



# Mathematical Biology Major

[www.Mathematics.Pitt.edu](http://www.Mathematics.Pitt.edu)

Revised 06/2023

Mathematics has assumed a significant role in the study of biological systems, in the development of biotechnology, and in advances in medicine. The construction and analysis of mathematical models of biological systems allows for the precise formulation of theoretical ideas, the testing of assumptions that may not be easily accessible experimentally, and the generation of novel predictions that can guide future research. The University of Pittsburgh is known for its excellence in biomedical research, and the Department of Mathematics at Pitt includes prominent faculty with strong records of teaching and research in mathematical biology.

The major in Mathematical Biology will help students develop an expertise in thinking mathematically about biological systems. Students will acquire fundamental skills in mathematical analysis and simulation, specialized experience in mathematical modeling in biology and neuroscience, and knowledge of particular areas of biology. These tools will prepare students to participate in undergraduate research and to go on to use quantitative methods in biotechnology, medicine, and other fields.

Required courses for the Mathematical Biology major  
The Mathematics

(u)-6. (i M) Tw [(1 o)-4.1)5.9 (s)h4 ( )]TJ -9J 0.m (e9E))-12 (0.9 ( E)-7 | 1c-6.1 (u)-6.2 (a)-A)-7.6 ( -6.1 (u)-6.2 (a)-9.2 Tc -0.003 T-7 6 ( 1sd (

Students pursuing the Mathematical Biology major are encouraged to take CHEM 0110 General Chemistry 1 and CHEM 0120 General Chemistry 2, as these courses will satisfy the Dietrich School of Arts and Sciences breadth requirement in natural science and will expand their biology and neuroscience course options. Several of the BIOSC courses that fulfill requirements for this major have prerequisites, but some do not have prerequisites. PHYS 0174 Basic Physics for Science and Engineering 1 and PHYS 0175 Basic Physics for Science and Engineering 2 also carry a high degree of relevance for Mathematical Biology majors.

#### Advising

Jason DeBlois  
THACK 407  
[UGDMath@Pitt.edu](mailto:UGDMath@Pitt.edu)

#### Checklist for the Mathematical Biology major

Three Calculus courses (12 credits)

\_\_\_\_\_ MATH 0220

\_\_\_\_\_ MATH 0230

\_\_\_\_\_ MATH 0240

Mathematical Biology students who plan to continue in graduate studies are advised to take MATH 1530 Advanced Calculus 1 and MATH 1540 Advanced Calculus 2.

Two introductory theoretical courses (7 credits)

\_\_\_\_\_ MATH 0413 \* \_\_\_\_\_ MATH 0420 \*

MATH 1370 Introduction to Computational Neuroscience and MATH 1380 Mathematical Biology introduce students to techniques for independent research; students completing these courses are encouraged to pursue research opportunities in Mathematical Biology that are available locally and nationally.

Professional Development

\_\_\_\_\_ MATH 0500

Two upper-level required courses (6 credits)

\_\_\_\_\_ MATH 1180 or MATH 1185 \_\_\_\_\_ MATH 0500

#### Grade requirements

A grade of C or better is required in each course that is to count toward the major. A minimum GPA of 2.0 in departmental courses is required for graduation.

e(\_ M)-4 <</MCID >>BDC -8.54 (o)-1.1 (d)-2.2 (u)-4.5

#### Satisfactory/No Credit option

Only MATH 0500 may be taken on an S/NC basis; other courses must be taken on a letter grade basis.

#### Writing (W) requirement

Students must complete at least one W course in the major. Either MATH 0413 or MATH 0450 satisfies this requirement.

#### Honors major requirements

To earn departmental honors in Mathematical Biology, the student must:

- x Fulfill all requirements for a degree in Mathematical Biology.
- x Complete the following courses with a grade of A- or higher.
  - x MATH 1370 Introduction to Computational Neuroscience
  - x MATH 1380 Mathematical Biology
- x Complete the following courses with a grade of B or higher.
  - x MATH 1530 Advanced Calculus 1;
  - x One 2000-level mathematics course (in lieu of an upper level elective);
- x Complete one of the following requirements.
  - o An honors thesis under the direction of Mathematics faculty member; for students seeking a BPhil from the University Honors College, this requirement could be satisfied by the Honors College thesis;
  - o A 2000-level mathematics course with a grade of B or higher, in addition to the course used for requirement 3, above.

Although not required, the department strongly recommends that honors degree candidates take the intermediate honors courses MATH 1185 and 0450 during their freshman or sophomore year.