

# MATHEMATICS: BIOLOGICAL MATHEMATICS, BA

At the core of modern theoretical science, mathematics has historically provided an expressive language and a theoretical framework for advances in the physical sciences. It has since become central in the life and social sciences and in computer science. Mathematics at Penn embraces traditional core areas of mathematics and developing areas (Penn is one of the world's leading centers in the application of logic to theoretical computer science). The goals of the major program are to assist students in acquiring both an understanding of mathematics and the ability to use it. The mathematics major provides a solid foundation for graduate study in mathematics and a background for study in economics, the biological sciences, the physical sciences, and engineering, as well as many non-traditional areas.

The minimum total course units (<https://www.college.upenn.edu/credits-needed-major/>) for graduation in this major is 36. Double majors may entail more course units.

Majors and prospective majors: Please email [majoradvisor@math.upenn.edu](mailto:majoradvisor@math.upenn.edu). You will be assigned to one of the Math Major Advisors who will discuss your current and future plans with you. It is important that you see this advisor at least once per semester thereafter.

Below is a planning tool that is meant to help you but does not replace the web and advisor visit requirements.

**For more information:** <https://www.math.upenn.edu/undergraduate/math-majors-and-minors/biological-mathematics-concentration-mathematics-major/> (<https://www.math.upenn.edu/undergraduate/math-majors-and-minors/biological-mathematics-concentration-mathematics-major/>)

For information about the General Education requirements, please visit the College of Arts & Sciences Curriculum (<https://www.college.upenn.edu/curriculum/>) page.

Code	Title	Course Units
<b>College General Education Requirements and Free Electives</b>		
Foundational Approaches + Sectors <sup>1</sup> + Free Electives		17.5-18.5
<b>Major Requirements</b>		
<i>Mathematics Requirement</i>		
Calculus Requirement:		
MATH 1400	Calculus, Part I	1
MATH 1410	Calculus, Part II <sup>2</sup>	1
or MATH 1610 Honors Calculus		
MATH 2400	Calculus, Part III	1
or MATH 2600 Honors Calculus, Part II		
MATH 3610	Advanced Calculus	1
or MATH 5090 Advanced Analysis		
MATH 3600	Advanced Calculus	1
or MATH 5080 Advanced Analysis		
Algebra Requirement:		
MATH 3700	Algebra	1
or MATH 5020 Abstract Algebra		

MATH 3710	Algebra	1
or MATH 5030 Abstract Algebra		
Statistics Requirement:		
MATH 3200	Computer Methods in Mathematical Science I	1
STAT 4310	Statistical Inference	1
Upper Level Math Course:		
Select one of the following:		
MATH 2410	Calculus, Part IV	
MATH 4200	Ordinary Differential Equations	
MATH 4250	Partial Differential Equations	
MATH 4800	Topics in Modern Math (only if Life Science related)	
Other		
<i>Biology Requirement</i>		
Select one of the following Tracks:		8.5
Track 1:		
BIOL 1121	Introduction to Biology - The Molecular Biology of Life	
BIOL 1124	Introductory Organismal Biology Lab	
Select two of the following:		
BIOL 2210	Molecular Biology and Genetics	
BIOL 2410	Evolutionary Biology	
BIOL 2610	Ecology: From individuals to ecosystems	
Select three of the following:		
BIOL 4410	Advanced Evolution	
BIOL 4517	Theoretical Population Biology	
BIOL 4231	Genome Science and Genomic Medicine	
BIOL 4536	Introduction to Computational Biology & Biological Modeling	
BIOL 5536	Fundamentals of Computational Biology	
Select one of the following additional science courses:		
CHEM 1011 & CHEM 1101	Introduction to General Chemistry I and General Chemistry Laboratory I	
CHEM 1011 & CHEM 1102	Introduction to General Chemistry I and General Chemistry Laboratory II	
PHYS 0151	Principles of Physics II: Electromagnetism and Radiation	
Track 2:		
BIOL 1101	Introduction to Biology A	
BIOL 1102	Introduction to Biology B	
Select two of the following:		
BIOL 2210	Molecular Biology and Genetics	
BIOL 2410	Evolutionary Biology	
BIOL 2610	Ecology: From individuals to ecosystems	
Select two of the following:		
BIOL 4410	Advanced Evolution	
BIOL 4231	Genome Science and Genomic Medicine	
BIOL 4235	The RNA World: A functional and computational analysis	
Select one of the following additional science courses:		
CHEM 1011 & CHEM 1101	Introduction to General Chemistry I and General Chemistry Laboratory I	

CHEM 1011 & CHEM 1102	Introduction to General Chemistry I and General Chemistry Laboratory II
PHYS 0151	Principles of Physics II: Electromagnetism and Radiation

---

**Total Course Units** **36-37**

1

You may count no more than one course toward both a Major and a Sector requirement. For Exceptions, check the Policy Statement (<http://www.college.upenn.edu/sectors-policy/>).

2

MATH 1610 Honors Calculus is a Honors Course.

---

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2023 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.

---