

APPLIED MATHEMATICS (BS)

Students earning a B.S. in Applied Mathematics will acquire foundational knowledge in the field, as well as competency in the critical thinking, technological, and communication skills necessary for its application. Applied math is a dynamic discipline with applications to many fields, including Systems Biology, Data Mining and Data Privacy, Materials Science, Computer Animation and Digital Imaging, Finance and Economics, Ecology, Epidemiology, and Climatology, among others.

Related Programs

Major

- Mathematics (BS) (<https://catalog.luc.edu/undergraduate/arts-sciences/mathematics-statistics/mathematics-bs/>)
- Mathematics - Education Track (BS) (<https://catalog.luc.edu/undergraduate/arts-sciences/mathematics-statistics/mathematics-education-track-bs/>)

Combined

- Mathematics (BS/MS) (<https://catalog.luc.edu/undergraduate/accelerated-bachelors-masters-program/mathematics-bs-ms/>)

Curriculum

AP Credit Policies (<https://catalog.luc.edu/undergraduate/arts-sciences/mathematics-statistics/#policiestext>)

Code	Title	Hours
Lower Level Course Requirements		
MATH 161	Calculus I	4
MATH 162	Calculus II	4
	or MATH 162A Calculus II, Alternate	
MATH 201	Introduction to Discrete Mathematics & Number Theory	3
MATH 212	Linear Algebra	3
MATH 263	Multivariable Calculus	4
	or MATH 263A Multivariable Calculus, Alternate	
MATH 264	Ordinary Differential Equations	3
PHYS 121 & PHYS 111L	College Physics I with Calculus Lecture/ Discussion and College Physics Laboratory I	4
Choose one of the following course sequences:		6-9
COMP 170 & COMP 271 & COMP 272	Introduction to Object-Oriented Programming and Data Structures I and Data Structures II	
MATH 215 & COMP 231	Object-Oriented Programming with Mathematics and Data Structures & Algorithms for Informatics	
Additional Science Requirements		
Select one of the following:		3
ANTH 101	Human Origins	
BIOL 101	General Biology I	
BIOL 102	General Biology II	
CHEM 160	Chemical Structure and Properties	
ENVS 101	The Scientific Basis of Environmental Issues	
PHYS 122	College Physics II with Calculus Lecture/ Discussion	

Probability and Statistics Requirements		
Select one of the following:		6
MATH 304 & MATH 305	Introduction to Probability and Introduction to Mathematical Statistics	
STAT 203 & STAT 308	Introduction to Probability & Statistics and Applied Regression Analysis	
Upper Level Course Requirements		
MATH 309	Numerical Methods	3
MATH 356	Introduction to Mathematical Modeling	3
Electives A		
Select two of the following:		6
MATH 318	Combinatorics	
MATH 331	Cryptography	
MATH 345 / STAT 388	Introduction to Financial Mathematics Derivatives	
MATH 358	Introduction to Optimization	
MATH 360	Introduction to Game Theory	
MATH 365	Introduction to Partial Differential Equations	
MATH 366	Applied Dynamical Systems	
MATH 388	Special Topics in Mathematics (Must be approved beforehand)	
STAT 321	Computational Aspects of Modeling and Simulation	
Elective B		
One elective chosen from any 300-level MATH or an approved 300-level STAT course		3
Total Hours		55-58

Suggested Sequence of Courses

Note: This is only one possibility. Among other things, depending on initial math placement, which can range from MATH 100 to MATH 263, the schedule will look very different. Especially for students starting at MATH 161 or above, there is a lot of space to pursue a minor or even a second major.

Course	Title	Hours
Year 1		
Fall		
MATH 161	Calculus I	4
Additional Science Requirement		3
Hours		7
Spring		
MATH 162	Calculus II	4
MATH 201	Introduction to Discrete Mathematics & Number Theory	3
Hours		7
Year 2		
Fall		
MATH 263	Multivariable Calculus	4
MATH 215	Object-Oriented Programming with Mathematics	3
PHYS 121	College Physics I with Calculus Lecture/ Discussion	3
PHYS 111L	College Physics Laboratory I	1
Hours		11

Spring

MATH 212	Linear Algebra	3
MATH 264	Ordinary Differential Equations	3
COMP 231	Data Structures & Algorithms for Informatics	3
Hours		9

Year 3**Fall**

STAT 203 or MATH 304	Introduction to Probability & Statistics or Introduction to Probability	3
300-level Applied Math Elective		3
Hours		6

Spring

STAT 308 or MATH 305	Applied Regression Analysis or Introduction to Mathematical Statistics	3
MATH 309 or MATH 356	Numerical Methods or Introduction to Mathematical Modeling	3
Hours		6

Year 4**Fall**

300-level Applied Math Elective		3
300-level Math/Stat Elective		3
Hours		6

Spring

MATH 309 or MATH 356	Numerical Methods or Introduction to Mathematical Modeling	3
-------------------------	---	---

For students in departmental honors: Additional 300-level math class

Hours		3
Total Hours		55

Learning Outcomes

- Students will have wide knowledge of and strong skills in using the methods and tools that form the foundation of applied math. These include calculus, linear algebra, and differential equations, as well as statistics and computer sciences.
- Students will acquire foundational knowledge of the language of formal mathematics and the ability to read and write rigorous and logical mathematical arguments.
- Students will be able to use applied mathematical knowledge in a wide variety of contexts. They will be able to model real-world situations mathematically, making appropriate choices as to the models and methods to employ. They will analyze these models with a variety of tools and interpret the results in a meaningful way. They will be able to present their findings in clear, professional language.
- Students will understand how the different areas and methods of applied math fit together. They will understand how these are used in modern applied mathematical settings and will also be able to fit them into a historical context.

Transfer-Student Residency Requirement

At least 21 credit hours of Applied Mathematics (BS) must be completed at Loyola.

College of Arts and Sciences Graduation Requirements

All Undergraduate students in the College of Arts and Sciences are required to take two Writing Intensive courses (6 credit hours) as well as complete a foreign language requirement at 102-level or higher (3 credit hours) or a language competency test. More information can be found here (<https://www.luc.edu/cas/college-requirements/>).

Additional Undergraduate Graduation Requirements

All Undergraduate students are required to complete the University Core, at least one Engaged Learning course, and UNIV 101. SCPS students are not required to take UNIV 101. Nursing students in the Accelerated BSN program are not required to take core or UNIV 101. You can find more information in the University Requirements (<https://catalog.luc.edu/undergraduate/university-requirements/>) area.