

2009-2010

B.S. in Biology/Mathematics

College of Sciences and Technology

What Is the Study of Biology/Mathematics?

Biology, as the study of living things, is an academic endeavor with a basic research focus on seeking answers to questions rather than on applying biological knowledge to solve problems. As scientists, Biologists have two prime motivations: (1) intellectual curiosity about biological systems, and (2) the philosophy that creating and disseminating reliable knowledge has intrinsic worth.

"Mathematics reveals hidden patterns that help us understand the world around us. Now much more than Arithmetic and Geometry, Mathematics today is a diverse discipline that deals with data, measurements, and observations from science; with inference, deduction, and proof; and with mathematical models of natural phenomena, of human behavior, and of social systems.

As a practical matter, Mathematics is a science of pattern and order. Its domain is not molecules or cells, but numbers, chance, form, algorithms, and change. As a science of abstract objects, Mathematics relies on logic rather than on observation as its standard of truth, yet employs observation, simulation, and even experimentation as means of discovering truth." *From Everybody Counts: A Report to the Nation on the Future of Mathematics Education* (c) 1989 National Academy of Sciences.

Why Should I Consider This Major?

Are you interested in Biology and Math? Are you wondering where your interest could take you? Consider a Biology/Math B.S. degree. Many areas in Biology have benefited from a combination of these disciplines. From Physiology to Genomics to Ecology, mathematical models can be used to help solve biological problems.

In addition to theorems and theories, Mathematics offers distinctive modes of thought which are both versatile and powerful, including modeling, abstraction, optimization, logical analysis, inference from data, and use of symbols. Experience with mathematical modes of thought builds mathematical power, a capacity of mind increasing value in this technological age that enables one to read critically, to identify fallacies, to detect bias, to assess risk, and to suggest alternatives. Mathematics empowers us to understand better the information-laden world in which we live.

How to Declare:

Declare as early as possible so that a program of study can be planned in collaboration with departmental advisors.

Mid-Program Checkpoint:

Students intending to complete a Bachelor of Science degree in Biology-Mathematics within four years should complete the following courses by the start of their junior year. Students are expected to follow all prerequisite requirements for courses and seek early departmental advisement.

Coursework:

MATH 124, 125, 224
CHEM 121, 122 & 123, 251
MATH 204, CSCI 141 or MATH 207
Start the Physics sequence, i.e. PHYS 121, 122, 123

Other Activities:

Develop excellent laboratory skills.
Attend Math Colloquiums and Biology Seminars.
Discuss national and international study abroad opportunities with the International Programs and Exchanges Office.

Contact Information:

Biology Department Website:
<http://www.biol.wvu.edu/biology/>

Mathematics Department Website:
<http://www.wvu.edu/depts/math/>

Mathematics Faculty Advisor:

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Biology Faculty Advisors:

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Biology Undergraduate Advisor:

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Sample Careers:

Populations Researcher

Biostatistician

Research Analyst

Bioinformatics Scientist



B.S. Biology/Mathematics Major Requirements: 104-105 Credits

BIOL 204 Introduction to Evolution, Ecology and Biodiversity (4)

BIOL 205 Introduction to Cellular and Molecular Biology (5)

BIOL 206 Introduction to Organismal Biology (5)

BIOL 321 Genetics (4)

BIOL 323 Cell and Molecular Biology (4)

BIOL 325 Ecology (3)

BIOL 432 Evolutionary Biology (4)

MATH 124 Calculus and Analytic Geometry I (5)

Or MATH 134 Honors Calculus I (5)

MATH 125 Calculus and Analytic Geometry II (5)

Or MATH 135 Honors Calculus II (5)

Note: MATH 138 (5) can substitute for the 124/134 and 125/135 set.

*MATH 204 Elementary Linear Algebra (4)

MATH 224 Multivariable Calculus and Geometry I (5)

*MATH 331 Ordinary Differential Equations (4)

MATH 341 Probability and Statistics Inference (4)

MATH 342 Statistical Methods (4)

MATH 432 Systems of Differential Equations (4)

Note: the pair MATH 203 and 303 can substitute for MATH 204 and 331.

One of:

CSCI 139 Programming Fundamentals in PYTHON (4)

CSCI 140 Programming Fundamentals in C ++ (4)

CSCI 141 Computer Programming I (4)

MATH 207 Mathematical Computing (3)

Plus 8 credits of approved upper-division electives from Math, Math/Computer Science or Biology

CHEM 121, 122, 123 General Chemistry I, II, III (5, 5, 4)

Or CHEM 125, 126, 225 General Chemistry, Honors (5, 5, 5)

CHEM 251 Elementary Organic Chemistry (5)

PHYS 121, 122 Physics with Calculus I, II (5, 5)

These courses are required (or advised) for this major and may be used to satisfy GUR or Writing Proficiency requirements.

QSR: MATH 124

LSCI: CHEM 121, 122, 123; BIOL 204, 205, 206,
PHYS 121, 122, 123

WP: Three Writing Proficiency points are required for graduation (they are noted as WP1, WP2, and WP3). Check [Classfinder](#) or [Online Timetable](#) for departmental offerings each quarter.

Other Biology/Mathematics Options:

B.A. Biology (74 credits)

B.A. Behavioral Neuroscience (110-110 credits)

B.A. Anthropology/Biology (89)

B.A. Mathematics (70 credits plus 17-20 in supporting courses)

B.A. Economics/Mathematics (94-95 credits)

B.S. Biology (90-95 credits)

B.S. Biology/Anthropology (101-104 credits)

B.S. Cellular and Molecular Biology/Biochemistry (106 credits)

B.S. Mathematics (70 credits plus 17-20 in supporting courses)

B.S. Mathematics/Computer Science (91 credits)

B.A. Ed. Biology/Chemistry–Secondary (103-107 credits plus certification program)

B.A. Ed. Mathematics–Elementary (50 credits plus certification program)

B.A. Ed. Mathematic–Secondary (70 credits plus certification program)

B.A. Ed. Chemistry/Mathematics–Secondary (102-121 credits plus certification program)

B.A. Ed. Physics/Mathematics (106-107 credits plus certification program)

Biology Minor (43 credits)

Mathematics Minor (34-35 credits)