Mathematics Major, B.S.

Department of Mathematics and Statistics

Mathematics is fundamental to solving problems in physics, chemistry, biology, medicine, business, engineering, and technology. Areas of emphasis within the mathematics major include Applied Analysis, Applied Discrete, Computational Mathematics, Mathematics Education, and Pre-Graduate Studies. These areas of emphasis allow students to target their preparation for careers in business, industry, teaching and government, or for further studies in law or graduate school.

Typical Program of Study:

Fall Semester		*Spring Semester*	
First Year			
Comp 1120 College Writing	3 cr	CS 1511 Computer Science I	5 cr
Math 1296 Calculus I*		Math 1297 Calculus II	
or Math 1526 Honors Calculus I	5 cr	or Math 1527 Honors Calculus II	5 cr
Liberal Education	7 cr	Liberal Education	6 cr
	15 cr		16 cr
Second Year			
Math 3280 Diff Eq with Linear Algebra	4 cr	Math 3299 Intermediate Analysis	3 cr
Math 3355 Discrete Mathematics	4 cr	Stat 3611 Intro to Probability & Statistics	4 cr
Liberal education/minor courses	6 cr	Liberal education/minor courses	8 cr
	14 cr		15 cr
Third Year			
Math 4326 Linear Algebra	3 cr	Math emphasis or elective course [a, b]	3-4 cr
Comp 31XX Advanced Writing	3 cr	Math emphasis or elective course [a, b]	3-4 cr
Liberal education/minor courses	9 cr	Liberal education/minor courses	7-8 cr
	15 cr		13-16 cr
Fourth Year			
Math 3941 Undergraduate Colloquium	1 cr	Math emphasis or elective course [a, b]	3-4 cr
Math emphasis or elective course [a, b]	3-4 cr	Math emphasis or elective course [a, b]	3-4 cr
Liberal education/minor courses	10-11cr	Liberal education/minor courses	7-8 cr
	14-16 cr		13-16 cr

* First math course is determined by math placement exam. This schedule presupposes placement into Math 1296 or Math 1526.

[a] Also required are 16 elective credits of Math and/or Stat courses above 3097, with a minimum of 10 credits above 4000. At most one credit of Math 3120 may count towards the math major. A student pursuing a second major in statistics & actuarial science cannot apply Stat courses as electives.

[b] Recommended areas of emphasis include *Applied Analysis, Applied Discrete, Computational Mathematics, Mathematics Education,* and *Pre-Graduate Studies.* Completion of a designated emphasis area will be noted on the transcript.

For further information:

Department of Mathematics and Statistics
140 Solon Campus Center
1117 University Drive
Duluth, MN 55812-2496
218-726-8747
math@d.umn.edu
http://www.d.umn.edu/math

Mathematics Major, B.S.

MAJOR REQUIREMENTS	CREDITS	PREREQUISITES	SEMESTER TO BE COMPLETED	GRADE
YEAR 1				
Comp 1120	3			
CS 1511 Computer Science I	5	3.5 yrs HS math		
Math 1296 Calculus I*	5	Math 1250 with at least a 'C-' or math placement		
or				
Math 1526 Honors Calculus I	5	Placement		
Math 1297 Calculus II	5	Math 1296 with at least a 'C-'		
or				
Math 1527 Honors Calculus II	5	Math 1526 with at least a 'C-'		
YEAR 2				
Math 3280	4	Math 1297 or 1527 with at least a 'C-'		
Math 3299	3	Math 1297 or 1527		
Math 3355	4	Math 1297 or 1527, CS 1511		
Stat 3611	4	Math 1296 with at least a 'C-'		
YEAR 3				
Comp 31XX Advanced Writing	3	Comp 1120; 60 credits		
Math 4326 Linear Algebra	3	Math 3280 with at least a 'C-'		
Math emphasis or elective course [a, b]	3-4			
Math emphasis or elective course [a, b]	3-4			
YEAR 4				
Math 3941 Undergraduate Colloquium	1	Dept approval; must reg during semester of 16th point		
Math emphasis or elective course [a, b]	3-4			
Math emphasis or elective course [a, b]	3-4			
Math emphasis or elective course [a, b]	3-4			

* First math course is determined by math placement exam. This schedule presupposes placement into Math 1296 or Math 1526.

[a,] Also required are 16 elective credits of Math and/or Stat courses above 3097, with a minimum of 10 credits above 4000. At most one credit of Math 3120 may count towards the math major. A student pursuing a second major in statistics & actuarial science cannot apply Stat courses as electives.

[b] See boxes below for "emphasis" course options.

NOTE: In addition to the above requirements, students must complete the liberal education program and a minor to earn a B.S. degree.

Applied Analysis Emphasis:
Math 3298 - Calculus III (4)
At least four of the following as electives:
Math 4230 – Applied Mathematics: Complex Variables (3)
Math 4240 - Operational Methods (3)
Math 5220 - Optimization and Control (3)
Math 5260 - Dynamical Systems (3)
Math 5270 - Modeling with Dynamical Systems (3)
Math 5280 - Partial Differential Equations (3)
Math 5830 - Numerical Analysis: Approximation and Quadrate (4)
Math 5840 - Numerical Analysis: Systems and Optimization (4)
Math 5850 - Numerical Differential Equations (4)
Students are encouraged to take CS 1521- Computer Science II (5).

Applied Discrete Emphasis:
At least four of the following as electives:
Math 5327 - Advanced Linear Algebra (3)
Math 5330 - Theory of Numbers (3)
Math 5365 - Graph Theory (3)
Math 5366 - Enumerative Combinatorics (3)
Math 5371 - Abstract Algebra I (3)
Math 5372 - Abstract Algebra II (3)
Math 5384 – Algebraic Coding Theory (3)
Students are encouraged to take CS 1521- Computer Science II (5).

Computational Emphasis:
Math 3298 - Calculus III (4)
At least two of the following electives:
Math 4820 - Numerical Methods (3)
Math 5830 - Numerical Analysis: Approximation & Quadrature (4)
Math 5840 - Numerical Analysis: Systems and Optimization (4)
Math 5850 - Numerical Differential Equations (4)
Students in this area are also encouraged to take CS 1521- Computer Science II (5) and/or a computer language course covering BASIC, FORTRAN or Java.

Mathematics Education:
Math 3110 - Foundations (3)
Math 3298 - Calculus III (4)
Math 4371 – Introduction to Abstract I (3)
Students interested in obtaining a teaching license for the State of Minnesota should consider pursuing the B. A. S. in Teaching Mathematics, which is offered cooperatively with the UMD Department of Education.

Pre-Graduate Studies:
Math 3298 - Calculus III (4)
Math 4230 - Applied Mathematics: Complex Variables (3)
Math 5201 - Real Variables (4)
Math 5371 - Abstract I (3)
Math 5372 - Abstract II (3)
Students considering further studies at the graduate level are also encouraged to take Comm 1112 – Public Speaking and undertake an undergraduate research project.