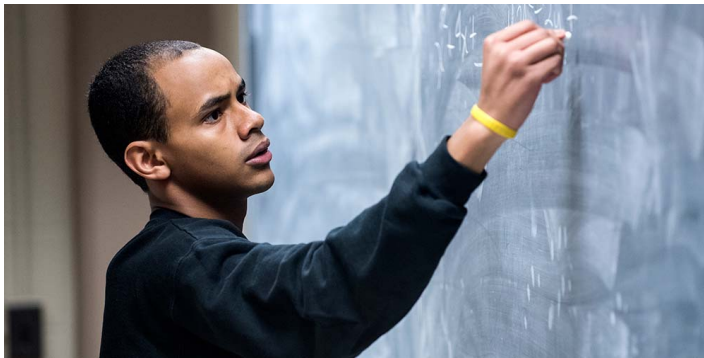


MATHEMATICS (BS)



This program was approved for students entering the university in the Summer 2022–Spring 2023 catalog year. For more information about catalog year, go to Catalog Year Information (<http://catalog.louisville.edu/undergraduate/university-wide-unit-specific-policies/catalog-year/>).

Bachelor of Science in Mathematics

Unit: College of Arts and Sciences (<http://www.louisville.edu/a-s/>) (AS)
Department: Mathematics (<https://louisville.edu/math/>)
Academic Plan Code(s): MATHBS, MATHBS_ACS

Completion of this degree requires work to be submitted for the department’s Learning Outcomes Measurement. For details, contact the department.

Degree Summary

Code	Title	Hours
	General Education Requirements (http://catalog.louisville.edu/undergraduate/general-education-requirements/) ¹	31
	(7-10 hours of General Education requirements may be satisfied through coursework required by the degree program)	
	College/School Requirements ¹	13-15
	Program/Major Requirements ¹	51
	Supporting Courses ¹	24-26
Minimum Total Hours		121

Track in Actuarial Science

Code	Title	Hours
	General Education Requirements (http://catalog.louisville.edu/undergraduate/general-education-requirements/) ¹	31
	(7-10 hours of General Education requirements may be satisfied through coursework required by the degree program)	
	College/School Requirements ¹	13-15
	Track Requirements ¹	45
	Supporting Courses	30-33
Minimum Total Hours		121-122

¹ Some courses required in this degree program satisfy multiple requirements. **To complete the degree in the minimum number of hours listed, some hours from the General Education Requirements must be satisfied by courses defined by the unit and/or program.** Using other courses to satisfy General Education requirements will require additional hours to complete the degree requirements. See the Degree Requirements and/or Track tabs for specific coursework.

Specific coursework information can be found on the Degree Requirements tab.

Accelerated BA-BS/MA Option in Mathematics

Mathematics majors who are considering pursuing a master’s degree (MA) in Mathematics can speed up the process by applying some of their undergraduate credit hours toward a master’s degree. Students accepted into the Accelerated BA-BS/MA take three graduate courses (9 credit hours) as an undergraduate that apply toward both the bachelor’s degree and the eventual master’s degree.

Interested students must apply to the program during their Junior year (i.e., when they have accumulated 60-90 hours of credit). Applicants must have completed MATH 205, MATH 206, MATH 301, and MATH 325, or equivalent courses, prior to application. Applicants must have a minimum overall GPA of 3.5, and minimum GPA of 3.66 in mathematics courses.

Early Start Program (Jointly with the College of Education and Human Development)

The Master of Arts in Teaching program in conjunction with the undergraduate programs in Chemistry, Biology, and Mathematics offers a comprehensive and professionally-focused program leading to an additional degree of MAT Middle or Secondary Education. This early start program enables superior students to receive two degrees within five years. A total of 149-152 credits are required for the dual degrees: 122-125 credits of coursework devoted toward the baccalaureate degree and 36 credits toward the MAT, with nine hours double-counted. This program will be available for students who are entering their junior year. They may take graduate level courses in the College of Education and Human Development (CEHD) in their 4th year of study.

The current qualifications for the joint degree program have been agreed upon by discipline faculty from the Colleges of Arts and Sciences and Education and Human Development. The criteria vary by discipline. Students enrolling in the accelerated program will be non-thesis students and must adhere to all policies pertaining to Graduate Students. All interested students must submit an application to the College of Education and Human Development (CEHD) MAT program and meet the admission criteria.

Departmental Admission Requirements

Admission to the BS in Mathematics requires enrollment in a mathematics course beyond MATH 205; a minimum cumulative grade point average of 2.0; and a minimum grade point average of 2.0 on all courses in the major.

The Application for Major form can be found on the Arts & Sciences Advising Center website (<http://louisville.edu/artsandsciences/advising/apply/>).

Accelerated BA/BS-MA Option in Mathematics

Students must apply for admission to the program no later than the end of the junior year and must have completed MATH 205 (<https://catalog.louisville.edu/search/?P=MATH%20205>), MATH 206 (<https://catalog.louisville.edu/search/?P=MATH%20206>), MATH 301 (<https://catalog.louisville.edu/search/?P=MATH%20301>), and MATH 325 (<https://catalog.louisville.edu/search/?P=MATH%20325>), or equivalent courses, prior to application.

Applicants must have a minimum overall GPA of 3.5, and minimum GPA of 3.66 in mathematics courses.

General Education Requirements

Code	Title	Hours
General Education Requirements (http://catalog.louisville.edu/undergraduate/general-education-requirements/) ¹		31
The following courses are required by the program and satisfy the respective General Education Requirement(s):		
MATH 205	Calculus I - QR	
PHYS 298	Introductory Mechanics, Heat and Sound - S or CHEM 201 General Chemistry I - S or BIOL 240 Unity of Life - S	
PHYS 295	Introductory Laboratories I - SL or CHEM 207 Introduction to Chemical Analysis I - SL or BIOL 241 Experimental Biology I: Molecules and Cells - SL	

All degrees require the completion of the University-wide General Education Program (link provided above). To complete the degree in the **minimum number of hours** listed on the Overview tab, some hours from the General Education Requirements must be satisfied by courses defined by the unit and/or program.

College/School Requirements

Code	Title	Hours
Arts & Sciences Requirements		
GEN 100 or GEN 101	Student Success Center First Year Experience Arts & Sciences First Year Experience	1
	Foreign Language ²	6-8
	Electives in Humanities or Social Sciences, at the 300 level or above ³	6
	WR—two approved courses at the 300 level or above ⁴	
Minimum Total Hours		13-15

Program/Major Requirements

Course requirements for the track in Actuarial Science can be found on the Track Requirements tab.

Code	Title	Hours
Mathematics Department ^{5,6}		
MATH 205	Calculus I - QR ⁷	4
MATH 206	Calculus II	4
MATH 301	Calculus III	4
MATH 311	Introduction to Higher Math	3
MATH 325	Introduction to Linear Algebra	3
MATH 387	Discrete Mathematics	3
MATH 405	Differential Equations	3
MATH 501	Introduction to Analysis I - CUE	3

MATH 502	Introduction to Analysis II	3
MATH 521	Modern Algebra I - CUE	3
MATH 522	Modern Algebra II	3
MATH 561	Probability	3
Select four courses from the following:		12
MATH 360	Statistical Data Analysis - WR	
MATH 407	Numerical Analysis	
MATH 505	Introduction to Partial Differential Equations	
MATH 507	Fourier Analysis	
MATH 511	Complex Analysis I	
MATH 512	Complex Analysis II	
MATH 535	Modeling I	
MATH 536	Modeling II	
MATH 550	Advanced Euclidean Geometry	
MATH 551	Geometry	
MATH 562	Mathematical Statistics	
MATH 581	Introduction to Graph Theory	

Minimum Total Hours **51**

Code	Title	Hours
Supporting Courses		

Select one of the following sequences:⁷ 8-10

Sequence One:		
PHYS 298	Introductory Mechanics, Heat and Sound - S	
PHYS 299	Introductory Electricity, Magnetism and Light	
PHYS 295	Introductory Laboratories I - SL	
PHYS 296	Introductory Laboratories II - SL	
Sequence Two:		
CHEM 201	General Chemistry I - S	
CHEM 202	General Chemistry II - S	
CHEM 207	Introduction to Chemical Analysis I - SL	
CHEM 208	Introduction to Chemical Analysis II - SL	
CHEM 209	Introduction to Chemical Analysis III	
Sequence Four:		
BIOL 240	Unity of Life - S	
BIOL 241	Experimental Biology I: Molecules and Cells - SL	
BIOL 242	Diversity of Life - S	
BIOL 243	Experimental Biology II: Organismal Biology - SL	
Elective in second science discipline ⁷		3
CSE 130	Introduction to C and C++ Programming Languages	3
Elective in Natural Sciences (other than Mathematics) ⁹		3
Minimum Electives ¹⁰		5-9

Minimum Total Hours **24-26**

At least 50 of the total minimum hours required must be at the 300 level or above.

Program/Major requirements and Supporting Courses for Track in Actuarial Science are articulated on the Track Requirements tab.

Code	Title	Hours
Culminating Undergraduate Experience (Graduation requirement)		

Requirement fulfilled by completing:

MATH 501 Introduction to Analysis I - CUE
or MATH 521 Modern Algebra I - CUE

- 1 Ten (10) hours of General Education requirements (Quantitative Reasoning and Natural Sciences) are met with requirements in the major or supporting coursework.
- 2 Completion of the second semester of a single foreign language; hours will vary depending on the language taken
- 3 In addition to courses counted toward General Education
- 4 May be incorporated into other degree requirements
- 5 Mathematics courses at the 100 level do not count toward hours in the major.
- 6 A minimum of 12 hours in courses numbered 311 or higher must be successfully completed in the Department of Mathematics at the University of Louisville.
- 7 Fulfills General Education requirement.
- 8 Or another computer related course chosen in consultation with the departmental advisor
- 9 Or a second computer related course chosen in consultation with departmental advisor
- 10 Elective hours are dependent on completion of at least 10 hours of General Education requirements through requirements in the major, track and/or supporting coursework

Track Requirements

Track in Actuarial Science

Code	Title	Hours
Mathematics Department ^{1,2}		
MATH 205	Calculus I - QR ³	4
MATH 206	Calculus II	4
MATH 301	Calculus III	4
MATH 311	Introduction to Higher Math	3
MATH 325	Introduction to Linear Algebra	3
MATH 360	Statistical Data Analysis - WR	3
MATH 372	Theory of Interest	3
MATH 387	Discrete Mathematics	3
MATH 405	Differential Equations	3
MATH 501	Introduction to Analysis I - CUE	3
MATH 561	Probability	3
MATH 562	Mathematical Statistics	3
MATH 570	Foundations of Actuarial Science	3
MATH 521	Modern Algebra I - CUE	3
or MATH 573	Actuarial Models I	
Minimum Total Hours		45

Code	Title	Hours
Supporting Courses		
Select one of the following sequences: ³		4-5
Sequence One:		
PHYS 298	Introductory Mechanics, Heat and Sound - S	
PHYS 295	Introductory Laboratories I - SL	
Sequence Two:		
CHEM 201	General Chemistry I - S	
CHEM 207	Introduction to Chemical Analysis I - SL	

Sequence Three:

BIOL 102	Biology: Current Issues and Applications - S	
BIOL 104	Laboratory for Biology: Current Issues and Applications - SL	
Elective in second science discipline ³		3
ECON 201	Principles of Microeconomics - SB	3
ECON 202	Principles of Macroeconomics - SB	3
CIS 305	Data Analysis for Decision-Making	3
FIN 301	Corporate Finance ⁴	3
FIN 401	Investments ⁴	3
FIN 403	Financial Derivatives ⁴	3
FIN 433	Financial Markets and Institutions ^{4,5}	3
Minimum Electives		2-4
Minimum Total Hours		30-33

At least 50 of the total minimum hours required must be at the 300 level or above.

- 1 Mathematics courses at the 100 level do not count toward hours in the major.
- 2 A minimum of 12 hours in courses numbered 311 or higher must be successfully completed in the Department of Mathematics at the University of Louisville.
- 3 Fulfills General Education requirement
- 4 Students must be admitted to the College of Business prior to enrollment in these courses
- 5 FIN 433 can be used as an elective in Humanities or Social Sciences at the 300+ level.

Flight Plan

Mathematics

Course	Title	Hours
Year 1		
Fall		
GEN 100 or GEN 101	Student Success Center First Year Experience or Arts & Sciences First Year Experience	1
ENGL 101	Introduction to College Writing - WC	3
MATH 205	Calculus I - QR	4
General Education: Cardinal Core Oral Communication - OC		3
General Elective		3
Hours		14
Spring		
ENGL 102	Intermediate College Writing - WC	3
General Education: Cardinal Core Arts & Humanities - AH		3
Foreign Language 1		3-4
MATH 206	Calculus II	4
MATH 311	Introduction to Higher Math	3
Hours		16-17
Year 2		
Fall		
General Education: Cardinal Core Arts & Humanities Global Diversity - AHD2		3
General Elective		3
Foreign Language 2		3-4
MATH 301	Calculus III	4
MATH 325	Introduction to Linear Algebra	3
Hours		16-17

Spring		
General Education: Cardinal Core Social & Behavioral Sciences US Diversity - SBD1		3
General Education: Cardinal Core Social & Behavioral Sciences Historical Perspective - SBH		3
Humanities or Social Science WR Elective (300 level or above)		3
Math Elective		3
MATH 405	Differential Equations	3
Hours		15
Year 3		
Fall		
Humanities or Social Science WR Elective (300 level or above)		3
MATH 387	Discrete Mathematics	3
MATH 501	Introduction to Analysis I - CUE	3
	or MATH 521 or Modern Algebra I - CUE	
MATH 561	Probability	3
First portion of chosen Natural Science sequence		3-5
Hours		15-17
Spring		
Second portion of chosen Natural Science sequence (also fulfills portion of Gen Ed Natural Science requirement - S/SL/B)		4-5
Natural Science Elective (not from chosen sequence) (also fulfills portion of Gen Ed Natural Science requirement - S)		3
Math Elective		3
MATH 502	Introduction to Analysis II	3
	or MATH 522 or Modern Algebra II	
CSE 130	Introduction to C and C++ Programming Languages	3
Hours		16-17
Year 4		
Fall		
MATH 521	Modern Algebra I - CUE	3
	or MATH 501 or Introduction to Analysis I - CUE	
Math Elective		3
General Elective		3
General Elective (300 level or above)		3
Natural Science Elective (non-Math) or second computer-related course		3
Hours		15
Spring		
MATH 522	Modern Algebra II	3
	or MATH 502 or Introduction to Analysis II	
Math Elective		3
General Elective		3
General Elective		3
General Elective (if needed)		3
Hours		15
Minimum Total Hours		122-127

Mathematics, track in Actuarial Science

Course	Title	Hours
Year 1		
Fall		
GEN 100	Student Success Center First Year Experience	1
	or GEN 101 or Arts & Sciences First Year Experience	
ENGL 101	Introduction to College Writing - WC	3
General Education: Cardinal Core Oral Communication - OC		3
MATH 205	Calculus I - QR	4
ECON 201	Principles of Microeconomics - SB	3
ACCT 201	Principles of Financial Accounting	3
Hours		17
Spring		
ENGL 102	Intermediate College Writing - WC	3
MATH 206	Calculus II	4

MATH 311	Introduction to Higher Math	3
ECON 202	Principles of Macroeconomics - SB	3
ACCT 202	Principles of Managerial Accounting	3
Hours		16
Year 2		
Fall		
General Education: Cardinal Core Arts & Humanities Global Diversity - AHD2		3
Foreign Language 1		3-4
MATH 301	Calculus III	4
MATH 325	Introduction to Linear Algebra	3
Hours		14
Spring		
Foreign Language 2		3-4
MATH 372	Theory of Interest	3
MATH 387	Discrete Mathematics	3
MATH 561	Probability	3
FIN 301	Corporate Finance	3
Hours		16
Year 3		
Fall		
General Education: Cardinal Core Social & Behavioral Sciences Historical Perspective - SBH		3
MATH 562	Mathematical Statistics	3
MATH 570	Foundations of Actuarial Science	3
FIN 401	Investments	3
General Elective		3
Hours		15
Spring		
General Education: Cardinal Core Arts & Humanities US Diversity - AHD1		3
Chosen Natural Science Sequence (lecture & lab)		4-5
MATH 405	Differential Equations	3
FIN 433	Financial Markets and Institutions	3
Hours		13-14
Year 4		
Fall		
MATH 360	Statistical Data Analysis - WR	3
MATH 501	Introduction to Analysis I - CUE	3
General Elective		3
General Elective		3
Humanities or Social Science WR Elective (300 level or above)		3
Hours		15
Spring		
MATH 521	Modern Algebra I - CUE	3
	or MATH 573 or Actuarial Models I	
CIS 305	Data Analysis for Decision-Making	3
FIN 403	Financial Derivatives	3
Natural Science Elective (outside of chosen Natural Science sequence)		3
Humanities or Social Science WR Elective (300 level or above)		3
Hours		15
Minimum Total Hours		121-122

Degree Audit Report

Degree Audit reports illustrate how your completed courses fulfill the requirements of your academic plan. What-if reports allow you to compare the courses you have completed in your current academic plan to the courses required in another academic plan. Should you have questions about either report, please consult with your academic advisor.

To create either report:

1. Log into your ULink account.
2. Click on the Academic Progress tile.

3. Next, click on "View my Degree Audit" to run a Degree Audit report in the Undergraduate Advising area.
4. To create a What-if report, click on "Create a What-if Advisement Report."

Click here to run a Degree Audit report, or create a What-if report. (<https://ulink.louisville.edu>)

Flight Planner

Based on your major, the Flight Planner tool may be available for you to create a personalized Flight Plan. The Flight Planner can be found in the ULink Student Center. Consult with your advisor for assistance with the Flight Planner.