

MASTER OF SCIENCE IN THE FIELD OF BIOLOGICAL SCIENCES (STEM)

Beginning in fall 2025, the Department of Biological Sciences will offer three concentrations for students in the MS in biological sciences program. Students must select and apply for one of these concentrations, which are described below.

This is a highly interactive master's program drawing on the department's research strengths spanning the areas of systematics, evolution, ecology as well as cellular and molecular biology. Students who wish to enhance their knowledge of a specific area of biology while gaining additional quantitative analysis and laboratory skills through applied courses can apply to either the biodiversity science concentration or the cellular and molecular biology concentration. A third thesis-based concentration option allows students to pursue research in the laboratory of an advisor identified at the time of admission. Students in the program often take advantage of other researchers, faculty, and facilities at GW and elsewhere in the Washington area. These include the National Institutes of Health (NIH) and Smithsonian Institution's National Museum of Natural History.

Biodiversity Science Concentration (non-thesis)

Amid increasing concern about the health of ecosystems and endangered species, expertise in biodiversity science allows students to specialize in the principles and methods of comparative biodiversity science. Students in this track explore the complexities of evolution over time, the ecological interactions of species with each other and the environment, and potential biological indicators of ecosystem disturbances.

Cellular and Molecular Biology Concentration (non-thesis)

Graduate students in the cellular and molecular biology focus area (<https://biology.columbian.gwu.edu/graduate/#focus>) prepare for real-world challenges through research (<https://biology.columbian.gwu.edu/node/36/>) on well-studied model systems, non-model organisms, and comparisons among different types of organisms. Students in the program will gain advanced laboratory and statistical analytical skills. The program will prepare students for research and laboratory-based careers as well as medical and MD/PhD programs.

Research Lab Thesis-Based Concentration

This concentration allows students to pursue research in the laboratory of an advisor identified at the time of admission in one of two broad areas: cell and molecular biology or systematics, evolution, and ecology. Aimed at those who seek additional graduate work such as for a PhD, coursework is tailored to the student's research interests and it also requires the successful completion and defense of a written research thesis. To complement their classroom education, students can get involved in ongoing field research at both terrestrial and aquatic field sites around the world. Students must contact faculty prior to application to this

concentration to inquire whether faculty are taking students on in their lab.

This is a STEM designated program.

Visit the program website (<https://biology.columbian.gwu.edu/ms-biology/>) for additional information.

ADMISSIONS

Visit the Columbian College of Arts and Sciences website for application requirements (<https://columbian.gwu.edu/application-requirements/>).

Supporting documents not submitted online should be mailed to:

Columbian College of Arts and Sciences, Office of Graduate Studies
The George Washington University
801 22nd Street NW, Phillips Hall 107
Washington DC 20052

For additional information about the admissions process visit the Columbian College of Arts and Sciences Frequently Asked Questions (<https://columbian.gwu.edu/graduate-admissions-faq/>) page.

Contact for questions:

askccas@gwu.edu
202-994-6210 (phone)
Hours: 9:00 am to 5:00 pm, Monday through Friday

REQUIREMENTS

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Graduate Programs (<https://bulletin.gwu.edu/arts-sciences/#regulationsgraduatetext>).

Completion of all requirements for one of the following 30-credit concentrations: biodiversity science concentration (non-thesis); cellular and molecular biology concentration (non-thesis); or research lab thesis-based concentration.

Code	Title	Credits
Biodiversity science concentration		
30 credits, including 6 credits in required core courses, 3 credits in quantitative analysis, 6 credits in professional experience, and 15 credits in elective courses.		
Required		
Core courses		
BISC 6102	Scientific Presentation	
BISC 6103	Professional Development	

BISC 6238 Foundations of Ecology
 or BISC 6276 Foundations in Evolution

Quantitative analysis course *

BISC 6233 Biometry

Professional experience

A total of 6 credits taken in research and/or internship. Courses can be repeated for credit.

BISC 6295 Research

BISC 6299 Internship in Biological Sciences

Electives

15 credits in elective courses selected from the following:

BIOC 6223 Bioinformatics

BIOC 6243 Applied Bioinformatics

BISC 6206 Current Topics in Evolutionary Ecology (can be repeated for credit provided the topic differs)

BISC 6207 Seminar: Current Topics in Systematic Biology (can be repeated for credit provided the topic differs)

BISC 6210 Methods of Study of Evolution

BISC 6211 Biogeography and Speciation

BISC 6214 The Phylogenetic Basis of Comparative Biology

BISC 6215 Vertebrate Phylogeny

BISC 6216 Morphological Systematics

BISC 6225 Molecular Phylogenetics

BISC 6232 Organismal Form and Function

BISC 6243 Seminar: Ecology (can be repeated for credit provided the topic differs)

BISC 6260 Conservation Biology

GEOG 6220 Seminar: Climatic Change

GEOG 6303 Introduction to Remote Sensing

GEOG 6304 Geographic Information Systems I

PUBH 6860 Principles of Bioinformatics

PUBH 6899 Topics in Biostatistics and Bioinformatics (can be repeated for credit provided the topic differs)

Cellular and molecular biology concentration

30 credits, including 6 credits in required core courses, 9 credits in laboratory experience courses, 9 credits in quantitative analysis and bioinformatics courses, and 6 credits in elective courses.

Required

Core courses

BISC 6102 Scientific Presentation

BISC 6103 Professional Development

BISC 6205 Foundations in Cell and Molecular Biology

Laboratory experience

9 credits in courses selected from the following:

BISC 6234 Microbial Genomics Laboratory

BISC 6274 Gene Regulation and Genetic Engineering

BISC 6275 Introduction to Recombinant DNA Techniques

BISC 6295 Research (can be repeated for credit)

BISC 6299 Internship in Biological Sciences (can be repeated for credit)

Quantitative analysis and bioinformatics courses

9 credits in courses selected from the following: *

BIOC 6223 Bioinformatics

BIOC 6240 Next Generation Sequencing

BIOC 6242 Bioscience Big Data Statistics

BIOC 6243 Applied Bioinformatics

PUBH 6002 Biostatistical Applications for Public Health

PUBH 6851 Introduction to R for Public Health Research

PUBH 6852 Introduction to Python for Public Health Research

PUBH 6860 Principles of Bioinformatics

PUBH 6899 Topics in Biostatistics and Bioinformatics (can be repeated for credit provided the topic differs)

PUBH 8885 Computational Biology

Electives

6 credits in elective courses selected from the following:

BIOC 6221	Proteins, Pathways, and Human Health
BIOC 6228	Research Essentials and Bioscience Careers
BIOC 6237	Proteomics and Biomarkers
BISC 6212	Virology and Antiviral Immunity
BISC 6218	Innate Immunity
BISC 6219	Host-Microbe Interactions
BISC 6251	Evolutionary Developmental Biology
MICR 6236	Fundamentals in Geonomics and Proteomics I
MICR 8210	Infection and Immunity
PUBH 6276	Public Health Microbiology

Research lab thesis-based concentration

30 credits, including 6 credits in required core courses, 18 credits in elective courses, and 6 credits in thesis. The research thesis must be completed and successfully defended.

Required

Core courses

BISC 6102	Scientific Presentation
BISC 6103	Professional Development
BISC 6205	Foundations in Cell and Molecular Biology
or BISC 6238	Foundations of Ecology
or BISC 6276	Foundations in Evolution

Thesis

BISC 6999	Thesis Research (taken twice for a total of 6 credits)
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Electives

18 credits in elective courses selected in consultation with the thesis advisor.

Students use elective credits to map out the courses to be taken throughout the degree. The program of study is prepared in the first semester under the guidance of the student's thesis advisor. Selected courses are those most appropriate for supporting and achieving the specific research-focused goals of the student's thesis.

*BISC 6243 can count as a quantitative analysis course when taught as Data Analysis in R.

Undergraduate courses taken for graduate credits—A limited number of upper-division undergraduate courses can be taken for graduate credit with the permission of the advisor and the instructor. For the biodiversity science concentration, the following courses can be counted as electives if taken for graduate credit: BISC 2216, BISC 2224, and BISC 2339. For the cellular and molecular biology concentration, the following courses can be counted as laboratory experience courses if taken for graduate credit: BISC 3208, BISC 3209, BISC 3210, BISC 3211, and BISC 3215. Students should consult with the program advisor before registering for undergraduate courses.