

# BIOINFORMATICS AND COMPUTATIONAL BIOLOGY, PHD

**Banner Code: SC-PHD-BCB**

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In the field of bioinformatics and computational biology, specialists collect, store, analyze, model, and present complex biological data to understand how individual components of biological systems and the interactions between them inform function at all levels of biological hierarchy. Through the combination of biological analysis and high-performance computing, critical contributions are made to biomedical, agricultural, and environmental sciences. The main objective of this doctorate is to educate the next generation of computational biologists for careers in academia, industry, and government. The program provides students with interdisciplinary academic training that includes fundamental bioscience courses as well as advanced courses in bioinformatics, which cover the most recent developments in the field. The curriculum is designed to be completed in approximately two years. The completion of coursework, the comprehensive exam, and a successful dissertation proposal result in advancement to candidacy status. In the final phase of the program, students focus on research that culminates in a dissertation.

The program is structured to be accessible for full and part-time students. Because the program has a fully online option, students may choose to earn the doctoral degree entirely remotely or in a traditional face-to-face format. All courses are offered in hybrid, distance learning, or asynchronous formats without requiring students to travel to campus. Visit Mason Online (<http://masononline.gmu.edu/>) for details.

## Admissions & Policies

### Admissions

University-wide admissions policies can be found in the Graduate Admissions Policies (<https://catalog.gmu.edu/admissions/graduate-policies/>) section of this catalog. International students and students having earned international degrees should also refer to Admission of International Students (<https://catalog.gmu.edu/admissions/international-students/>) for additional requirements.

### Eligibility

Applicants should have a bachelor's degree in biology, computer science, or a related field from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent with a minimum GPA of 3.25 in the last earned degree. Applicants are expected to have completed coursework in molecular biology, genetics, calculus, chemistry, computer programming, and probability and statistics. Students with deficiencies in one or more of

these areas may be admitted and required to take additional courses, some of which may not be applicable to the degree's credit total.

### Application Requirements

To apply for this program, prospective students should submit the George Mason University Admissions Application (<https://www2.gmu.edu/admissions-aid/apply-now/>) and its required supplemental documentation, a goals statement, and three letters of recommendation.

The GRE is not required for admission into this program.

### Policies

For policies governing all graduate programs, see AP6 Graduate Policies (<https://catalog.gmu.edu/policies/academic/graduate-policies/>).

### Transferring Previous Graduate Credit into this Program

Previously earned and relevant graduate credits may be eligible for transfer into this program; details can be found in the Credit by Exam or Transfer (<https://catalog.gmu.edu/policies/academic/graduate-policies/>) section of this catalog.

## Requirements

### Degree Requirements

Total credits: 72

Students should refer to the Admissions & Policies tab for specific policies related to this program.

### Doctoral Coursework

Code	Title	Credits
<b>Fundamental Bioscience Courses</b>		
BINF 701	Systems Biology	3
BINF 702	Biological Data Analysis	3
<b>Core Bioinformatics Courses</b>		
BINF 690	Numerical Methods for Bioinformatics	3
BINF 705	Research Ethics	1
BINF 730	Biological Sequence and Genome Analysis	3
BINF 731	Protein Structure Analysis	3
BINF 740	Introduction to Biophysics	3
<b>General Electives</b>		
Select 23-35 credits of approved general electives or independent research		23-35
<b>Lab Rotation</b>		<b>3</b>
BINF 703	Bioinformatics Lab Rotation (taken three times)	
<b>Colloquium</b>		<b>3</b>
BINF 704	Colloquium in Bioinformatics (taken three times)	
<b>Total Credits</b>		<b>48-60</b>

## Doctoral Committee and Advancement to Candidacy

By the end of the semester when coursework is completed, the student must form a doctoral committee made up of a minimum of three graduate faculty members and take a written comprehensive exam. The exam includes written and oral components. Upon passing the comprehensive exam and submitting an acceptable dissertation proposal, the student is advanced to doctoral candidacy to begin the dissertation writing phase.

## Dissertation Research

A minimum of 12 and maximum of 24 combined credits from BINF 998 Doctoral Dissertation Proposal and BINF 999 Doctoral Dissertation may be applied toward satisfying doctoral degree requirements. Students must take at least 3 credits of BINF 999 Doctoral Dissertation.

Code	Title	Credits
Select 12-24 credits from the following:		12-24
BINF 998	Doctoral Dissertation Proposal	
BINF 999	Doctoral Dissertation	
<b>Total Credits</b>		<b>12-24</b>

## Doctoral Dissertation

After advancing to doctoral candidacy, students work on their doctoral dissertation while enrolled in BINF 999 Doctoral Dissertation. The dissertation should represent a significant contribution that is suitable for publication in a refereed scientific journal. The dissertation must be defended in a public forum before the dissertation committee and other interested faculty.