



Fairbanks North Star Borough School District

Easing the High School to College Transition



Bridging the Gap in Mathematics

All students seeking a Bachelor's degree must study mathematics in college.

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| <ul style="list-style-type: none"> • Most UAF bachelor's students must be successful in at least two semesters of college-level mathematics. • Students majoring in most of the natural sciences and engineering should expect to complete substantially more. | <ul style="list-style-type: none"> • The FNSBSD math curriculum is well aligned with that of UAF. • Students who arrive at UAF with mastery of all topics through Algebra II will be prepared; those with less mastery will not be prepared. Students intending science or engineering majors are much more likely to be successful if they have also completed Precalculus in high school. |
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Mathematics education should be continuous for success.

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| <ul style="list-style-type: none"> • Students should enroll in mathematics courses every semester of high school to prepare for university mathematics. • Even if Algebra II is completed in the junior year, additional math should be taken in the senior year • "Time off" from mathematics study usually results in a loss of knowledge and skills, so that one year without math may actually set a student back two years. | <ul style="list-style-type: none"> • There is a strong correlation between years of high school mathematics study and performance on standardized tests, such as the ACT. • It is much easier for most students to complete UAF mathematics requirements if they do so at the start of their college study. • Delaying mathematics study until near college graduation only makes it harder to succeed without remedial work. |
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Pacing of material at the university level is roughly doubled from high school

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| <ul style="list-style-type: none"> • Many students find adjusting to the rapid pace of college mathematics classes difficult. (UAF's one-semester Math 200 is equivalent to a year-long AP Calculus AB course). | <ul style="list-style-type: none"> • When students go to college they are often advised to re-take the last math class that they took in high school. |
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Calculator use is not permitted in many core university courses

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| <ul style="list-style-type: none"> • Reasons for this vary from philosophical (an instructor wishing to emphasize certain modes of reasoning) to practical (in a class of 50 students, it can be difficult to ensure all students have calculators of equal capability). | <ul style="list-style-type: none"> • While most students who used calculators heavily in high school have no trouble adjusting to this, a few students have become so dependent on calculators that they have trouble. |
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Homework is a smaller percentage of a student's grade in college math compared to high school

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| <ul style="list-style-type: none"> • College tests are typically 80% of the grade, depending on the instructor. • Most college homework needs to be done outside of class. | <ul style="list-style-type: none"> • Some faculty assign homework on-line. • There are two math labs at UAF (one developmental for courses at or under the Algebra II level). • College tutors are present to help with algebra. Students should take advantage of college tutoring. |
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Understanding UAF Entry-Points and Placement

Concepts and Contemporary Applications of Mathematics (Math 103)

Appropriate for a liberal arts student, this course samples topics from probability and statistics, graph theory, voting systems, and other areas, with the goal of developing problem solving skills and an appreciation for the applicability of mathematical application in widespread areas.

- Necessary background is the high school core; Algebra I, geometry, and Algebra II.

Precalculus and Trigonometry (Math 107, 108)

Appropriate for students needing to develop traditional mathematical skills beyond the high school level, possibly for use in the calculus sequence.

- Necessary background is the high school core, with students using all the standard mathematical skills developed there.

Calculus (Math 200, 201, 202)

Appropriate for students without any deficiencies in standard mathematical skills who have also mastered precalculus and trigonometry while in high school. One or more of these courses is required for most engineering, math, computer sciences and other science degrees. Some colleges require calculus for business degrees. Students may place out of one or more of these with AP credit.

Developmental Math

Appropriate for students who have not yet mastered the high school core material or who no longer retain mastery due to time away from mathematics courses. The Developmental Math curriculum roughly duplicates the high school core, so that with appropriate diagnostic testing students may fill the gaps in their preparation.

- **Developmental mathematics courses cannot be counted toward a bachelor's degree, though students must pay tuition to take them. A poorly prepared student may need to take several semesters of these courses before they can enter the courses needed for their degree. A developmental math course at UAF in fall of 2008 is \$399 plus the cost of books.**

Placement in a math course is determined by a student's high school background along with test scores such as the ACT, SAT, or Accuplacer

The UAF advising center administers computer-administered placement exams on a walk-in basis. Without objective placement scores (SAT or ACT) indicating they are prepared for it, students may not begin any mathematics course. There is a Compass Test for students to take if they are challenging their math placement.

The progression from high school to university instruction: The university mathematics curriculum continues the high school curriculum in that each successive course builds on the previous one, not only in terms of topics, but also in 'mathematical sophistication'. Laying the groundwork for this in high school courses, in ways consistent with the maturity and readiness of the students, will increase student success.

In university courses, expect to see increased emphasis on:

- logical reasoning, with verbal justification required to explain why mathematical steps are performed;
- mathematical analysis and solution of problems that require many steps, rather than only one or two;
- reformulation of real-world problems in mathematical form and interpretation of the mathematical solutions in the original setting as a crucial part of using mathematics to understand the world;
- developing an appreciation for rigorous deduction (i.e., mathematical proof), first through understanding proofs and later through developing them;
- communication of mathematical arguments to others, using a mixture of words and mathematical symbols properly in a clear and organized way.

Collaboration

Suggested contact(s) for FNFSBSD Instructors

FNFSBSD Mathematics department heads:

- Natalya Medvedeva, Eielson HS natalya.medvedeva@k12northstar.org
- Amy Brown, Hutchison HS amy.brown@k12northstar.org
- Ted Riggs, Lathrop HS ted.riggs@k12northstar.org
- Teresa Hall, North Pole HS teresa.hall@k12northstar.org
- Toni Hawkins, West Valley HS toni.hawkins@k12northstar.org

Suggested contacts for UAF Instructors

- Anthony Rickard, Chair, Dept. of Mathematics and Statistics; adrickard@alaska.edu, 474-5374
- Jenise Klos, Administrative Assistant, Dept. of Mathematics and Statistics, 474-7332
- Latrice Laughlin, Instructor, Dept. of Mathematics and Statistics, lilaughlin@alaska.edu, 474-5427