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.

Curriculum
(Effective Fall 2023)

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 161</td>
<td>Calculus I</td>
<td>4</td>
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<tr>
<td>MATH 162</td>
<td>Calculus II</td>
<td>4</td>
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<tr>
<td>or MATH 162A</td>
<td>Calculus II, Alternate</td>
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<tr>
<td>MATH 263</td>
<td>Multivariable Calculus</td>
<td>4</td>
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<tr>
<td>or MATH 263A</td>
<td>Multivariable Calculus, Alternate</td>
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<tr>
<td>MATH 201</td>
<td>Introduction to Discrete Mathematics &amp; Number Theory</td>
<td>3</td>
</tr>
<tr>
<td>MATH 212</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 215</td>
<td>Object-Oriented Programming with Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 264</td>
<td>Ordinary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>COMP 231</td>
<td>Data Structures &amp; Algorithms for Informatics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 121</td>
<td>College Physics I Lec/Dis</td>
<td>4</td>
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<tr>
<td>&amp; PHYS 111L</td>
<td>and College Physics Laboratory I</td>
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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 Phys II Lec/Dis

Probability and Statistics Requirements
Select one of the following: 6
- STAT 203 Introduction to Probability & Statistics & Applied Regression Analysis
- MATH 304 Introduction to Probability & MATH 305 Introduction to Mathematical Statistics

Upper Level Course Requirements
MATH 309 Numerical Methods 3
MATH 356 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
STAT 321 Computational Aspects of Modeling and Simulation
MATH 388 Special Topics in Mathematics (Must be approved beforehand)

Elective B
One elective chosen from any 300-level Math or an approved 300-level Stat course 3

Total Hours 55

Note: 55 total credit hours

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.

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.