

MATHEMATICS (BA OR BS)

The Mathematics Department offers programs of study in Mathematics, Applied Mathematical Sciences, Actuarial Science (in cooperation with the School of Business), Mathematical Statistics (in cooperation with the Department of Statistics), and Mathematics - Physics (in cooperation with the Department of Physics).

The Department offers both Bachelor of Science and Bachelor of Arts degrees in Mathematics, Applied Mathematical Sciences, Mathematics-Statistics, Mathematics-Actuarial Science, and Mathematics-Actuarial Science-Finance, and a Bachelor of Science in Mathematics-Physics. The Bachelor of Science program provides in-depth training in Mathematics as preparation for graduate study or for participation in scientific and engineering teams in government, industry, or research laboratories. The Bachelor of Arts degree is designed to provide training in contemporary mathematics without the depth and concentrated specialization required for the Bachelor of Science program.

A minor in Mathematics (<https://catalog.uconn.edu/undergraduate/minors/mathematics-minor/>) is described in the "Minors" section.

The following courses may not be counted in any of the Mathematics major groups:

Course	Title	Credits
MATH 2010Q	Fundamentals of Algebra and Geometry	3
MATH 2011Q	Fundamentals of Algebra and Geometry	3
MATH 2705W	Technical Writing in Mathematics	1
MATH 2720W	History of Mathematics	3
MATH 2794W	Mathematics Writing Seminar	2
MATH 3670W	Technical Writing for Actuaries	3
STAT 3494W	Undergraduate Seminar	1

Writing in the Major

To satisfy the writing in the major and information literacy competencies in the Mathematics B.A. or B.S., the Applied Mathematical Sciences B.A. or B.S., the Mathematics-Actuarial Science B.A. or B.S., and the Mathematics-Actuarial Science-Finance B.A. or B.S., all students must pass one of the following courses:

Course	Title	Credits
MATH 2705W	Technical Writing in Mathematics	1
MATH 2710W	Transition to Advanced Mathematics	3
MATH 2720W	History of Mathematics	3
MATH 2794W	Mathematics Writing Seminar	2
MATH 3670W	Technical Writing for Actuaries	3
MATH 3710W	Introduction to Mathematical Modeling	3
MATH 3796W	Senior Thesis in Mathematics	3

See the Mathematics-Physics and Mathematics-Statistics sections for information about the writing in the major requirement for those programs.

Mathematics (BA)

The requirements for the B.A. in Mathematics are 27 credits of 2000-level or above course work in Mathematics and 12 credits of course work in approved related areas. The required courses are:

Course	Title	Credits
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Required Courses

Complete the courses for one of the following groups:

Group 1 (p.)

MATH 2110Q Multivariable Calculus
or MATH 2130Q

MATH 2210Q Applied Linear Algebra

MATH 2410Q Elementary Differential Equations
or MATH 2420Q

Select one of the following:

MATH 2710 Transition to Advanced Mathematics

MATH 2141Q Advanced Calculus I
& MATH 2142Q and Advanced Calculus II

Group 2 (p.)

MATH 2141Q Advanced Calculus I

MATH 2142Q Advanced Calculus II

MATH 2143Q Advanced Calculus III

MATH 2144Q Advanced Calculus IV

Additional Courses

MATH 3510 Numerical Analysis I
or MATH 4110 Introduction to Modern Analysis

MATH 3230 Abstract Algebra I
or MATH 4210 Advanced Abstract Algebra

Select at least three additional credits from any of the following courses: 3

MATH 3151 Analysis II

MATH 3210 Abstract Linear Algebra

MATH 3231 Abstract Algebra II

MATH 3240 Introduction to Number Theory

MATH 3250 Combinatorics

MATH 3260 Introduction to Mathematical Logic

MATH 3330 Elements of Topology
or MATH 4310 Introduction to Geometry and Topology

MATH 3370 Differential Geometry

MATH 3094 Undergraduate Seminar (approved sections)

MATH 3795 Special Topics (approved sections)

Any 2000 level or above MATH courses

Mathematics (BS)

The requirements for the B.S. in Mathematics are:

Course	Title	Credits
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Required Courses

Complete the courses for one of the following groups: 13-16

Group 1 (p.)

MATH 2110Q Multivariable Calculus
or MATH 2130Q

MATH 2210Q Applied Linear Algebra

MATH 2410Q Elementary Differential Equations
or MATH 2420Q

Select one of the following:

MATH 2710 Transition to Advanced Mathematics

MATH 2141Q & MATH 2142Q	Advanced Calculus I and Advanced Calculus II	
Group 2 (p.)		
MATH 2141Q	Advanced Calculus I	
MATH 2142Q	Advanced Calculus II	
MATH 2143Q	Advanced Calculus III	
MATH 2144Q	Advanced Calculus IV	
Additional Courses		
MATH 3150 or MATH 4110	Analysis I Introduction to Modern Analysis	3
MATH 3151	Analysis II	3
MATH 3230 or MATH 4210	Abstract Algebra I Advanced Abstract Algebra	3
Select at least six additional credits from the following:		6
MATH 2360Q	Geometry	
MATH 3146	Introduction to Complex Variables	
MATH 3160 or MATH 3165	Probability	
MATH 3170	Elementary Stochastic Processes	
MATH 3210	Abstract Linear Algebra	
MATH 3231	Abstract Algebra II	
MATH 3240	Introduction to Number Theory	
MATH 3250	Combinatorics	
MATH 3260	Introduction to Mathematical Logic	
MATH 3330 or MATH 4310	Elements of Topology Introduction to Geometry and Topology	
MATH 3370	Differential Geometry	
MATH 3410	Differential Equations for Applications	
MATH 3435	Partial Differential Equations	
MATH 3510	Numerical Analysis I	
MATH 3511	Numerical Analysis II	
MATH 3710	Introduction to Mathematical Modeling	
MATH 3094	Undergraduate Seminar (approved sections)	
MATH 3795	Special Topics (approved sections)	
Select at least three additional credits from the following:		3
MATH 3210	Abstract Linear Algebra	
MATH 3231	Abstract Algebra II	
MATH 3240	Introduction to Number Theory	
MATH 3250	Combinatorics	
MATH 3260	Introduction to Mathematical Logic	
MATH 3330 or MATH 4310	Elements of Topology Introduction to Geometry and Topology	
MATH 3370	Differential Geometry	
In addition, at least 12 credits at the 2000 level or above in approved related areas are required		12
Total Credits		43-46

Applied Mathematical Sciences (BA)

The requirements for the B.A. in Applied Mathematical Sciences are 27 credits of 2000-level or above course work in Mathematics and 12 credits of course work in approved related areas.

Course	Title	Credits
Required Courses		
MATH 2110Q or MATH 2130Q or MATH 2143Q	Multivariable Calculus Advanced Calculus III	4
MATH 2210Q or MATH 2143Q & MATH 2144Q	Applied Linear Algebra Advanced Calculus III and Advanced Calculus IV	3-6
MATH 2410Q or MATH 2420Q or MATH 2144Q	Elementary Differential Equations Advanced Calculus IV	3
MATH 3410 or MATH 3435	Differential Equations for Applications Partial Differential Equations	3
MATH 3510 & MATH 3511	Numerical Analysis I and Numerical Analysis II	6
Additional Courses		
Choose the remainder of the 27 credits of Mathematics from the following		5-8
MATH 2710	Transition to Advanced Mathematics	
MATH 3146	Introduction to Complex Variables	
MATH 3150 or MATH 4110	Analysis I Introduction to Modern Analysis	
MATH 3160 or MATH 3165	Probability	
MATH 3170	Elementary Stochastic Processes	
MATH 3210 or MATH 4210	Abstract Linear Algebra Advanced Abstract Algebra	
MATH 3250	Combinatorics	
MATH 3410	Differential Equations for Applications	
MATH 3435	Partial Differential Equations	
MATH 3710	Introduction to Mathematical Modeling	
MATH 3094	Undergraduate Seminar (approved sections)	
MATH 3795	Special Topics (approved sections)	
Total Credits		24-30

Applied Mathematical Sciences (BS)

The requirements for the B.S. in Applied Mathematical Sciences are:

Course	Title	Credits
Select one of the following options:		
Option 1		
MATH 2110Q or MATH 2130Q	Multivariable Calculus	
MATH 2210Q	Applied Linear Algebra	
MATH 2410Q or MATH 2420Q	Elementary Differential Equations	
MATH 2710 or MATH 2141Q & MATH 2142Q	Transition to Advanced Mathematics Advanced Calculus I and Advanced Calculus II	
Option 2		
MATH 2141Q	Advanced Calculus I	

MATH 2142Q	Advanced Calculus II	
MATH 2143Q	Advanced Calculus III	
MATH 2144Q	Advanced Calculus IV	
MATH 3150	Analysis I	3
or MATH 4110	Introduction to Modern Analysis	
MATH 3410	Differential Equations for Applications	3
or MATH 3435	Partial Differential Equations	
MATH 3510	Numerical Analysis I	6
& MATH 3511	and Numerical Analysis II	
Select two of the following:		6
MATH 3146	Introduction to Complex Variables	
MATH 3151	Analysis II	
MATH 3160	Probability	
or MATH 3165		
MATH 3170	Elementary Stochastic Processes	
MATH 3410	Differential Equations for Applications	
MATH 3435	Partial Differential Equations	
MATH 3710	Introduction to Mathematical Modeling	
MATH 3094	Undergraduate Seminar (approved sections)	
MATH 3795	Special Topics (approved sections)	
Select at least three additional credits from the following:		3
MATH 2360Q	Geometry	
MATH 3160	Probability	
or MATH 3165		
MATH 3180	Mathematics for Machine Learning	
MATH 3210	Abstract Linear Algebra	
or MATH 4210	Advanced Abstract Algebra	
MATH 3230	Abstract Algebra I	
MATH 3231	Abstract Algebra II	
MATH 3240	Introduction to Number Theory	
MATH 3250	Combinatorics	
MATH 3260	Introduction to Mathematical Logic	
MATH 3330	Elements of Topology	
or MATH 4310	Introduction to Geometry and Topology	
MATH 3094	Undergraduate Seminar (approved sections)	
MATH 3795	Special Topics (approved sections)	
Total Credits		34-37

Mathematics-Statistics (BA or BS)

The requirements for the B.S. or B.A. in Mathematics-Statistics degree are 40 credits at the 2000 level or above in Mathematics and Statistics, with at least 12 credits in each department.

The required courses for the Mathematics-Statistics major are:

Course	Title	Credits
Select one of the following:		4
MATH 2110Q	Multivariable Calculus	
MATH 2130Q		
MATH 2143Q	Advanced Calculus III	
Select one of the following:		3-8
MATH 2210Q	Applied Linear Algebra	

or MATH 3210	Abstract Linear Algebra	
MATH 2143Q	Advanced Calculus III	
& MATH 2144Q	and Advanced Calculus IV	
Select one of the following:		3
MATH 2410Q	Elementary Differential Equations	
MATH 2420Q		
MATH 2144Q	Advanced Calculus IV	
STAT 3375Q	Introduction to Mathematical Statistics I	6
& STAT 3445	and Introduction to Mathematical Statistics II	

To satisfy the Writing in the Major and Information Literacy competencies, all students must pass one of the following courses:

Course	Title	Credits
MATH 2705W	Technical Writing in Mathematics	1
MATH 2710W	Transition to Advanced Mathematics	3
MATH 2720W	History of Mathematics	3
MATH 2794W	Mathematics Writing Seminar	2
MATH 3670W	Technical Writing for Actuaries	3
MATH 3710W	Introduction to Mathematical Modeling	3
MATH 3796W	Senior Thesis in Mathematics	3
STAT 3494W	Undergraduate Seminar	1

Mathematics-Actuarial Science (BA or BS)

The requirements for the B.S. or B.A. degree in Mathematics-Actuarial Science are 40 credits at the 2000 level or above in Mathematics, Statistics, Business, and related areas. The required courses are:

Course	Title	Credits
MATH 2110Q	Multivariable Calculus	4
or MATH 2130Q		
or MATH 2143Q	Advanced Calculus III	
MATH 2210Q	Applied Linear Algebra	3-4
or MATH 2144Q	Advanced Calculus IV	
MATH 2620	Financial Mathematics I	3
MATH 3160	Probability	3
or MATH 3165		
MATH 3620	Foundations of Actuarial Science	3
MATH 3630	Long-Term Actuarial Mathematics I	4
MATH 3636	Actuarial Statistical Modeling I	3
MATH 3637	Actuarial Statistical Modeling II	3
MATH 3639	Actuarial Loss Models	3
MATH 3640	Short-Term Insurance Ratemaking	3
STAT 3375Q	Introduction to Mathematical Statistics I	3
STAT 3445	Introduction to Mathematical Statistics II	3
Total Credits		38-39

Admission to the Actuarial Science program will be available only to students who meet the following two requirements. First, the student must have a total grade point average of 3.2 or higher or a grade point average of 3.2 or higher in mathematics. The student must also satisfy one of the following:

- completed MATH 11126Q or MATH 1131Q Calculus I with a grade of at least "B";
- successfully completed an honors calculus course with a grade of at least "C";
- Received AP credit for MATH 1131Q Calculus I; or
- received a passing score on one or more of the actuarial examinations.

Students not satisfying one or more of the requirements may be admitted into the program by the Mathematics Department Actuarial Committee.

To remain as an Actuarial Science Major, the student is required to maintain a total grade point average of 3.2 or higher. Students who do not satisfy this requirement may remain in the major with the permission of the director of the Actuarial Science program or his/her designee. If the student is not continued in the program, but meets minimum University of Connecticut scholastic standards as outlined in the University Senate by-laws, the director or designee will work with the student to identify an appropriate alternative major.

Mathematics-Actuarial Science-Finance (BA or BS)

The requirements for the B.S. or B.A. degree in Mathematics-Actuarial Science-Finance are 40 credits at the 2000 level or above in Mathematics, Statistics, Business, and related areas and 15 credits in Finance. The required courses are:

Course	Title	Credits
Select one of the following: 4		
MATH 2110Q	Multivariable Calculus	4
MATH 2130Q		
MATH 2143Q	Advanced Calculus III	
MATH 2210Q	Applied Linear Algebra	3
or MATH 2144Q	Advanced Calculus IV	
MATH 2620	Financial Mathematics I	3
MATH 3160	Probability	3
or MATH 3165		
MATH 3620	Foundations of Actuarial Science	3
MATH 3630	Long-Term Actuarial Mathematics I	4
MATH 3639	Actuarial Loss Models	3
MATH 3640	Short-Term Insurance Ratemaking	3
MATH 3650	Financial Mathematics II	3
MATH 3660	Advanced Financial Mathematics	3
STAT 3375Q	Introduction to Mathematical Statistics I	3
STAT 3445	Introduction to Mathematical Statistics II	3
ACCT 2001	Principles of Financial Accounting	3
FNCE 4209	Applications in Financial Management	3
FNCE 4306	Financial Services	3
FNCE 4430	Mergers and Acquisitions	3
Select the remainder of the 15 credits of Finance from the following: 6		
FNCE 4302	Fixed Income Securities	6
FNCE 4304	Financial Derivatives and Risk Management	
FNCE 4305	Global Financial Management	
FNCE 4307	Financial Modeling	

FNCE 4308	Introduction to Algorithmic Trading
FNCE 4309	High Frequency Trading Management
Total Credits	56

This degree is offered through the College of Liberal Arts and Sciences. Admission to the Actuarial Science program will be available only to students who meet the following two requirements. First, the student must have a total grade point average of 3.2 or higher or a grade point average of 3.2 or higher in mathematics. The student must also satisfy one of the following:

- completed MATH 11126Q or MATH 1131Q Calculus I with a grade of at least "B";
- successfully completed an honors calculus course with a grade of at least "C";
- received AP credit for MATH 1131Q Calculus I; or
- received a passing score on one or more of the actuarial examinations.

Students not satisfying one or more of the requirements may be admitted into the program by the Mathematics Department Actuarial Committee.

To remain as an Actuarial Science Major, the student is expected to maintain a total grade point average of 3.2 or higher.

Mathematics-Physics (BS)

The B.S. degree in Mathematics-Physics may be completed by following either track A, which has a physics emphasis, or track B, which has a mathematics emphasis. Students in track A should choose an advisor from the Physics Department, and those in Track B should choose an advisor from the Mathematics Department. The number of credits for 2000-level courses or above in the Track A is 30 in Physics and 19 in Mathematics, and for Track B these numbers are 21 credits in Physics and 28 in Mathematics.

In either track, the writing in the major and information literacy competencies are met using PHYS 2501W Advanced Undergraduate Laboratory.

Mathematics-Physics Major Track A (Physics Emphasis)

Course	Title	Credits
Complete the courses from one of the following groups:		10-16
<i>Group 1</i>		
MATH 2110Q	Multivariable Calculus	3
or MATH 2130Q		
or MATH 2143Q	Advanced Calculus III	
MATH 2210Q	Applied Linear Algebra	3
MATH 2410Q	Elementary Differential Equations	
or MATH 2420Q		
<i>Group 2</i>		
MATH 2141Q	Advanced Calculus I	3
MATH 2142Q	Advanced Calculus II	
MATH 2143Q	Advanced Calculus III	
MATH 2144Q	Advanced Calculus IV	

Additional Required Courses

MATH 3146	Introduction to Complex Variables	3
MATH 3410	Differential Equations for Applications	3
MATH 3510	Numerical Analysis I	3

PHYS 2300	The Development of Quantum Physics	3
PHYS 2501W	Advanced Undergraduate Laboratory	4
PHYS 3101	Mechanics I	3
PHYS 3201	Electricity and Magnetism I	3
PHYS 3202	Electricity and Magnetism II	3
PHYS 3300	Statistical and Thermal Physics	3
PHYS 3401	Quantum Mechanics I	3
Select nine credits of 2000-level or above PHYS electives.		9
Total Credits		50-56

Mathematics-Physics Major Track B (Mathematics Emphasis)

Course	Title	Credits
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Required Courses

Complete the courses from one of the following groups: 16-21

Group 1

MATH 2110Q	Multivariable Calculus	
or MATH 2130Q		
or MATH 2143Q	Advanced Calculus III	
MATH 2210Q	Applied Linear Algebra	
MATH 2410Q	Elementary Differential Equations	
or MATH 2420Q		
MATH 2710	Transition to Advanced Mathematics	
or MATH 2141Q	Advanced Calculus I	
	and Advanced Calculus II	
& MATH 2142Q		
MATH 3146	Introduction to Complex Variables	

Group 2

MATH 2141Q	Advanced Calculus I	
MATH 2142Q	Advanced Calculus II	
MATH 2143Q	Advanced Calculus III	
MATH 2144Q	Advanced Calculus IV	
MATH 3146	Introduction to Complex Variables	

Additional Required Courses

PHYS 2300	The Development of Quantum Physics	3
PHYS 2501W	Advanced Undergraduate Laboratory	4
PHYS 3101	Mechanics I	3
PHYS 3201	Electricity and Magnetism I	3
PHYS 3202	Electricity and Magnetism II	3
PHYS 3401	Quantum Mechanics I	3
Select three credits from the following:		3
PHYS 2200	Computational Physics	
PHYS 2400	Mathematical Methods for the Physical Sciences	
PHYS 3102	Mechanics II	
PHYS 3150	Electronics	
PHYS 3300	Statistical and Thermal Physics	
PHYS 3501	Modern Experimental Methods	
PHYS 3989	Undergraduate Research	
PHYS 4093	Foreign Study	
PHYS 4095	Special Topics	
PHYS 4096W	Research Thesis in Physics	
PHYS 4098	Variable Topics	

PHYS 4099	Independent Study	
PHYS 4100	Physics of the Earth's Interior	
PHYS 4130	Fundamentals of Planetary Science	
PHYS 4140	Principles of Lasers	
PHYS 4150	Optics	
PHYS 4210	Introduction to Solid State Physics	
PHYS 4350	Nuclei and Particles	
PHYS 4710	Stars and Compact Objects	
PHYS 4720	Galaxies and the Interstellar Medium	
PHYS 4730	General Relativity and Cosmology	
PHYS 4740	Advanced Methods in Astrophysics	
PHYS 4900		

Select four of the following: 12

MATH 3150	Analysis I	
or MATH 4110	Introduction to Modern Analysis	
MATH 3151	Analysis II	
MATH 3160	Probability	
MATH 3210	Abstract Linear Algebra	
MATH 3230	Abstract Algebra I	
or MATH 4210	Advanced Abstract Algebra	
MATH 3330	Elements of Topology	
or MATH 4310	Introduction to Geometry and Topology	
MATH 3370	Differential Geometry	
MATH 3410	Differential Equations for Applications	

Total Credits 50-55

University General Education Requirements

Every student must meet a set of core requirements to earn a baccalaureate degree, in addition to those required by the student's major course of study and other requirements set by the student's school or college. For more information about these requirements, please see General Education Requirements (<https://catalog.uconn.edu/undergraduate/gen-ed-requirements/>).

College of Liberal Arts and Sciences Degree Requirements

Students must meet a set of requirements established by the college in addition to the University's General Education requirements. For more information, see the College of Liberal Arts and Sciences (<https://catalog.uconn.edu/undergraduate/liberal-arts-sciences/#requirementstext>) section of this catalog.