

# B.S. IN BIOLOGY - INTEGRATIVE BIOLOGY CONCENTRATION

College of the Sciences and Mathematics

## Curriculum

Code	Title	Credits
General Education Requirements ( <a href="http://catalog.wcupa.edu/undergraduate/general-education-requirements/">http://catalog.wcupa.edu/undergraduate/general-education-requirements/</a> )		
First Year Experience		4
<b>Academic Foundations</b>		
English Composition requirement		6
Mathematics requirement		3
MAT 121	Introduction to Statistics I	
or MAT 125	Introduction to Statistics and Probability	
Interdisciplinary requirement		3
Diverse Communities requirement		3
<b>Distributive Requirements</b>		
Science requirement		6
CHE 103	General Chemistry I	
PHY 130	General Physics I	
Behavioral & Social Science requirement		6
Humanities requirement		6
Arts requirement		3
<b>Additional Baccalaureate Requirements</b>		
Writing Emphasis requirement		9
Speaking Emphasis requirement		9
Ethics requirement		3
<b>Major Core Requirements</b>		
BIO 110	General Biology I <sup>1</sup>	4
BIO 111	General Biology II <sup>1</sup>	4
BIO 210	Genetics <sup>1</sup>	3
BIO 210L	Genetics Lab <sup>1</sup>	1
BIO 211	Cell Biology <sup>1</sup>	4
CHE 103	General Chemistry I	3
CRL 103	General Chemistry I Lab	1
CHE 104	General Chemistry II	3
CRL 104	General Chemistry II Lab	1
CHE 231	Organic Chemistry I	4
CRL 231	Organic Chemistry I Lab	2
CHE 232	Organic Chemistry II	3
PHY 130	General Physics I <sup>3</sup>	4
or PHY 170	Physics I	
PHY 140	General Physics II <sup>3</sup>	
or PHY 180	Physics II	
MAT 121	Introduction to Statistics I	
or MAT 125	Introduction to Statistics and Probability	3
Select one semester of calculus		3-4
<b>Other Major Requirements</b>		
BIO 270	Ecology <sup>1</sup>	3
<b>Biology Electives <sup>4</sup></b>		
Select 20 semester hours under advisement		20
<b>Capstone Requirement</b>		
Select one of the following: <sup>2</sup>		1-16
BIO 409	Internship in Biological Sciences <sup>1,5,6</sup>	
BIO 490	Biology Seminar <sup>1,5</sup>	

BIO 491 Special Problems in Biology <sup>1,5,6</sup>

**Total Minimum Credits Required** 120

- 1 Biology core courses must be passed with a grade of C- (70%) or better.
- 2 The requirement for BIO 490/BIO 409/BIO 491 is waived for students in the Accelerated (B.S. + M.S.) program. It is replaced by an additional 3 credits of biology electives. Students not completing a thesis (BIO 608-BIO 610) will be required to complete BIO 490/BIO 409/BIO 491.
- 3 The recommended Physics sequence is PHY 130 & PHY 140. Students may substitute the PHY 170 & PHY 180 sequence, but PHY 130 may not be used as a prerequisite for PHY 180 and PHY 170 may not be used as a prerequisite for PHY 140.
- 4 Selected from BIO 214, BIO 215, BIO 217, BIO 277, or BIO courses at or above the 300 level, except BIO 307 and BIO 469.
- 5 This course fulfills the general education Capstone requirement.
- 6 A maximum of 8 combined credits from BIO 409 and BIO 491 may be applied to the total BIO program credits.

## Accelerated B.S. in Biology to M.S. in Biology Program

To be considered for the accelerated program and enroll in BIO 608 (Thesis Research I), students must have attained (completed) 75 credits with a minimum of 18 biology credits. Students must have a minimum cumulative GPA of 3.00 including a minimum GPA of 3.00 for biology courses. BIO 608 requires departmental permission to enroll; students must arrange a committee meeting prior to enrolling in BIO 608 (e.g., during their third year). The accelerated program in biology is only open to thesis students. Any student wishing to switch out of the thesis option will be required to complete all requirements of the B.S. degree. Once admitted to the graduate program, graduate policies apply, including minimum GPA (3.00). *See the Graduate Catalog for further details.*

*Students in the M.S. Biology program are required to take 21 credits of electives from the following three categories, 12 credits of which will be used to satisfy the B.S. program.*

Code	Title	Credits
<b>Core Requirements</b>		
BIO 510	Graduate Seminar in Biology	3
BIO 511	Experimental Design and Analysis	3
BIO 520	Topics and Research Methods in Cellular, Microbial, and Molecular Biology	3
BIO 521	Topics and Research Methods in Ecology, Evolution, and Organismal Biology	3
<b>Electives</b>		<b>9</b>
Select nine credits of electives from the following options:		
Any other 500-level biology course, with the exception of BIO 591.		
Up to six credits of 400-level biology courses, where no 500-level course is available.		
Up to six credits of graduate course work from another department or university, pending prior departmental approval.		
Electives may not be repeats of courses unless the course topic changed significantly.		
<b>Research and Capstone <sup>1</sup></b>		
BIO 608	Thesis Proposal <sup>2</sup>	3
BIO 609	Thesis Research <sup>3</sup>	3

BIO 610	Thesis and Defense <sup>4</sup>	3
<b>Total Minimum Credits Required</b>		<b>30</b>

- Part-time students will be required to take the same group of courses as full-time students except they must complete BIO 608 by the end of their third year. As with the full-time students, part-time students cannot sign up for BIO 609 unless they have obtained a letter grade for BIO 608. In addition, they must sign up for BIO 610 by the start of their sixth year and complete it by the end of that year.
- A thesis committee must have been formed, met with the student to discuss course work and research ideas, and the "Committee Composition" form needs to have been completed and submitted to the graduate coordinator in Biology at least 1 week prior to the start of the semester, before the student may be enrolled in BIO 608.
- A letter grade must be assigned for BIO 608 before the student may be enrolled in BIO 609. All paperwork must be filed at least 1 week prior to the start of the semester the student wants to conduct BIO 609 work.
- A letter grade must be assigned for BIO 609 before the student may be enrolled in BIO 610. All paperwork must be filed at least 1 week prior to the start of the semester the student wants to conduct BIO 610 work. To complete BIO 610 successfully, the student must present the thesis research in an open seminar and also pass a final thesis defense before the thesis committee. The degree will not be awarded until the student's committee has accepted the thesis and signed by the dean of The Graduate School.

## Sample Course Plan

To track their individual degree progress, students are advised to access their Degree Progress Report (DPR) via myWCU regularly. For more information, visit [wcupa.edu/DegreeProgressReport](http://wcupa.edu/DegreeProgressReport) (<http://wcupa.edu/degreeprogressreport/>).

The following is a sample suggested course sequence for this program; course offerings and availability are not guaranteed. Students should consult their academic advisor with any questions.

### B.S. in Biology - Integrative Biology Concentration

Course	Title	Credits
<b>Year One</b>		
<b>Semester One</b>		
BIO 110	General Biology I	4
CHE 103 & CRL 103	General Chemistry I and General Chemistry I Lab	4
WRT 120	Effective Writing I	3
FYE 100X	First Year Experience	4
<b>Credits</b>		<b>15</b>
<b>Semester Two</b>		
BIO 111	General Biology II	4
CHE 104 & CRL 104	General Chemistry II and General Chemistry II Lab	4
MAT 121 or MAT 125	Introduction to Statistics I <sup>1</sup> or Introduction to Statistics and Probability	3
WRT 2XX	200-level WRT Course	3
Behavioral & Social Science Gen Ed		3
<b>Credits</b>		<b>17</b>
<b>Year Two</b>		
<b>Semester Three</b>		
BIO 210 & 210L	Genetics and Genetics Lab <sup>2</sup>	4
CHE 231 & CRL 231	Organic Chemistry I and Organic Chemistry I Lab	6

Humanities & Ethics Gen Ed	3
Diverse Communities Gen Ed	3

**Credits 16**

#### Semester Four

BIO 211	Cell Biology <sup>2</sup>	4
CHE 232	Organic Chemistry II	3
MAT 145	Calculus for the Life Sciences	3-4
or	or Brief Calculus	
MAT 143	or Calculus I	
or		
MAT 161		

Arts Gen Ed 3

Behavioral & Social Science Gen Ed 3

**Credits 16-17**

#### Year Three

##### Semester Five

BIO 270	Ecology <sup>2</sup>	3
PHY 130	General Physics I	4
BIO XXX	Biology Elective	3
Humanities Gen Ed		3
Directed Elective		3

**Credits 16**

##### Semester Six

PHY 140	General Physics II	4
BIO XXX	Biology Elective	3
BIO XXX	Biology Elective	3
Interdisciplinary Gen Ed		3
Speaking Emphasis Gen Ed		3

**Credits 16**

#### Year Four

##### Semester Seven

BIO XXX	Biology Elective	3
BIO XXX	Biology Elective	3
Upper-Level Directed Elective		3
Directed Elective		3

**Credits 12**

##### Semester Eight

BIO 409	Internship in Biological Sciences	3
or	or Biology Seminar	
BIO 490	or Special Problems in Biology	
or		
BIO 491		
BIO XXX	Biology Elective	3
BIO XXX	Biology Elective	3
Directed Elective		3

**Credits 12**

**Total Credits 120-121**

- Students should take Statistics (MAT 121 or MAT 125) in the first year.
- All required 200-level Biology courses should be completed by the end of Semester #5.

### B.S. in Biology - Integrative Biology Concentration to M.S. in Biology Accelerated Program

Course	Title	Credits
<b>Year One</b>		
<b>Semester One</b>		
BIO 110	General Biology I	4

CHE 103 & CRL 103	General Chemistry I and General Chemistry I Lab	4
WRT 120	Effective Writing I	3
FYE 100X	First Year Experience	4
<b>Credits</b>		<b>15</b>

**Semester Two**

BIO 111	General Biology II	4
CHE 104 & CRL 104	General Chemistry II and General Chemistry II Lab	4
MAT 121 or MAT 125	Introduction to Statistics I <sup>1</sup> or Introduction to Statistics and Probability	3
WRT 2XX	200-level WRT Course	3
Behavioral & Social Science Gen Ed		3
<b>Credits</b>		<b>17</b>

**Year Two****Semester Three**

BIO 210 & 210L	Genetics and Genetics Lab <sup>2</sup>	4
CHE 231 & CRL 231	Organic Chemistry I and Organic Chemistry I Lab	6
Humanities & Ethics Gen Ed		3
Diverse Communities Gen Ed		3
<b>Credits</b>		<b>16</b>

**Semester Four**

BIO 211	Cell Biology <sup>2</sup>	4
CHE 232	Organic Chemistry II	3
MAT 145 or MAT 143 or MAT 161	Calculus for the Life Sciences or Brief Calculus or Calculus I	3-4
Arts Gen Ed		3
Behavioral & Social Science Gen Ed		3
<b>Credits</b>		<b>16-17</b>

**Year Three****Semester Five**

BIO 270	Ecology <sup>2</sup>	3
PHY 130	General Physics I	4
BIO XXX	Biology Elective	3
Humanities Gen Ed		3
Directed Elective		3
<b>Credits</b>		<b>16</b>

**Semester Six**

PHY 140	General Physics II	4
BIO XXX	Biology Elective	3
BIO XXX	Biology Elective	3
Interdisciplinary Gen Ed		3
Speaking Emphasis Gen Ed		3
<b>Credits</b>		<b>16</b>

**Year Four****Semester Seven**

BIO 510	Graduate Seminar in Biology	3
BIO 520	Topics and Research Methods in Cellular, Microbial, and Molecular Biology	3
BIO 608	Thesis Proposal	3
Upper-Level Directed Elective		3

Directed Elective	2
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<b>Credits</b>	<b>14</b>
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**Semester Eight**

BIO 511	Experimental Design and Analysis	3
BIO 521	Topics and Research Methods in Ecology, Evolution, and Organismal Biology	3
Directed Elective		3
Directed Elective		3

<b>Credits</b>	<b>12</b>
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**Year Five****Semester Nine**

BIO 609	Thesis Research	3
BIO XXX	Biology Elective	3
BIO XXX	Graduate Biology Elective	3

<b>Credits</b>	<b>9</b>
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**Semester Ten**

BIO 610	Thesis and Defense	3
BIO XXX	Graduate Biology Elective	3
BIO XXX	Graduate Biology Elective	3

<b>Credits</b>	<b>9</b>
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<b>Total Credits</b>	<b>140-141</b>
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- Students should take Statistics (MAT 121 or MAT 125) in the first year.
- All required 200-level Biology courses should be completed by the end of Semester #5.