Program Change Request

Date Submitted: 03/04/22 1:55 pm

Viewing: SC-CERG-BCB : Bioinformatics and Computational Biology Graduate Certificate

Last approved: 02/23/21 4:32 pm

Last edit: 03/14/22 2:29 pm

Changes proposed by: jbazaz

Catalog Pages Using this Program

Bioinformatics and Computational Biology Graduate Certificate

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

Yes

Requestor:

Name	Extension	Email
Ancha Baranova	571-334-1145	abaranov@gmu.edu

Effective Catalog: 2022-2023

Program Level: Graduate

Program Type: Certificate

Degree Type: Graduate Certificate

In Workflow

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

Approval Path

1. 03/09/22 1:16 pm Iosif Vaisman (ivaisman): Approved for SSB Program Chair

History

1. Nov 16, 2017 by clmig-jwehrheim
2. Jun 4, 2018 by rzachari
3. Mar 6, 2020 by pxiong
4. Feb 23, 2021 by Johanna Riemen (jriemen)

Title:	Bioinformatics and Computational Biology Graduate Certificate
Banner Title:	**Bioinformatics Compu Biol GC**
Registrar/OAPI Use Only – SCHEV Status	Approved
Registrar's Office Use Only – Program Start Term	Fall 2018
Registrar/OAPI Use Only – SCHEV Letter	BCB CERG.pdf
Registrar/OAPI Use Only – SACSCOC Status	
Concentration(s):	
Registrar/IRR Use Only – Concentration CIP Code	
College/School:	College of Science
Department / Academic Unit:	School of Systems Biology
Jointly Owned Program?	No

Justification

What: Removing letters of recommendation and adding the option of an IELTS test.
Why: To ease the path into this certificate.

What: Adding a track in Systems Biology and Biotechnology.
Why: The fields of Bionformatics and Biotechnology are intertwined. This interdisciplinary junction incorporates basic knowledge and applied skills drawn from both computer science and biology to extract insights from large sets of biological data being accumulated worldwide at the genome, proteome, transcriptome, and metabalome levels. Hence, Bioinformatics is dependent on Biotechnology.

Notably, a majority of the students either entering the field or already employed as Biological Data Analysts have graduated with a B.S. in either Biology or in Computer Science. These students need graduate level education in a complementary field, and many of these students are drawn to existing programs, i.e. Bioinformatics and Computational Biology at SSB, GMU.

On the other hand, for many students, joining interdisciplinary program at MS level is a big step. Many prospective students who recently graduated with B.S. degree in Computer Science or in Biology are hesitant to do so, as they need to "test the waters" with Graduate Certificate first.

Proposed concentration in Graduate Certificate in Bioinformatics will have an emphasis on Biotechnology and Systems Biology and will provide its students with solid background before making a choice of the M.S level degree in Biology or in Bioinformatics.

According to Indeed.com, 1365 jobs are available right now, with some of them being urgent hires.
https://www.indeed.com/q-Biological-Data-Analyst-jobs.html?vjk=7e60295aee976e8d

Landscaping analysis of job openings show that worldwide, biologists are stepping up their efforts in understanding biological processes by using a variety of experimental and bioinformatics methods. This has resulted in a flood of biological and clinical data, which could be overwhelming for researchers to handle without appropriate data processing and analysis tools, especially when there is a lack of training or no knowledge of programming, statistics, and modeling. Therefore, custom data analysis services have become increasingly important in biosciences and can certainly help accelerate the research cycle. Consequently, major hiring efforts are put by consulting companies specializing in custom data analysis, which often indicate biology background rather that computer science/ programming background as preferred requirement.

Graduate Certificate in Bioinformatics with track in Biotechnology and Systems Biology will fill this need.

Catalog Published Information

Total Credits Required: Total credits: 15

Registrar's Office Use Only - Program Code:
SC-CERG-BCB

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.
To apply for this program, please complete the George Mason University Admissions Application.
Applicants should hold a BA or BS degree in a discipline related to biological or computer science from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent, with a minimum GPA of 3.00. Applicants should have taken courses in molecular biology, computer science, calculus, physical chemistry, or statistics, and should also possess working knowledge of a computer programming language. To apply, prospective students should complete a George Mason University Admissions Application, supply ~~two copies of~~ official transcripts from each college and graduate institution attended, and **provide** a current résumé. TOEFL **or IELTS** scores are required of all international applicants.

Program-Specific Policies:

Policies

For policies governing all graduate certificate programs, see AP.6 Graduate Policies.

Premium Tuition

The certificate is a professional certification program that charges students at a differential (premium) tuition rate, with an additional $100 per credit added to the standard George Mason University graduate tuition rate for students who enroll in this certificate program, regardless of in-state or out-of-state status. The differential tuition is used to fund continuing improvements in the College of Science's (COS) educational facilities used to support the certificate program.
Students may not pursue this certificate concurrently with any other graduate degree program or certificate program offered by COS. In addition, students may not apply previous credit hours from another certificate, degree, or non-degree studies to this certificate program because of the differential (premium) tuition rate.

Degree Requirements:

This certificate may be pursued on a full-or part-time basis.
Students should refer to the Admissions & Policies tab for specific policies related to this program.

Required Courses

Students must complete the following coursework:

BINF 630	Bioinformatics Methods	3
BINF 631	Molecular Cell Biology for Bioinformatics	3
~~BINF 634~~	~~Bioinformatics Programming~~	~~3~~
Total Credits		6

Systems Biology and Biotechnology Track

This track was largely created to build a "bridge" option for students who had not yet decided if they would like to pursue a wet lab career or enter into the field of computational biology. Once completed, these certificate

graduates will be well prepared to enter into the Biology, MS, the Bioinformatics and Computational Biology, MS, or to pursue a career in biotechnology.		
BINF 701	**Systems Biology**	**3**
BIOS 742	**Biotechnology**	**3**
or BIOS 743	**Genomics, Proteomics, and Bioinformatics**	
Choose one elective from the following:		**3**
BIOL 502	**Adaptation in Biosystems**	
BIOL 508	**Selected Topics in Animal Biology**	
BIOL 682	**Advanced Eukaryotic Cell Biology**	
BIOL 689	**Interdisciplinary Tools in the Biosciences**	
Total Credits		9

Non-Track Electives

~~Select two courses from the following courses, or other courses as approved by the coordinator:~~		~~6~~
For students not choosing the Systems Biology and Biotechnology Track, select three courses from the following, or other courses as approved by the coordinator:		**9**
BINF 633	Molecular Biotechnology	
BINF 634	**Bioinformatics Programming**	
BINF 636	Microarray Methodology and Analysis	
BINF 639	Introduction to Biometrics	
BINF 730	Biological Sequence and Genome Analysis	
BINF 731	Protein Structure Analysis	
BINF 732	Genomics	
BINF 733	Gene Expression Analysis	
BINF 734	Advanced Bioinformatics Programming	
BINF 739	Topics in Bioinformatics	
Total Credits		9

~~Required Courses Electives~~

Retroactive Requirements Updates:

Plan of Study:

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 students are able to pursue on a: Both Full and Part-time basis

What is the primary delivery format for the program? **Both Face-to-Face and Distance**

Does any portion of this program occur off-campus?

No

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

No

Related Departments

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

No

Are you adding or removing a licensure component?

No

Additional SCHEV & SACSCOC Information

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

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 instructional 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

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

Will any additional faculty be required?

No

Will any additional financial resources be needed?

No

Additional library/learning resources needed?

No

OAPI Use Only – Determination of SACSCOC Impact

Comments or Notes

Green Leaf Program Designation

Is this a Green Leaf program? No

Does this program cover material which crosses into another department?

No

Additional Attachments

Reviewer Comments

Additional Comments

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

%wi_required.eschtml%

Key: 414