

DEPARTMENT OF BIOLOGY

CURRICULUM GUIDE

Program Overview

All students are required to complete a core of basic biology courses: General Biology (BIOL 101 and BIOL 102) and Genetics (BIOL 200). BIOL 101 and 102 are prerequisites for Genetics (BIOL 200). Unless approved as transfer courses at the time of matriculation, **all core biology courses must be completed at Howard University**. All prerequisite courses must be passed with a minimum grade of C before taking biology electives. After completing the core courses, students will take a minimum of 22 credit hours of Biology electives. Every student is required to take at least one elective course from each of the three concentration areas: **1) Cellular & Molecular**, **2) Anatomy & Physiology**, and **3) Ecology & Evolution**. The remaining elective credit hours can be taken from any of the courses listed in the Biology Electives (page 5) in consultation with the student's departmental advisor. Senior Seminar (BIOL 493 or 494) is required of all majors, and is taken in the senior year. A student must earn a minimum of **35 credit hours** in Biology to fulfill the requirements for the major and all Biology courses must be passed with a **minimum grade of C** in order to count toward the 35 credit hours required for the Biology major.

Courses in chemistry, physics, and mathematics must also be taken as supporting courses for the departmental major. The supporting courses include: one year of General Chemistry (CHEM 003 and CHEM 004) including the laboratory components (CHEM 005 and CHEM 006); one year of Organic Chemistry (CHEM 141 and CHEM 142) including the laboratory component (CHEM 145), which is taken with CHEM 142; one year of General Physics (PHYS 001 and PHYS 002); and mathematics through Pre-Calculus (MATH 007), **AND** at least one of the following: Calculus I (MATH 156), Introduction to Statistics (MATH 009), or Biostatistics (BIOL 430).

The curriculum is designed to expose students to fundamental concepts in biology and related disciplines, as well as provide depth of understanding in areas of specialization within biology. Successful completion of the prescribed course of study will enable students to pursue careers in biomedical and environmental sciences, research, education, and public service.

Student Advising

Major advisors are assigned by the Biology department and all Biology majors should check with the departmental office (Room 130, E.E. Just Hall) to determine his/her assigned faculty advisor. A student may change advisors, but must do so through the departmental office. Students are expected to formally declare their major in the College of Arts and Sciences by the spring semester of their sophomore year, although formal declaration may be made after the accumulation of 30 credit hours in the university.

All program changes (including withdrawals) should be done in consultation with, and approved by, each student's faculty advisor.

The Comprehensive Examination

In order to graduate, all students must pass the Comprehensive Examination (CE) with a minimum score of 60%. Students may take the CE as early as their junior year. Students are strongly encouraged to take the CE before the last semester of the senior year.

COLLEGE SUPPORT SERVICES:

The Office of Undergraduate Studies provides overall academic advisement for the completion of the College of Arts and Sciences requirements, as well as student counseling.

CENTER FOR PREPROFESSIONAL EDUCATION - Room 518, University Center (located at 2225 Georgia Avenue, N.W.). This office provides information and counseling for the health professions, assistance in completing applications for professional schools, as well as information on the GRE, MCAT, DAT, etc.

Honors

Students admitted to the COAS Honors Program, must contact the Honors Advisor in the Department of Biology, immediately after being admitted.

SUGGESTED PROGRAM FOR BIOLOGY MAJORS
Undergraduate Curriculum Guide for the Biology B.S. Degree

Freshman Year (34 hours)

First Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
ENGW	Freshman English I	3
FRSM 001	Freshman Orientation	1
MATH 007	Precalculus	4
BIOL 101	General Biology I	4
CHEM 003	General Chemistry I	4
CHEM 005	General Chemistry Lab I	1
Total		17

Second Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
ENGW	Freshman English II^^	3
BIOL 102	General Biology II	4
CHEM 004	General Chemistry II	4
CHEM 006	General Chemistry II Lab	1
MATH 156	Calculus or equivalent	4
HHPL	Physical Education	1
Total		17

Sophomore Year (32 hours)

First Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
BIOL 200	Genetics	4
CHEM 141	Organic Chemistry I	3
	Division A, B or C course	3
	Foreign Language	3
ENGW	Technical Writing~	3
Total		16

Second Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
BIOL	Biology Elective	4
CHEM 142	Organic Chemistry II	3
CHEM 145	Organic Chemistry II Lab	3
	Foreign Language	3
	Division A, B or C course	3
Total		16

Second Semester

Junior Year (30 hours)

First Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
BIOL	Biology Elective	4
PHYS 001	Physics I Lecture/Lab	5
	Foreign Language	3
PHIL	Philosophy Elective	3
Total		15

Second Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
BIOL	Biology Elective	4
PHYS 002	Physics II Lecture/Lab	5
	Division A, B or C course	3
	Foreign Language	3
Total		15

Senior Year (24-26 hours)

First Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
BIOL	Biology Electives	7-8
BIOL	Senior Seminar	1
	Division A, B or C course	3
HHPL	Physical Education	1
Total		12-13

Second Semester

<u>Course #</u>	<u>Course Name</u>	<u>Credit Hrs</u>
BIOL	Biology Elective	3-4
	Division A, B or C course	3
	African American Cluster***	3
COMC 101	Speech	3
Total		12-13

~The technical writing requirement in English may be satisfied by enrolling in the writing intensive (WAC) sections of departmental or divisional courses (look for -700 level sections in the Schedule of Classes).

^^Those placed into ENGW 104 will take their second English series course (ENGW 105) their sophomore year.

***The African American Cluster Courses may be taken concurrently as a Divisional *A/B/C* course (see below).

REQUIREMENTS FOR BIOLOGY MAJORS

Biology Requirements (for the major)	Credit Hours
Biology (BIOL 101, 102)	8
Genetics (BIOL 200)	4
Biology Electives [∞]	22
Senior Seminar (BIOL493/494)	1
Total Biology Major Requirements	35
Other Requirements (for the Biology major)	
General Chemistry (CHEM 003/005)	5
General Chemistry (CHEM 004/006)	5
Organic Chemistry (CHEM 141/142)	6
Organic Chemistry (CHEM 145)	3
Physics (PHYS 001/002)	10
Total Other Biology Major Requirements	29
College of Arts and Science Requirements	
English (3 courses) ⁺	9
Mathematics (2 courses: MATH 007 AND MATH156 or MATH009 or BIOL 430)	8
Division A (3 courses)	9
Division B (1 course)	3
Division C (2 courses)	6
[African American Cluster Course ^{***}]	
Language (4 courses) ^{****}	12
Philosophy	3
Speech	3
Physical Education (2 courses) (2 1-credit courses, must include Swimming) (1 health OR 1 activity)	2
Freshman Orientation	1
Total COAS Requirements	56
TOTAL REQUIRED CREDITS	<u>120</u>

[∞] Student must take at least one elective course from each of the three concentration areas: 1) Cellular & Molecular, 2) Anatomy & Physiology, and 3) Ecology & Evolution. The remaining elective credit hours can be taken from any of the Biology Electives at the discretion of the student and selected in consultation with the student's Departmental advisor.

^{***}Because the African American Cluster Course can be taken concurrently as Divisional *AIB/C* course, ENGL054/055 (DivA), HIST005/006(DivB), AFRO005/006(DivB),and AFST101 (DivC) are recommended.

^{****}Biology Majors may fulfill the foreign language requirement with any foreign language taught in the College of Arts and Sciences provided it also fulfills the language requirement of the College.

BIOLOGY MAJOR CURRICULUM

Core Courses: Biology majors are required to satisfactorily complete the Core Courses before enrolling in the Biology Electives, except for Senior Seminar which must be taken during the senior year. Unless a student receives credit for a comparable course as a transfer student from an accredited institution, Biology 101,102, 200 and 493/494 must be taken at Howard University.

<u>Course Title</u>	<u>Course Number</u>	<u>Credit Hours</u>
Biology 101	BIOL 101	4
Biology 102	BIOL 102	4
Genetics	BIOL 200	4
Senior Seminar	BIOL 493 or 494	1

Constraints:

1. Only two (2) Topics courses may be taken for credit toward major requirements.
2. Non-University and Non-Consortium Courses – Students are limited to a maximum of 2 courses applied towards the Biology major. Students taking courses elsewhere over the summer, or participating in study abroad must submit and receive approval prior to taking the course(s). The Department is not obligated to grant transfer credit for courses taken without prior approval. These courses may not be used to substitute for the core courses. The Department accepts courses from accredited, degree-granting institutions only. Courses at Universities within the Consortium, must be taken through the Consortium.

BIOLOGY MINOR CURRICULUM

For students majoring in other programs who wish to complete a minor in Biology, the following course work is required:

<u>Course Title</u>	<u>Course Number</u>	<u>Credit Hours</u>
Biology 101	BIOL 101	4
Biology 102	BIOL 102	4
Genetics	BIOL 200	4
Biology Elective(s)	BIOL xxx	4
(totaling a minimum of 4 credits)		
Total Biology Minor Requirements		16

MINOR FOR BIOLOGY MAJORS:

While Biology majors can choose a minor in any area, most select Chemistry since they fulfill the requirements for a minor in Chemistry within the Biology Majors (see pg. 3, Other Biology Requirements). The Chemistry Department course requirements for the minor are as follows:

<u>Course Title</u>	<u>Course Number</u>	<u>Credit Hours</u>
General Chemistry Lecture I (may be satisfied by examination)	CHEM 003	4
General Chemistry Lecture II	CHEM 004	4
General Chemistry Laboratory I	CHEM 005	1
General Chemistry Laboratory II	CHEM 006	1
Organic Chemistry Lecture I	CHEM 141	3
Organic Chemistry Lecture II	CHEM 142	3
Organic Chemistry Laboratory	CHEM 145	3
Total Chemistry Minor Requirements		19

BIOLOGY ELECTIVES TABLE3

Note – all core courses (BIOL101, BIOL 102, and BIOL200) must be completed before taking most Biology electives.

Cellular & Molecular				Anatomy & Physiology				Ecology & Evolution				Interdisciplinary Courses			
		Cr	Prereqs			Cr	Prereqs			Cr	Prereqs			Cr	Prereqs
Microbiology	220	4	200	Topics in Aspects of Aging	219	1		Plant Diversity	202	4	101/102	Science & Public Policy	204	3	Jr/Sr status
Cell Biology	310	4	200	Comparative Anatomy	251	4	200	Invertebrate Biology	205	4	101/102	Independent Investigations	390	3	consent
Molecular Biology (WAC)	320 (720)	4	200	Aging Physiology	319	1		Ecology	230	4	200	Biostatistics	430	4	200
Developmental Biology (WAC)	413 (713)	4	310 or 320 (2 ENGL series)	Bacterial Physiology	340	3	220 & Chem142	Evolution	240	3	200	Neuropsychology	PSYC 023	3	
Advanced Cytology	416	4	310	Animal Physiology	341	4	200	Global Climate Change Biology	328	4	230	Biochemistry I	CHEM 151	3	
Cancer Biology	420	3	310 or 320	Plant Physiology	344	4	200	Insect Biology (Entomology)	402	4	205	Biochemistry II	CHEM 152	3	
Virology	421	3/4	200	Experimental Parasitology	406	4	consent	Animal Parasitology (WAC)	404 (702)	4	200 (2 ENGL series)	Honors Orientation (honors only)	217	1	
Immunology	422	4	310 or 320	Neurophysiology	444	4	341	Ichthyology	407	4	200	Directed Readings for Sophomore (honors only)	218	1	
Pathogenic Bacteriology	425	4	220	Molecular Plant Physiology	460	4	344	Animal Behavior	409	4	230 or 240	Directed Readings for Juniors (honors only)	317	1	
Endocrinology	441	4	341	Topics in Anatomy & Physiology	502	1	Jr/Sr status	Plant Systematics	410	4	202	Proposal Development (honors only)	318	1	
Molecular Genetics	450	4	200 or 310 or 320					Biological Anthropology	412	4	240	Bioinformatics	419	4	200
Biotechnology	462	4	200 or 310 or 320					Evolutionary Medicine	417	4	200	Honors Research (honors only)	491/492	2	
Topics in Cellular & Molecular Biology	500	1	Jr/Sr status					Environmental Microbiology	424	4	220	Honors Thesis (honors only)	498/499	1	
								Food Microbiology	426	4	220				
								Plant Populations & Communities	432	4	230				
								Population Genetics	449	4	240	Environmental Studies	801	4	101/102
								Human Evolutionary Biology	475	4	200	Topics in Ecology & Evolution	501	1	Jr/Sr status

consent – student must have consent of the instructor in order to register for this course. **Jr/Sr Status** – student must have junior or senior status in order to register for this course