

BA in Biological Sciences

Degree Program Description

Biology is a broad field centered on the study of living organisms and processes. While the degree program requires general education courses in behavioral sciences, social sciences, and the humanities, students can specialize their curriculum through their course selections. The main difference between the BS degree and the BA degree is that the BS degree requires more credit hours in biology, chemistry, physics, and math than the BA degree. Some of the knowledge that students acquire includes basic sciences necessary for upper-level biological science coursework (i.e., mathematics, statistics, physics, general and organic chemistry), how biologists use mathematical modeling and simulation to describe living systems, and arguments employed by scientists and others in key ethical controversies in biological science and research (for example, stem cell research). This degree is designed to prepare students for graduate study, professional schools, or direct entry into the workplace. Undergraduates majoring in biological sciences go on to careers in a wide range of fields, including medicine and other health professions, biotechnology, industry, government service, conservation and ecology, and secondary and higher education.

Major Program Requirements

Department Level Requirements (<http://catalog.missouri.edu/collegeofartsandscience/biologicalsciences/biologicalsciences-major-requirements/>) must be completed in addition to all university requirements (<http://catalog.missouri.edu/academicdegree/requirements/universityrequirements/>), including general education (<http://catalog.missouri.edu/academicdegree/requirements/generaleducationrequirements/>), and the degree requirements below.

Requirements - Biological Sciences

Requirements for the BA and BS degrees with a major in Biological Sciences include course work in biology and ancillary science departments (chemistry, physics and math). The BS degree program requires more extensive course work, with additional studies in biology and the ancillary sciences. The BA degree program is more flexible and has fewer required courses to accommodate students with dual degrees or minors in other departments. Both degree programs can be used to prepare for graduate study or professional school. Students must also complete college and university graduation requirements, including university general education requirements.

All courses in the major (including ancillary sciences) must be completed with a grade of C- or higher with a cumulative GPA of 2.0 or higher. (Satisfactory/Unsatisfactory grading is not acceptable for courses in the major.) At least 12 hours of biology coursework must be taken in residence at MU.

Major Core Requirements in Biology

BIO_SC 1500	Introduction to Biological Systems with Laboratory	5
or BIO_SC 1010 & BIO_SC 1020	General Principles and Concepts of Biology and General Biology Laboratory	
(Grade of A or B required for Bio Sci 1010/1020)		
BIO_SC 2200	General Genetics	4
BIO_SC 2300	Introduction to Cell Biology	4
Evolutionary Biology (select from):		3

BIO_SC 3400	Evolution and Ecology	
BIO_SC 4600	Evolution	
Biological Diversity (select from):		3-5
MICROB 3200	Medical Microbiology and Immunology	
BIO_SC 3210	Plant Systematics	
BIO_SC 3260	Invertebrate Zoology	
BIO_SC 3360	Herpetology	
BIO_SC 3510	Biology of Fungi	
BIO_SC 3710	Introductory Entomology	
BIO_SC 3750	General Microbiology	
F_W 2600	Ornithology	
F_W 2700	Ichthyology	
F_W 3660	Mammalogy	
Capstone course (select one) (complete in last 45 hours):		3-5
BIO_SC 4950 & BIO_SC 4952	Undergraduate Research in Biology and Undergraduate Research in Biology	
BIO_SC 4950H & BIO_SC 4952H	Honors Research in Biology and Honors Research in Biology	
BIO_SC 4972	Developmental Biology	
BIO_SC 4976	Molecular Biology	
BIO_SC 4978	Cancer Biology	
BIO_SC 4982	Human Inherited Diseases	
BIO_SC 4983	Molecular Ecology	
BIO_SC 4990	Vertebrate Histology and Microscopic Anatomy	
BIO_SC 4994	Senior Seminar	

Degree Requirements

CHEM 1320	College Chemistry I	4
CHEM 1330	College Chemistry II	4
CHEM 2100 & CHEM 2110 or CHEM 2030	Organic Chemistry I and Organic Chemistry II Survey of Organic Chemistry	3-6
One course in Physics, Geology or Astronomy		4-5
PHYSICS 1210	College Physics I	
PHYSICS 2750	University Physics I	
GEOL 1100	Introduction to the Earth with Laboratory	
GEOL 1400	Themes in Geology	
ASTRON 1010	Introduction to Astronomy	
Select one of the following:		3-5
MATH 1400	Calculus for Social and Life Sciences I	
MATH 1500	Analytic Geometry and Calculus I	
STAT 1200 or STAT 1300 or STAT 1400 or STAT 2500	Introductory Statistical Reasoning Elementary Statistics Elementary Statistics for Life Sciences Introduction to Probability and Statistics I	
INFOTC 1040	Introduction to Problem Solving and Programming	

Total Credits **18-24**

All courses in the major (including ancillary sciences) must be completed with a grade of C- or higher with a cumulative GPA of 2.0 or higher. No more than 5 credits of introductory biology coursework may be included in the major. At least 12 hours of biology coursework must be taken in residence at MU.

Electives

All biology majors must take additional biology courses to total at least 29 credits for the BA degree, of which at least 16 credits must be at the 3000 level or above.

Elective credits must be in formal courses numbered above 2000 and must include at least one 3000- or 4000-level laboratory course, one 4000-level course, and one WI course at the 3000 or 4000 level in a natural science. BIO_SC 2001, BIO_SC 2010, BIO_SC 2015, BIO_SC 2060, BIO_SC 2100, BIO_SC 2150, BIO_SC 2950, and BIO_SC 3010 may not be used to satisfy this requirement. MICROB 3200 may not be used to satisfy the laboratory course requirement.,

Independent readings, internships, and problems courses do not apply (i.e., BIO_SC 2940, BIO_SC 2960, BIO_SC 2965H, BIO_SC 4085, and BIO_SC 4960).

Students completing research courses BIO_SC 4950, BIO_SC 4950H, BIO_SC 4952, or BIO_SC 4952H for 6 credits may apply 3 credits toward fulfillment of capstone or biology elective hours for the BA degree.

Students may repeat research courses for a total of 12 hours. Any credits remaining after 3 hours are used as a capstone or an elective in biology will be applied toward total hours to graduate. A maximum of 12 credit hours from the following courses (BIO_SC 2940, BIO_SC 2960, BIO_SC 2965H, BIO_SC 4085, BIO_SC 4950, BIO_SC 4950H, BIO_SC 4952 and BIO_SC 4952H) can be counted toward graduation.

BIOCHM 4270 and BIOCHM 4272 may apply toward fulfillment of biology elective hours for the BA or BS degree.

Semester Plan

NOTE: These plans are intended only as general guides. Courses outside Biology, Chemistry, MATH 1100, and ENGLSH 1000 are provided only for illustrative purposes. Advanced credit or exemption from the Foreign Language requirement and/or advanced credit in non-science courses, along with the interests of each individual student will determine a final combination of courses in each semester that is unique for each student. Note also that the sample schedules in Semester 5 and beyond are left incomplete on purpose because each schedule should be highly individualized at that point. Students who are pursuing the BA will not need to complete CHEM 2130.

Plan 1

A student that is exempt from MATH 1100

First Year			
Fall	CR	Spring	CR
CHEM 1320		4 CHEM 1330	4
ENGLSH 1000		3 BIO_SC 1500	5
Behavioral Science Course		3 Humanities Course (2000 level)**	3
Social Science Course (MO State Law)		3 Social Science Course**	3
Elective		2	
			15

Second Year			
Fall	CR	Spring	CR
CHEM 2030		3 BIO_SC 2300	4
BIO_SC 2200		4 Biology Diversity	4
Second language I		4-6 Second language II	4-6

Elective		3 Elective	3
			15-17

Third Year			
Fall	CR	Spring	CR
Biology Elective Lab (3000 level)		5 Physical Science	4
Mathematical Science (MATH 1400- free back credit MATH 1100)		3 Biology Elective	3
Second language III		4 Behavioral Science	3
Elective		3 Humanities (2000 level)	3
		Elective	3
			15

Fourth Year			
Fall	CR	Spring	CR
Biology Capstone		3 Biology Elective- Writing Intensive	3
Social Science (2000 level)		3 Evolutionary Biology	3
Humanities		3 Humanities	3
Writing Intensive Elective		3 Elective	3
Elective		3 Elective	3
			15

Total Credits: 120-124

** Could meet A&S Diversity Intensive Requirement (3hrs)

Plan 2

A student that needs MATH 1100

First Year			
Fall	CR	Spring	CR
BIO_SC 1500		5 CHEM 1320	4
MATH 1100		3 ENGLSH 1000	3
Behavioral Sciences Course		3 Humanities Course**	3
Social Science Course (MO State Law)		3 Social Science Course**	3
Elective		1-2 Elective	1-2
			15-16

Second Year			
Fall	CR	Spring	CR
CHEM 1330		4 BIO_SC 2300	4
BIO_SC 2200		4 Biology Diversity	4
Elective		3 Foreign Language	4-6
Foreign Language		4-6 Elective	3
			15-17

Third Year			
Fall	CR	Spring	CR
CHEM 2030		3 Biology Elective Lab (3000 level)	5
Mathematical Science		3 Physical Science	4
Humanities		3 Behavioral Science	3
Foreign Language		4-6 Humanities (2000 level)	3
Elective		3	
			16-18

Fourth Year			
Fall	CR	Spring	CR
Biology Capstone		3 Biology Elective- Writing Intensive	3
Elective		3 Evolutionary Biology	3

Social Science (2000 level)	3 Elective	3
Writing Intensive Elective	3 Humanities	3
Elective	3 Elective	3
	15	15

Total Credits: 120-128

** Could meet A&S Diversity Intensive Requirement (3hrs)