Program Change Request

Date Submitted: 04/10/20 3:18 pm

Viewing: SC-MS-BIOL : Biology, MS

Last approved: 02/05/20 2:43 pm

Last edit: 05/01/20 10:57 am

Changes proposed by: jbazaz

Catalog Pages Using this Program

Biology, MS

2020-2021

Rationale for

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

Yes

Requestor:

In Workflow

1. **SSB Program Chair**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. SC CAT Editor
5. Assoc Provost-Graduate
6. Registrar:Concentrat Code
7. Registrar-Programs: Duration
8. Registrar-Programs

Approval Path

1. 04/10/20 3:40 pm Iosif Vaisman (ivaisman): Approved for SSB Program Chair

History

1. Nov 16, 2017 by clmig-jwehrheim
2. Mar 15, 2018 by Rebekah Zacharias (rzachari)
3. Sep 30, 2019 by Jennifer Bazaz Gettys (jbazaz)
4. Feb 5, 2020 by Jennifer Bazaz Gettys (jbazaz)

Name	Extension	Email

Name	Extension	Email
Ancha Baranova	5713341145	abaranov

Effective Catalog: 2020-2021

Program Level: Graduate

Program Type: Master's

Degree Type: Master of Science

Title: Biology, MS

Banner Title: Biology, MS

Is this a retitling of an existing

Existing Program

Registrar/OAPI Use Only – SCHEV Status Approved

Registrar's Office Use Only – Program Start Term

Registrar/OAPI Use Only – SCHEV Letter

Concentration(s):

	Associated Concentrations	Registrar's Office Use Only: Concentration Code
1 ~~4~~	Evolutionary Biology	EB
2 ~~1~~	Microbiology and Infectious Disease	MID
3 ~~2~~	Molecular Biology	MOB
4 ~~3~~	Neuroscience	NEUR
5	**Nutrition Genetics and Nutraceuticals**	**NGN**
6 ~~5~~	Translational and Clinical Research	TCR

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

Academic Themes:

Justification

Admissions changes to allow a GRE waiver for those holding an MS. Removed instances of suggested GRE scores.

Reorganizing the shared core so that grouping is listed first. Removed shared courses from the concentration sections and modified concentrations to meet credit hour requirements.

Alphabetized and added course options to the concentrations.

Creating a concentration in Nutrition Genetics and Nutraceuticals in collaboration with CHHS.

Catalog Published Information

Total Credits Required: Total credits: 30

Registrar's Office Use Only - Program Code: SC-MS-BIOL

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.
While each applicant's qualifications are reviewed as a whole, the following are **required:** ~~provided:~~ Applicants to the program must have a bachelor's degree in biology or **other relevant fields.** ~~its equivalent.~~ Additionally, all MS concentrations require a GPA of 3.00 in biology coursework or in the last 60 credits of undergraduate study. Students must also submit three letters of recommendation and scores on the GRE general exam. **GRE is waived for those with previous MS degree in any field, with graduate-level Certificate or at least 9 credits of relevant non-degree studies.** ~~Exam scores should be in the 45th percentile orabove.~~**Previous research experience or relevant**

employment ~~Admission~~ is **a plus. Admission is** contingent on acceptance by **a** ~~a~~ faculty **research adviser.** ~~research advisor.~~

Evolutionary Biology (EB) Concentration

Students who choose the Evolutionary Biology Concentration must also submit a personal statement/statement of interest consistent with at least one faculty member's research program.
~~**program.**~~

Microbiology and Infectious Disease (MID) Concentration

Students who choose the Microbiology and Infectious Disease Concentration must have a lecture and lab course in microbiology and a lecture course in biochemistry.

Translational and Clinical Research (TCR) Concentration

Students who choose the Translational and Clinical Research Concentration may submit MCAT scores in place of GRE general exam scores.
~~Evolutionary Biology (EB) Concentration Students who choose the Evolutionary Biology Concentration must also submit a personal statement/statement of interest consistent with at least one faculty member's researchprogram.GRE score should be approximately303.~~

Program-Specific Policies:

Policies

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

Degree Requirements:

Students should refer to the Admissions & Policies tab for specific policies related to this program.
Candidates for the Biology, MS must complete the Core Courses and choose one concentration, detailed below, for a total of 30 credits (minimum).

Program of Study

The faculty advisor and the student work together to develop a program of study that best fits the student's background and interests. The student must submit a program of study to the program director for approval within the first 12 credits of coursework. By the end of the second semester of coursework, students will form a graduate committee made up of three faculty members. At least two committee members must be faculty in **the** ~~the~~School of Systems Biology.

Core Courses

Students must complete all core courses and choose one concentration option.

Course List

Code	Title	Credits
Cell and Molecular Requirement		**3**
BIOL 682	**Advanced Eukaryotic Cell Biology**	
or BIOS 744	**Molecular Genetics**	
Professional Methods Requirement		**4**
BIOL 690	**Introduction to Graduate Studies in Biology**	
Choose one from the following:		
BIOL 689	**Interdisciplinary Tools in the Biosciences**	
BIOL 691	**Current Topics in Biology 1**	
or BIOS 702	**Research Methods**	
NEUR 702	**Research Methods**	
Seminar Requirement		**3**
Select a total of 3 credits from the following courses:		
BIOL 692	**Seminar in Biology**	
BIOL 695	**Seminar in Molecular, Microbial, and Cellular Biology 2**	
Systems Biology/Evolution Requirement		**3**
BIOL 502	**Adaptation in Biosystems**	
Research Requirement		**2-6**
Details for this requirement are outlined in the section below.		
Total Credits		15-19

1 When the topic is "Research Methods," or "Creativity and Innovation".

2 May be taken up to six times in this program under different topics.

~~Concentration Options Candidates for the Biology, MS focus their study in one of five approved concentrations below, or by completing coursework for the program in biological sciences in an area of study chosen in consultation with the student's advisor and programdirector.~~Research **Requirement** ~~Options~~

Students have the option to complete a **2-3** ~~3-6~~ credit **research project (BIOL 798 Master's Research Project)** ~~master's thesis (BIOL 799 Thesis)~~ or a **3-5** ~~1-3~~ credit **master's thesis (BIOL 799 Thesis).** ~~research project (BIOL 798 Master's Research Project).~~ In accordance with AP.6 Graduate Policies, the same quality of work is expected of students regardless of which option they choose.

- ~~**Thesis:In general, the MS thesis is most appropriate for students planning or considering a researchcareer.Students pursuing the thesis option must write a formal thesis that meets the requirements of the school and must defend their thesis and present their results in a publicseminar.**~~**Research Project:** The MS project is most appropriate for students who have scheduling commitments, such as a full-time job, that may preclude performing a complete series of laboratory experiments. Students pursuing the project option must successfully complete written and oral comprehensive exams.
- **Thesis: In general, the MS thesis is most appropriate for students planning or considering a research career. Students pursuing the thesis option must write a formal thesis that meets the requirements of the school and must defend their thesis and present their results in a public seminar.**

Course List

Code	Title	Credits

Code	Title	Credits
Select a Research Project or a Master's Thesis		
BIOL 798	Master's Research Project	2-3
BIOL 799	Thesis	3-5

General ~~MS without~~ Concentration ~~Program in Biological SciencesMS with~~

Course List

Code	Title	Credits
~~Cell Biology~~		~~3~~
~~BIOL 682~~	~~Advanced Eukaryotic Cell Biology~~	
~~Research Methodology~~		~~1-3~~
~~BIOL 690~~	~~Introduction to Graduate Studies in Biology~~	
~~or BIOS 702~~	~~Research Methods~~	
~~Seminar~~		~~2~~
~~BIOL 692~~	~~Seminar in Biology~~	
~~or BIOL 695~~	~~Seminar in Molecular, Microbial, and Cellular Biology~~	
~~Research~~		~~1-6~~
General Concentration Coursework		**12**
In consultation with an advisor, select at least 12 credits of graduate coursework from BIOL, BIOS, BMED, or NEUR-prefixed courses. Suggestions include:		
~~BIOL 798~~	~~Master's Research Project~~	
~~BIOL 799~~	~~Thesis (3-6 credits)~~	
~~Electives 1~~		~~16-23~~
~~In order to reach 30 total credits, select 16-23 credits of electives in BIOL, BIOS, or related areas:~~		
BIOL 508	Selected Topics in Animal Biology 1	
BIOL 553	Advanced Topics in Immunology	
BIOL 566	Cancer Genomics	
BIOL 568	Advanced Topics in Molecular Genetics	
BIOL 575	Selected Topics in Genetics	
BIOL 579	Molecular Evolution and Conservation Genetics	
BIOL 583	General Biochemistry	
BIOL 585	Eukaryotic Cell Biology Laboratory	
BIOL 693	Directed Studies in Biology 2	
or BINF 795	Bioinformatics Internship	
BIOL 793	Research in Biology	
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	

Code	Title	Credits
BIOS 767	Molecular Evolution	
Total Credits:		30

1 Suggested section topics: "Research and Development in a Biotechnology Company," or "Biology of Obesity and Weight Loss". Other relevant topics may only be applied toward the degree with advisor approval.

2
- No more than 3 credits of directed study or internship can be applied.
- Topics should be relevant and approved by the program director.

3 ~~Credit for this course may only be applied toward the degree if the course topic is relevant to the concentration or research topic and approved by the advisor.~~

Concentration in Evolutionary Biology (EB) ~~Microbiology and Infectious Disease (MID)~~MS with

Course List

Code	Title	Credits
Populations and Species		**3-6**
Select 3-6 credits from the following:		
BIOL 574	**Population Genetics**	
BIOL 579	**Molecular Evolution and Conservation Genetics**	
or BIOS 767	**Molecular Evolution**	
BIOL 648	**Population Ecology**	
Organismal Biology		**3-6**
Select 3-6 credits from the following:		
BIOL 501	**Microbial Diversity: An Organismal Approach**	
BIOL 507	**Selected Topics in Ecology**	
BIOL 508	**Selected Topics in Animal Biology**	
BIOL 518	**Conservation Biology**	
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 566	**Cancer Genomics**	
BIOL 581	**Estuarine and Coastal Ecology**	
BIOL 582	**Estuarine and Coastal Ecology Laboratory**	
BIOL 643	**Microbial Ecology**	
EVPP 536	**The Diversity of Fishes**	
Molecular Techniques		**3-4**
Select 3-4 credits from the following:		
BIOL 693	**Directed Studies in Biology 1**	

Code	Title	Credits
or BINF 795	Bioinformatics Internship	
BIOS 716	Methods in Evolutionary Biology	
EVPP 515	Molecular Environmental Biology I	
EVPP 615	Molecular Environmental Biology II	
Electives		**2-6**
If needed in order to reach a total of 30 credits, select from the following courses: [2]		
BIOL 583	General Biochemistry	
BIOL 693	Directed Studies in Biology [1]	
or BINF 795	Bioinformatics Internship	
BIOS 741	Genomics	
Any additional course listed in the Core Courses section		
Total Credits:		**30**

1 • No more than 3 credits of directed study or internship can be applied to this concentration.
• Topics should be relevant to the concentration and should be approved by the program director.

2 Other relevant graduate-level coursework may be selected in consultation with the advisor.

Concentration in Microbiology and Infectious Disease (MID) ~~Molecular Biology (MOB) MS with~~

~~1 Other relevant graduate-level coursework may be selected in consultation with the advisor.~~

~~2 Suggested section topic: Epigenetics. Other relevant topics may only be applied toward the degree with advisor approval.~~

~~3 Credit for this course may only be applied toward the degree if the course topic is relevant to the concentration or research topic and approved by the advisor.~~

Course List

Code	Title	Credits
~~Cell Biology~~		~~3~~
~~BIOL 682~~	~~Advanced Eukaryotic Cell Biology~~	
~~Research Methodology~~		~~1-3~~
~~BIOL 690~~	~~Introduction to Graduate Studies in Biology~~	
~~or BIOS 702~~	~~Research Methods~~	
~~Core Biology~~		~~12-13~~
Microbiology and Infectious Diseases		**12**
In consultation with an advisor, select 12 credits from the following:		
BINF 739	Topics in Bioinformatics 1	
~~Seminar~~		~~2~~
~~BIOL 695~~	~~Seminar in Molecular, Microbial, and Cellular Biology~~	
~~Research~~		~~1-6~~
BIOL 553	Advanced Topics in Immunology	
BIOL 563	Virology	
BIOL 685	Emerging Infectious Diseases	

Code	Title	Credits
~~BIOL 691~~	~~Current Topics in Biology 3~~	
BIOL 693	Directed Studies in Biology 2	
BIOL 669	Pathogenic Microbiology	
BIOL 715	Microbial Physiology	
Electives		**0-3**
If needed to reach a total of 30 credits, select from the following courses:		
~~BIOL 798~~	~~Master's Research Project~~	
~~BIOL 799~~	~~Thesis (3-6 credits)~~	
~~Electives 1~~		~~3-11~~
~~In order to reach 30 total credits, select from the following courses 3-11 credits not previously taken:~~		
~~BIOL 506~~	~~Selected Topics in Microbiology 2~~	
~~BIOL 553~~	~~Advanced Topics in Immunology~~	
BIOL 560	Infectious Diseases of Wildlife	
BIOL 564	Techniques in Virology	
~~BIOL 580~~	~~Computer Applications for the Life Sciences~~	
BIOL 583	General Biochemistry	
BIOL 718	Techniques in Microbial Pathogenesis	
~~BIOS 710~~	~~Current Topics in Bioscience 2~~	
~~BIOS 743~~	~~Genomics, Proteomics, and Bioinformatics~~	
BIOS 742	**Biotechnology**	
Any additional course listed in the Core Courses section		
Total Credits:		30

1 When the topic is "Computational Analysis: Viral Genomes".

2
- No more than 3 credits of directed study can be applied to this concentration.
- Topics should be relevant to the concentration and should be approved by the program director.

~~3 Suggested section topic: Vaccines. Other relevant topics may only be applied toward the degree with advisor approval.~~

~~4 Credit for this course may only be applied toward the degree if the course topic is relevant to the concentration or research topic and approved by the advisor.~~

Concentration in Molecular Biology (MOB) ~~Neuroscience (NEUR)MS with~~

Course List

Code	Title	Credits
~~Cell Biology~~		~~3~~
~~BIOL 682~~	~~Advanced Eukaryotic Cell Biology~~	
~~Research Methodology~~		~~1-3~~
~~BIOL 690~~	~~Introduction to Graduate Studies in Biology~~	
~~or BIOS 702~~	~~Research Methods~~	
~~Core Biology~~		~~12-13~~
Molecular Biology		**12**

Code	Title	Credits
In consultation with an advisor, select 12 credits from the following:		
BIOL 508	**Selected Topics in Animal Biology 1**	
BIOL 568	Advanced Topics in Molecular Genetics	
BIOL 579	Molecular Evolution and Conservation Genetics	
or BIOS 767	Molecular Evolution	
BIOL 580	Computer Applications for the Life Sciences	
or BINF 630	Bioinformatics Methods	
~~BINF 630~~	~~Bioinformatics Methods~~	
~~BINF 634~~	~~Bioinformatics Programming~~	
~~Molecular Techniques~~		~~2-7~~
~~Select 2-7 credits from the following:~~		
~~BINF 739~~	~~Topics in Bioinformatics~~	
BIOL 583	General Biochemistry	
BIOL 585	Eukaryotic Cell Biology Laboratory	
BIOL 678	Cell-Based Assays	
BIOL 693	Directed Studies in Biology 2	
or BINF 795	Bioinformatics Internship	
~~BIOL 793~~	~~Research in Biology~~	
~~BIOS 740~~	~~Laboratory Methods in Functional Genomics and Biotechnology~~	
BIOS 716	Methods in Evolutionary Biology	
~~BIOS 740~~	~~Laboratory Methods in Functional Genomics and Biotechnology~~	
BIOS 742	Biotechnology	
or BINF 633	Molecular Biotechnology	
NEUR 651	Molecular Neuropharmacology	
~~Bioinformatics~~		~~3~~
Electives		**0-3**
If needed to reach a total of 30 credits, select from the following courses:		
BINF 641	**Biomolecular Modeling**	
BIOL 693	**Directed Studies in Biology 2**	
or BINF 795	**Bioinformatics Internship**	
BIOS 741	Genomics	
~~BIOS 742~~	~~Biotechnology~~	
~~BIOS 743~~	~~Genomics, Proteomics, and Bioinformatics~~	
~~BIOS 744~~	~~Molecular Genetics~~	
~~BIOS 767~~	~~Molecular Evolution~~	
NEUR 592	**Special Topics in Neuroscience 3**	
or NEUR 689	**Topics in Neuroscience**	
CHEM 564	**General Biochemistry II**	
CHEM 660	**Protein Biochemistry**	
Any additional course listed in the Core Courses section		

Code	Title	Credits
~~Seminar~~		~~2~~
~~BIOL 695~~	~~Seminar in Molecular, Microbial, and Cellular Biology~~	
~~Research~~		~~1-6~~
~~Select one from the following:~~		
~~BIOL 798~~	~~Master's Research Project~~	
~~BIOL 799~~	~~Thesis (3-6 credits)~~	
~~Electives 1~~		~~0-6~~
~~In order to reach 30 total credits, select from the following courses 0-6 credits of BIOL, BIOS, or related electives not previously taken:~~		
~~BIOL 553~~	~~Advanced Topics in Immunology~~	
~~BIOL 562~~	~~Personalized Medicine~~	
~~BIOL 566~~	~~Cancer Genomics~~	
~~BIOL 568~~	~~Advanced Topics in Molecular Genetics 2~~	
~~BIOL 575~~	~~Selected Topics in Genetics~~	
~~BIOL 579~~	~~Molecular Evolution and Conservation Genetics~~	
~~BIOL 583~~	~~General Biochemistry~~	
~~BIOL 585~~	~~Eukaryotic Cell Biology Laboratory~~	
~~BIOL 666~~	~~Human Genetics Concepts for Health Care~~	
~~BIOL 691~~	~~Current Topics in Biology~~	
Total Credits:		30

1 When the topic is "Research and Development in a Biotechnology Company".

2
- **No more than 3 credits of directed study or internship can be applied to this concentration.**
- **Topics should be relevant to the concentration and should be approved by the program director.**

3 When the topic is "Glutamatergic Systems".

Concentration in Neuroscience (NEUR) ~~Evolutionary Biology (EB)~~ ~~MS~~ ~~with~~

~~1 Only required if not previously completed; this course is a prerequisite to EVPP 615%7CCode.~~

~~2 Other relevant graduate-level coursework may be selected in consultation with the advisor.~~

~~3 Credit for this course may only be applied toward the degree if the course topic is relevant to the concentration or research topic and approved by the advisor.~~

~~Course List~~

~~Code~~	~~Title~~	~~Credits~~
~~Cell Biology~~		~~3~~
~~BIOL 682~~	~~Advanced Eukaryotic Cell Biology~~	
~~Seminar~~		~~3-4~~
~~BIOL 690~~	~~Introduction to Graduate Studies in Biology~~	
~~Select 2 credits from the following:~~		
~~BIOL 692~~	~~Seminar in Biology~~	
~~or BIOL 695~~	~~Seminar in Molecular, Microbial, and Cellular Biology~~	

Code	Title	Credits
Core Courses		6-9
Select at least two courses from the following:		
BIOL 574	Population Genetics	
BIOL 579	Molecular Evolution and Conservation Genetics	
BIOL 648	Population Ecology	
Organismal Biology		6-8
Select 6-8 credits from the following suggestions in consultation with an advisor and/or committee and the program director:		
BIOL 501	Microbial Diversity: An Organismal Approach	
BIOL 507	Selected Topics in Ecology	
BIOL 508	Selected Topics in Animal Biology	
BIOL 518	Conservation Biology	
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 566	Cancer Genomics	
BIOL 572	Human Genetics	
BIOL 581	Estuarine and Coastal Ecology	
BIOL 582	Estuarine and Coastal Ecology Laboratory	
BIOL 643	Microbial Ecology	
EVPP 536	The Diversity of Fishes	
Molecular Techniques		4-7
EVPP 615	Molecular Environmental Biology II	
EVPP 515	Molecular Environmental Biology I 1	
Research		1-6
Select one from the following:		
BIOL 798	Master's Research Project	
BIOL 799	Thesis (3-6 credits)	
Electives 2		0-7
In order to reach 30 total credits, select from the following courses 0-7 credits not previously taken:		
BIOL 508	Selected Topics in Animal Biology	
BIOL 518	Conservation Biology	
BIOL 537	Ornithology	
BIOL 538	Mammalogy	
BIOL 539	Herpetology	
BIOL 543	Tropical Ecosystems	

Code	Title	Credits
BIOL 553	Advanced Topics in Immunology	
BIOL 568	Advanced Topics in Molecular Genetics	
BIOL 575	Selected Topics in Genetics	
BIOL 572	Human Genetics	
BIOL 579	Molecular Evolution and Conservation Genetics	
BIOL 581	Estuarine and Coastal Ecology	
& BIOL 582	and Estuarine and Coastal Ecology Laboratory	
BIOL 583	General Biochemistry	
BIOL 585	Eukaryotic Cell Biology Laboratory	
BIOL 666	Human Genetics Concepts for Health Care	
BIOL 693	Directed Studies in Biology 3	
BIOL 793	Research in Biology	
BIOS 701	Systems Biology	
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 762	Phylogenetic Analysis	
BIOS 765	Molecular Systematics	
BIOS 767	Molecular Evolution	
EVPP 536	The Diversity of Fishes	
EVPP 550	Waterscape Ecology and Management	
EVPP 551	Fungi and Ecosystems	
EVPP 555	Lab in Waterscape Ecology	
EVPP 643	Microbial Ecology	
EVPP 651	Multivariate Data Analysis for Ecology and Environmental Science	
Total Credits:		30

Course List

Code	Title	Credits
Statistics		3
BIOL 682	Advanced Eukaryotic Cell Biology	
Research Methodology		1-3
BIOL 690	Introduction to Graduate Studies in Biology	
or NEUR 702	Research Methods	
Core Neuroscience		12-13
Select 3 credits from the following:		
BINF 705	Research Ethics	
or NEUR 612	Neuroethics	
BINF 530	**Introduction to Bioinformatics Methods**	

Code	Title	Credits
BINF 630	Bioinformatics Methods	
~~BINF 705~~	~~Research Ethics~~	
~~BIOS 741~~	~~Genomics~~	
~~BIOS 742~~	~~Biotechnology~~	
~~BIOS 743~~	~~Genomics, Proteomics, and Bioinformatics~~	
~~BIOS 744~~	~~Molecular Genetics~~	
~~NEUR 592~~	~~Special Topics in Neuroscience 3~~	
BINF 702	**Biological Data Analysis**	
BIOL 691	Current Topics in Biology 1	
STAT 535	Analysis of Experimental Data	
STAT 544	Applied Probability	
STAT 554	Applied Statistics I	
~~Research~~		~~1-6~~
~~Select one from the following:~~		
~~BIOL 798~~	~~Master's Research Project~~	
~~BIOL 799~~	~~Thesis (3-6 credits)~~	
~~Electives 4~~		~~0-8~~
~~In order to reach 30 total credits, select from the following 0-8 credits not previously taken:~~		
NeuroBiology		**9**
In consultation with an advisor, select 9 credits from the following, at least 6 of which must be in NEUR-prefixed courses:		
~~BIOL 695~~	~~Seminar in Molecular, Microbial, and Cellular Biology~~	
~~BIOS 704~~	~~Topics in Biosciences~~	
BIOL 508	Selected Topics in Animal Biology 2	
~~BIOL 566~~	~~Cancer Genomics~~	
BIOL 568	Advanced Topics in Molecular Genetics 3	
BIOL 693	Directed Studies in Biology 4	
or BINF 795	Bioinformatics Internship	
NEUR 592	Special Topics in Neuroscience	
~~ECE 528~~	~~Introduction to Random Processes in Electrical and Computer Engineering~~	
~~PSYC 611~~	~~Advanced Statistics~~	
NEUR 601	Developmental Neuroscience	
NEUR 602	Cellular Neuroscience	
NEUR 603	Mammalian Neuroanatomy	
~~NEUR 634~~	~~Neural Modeling~~	
NEUR 621	**Synaptic Plasticity**	
NEUR 651	Molecular Neuropharmacology	
~~NEUR 701~~	~~Neuroscience Laboratory~~	
~~Seminar~~		~~2~~
NEUR 689	Topics in Neuroscience	

Code	Title	Credits
NEUR 709	Neuroscience Seminars	
~~Statistics~~		~~3-4~~
NEUR 710	**Special Topics in Neuroscience**	
NEUR 734	**Computational Neurobiology**	
NEUR 741	**Introduction to Neuroimaging**	
Electives		**0-3**
If needed to reach a total of 30 credits, select from the following:		
BIOL 583	General Biochemistry	
~~BIOL 666~~	~~Human Genetics Concepts for Health Care~~	
BIOL 691	**Current Topics in Biology 5**	
or BIOS 743	**Genomics, Proteomics, and Bioinformatics**	
BIOL 693	**Directed Studies in Biology 4**	
or BINF 795	**Bioinformatics Internship**	
Any additional NEUR-prefixed course at the 500-700 levels		
Total Credits:		30

1 When the topic is "MATLAB for Brain, Biological, and Cognitive Scientists".

2 When the topic is "Biology of Obesity and Weight Loss".

3 When the topic is "Epigenetics".

4
- No more than 3 credits of directed study or internship can be applied to this concentration.
- Topics should be relevant to the concentration and should be approved by the program director.

5 When the topic is "Genomics, Proteomics, and Bioinformatics".

Concentration in Nutrition Genetics ~~in Translational~~ and Nutraceuticals (NGN)

Course List

Code	Title	Credits
Nutrition		**6**
In consultation with an advisor, choose 6 credits from the following:		
BIOL 508	**Selected Topics in Animal Biology 1**	
NUTR 522	**Nutrition Across the Lifespan**	
NUTR 642	**Macronutrients**	
NUTR 670	**Nutrition Research Methods**	
Human Diseases		**6**
In consultation with an advisor, choose 6 credits from the following:		
BIOL 566	**Cancer Genomics**	
BIOL 666	**Human Genetics Concepts for Health Care**	
BIOS 743	**Genomics, Proteomics, and Bioinformatics**	
Electives		
If needed to reach a total of 30 credits, select from the following courses:		
BIOL 508	**Selected Topics in Animal Biology 2**	

Code	Title	Credits
BIOL 562	Personalized Medicine	
BIOL 568	Advanced Topics in Molecular Genetics	
BIOL 583	General Biochemistry	
BIOL 693	Directed Studies in Biology 3	
or BINF 795	Bioinformatics Internship	
CHEM 564	General Biochemistry II	
Any additional course listed in the Core Courses section		
Total Credits		**30**

1 When the topic is "Biology of Obesity and Weight Loss".

2 When the topic is "Research and Development in Biotechnology Companies".

3
- No more than 3 credits of directed study or internship can be applied to this concentration.
- Topics should be relevant to the concentration and should be approved by the program director.

Concentration in Translational and Clinical Research (TCR) ~~Curriculum Notes For students concurrently enrolled in the Advanced Biomedical Sciences Graduate Certificate , contact your advisor for details regarding:BMED course credit that may be counted towards this concentration Meeting requirements for graduate certificates and requirements for master's degrees~~

Course List

Code	Title	Credits
~~Cell Biology~~		~~3~~
~~BIOL 682~~	~~Advanced Eukaryotic Cell Biology~~	
~~Research Methodology~~		~~1-3~~
~~BIOL 690~~	~~Introduction to Graduate Studies in Biology~~	
~~or BIOS 702~~	~~Research Methods~~	
~~Seminar~~		~~2~~
Translational and Clinical Research 1		**12**
In consultation with an advisor, select 12 credits from the following:		
~~BINF 704~~	~~Colloquium in Bioinformatics~~	
BIOL 508	Selected Topics in Animal Biology 2	
~~BIOL 695~~	~~Seminar in Molecular, Microbial, and Cellular Biology~~	
~~Bioinformatics/Biostatistics~~		~~3~~
~~BINF 630~~	~~Bioinformatics Methods~~	
~~or STAT 535~~	~~Analysis of Experimental Data~~	
~~Human Genes, Cells and Tissues~~		~~3-9~~
BIOL 562	Personalized Medicine	
BIOL 566	Cancer Genomics	

Code	Title	Credits
BIOL 666	Human Genetics Concepts for Health Care	
~~BIOS 743~~	~~Genomics, Proteomics, and Bioinformatics~~	
~~Biochemistry~~		~~3-4~~
~~Select 3-4 credits from the following:~~		
BIOL 667	**Signal Transduction in Cancer**	
BIOL 691	Current Topics in Biology 3	
or BIOS 743	Genomics, Proteomics, and Bioinformatics	
BIOL 693	Directed Studies in Biology 4	
or BINF 795	Bioinformatics Internship	
~~BIOL 715~~	~~Microbial Physiology~~	
~~BIOL 718~~	~~Techniques in Microbial Pathogenesis~~	
~~BIOS 710~~	~~Current Topics in Bioscience~~	
BMED 603	**Cell Biology and Microscopic Anatomy 5**	
BMED 604	**Fundamentals of Human Physiology 5**	
BMED 605	**Introduction to Human Anatomy 5**	
Electives		**0-3**
If needed to reach a total of 30 credits, select from the following courses:		
BIOL 508	Selected Topics in Animal Biology 6	
~~BIOL 553~~	~~Advanced Topics in Immunology~~	
~~BIOL 562~~	~~Personalized Medicine~~	
~~BIOL 563~~	~~Virology~~	
~~BIOL 566~~	~~Cancer Genomics~~	
BIOL 568	Advanced Topics in Molecular Genetics	
~~BIOL 572~~	~~Human Genetics~~	
~~BIOL 585~~	~~Eukaryotic Cell Biology Laboratory~~	
~~BIOL 666~~	~~Human Genetics Concepts for Health Care~~	
~~BIOL 669~~	~~Pathogenic Microbiology~~	
~~BIOL 678~~	~~Cell-Based Assays~~	
~~BIOL 685~~	~~Emerging Infectious Diseases~~	
BIOL 583	General Biochemistry	
~~CHEM 563~~	~~General Biochemistry I~~	
~~CHEM 660~~	~~Protein Biochemistry~~	
~~Research~~		~~1-6~~
~~Select one from the following:~~		
~~BIOL 798~~	~~Master's Research Project~~	
~~or CHEM 798~~	~~Research Project~~	
~~BIOL 799~~	~~Thesis (3-6 credits)~~	
~~or CHEM 799~~	~~Master's Thesis~~	
~~Electives 1~~		~~0-14~~
~~In order to reach 30 total credits, select from the following courses 0-14 credits not previously taken:~~		

Code	Title	Credits
~~BIOL 506~~	~~Selected Topics in Microbiology 2~~	
BIOL 693	**Directed Studies in Biology 4**	
or BINF 795	**Bioinformatics Internship**	
BIOS 741	Genomics	
~~BIOS 742~~	~~Biotechnology~~	
~~BIOS 743~~	~~Genomics, Proteomics, and Bioinformatics~~	
~~BIOS 744~~	~~Molecular Genetics~~	
~~CHEM 579~~	~~Special Topics~~	
~~CHEM 661~~	~~Antibiotic Chemistry and Resistance~~	
~~CHEM 662~~	~~Modern Methods of Drug Discovery~~	
~~CHEM 665~~	~~Protein-Protein Interactions: Methods and Applications~~	
~~CHEM 796~~	~~Directed Reading and Research~~	
~~NEUR 651~~	~~Molecular Neuropharmacology~~	
Any additional course listed in the Core Courses section		
Total Credits:		30

1 For students concurrently enrolled in the Advanced Biomedical Sciences Graduate Certificate, contact your advisor for details regarding:
- BMED course credit that may be counted towards this concentration
- Meeting the requirements for graduate certificates and for master's degrees

2 When the topic is "Research and Development in a Biotechnology Company," or "Biology of Obesity and Weight Loss".

3 When the topic is "Genomics/Proteomics/Bioinformatics".

4
- No more than 3 credits of directed study or internship can be applied to this concentration.
- Topics should be relevant to the concentration and should be approved by the program director.

5 Course is only available for students enrolled in the Advanced Biomedical Sciences Graduate Certificate.

6 When the topic is "Research and Development in a Biotechnology Company".

Retroactive Requirements Updates:

Plan of Study:

Honors Information:

Accelerated Description/Dual Degree Description:

INTO-Mason Requirements:

College Requirements & Policies:

Department / Academic Unit Requirements & Policies:

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

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

Off-campus details:

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

No

Please explain:

Related Departments

Department
Health & Human Services

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

Are you changing the total number of credits required for this program?

Are you changing the delivery format in any way (e.g adding an online option)?

Are you adding/removing a licensure option which was approved by SCHEV?

Will any portion of this program be offered at an off-campus location?

Are you adding significant new content areas to the program?

Will this program change affect any specialized accreditation?

Green Leaf Program Designation

Is this a Green Leaf program? No

Green Leaf

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-

Relationship to

Relationship to

List sustainability-focused courses currently required in the degree

Sustainability-related academic programs either require at least one sustainability-related

List sustainability-related courses currently required in the degree

Does this program cover material which crosses into another department?

No

Impacted

Additional Attachments

SCHEV Proposal

Executive Summary

Reviewer Comments

Additional Comments

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

%wi_required.eschtml%

Attached Document

Key: 418