Program Change Request

Date Submitted: 03/01/24 8:56 am

Viewing: SC-PHD-BIOS : Biosciences, PhD

Last approved: 04/27/22 2:50 pm

Last edit: 03/01/24 9:07 am

Changes proposed by: jbazaz

Catalog Pages Using this Program

Biosciences, PhD

No Longer Anticipated closure

Are you completing this form on someone else's behalf?

Yes

Requestor:

In Workflow

1. **SSB CC**
2. **SSB Program Chair**
3. **SC Curriculum Committee**
4. SC Assistant Dean
5. Assoc Provost-Graduate
6. Registrar-Programs

Approval Path

1. 11/03/22 1:46 pm Iosif Vaisman (ivaisman): Approved for SSB Program Chair
2. 04/26/23 3:00 pm Jennifer Bazaz Gettys (jbazaz): Rollback to Initiator
3. 03/01/24 10:45 am Ramin Hakami (rhakami): Approved for SSB CC
4. 03/22/24 11:47 am Iosif Vaisman (ivaisman): Approved for SSB Program Chair

History

1. Nov 16, 2017 by clmig-jwehrheim
2. Oct 19, 2018 by Jennifer Bazaz

Gettys (jbazaz)
3. Mar 5, 2020 by jriemen
4. Feb 23, 2021 by jriemen
5. Feb 26, 2021 by jriemen
6. Jan 19, 2022 by Jennifer Bazaz Gettys (jbazaz)
7. Apr 27, 2022 by Jennifer Bazaz Gettys (jbazaz)

Name	Extension	Email
Alessandra Luchini	8945	aluchini

Effective Catalog: 2024-2025

Program Level: Graduate

Program Type: Doctoral

Degree Type: Doctor of Philosophy

Title: Biosciences, PhD

Approval Criteria
1. What was the process used within you
3. What evidence was used to identify nee
a. Have you ensured there are no other exis
b. Has CPE confirmed the proposed badge d
c. Has the instructor(s) for this badge experie
d. Is there a contact hour minimum?
e. Is an assessment required?
f. Does this badge provide a benefit for current
5. Is this badge co-sponsored with another
a. What is the organization, program, or departme

Earning Criteria
Course:
Badge:
Participant:
Payment:
Portfolio:
Presentation:
Assessment:
Credential:
Education
Other:
Project:
Professional
Schedule/Registration:

Skills Tag

Skills Tag

Badge Attributes

Please select one from each category:

Achievement Type:

Mastery Level:

Time Commitment:

Cost:

Industry Standards:

Recommendations:

Issuance information and Pricing

Pricing: See https://cpe.gmu.edu/digitalbadgepricing/ for more information

Estimated Number of Badges Expected to be Issued:

Notes:

- All badge requests will be routed to CPE for review and approval. Please al
- A Mason Digital Credentials Advisory Group may be developed to review ba

Banner Title: Biosciences, PhD

Is this a retitling of an existing program? Existing Program

Registrar/OAPI Use Only – SCHEV Status Approved

Registrar's Office Use Only – Program Start Term

Registrar/OAPI Use Only – SCHEV Letter

Registrar/OAPI Use Only – SACSCOC Status

Concentration(s):

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1	Cell and Molecular Biology	CMB
2	Microbiology and Infectious Disease	MID
3	Biocomplexity and Evolutionary Biology	BEB

INTO Major(s):

Registrar/IRR Use Only – Concentration CIP Code

College/School: College of Science

Department / Academic Unit: School of Systems Biology

Jointly Owned Program? No

Participating

Participating

Justification

What: The BIOS common core was increased from 12 credits to 18 and courses were removed from the concentrations.
Why: Changes in the core curriculum were implemented to fulfill minimum core requirements (25% common core credits,) and simultaneously, render the curriculum relevant for students in all the Biosciences concentrations: cellular and molecular biology, microbiology and infectious diseases, and biocomplexity and evolutionary biology.

What: Referring applicants to central admissions language and removing extraneous wording.
Why: To make the program more adaptable to changes in university policies.

Catalog Published Information

Total Credits Required: Total credits: 72

Registrar's Office Use Only - Program Code: SC-PHD-BIOS

Registrar/IRR Use Only – Program CIP Code

Admission Requirements:

Admissions

University-wide admissions policies can be found in the Graduate Admissions Policies section of this catalog. International students and students having earned international degrees should also refer to Admission of International Students for additional requirements. ~~catalog.~~

~~**To apply for this program, please complete the George Mason University Admissions Application.Application Requirements The**~~

~~following are required of applicants to thisprogram:~~Eligibility

Applicants should have obtained a minimum of ~~Minimum~~ 3.25 GPA in previous coursework with significant training in the biological sciences from an institution of ~~of~~ higher education accredited by a ~~a~~ Mason-recognized U.S. institutional accrediting agency or international equivalent.

Application Requirements

To apply for this program, prospective students should submit ~~please complete~~ the George Mason University Admissions Application and its required supplemental documentation, and: ~~Application.~~

- ~~Applicants are to supply a copy of official transcripts from each college and graduate institutionattended.~~Three letters of recommendation from faculty members or individuals who have firsthand knowledge of the applicant's academic or professional capabilities.
- A goals ~~An expanded goal~~ statement consistent with the research interests of at least one faculty member in the program.
- ~~A currentresume.TOEFL or IELTS scores are required of internationalstudents.~~An interview may also be required.

Applications should be submitted by January 1st for fall admission. Under unusual circumstances, applications may be considered for spring admission if they are received by October 1st. Applications will be considered until positions are filled. Students are encouraged to meet application deadlines to be considered for scholarships and stipends.
Strong candidates who lack several prerequisites may be admitted to provisional status. Removal from provisional status and continuation in the program is contingent on earning a GPA of 3.25 in the program's fundamental courses, plus completion of the missing prerequisites.
Students who have not taken a course in basic biochemistry will be required to complete one prior to BIOS 701 Systems Biology.
The GRE is not required for admission into this program.

Program-Specific Policies:

Policies

For policies governing all graduate programs/certificates, ~~programs,~~ see AP.6 Graduate Policies.

~~Reduction of Credits For students entering the doctoral program with a master's degree in a related field from an institution of higher education accredited by a Mason-recognizedU.S.institutional accrediting agency or international equivalent, the number of required credits may be reduced up to 30 credits, subject to approval of the program faculty and the college's associate dean for studentaffairs.~~Transferring Previous Graduate ~~Transfer of~~ Credit into this Program

Previously earned ~~Graduate credits taken previously~~ and relevant graduate credits ~~not used toward another degree~~ may be eligible for transfer into this program; details can be found in ~~transferred, subject to~~ the Credit by Exam or Transfer section of this catalog. ~~approval of the advisor, the program director, and the associate dean. See AP.6.5 Credit by Exam, Reduction or Transfer for more information.~~

Degree Requirements:

Students should refer to the Admissions & Policies tab for specific policies related to this program.
Students in this ~~the~~ doctoral program are required to present two research papers at a meeting or conference anytime ~~any time~~ before graduation.

Doctoral Coursework

Bioscience Core

~~BIOL 682~~	~~Advanced Eukaryotic Cell Biology~~	~~3~~
~~Six credits or two instances of~~		~~6~~
BIOS 701	Systems Biology	3
or BIOL 682	Advanced Eukaryotic Cell Biology	
BIOS 702	Research Methods	3
BIOS 703	Laboratory Rotation (repeated twice)	6
~~Three credits of~~		~~3~~
BIOS 704	Topics in Biosciences (repeated three times)	3
BIOS 743	Genomics, Proteomics, and Bioinformatics	3
or BIOS 767	Molecular Evolution	
or BIOL 580	Computer Applications for the Life Sciences	
Total Credits		18

Concentration in Cell and Molecular Biology (CMB)

This concentration prepares students for significant contributions in an academic or industrial research career. Coursework covers microarray analysis of gene expression, proteome analysis, sequencing and analysis of gene polymorphisms, gene and genome evolution, molecular studies of disease mechanisms, mechanisms of toxicology and mutagenesis, developmental neuroscience, and biotechnological applications.

~~Select 12 credits from the following:~~		~~12~~
Select 6 credits from the following: 1		6
BIOL 666	Human Genetics Concepts for Health Care	
BIOL 667	Signal Transduction in Cancer	
BIOL 689	Interdisciplinary Tools in the Biosciences	
~~BIOS 702~~	~~Research Methods~~	
BIOS 740	Laboratory Methods in Functional Genomics and Biotechnology	
BIOS 741	Genomics	
BIOS 742	Biotechnology	
~~BIOS 743~~	~~Genomics, Proteomics, and Bioinformatics~~	
~~BIOS 767~~	~~Molecular Evolution~~	

Total Credits	6

1

Students may take other courses as approved by their advisor.

Concentration in Microbiology and Infectious Disease (MID)

Students in this concentration will be prepared for employment in academia, government, or industry. By stressing mechanisms of pathogenicity, physiology, metabolism, and genomic and proteomic analysis of pathogens, students will have a firm foundation for future research in infectious disease. Students will also be introduced to advanced laboratory practices, such as animal research methodologies and biocontainment laboratory work.

~~Select 12-13 credits from the following:~~	~~12-13~~
Select 6-7 credits from the following:	6-7
BIOL 553 Advanced Topics in Immunology	
BIOL 563 Virology	
BIOL 583 General Biochemistry	
BIOL 669 Pathogenic Microbiology	
BIOL 689 Interdisciplinary Tools in the Biosciences	
BIOL 715 Microbial Physiology	
~~BIOS 702 Research Methods~~	
Total Credits	6-7

1

Students may take other courses as approved by their advisor.

Concentration in Biocomplexity and Evolutionary Biology (BEB)

This concentration prepares students for careers in academia, government or industry. Through this concentration students will learn laboratory and quantitative skills that will enable them to investigate evolutionary relationships among organisms at the population, species or ecosystem level. Students will be encouraged to explore a wide range of coursework in order to develop a broad background in evolutionary biology and a deep knowledge of relevant methodologies necessary to keep abreast in this rapidly changing field.

The science of evolutionary biology is fundamentally concerned with documenting not only genetic change, but also the processes that cause it. Evolutionary biology includes paleobiology, population genetics, evolutionary ecology and phylogenetics. Biocompexity is the study of living organisms, including their unique structural, chemical and genetic properties, their distribution and abundance in nature, and their evolutionary relationships to all other organisms. Given the fact that most of the earth's biodiversity is unknown, collecting, cataloging and studying organisms have always been and will continue to be one of the most challenging aspects of biology.

~~Select 12 credits from the following:~~	~~12~~
Select 6 credits from the following:	6
BIOL 502 Adaptation in Biosystems	
BIOL 574 Population Genetics	
BIOL 585 Eukaryotic Cell Biology Laboratory	
BIOL 689 Interdisciplinary Tools in the Biosciences	
BIOS 716 Methods in Evolutionary Biology	

~~BIOS 767 Molecular Evolution~~

Total Credits	6

Electives

Select 23-36 credits from the following lists associated with the chosen concentration:23-36

Cell and Molecular Biology & Microbiology and Infectious Disease Concentrations

- BIOL 564 Techniques in Virology
- BIOL 568 Advanced Topics in Molecular Genetics
- BIOL 579 Molecular Evolution and Conservation Genetics
- ~~BIOL 580 Computer Applications for the Life Sciences~~
- BIOL 667 Signal Transduction in Cancer
- BIOL 685 Emerging Infectious Diseases
- BIOL 689 Interdisciplinary Tools in the Biosciences
- BIOL 718 Techniques in Microbial Pathogenesis
- ~~BIOS 701 Systems Biology~~
- ~~BIOS 702 Research Methods~~
- BIOS 710 Current Topics in Bioscience
- BIOS 740 Laboratory Methods in Functional Genomics and Biotechnology
- BIOS 741 Genomics
- BIOS 742 Biotechnology
- ~~BIOS 743 Genomics, Proteomics, and Bioinformatics~~
- BIOS 744 Molecular Genetics
- BIOS 898 Directed Studies in Biosciences
- BIOS 899 Directed Research in Biosciences
- BINF 633 Molecular Biotechnology
- BINF 641 Biomolecular Modeling
- BINF 705 Research Ethics

Biocomplexity and Evolutionary Biology Concentration 1

- BIOL 506 Selected Topics in Microbiology
- BIOL 507 Selected Topics in Ecology
- BIOL 508 Selected Topics in Animal Biology
- BIOL 518 Conservation Biology
- BIOL 527 Conservation Medicine
- BIOL 532 Animal Behavior
- BIOL 533 Selected Topics in Plant Biology
- BIOL 537 Ornithology
- BIOL 538 Mammalogy
- BIOL 539 Herpetology
- BIOL 543 Tropical Ecosystems
- BIOL 559 Fungi and Ecosystems
- BIOL 561 Comparative Animal Physiology

BIOL 566	Cancer Genomics
BIOL 638	Sensory Ecology
BIOL 572	Human Genetics
BIOL 573	Developmental Genetics
BIOL 643	Microbial Ecology
BIOL 648	Population Ecology
BIOL 667	Signal Transduction in Cancer
BIOL 689	Interdisciplinary Tools in the Biosciences
BIOL 715	Microbial Physiology
BIOS 741	Genomics
BIOS 742	Biotechnology
~~BIOS 743~~	~~Genomics, Proteomics, and Bioinformatics~~
BIOS 744	Molecular Genetics
BIOS 898	Directed Studies in Biosciences
BIOS 899	Directed Research in Biosciences
EVPP 536	The Diversity of Fishes
GEOL 501	Selected Topics in Modern Geology (may be repeated once)
GEOL 534	Vertebrate Paleontology
Total Credits	23-36

1

Students may take other courses related to their research topic if approved by their committee. Courses in Geographic Information Systems or Statistics are encouraged.

Dissertation Committee

Upon admission to the program, each student is assigned an advisor from the bioscience faculty. The advisor may be changed by mutual consent of student and advisor, or petition to the program director and associate dean. With their advisor, students adopt an individual program that focuses on a specific area of research.

By the end of the fourth semester of coursework, students assemble a dissertation committee of four graduate faculty members with representation from at least two academic departments. The faculty advisor and the program director approve the program of study.

Qualifying Examination

On nearing completion of course requirements, students take a qualifying exam with a written and an oral component. At the discretion of the committee, the written qualifying exam may be retaken once if the student's performance was deemed below satisfaction.

Advancement to Candidacy

Upon successful completion of the qualifying exam, the majority of all coursework, and an accepted dissertation proposal, students will be recommended for advancement to candidacy by the committee and the program director.

The semester after advancement to candidacy, students are eligible to enroll in dissertation research (BIOS 999 Doctoral Dissertation Research). Students must review their progress on the dissertation with their graduate committee on a regular basis until graduation.

Dissertation Research

No more than 24 combined credits from BIOS 998 Doctoral Dissertation Proposal and BIOS 999 Doctoral Dissertation Research may be applied toward satisfying doctoral degree requirements. Students register for a minimum of 3 credits of BIOS 999 Doctoral Dissertation Research in the first semester of advancement.

Select 12-24 credits from the following:	12-24
BIOS 998 Doctoral Dissertation Proposal	
BIOS 999 Doctoral Dissertation Research	
Total Credits	12-24

Doctoral Dissertation

After advancing to doctoral candidacy, students work with their dissertation committee to develop their dissertation proposal into a completed doctoral dissertation. The dissertation research should represent a significant contribution that is publishable in a refereed scientific journal. When the dissertation is complete, students will present their results to their graduate committee and defend their dissertation in a public forum.

Retroactive Requirements Updates:

Plan of Study:

Honors Information:

Accelerated Description/Dual Degree Description:

INTO-Mason Requirements:

College Requirements & Policies:

Department / Academic Unit Requirements & Policies:

Program Outcomes

Additional Program Information

This information is required by the Office of Accreditation and Program Integrity.

Courses offered via distance (if applicable):

Indicate whether

What is the primary delivery format for the program? Face-to-Face Only

Does any portion of this program occur off-campus?

No

Off-campus details:

Are you working with a vendor / other collaborators to offer your program?

No

Please explain:

Related Departments

Could this program prepare students for any type of professional licensure, in Virginia or elsewhere?

No

Please explain:

Are you adding or removing a licensure component?

No

Please explain:

Additional SCHEV & SACSCOC Information

Is the content of the new program closely related to that of an existing approved program at the same instructional level (i.e., baccalaureate, master's, doctoral)?

Which existing approved program(s)?

Is this new program considered to be "advancing the degree level of a currently approved program" (i.e. existing content is at lower degree level, new content is at the higher degree

Which existing approved program(s)?

Is this new program considered to be "lowering the degree level of a currently approved program" (i.e. existing content is at higher degree level, new content is at the lower degree

Which existing approved program(s)?

Is this a re-opening of a program that was closed to admission within the last five years?

Date of Program Closure

What are the methods of delivery for the program?

Does this program include a course/credit-based competency-based education delivery option?

Is this change a simple retitling of an existing program, with no other changes, to any existing program content, curriculum requirements, etc?

No

Does this change represent a repackaging of content in an existing approved degree/certificate program at the same instructional level (i.e., baccalaureate, master's, or doctoral)?

No

Which existing approved program(s)?

Percentage of total credits containing new course content. ("New course content" is defined by SACSCOC as content that is not currently included in an existing approved degree/certificate program at the same instructiona level. Do not exclude gen ed credits in calculations for undergraduate programs.)

0%-24%

Does this change include the addition of a distance education or face-to-face method of delivery for this program

No

What is the new method of delivery?

Does this change include the addition of a course/credit-based competency-based education delivery option?

No

Will any additional equipment/facilities be needed?

No

Description of institutional impact:

Will any additional faculty be required?

No

Description of institutional impact:

Will any additional financial resources be needed?

No

Description of institutional impact:

Additional library/learning resources needed?

No

Description of institutional impact:

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program? No

Green Leaf Designation

Sustainability-focused academic programs require at least one green leaf course. Either that course is itself sustainability-focused or else the program requires a set of sustainability-related courses with aggregated

Relationship to Existing Courses

Relationship to Existing Programs

List sustainability-focused courses currently required in the degree

Sustainability-related academic programs either require at least one sustainability-related course or else offer any green leaf course as an option or elective. *

List sustainability-related courses currently required in the degree

Does this program cover material which crosses into another department?

No

Impacted Departments

Additional Attachments

SCHEV Proposal

Executive Summary

Reviewer Comments

Jennifer Bazaz Gettys (jbazaz) (04/26/23 3:00 pm): Rollback: SSB and BIOL need to come to an agreement.

Additional Comments

Is this course required of all students in this degree program?

%wi_required.eschtml%

Attached Document

Key: 420