B.S./M.S. IN BIOLOGY

Overview

The 5-year BS/MS degree in the Department of Biology is designed for students who are engaged in research and considering a career in biological sciences. Over the course of their senior year, plus one additional year of graduate study, students in the program will take graduate level courses, conduct independent research, and write a Masters of Science thesis.

The first step in this process is for the student and a faculty member to agree on a suitable research project. Students should consider talking with several faculty members to discuss possible projects before settling on a research topic. The Director of the Biology BS/MS program can assist the student in finding a participating faculty mentor in Biology. For at least two semesters of their undergraduate studies, the student must have enough time in their schedule to devote to research <BIL 495, BIL 496, BIL 497>. This is the equivalent of a 2-credit laboratory (6 hours per week), but if the student is enthusiastic about his/her project, he/she will want to spend more time on it than that. Applications to the program are evaluated at the end of the Junior year, so the student should begin research in his/her Sophomore year.

In addition to the requirements for the Bachelor of Science, a student must complete specific courses/seminars, as listed under Curriculum Requirements in preparation for their year of graduate study.

Timeline:

Freshman/Sophomore/Junior year: Find a research mentor, register with the Office of Undergraduate Research and begin your research project. Enroll in Projects in Biology <BIL 495, BIL 496, BIL 497>. Notify the Program Director of your intent.

Junior year: Apply to the program in the fall semester. Continue your research project.

Senior year: Complete the requirements for the B.S. and take one 3 credit Masters-level course each semester. Attend the Biology Departmental Seminar. Present your research findings at the Research, Creativity and Innovation Forum in the spring semester.

Masters year: Take 12-15 credits of Masters coursework each semester. Finish your lab research, write and defend your thesis.

Curriculum Requirements

Code	Title	Credit Hours
BS IN BIOLOGY REQUIREMENTS (121 CREDIT HOURS)		
Biology Core Courses		**22**
Two semesters of introductory biology plus labs are required, usually taken in the first year:		
BIL 150	General Biology	
BIL 151	General Biology Laboratory	
or BIL 153	Introductory Biology/Chemistry Laboratory I	
BIL 160	Evolution and Biodiversity	
BIL 161	Evolution and Biodiversity Laboratory	
or BIL 163	Introductory Biology/Chemistry Laboratory II	
Select one of the following three Options for upper level required biology core courses:		
Option One: This option is recommended for students interested in medical school, other health sciences, cell, molecular and developmental biology.		
BIL 250	Genetics	
BIL 255	Cellular and Molecular Biology	
BIL 360	Comparative Physiology	
BIL 330	Ecology	
or BIL 320	Evolutionary Biology	
Option Two: This option is recommended for students interested in ecology, evolution, biodiversity and conservation.		
BIL 250	Genetics	
BIL 320	Evolutionary Biology	
BIL 330	Ecology	
BIL 255	Cellular and Molecular Biology	
or BIL 360	Comparative Physiology	
Option Three:		
BIL 250	Genetics	
BIL 255	Cellular and Molecular Biology	

BIL 330	Ecology	
BIL 360	Comparative Physiology	
Additional BIL electives		**12**
At least one BIL elective must be a CAPSTONE course. Capstone courses can be located in Class Search under "Additional Search Criteria", subheading "Class Attributes". Seminars in Biology (BIL 374, BIL 375, and BIL 402) are capstones.		
At least four credit hours of the following must be taken for the B.S./M.S. in Biology program. A maximum of six credit hours may be applied as electives towards the B.S. in Biology.		
BIL 495	Projects in Biology	
BIL 496	Projects in Biology	
BIL 497	Projects in Biology	
Two biology laboratory or field courses beyond <BIL 151 or BIL 153> and <BIL 161 or BIL 163> are required as part of the additional BIL electives. Approved laboratory/field courses at the 300 level or higher in departments other than Biology (e.g., BMB 402, MIC 304, MSC 325, MBE 365, MBE 464, or NEU 403) can be counted towards this lab requirement. Projects in Biology <BIL 495, BIL 496 or BIL 497> may be counted as one of the two required lab courses.		
Up to eight credit hours toward the major may be selected from courses numbered 300 or higher in MBE, MES, MSC, or OCE. This excludes BMB 401 or MIC 301 which will not be counted as BIL electives.		
At least six credit hours of graduate courses in Biology (BIL 600-level) must be taken in the Senior year.		
A maximum of two credit hours of the following may be applied towards the major		
BIL 371	Readings in Biology	
BIL 372	Readings in Biology	
A maximum of three total credit hours from the following courses may be applied towards the major. Any course in this list may be taken only once to count towards the major. However, these courses may be taken additional times for general elective credit only.		
BIL 281	Undergraduate Learning Internship in Biology	
BIL 381	Workshop Leaders in Biology I	
BIL 382	Workshop Leaders in Biology II	
BIL 481	Undergraduate Teaching Assistant Training in Biology	
BIL 482	PRISM Teaching Fellow	
Chemistry		
Three semesters (17 credits) of chemistry are required for the biology major.		17
CHM 121 & CHM 113	Principles of Chemistry and Chemistry Laboratory I	
CHM 221 & CHM 205	Introduction to Structure and Dynamics and Chemical Dynamics Laboratory	
CHM 222 & CHM 206	Organic Reactions and Synthesis and Organic Reactions and Synthesis Laboratory	
or CHM 207	Chemical Dynamics and Organic Synthesis Laboratory	
Statistics or Computer Language/Programming		
Select one statistics or one computer language/programming course from the following. This will fulfill the mathematics/statistics/computer programming requirement under the College of Arts and Sciences General degree requirements for the Bachelor of Science.		3-4
BIL 511	Advanced Biostatistics	
ECS 204	Environmental Statistics	
MSC 204	Environmental Statistics	
MTH 224	Introduction to Probability and Statistics	
PSY 291	Introduction to Biobehavioral Statistics	
PSY 292	Introduction to Biobehavioral Statistics Section B	
CSC 120	Computer Programming I	
Physics		
Select one of the following Options:		10-11
Option One:		
PHY 101 & PHY 106	College Physics I and Physics Laboratory 1	

PHY 102 & PHY 108	College Physics II and Physics Laboratory 2	
Option Two:		
PHY 201 & PHY 106	University Physics I for the Sciences and Physics Laboratory 1	
PHY 202 & PHY 108	University Physics II for the Sciences and Physics Laboratory 2	
Option Three:		
PHY 211 & PHY 106	University Physics I for PRISM and Physics Laboratory 1	
PHY 212 & PHY 108	University Physics II for PRISM and Physics Laboratory 2	
Option Four:		
PHY 221	University Physics I	
PHY 222 & PHY 224	University Physics II and University Physics II Lab	
PHY 223 & PHY 225	University Physics III and University Physics III Lab	
Minor		**1-16**
Total credit hours for the minor will vary by department.		
The CHM requirement for the BS in biology fulfills either 12 or 15 (depending on which option is selected) of the 16 credits necessary for the minor in Chemistry. To complete the minor in Chemistry, only 1-4 additional credits in CHM are required beyond those necessary for the BS in Biology.		
General Education Requirements		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
ENG 106	Writing About Literature and Culture	3
or WRS 106	First-Year Writing II	
or WRS 107	First-Year Writing II: STEM	
Quantitative Skills:		
MTH 161	Calculus I (This course will fulfill the quantitative skills proficiency requirement.)	4
Areas of Knowledge:		
Arts and Humanities Cognate		9
People and Society Cognate		9
STEM Cognate (9 credits) (fulfilled through the major)		
Additional Requirements		
MTH 162	Calculus II	4
Language: one 200-level course (or higher)		3
Electives		7-28
MS IN BIOLOGY REQUIREMENTS (30 CREDIT HOURS)		
In the fifth year, 12-15 graduate-level credits in Biology should be taken each semester.		
Required graduate courses for the B.S./M.S. in Biology program. Some of these may be taken during the Senior year of the B.S.		
BIL 610	Lab Group Meeting	1
BIL 612	Graduate Core I	3
BIL 613	Graduate Core II	3
BIL 616	Professional Skills I	1
BIL 678	Current Topics in Biological Research - DVP	1
BIL 810	Master's Thesis	6
BIL 820	Research in Residence - Master's Thesis	1
Graduate-level (>600) electives in Biology		14
Total Credit Hours		**151**

Suggested Plan of Study

Year One		
Fall		**Credit Hours**
BIL 150	General Biology	4
BIL 151 or 153	General Biology Laboratory or Introductory Biology/Chemistry Laboratory I	1
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
MTH 161	Calculus I	4
WRS 105	First-Year Writing I	3
	Credit Hours	**17**
Spring		
BIL 160	Evolution and Biodiversity	4
BIL 161 or 163	Evolution and Biodiversity Laboratory or Introductory Biology/Chemistry Laboratory II	1
CHM 221	Introduction to Structure and Dynamics	4
CHM 205	Chemical Dynamics Laboratory	1
ENG 106, WRS 106, or WRS 107	Writing About Literature and Culture or First-Year Writing II or First-Year Writing II: STEM	3
MTH 162	Calculus II	4
	Credit Hours	**17**
Year Two		
Fall		
BIL 250 or 255	Genetics or Cellular and Molecular Biology	3
CHM 222	Organic Reactions and Synthesis	4
CHM 206	Organic Reactions and Synthesis Laboratory	2
Language 101		3
Statistics or Computer Science Course		3
Arts and Humanities Cognate Course		3
	Credit Hours	**18**
Spring		
BIL 250 or 255	Genetics or Cellular and Molecular Biology	3
BIL 330 or 320	Ecology or Evolutionary Biology	3
BIL 374, 375, or 402	Seminar in Biology or Seminar in Biology or Seminar in Biology	1
BIL 495	Projects in Biology	2
Language 102		3
Elective		3
	Credit Hours	**15**
Year Three		
Fall		
BIL 250, 255, or 360	Genetics or Cellular and Molecular Biology or Comparative Physiology	3
BIL 330 or 320	Ecology or Evolutionary Biology	3
PHY 101, 201, or 211	College Physics I or University Physics I for the Sciences or University Physics I for PRISM	4

PHY 106	Physics Laboratory 1	1
People and Society Cognate course		3
Language 2XX		3
	Credit Hours	**17**
Spring		
Biology Lab/Field course		1-2
BIL 496	Projects in Biology	2
PHY 102, 202, or 212	College Physics II or University Physics II for the Sciences or University Physics II for PRISM	4
PHY 108	Physics Laboratory 2	1
Arts and Humanities Cognate (WRI)		3
Elective		3
	Credit Hours	**14**
Year Four		
Fall		
BIL 612	Graduate Core I	3
BIL Elective		3
Arts and Humanities Cognate		3
Elective (WRI)		3
BIL 375, 374, or 402	Seminar in Biology or Seminar in Biology or Seminar in Biology	1
People and Society Cognate course (WRI)		3
	Credit Hours	**16**
Spring		
BIL 613	Graduate Core II	3
Elective (WRI)		3
People and Society Cognate		3
BIL Elective		3
Elective		1-3
	Credit Hours	**13**
Year Five		
Fall		
BIL 610	Lab Group Meeting	1
BIL 616	Professional Skills I	1
BIL 810	Master's Thesis	6
Graduate Electives		7
	Credit Hours	**15**
Spring		
BIL 611	Lab Group Meeting	1
BIL 678	Current Topics in Biological Research - DVP	1
BIL 820	Research in Residence - Master's Thesis	1
Graduate Electives		6
	Credit Hours	**9**
	Total Credit Hours	**151**