(4)
- MSL F111X—The Oceans.....(4)
- PHYS F102X—Energy and Society.....(4)
- PHYS F103X—College Physics.....(4)
- PHYS F104X—College Physics.....(4)
- PHYS F115X—Physical Science I.....(4)
- PHYS F175X—Astronomy.....(4)
- PHYS F211X—General Physics.....(4)
- PHYS F212X—General Physics.....(4)
- PHYS F213X—Elementary Modern Physics.....(4)

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## Library and Information Research . . . . . 0 – 1 Credit

- Successful completion of library skills competency test or LS F100X or LS F101X prior to junior standing

0 – 1

## Upper-Division Writing and Oral Communication

Complete the following at the upper-division level:

- Two writing intensive courses designated (W) and one oral communication intensive course designated (O), or two oral communication intensive courses designated (O/2) (see degree and/or major requirements)

Total credits required 38 – 39

All degrees (e.g. B.A., B.S., etc.) require additional courses.

Refer to specific degree and program requirements.

Students must earn a C- grade or better in each course used toward the baccalaureate core.