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

Admission deadlines:	Fall - April 1 (February 1 for priority fellowship consideration)
Standardized test scores:	GRE not required
	The Test of English as a Foreign Language (TOEFL), the academic International English Language Testing System (IELTS), or the PTE Academic is required of all applicants except those who hold a bachelor's, master's, or doctoral degree from a college or university in the United States or from an institution located in a country in which English is the official language, provided English was the language of instruction.
	Minimum scores for the program are:
	- Academic IELTS: an overall band score of 7.0 with no individual score below 6.0; or
	- TOEFL: 600 on paper-based or 100 on Internet-based; or
	- PTE Academic: 68;
	- Duolingo: 130
Recommendations required:	Two (2) recommendation
Prior academic records:	Transcripts are required from all colleges and universities attended, whether or not credit was earned, the program was completed, or the credit appears as transfer credit on another transcript. Unofficial transcripts from all colleges and universities attended must be uploaded to your online application. Official transcripts are required only of applicants who are offered admission.
	If transcripts are in a language other than English, English language translations must be provided. The English translation alone should be uploaded into your application.
Statement of purpose:	In an essay of 250 – 500 words, state your purpose in undertaking graduate study in your chosen field. Include your academic objectives, research interests, and career plans. Also discuss your related qualifications, including collegiate, professional, and community activities, and any other substantial accomplishments not already mentioned on the application. If you are applying for an assistantship or fellowship, you should also describe any teaching experience you have had.

	Applicants are required to establish correspondence with one or more potential research advisors in the Biological Sciences Department prior to submitting your application. You should mention these individuals in your statement of purpose, explain how your interests match their research program(s). Applicants who have not discussed with faculty their interests in the program are unlikely to be admitted.
International applicants only:	Please follow this link - https://columbian.gwu.edu/international-graduate-applicants (https://columbian.gwu.edu/international-graduate-applicants/) - to review the International Applicant Information carefully for details on required documents, earlier deadlines for applicants requiring an I-20 or DS-2019 from GW, and English language 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:

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)

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.