

**Biology: Microbiology, Cellular and Molecular Biology, & Biotechnology Option**
**Bachelor of Science (BS)**
**Microbiology, Cellular and Molecular Biology & Biotechnology Option**

This option is designed for students preparing to do graduate work in any area of the laboratory life sciences or to seek full-time employment. There is high demand for graduates with laboratory research training in the public and private sectors. Required and supporting courses provide the background that is essential for admission into life sciences graduate programs or for employment in biotechnology.

The Department of Biology has numerous research and teaching labs that provide excellent opportunities for active experiences. Faculty advisors in this area are active in research programs and readily involve students in their research programs.

**Biology students will...**

- Meet their advisor each semester to assess their progress towards their post-graduation goals.
- Take a core of courses that prepares them for any area of biology.
- Take rigorous coursework in general microbiology, laboratory methods in biotechnology, and molecular genetics
- Select additional courses and electives in virology, immunology, investigative molecular biology, epidemiology, physiology, bioinformatics, health physics, and toxicology.
- Complete 80 hours for 2 credit hours of experiential learning in labs on-campus or summer programs.
- Complete additional coursework in chemistry, biochemistry, and mathematics to make them competitive for admission to graduate programs.
- Attend classes in the newly renovated Magill Hall furnished with modern equipment.

**Career Planning**

Graduates find ready placement in industry and matriculate to prestigious graduate programs.

Demonstrated Career Proficiency is a Requirement of all Southeast Students		
CL001/CL002	First Semester	Complete the FOCUS2 assessment and develop a Career Action Plan.
CL003	Junior Year	Students gain information about career planning and job searching resources.
CL004	Senior Year	Students demonstrate advanced proficiency by identifying a position in their field, developing a cover letter, and tailoring a resume for the position. Materials are critiqued to ensure preparedness for a successful job search.
<b>Career Services</b> , located in Academic Hall 057, provides professional career advising to guide students in their career development.		

**Recent Internship Placement**

- Danforth Plant Research Center
- St. Francis Medical Center
- Southeast Missouri Hospital
- Washington University in St. Louis
- University of Nebraska
- Indian Association for the Cultivation of Science (Kolkata)

**Graduate School Matriculation**

- Washington University in St. Louis
- Southeast Missouri State University
- Missouri State University
- University of Missouri
- Vanderbilt University
- University of Wisconsin
- University of Minnesota
- University of Cincinnati
- Rensselaer Polytechnic Institute
- University of Massachusetts
- Miami University Ohio
- University of Arkansas for Medical School, College of Pharmacy
- Southeast Health College of Nursing and Health Science (Medical Technology)

**Employment of Past Graduates**

- Monsanto
- Pfizer
- Sigma-Aldrich Chemical Company
- Biokyowa
- Proctor and Gamble
- St. Jude's Children's Hospital
- Washington University in St. Louis
- St. Louis University
- Zoetis

**A number of graduates have matriculated to a variety of medical schools.**

**Admission Requirements**

A college preparatory sequence that includes three years of science (including biology, chemistry, and physics) and mathematics through advanced algebra is encouraged.

**To learn more**  
 Office of Admissions  
 (573) 651-2590  
[admissions@semo.edu](mailto:admissions@semo.edu)  
[www.semo.edu](http://www.semo.edu)

**To explore the College of Science, Technology, and Agriculture online, visit**  
[www.semo.edu/costa](http://www.semo.edu/costa)

**For advising**  
 College of Science, Technology, and Agriculture  
 Advising Center (573) 651-5930  
[costaadvising@semo.edu](mailto:costaadvising@semo.edu)  
[www.semo.edu/costa/advising/index.htm](http://www.semo.edu/costa/advising/index.htm)

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**Degree Map**

This is a guide based on the 2014-2015 Undergraduate Bulletin and is subject to change. The time it takes to earn a degree will vary based on several factors such as dual enrollment, remediation, and summer enrollment. Students will meet with an academic advisor each semester and use DegreeWorks to monitor their individual progress.

**CURRICULUM CHECKLIST**
**Biology: Microbiology, Cellular and Molecular Biology, and Biotechnology Option – 49 hours**

- \_\_\_ BI151 Biological Reasoning (3)
- \_\_\_ BI153 Intro to Organismal Biology (4)
- \_\_\_ BI154 Genetics and Cell Biology (4)
- \_\_\_ BI489 Analysis of Biological Issues (2)
- \_\_\_ CH185/085/005 General Chemistry (5)
- \_\_\_ MA134 College Algebra (3)
- \_\_\_ MA xxx Additional Math (3)
- \_\_\_ BI200 General Microbiology (3)
- \_\_\_ BI245 Lab Methods in Biotechnology (3)
- \_\_\_ BI381 Molecular Genetics (3)

**Experiential Learning Requirement: 2 hours**

- \_\_\_ BI 471-473 Internships in Biology (2)  
OR
- \_\_\_ BI 551-553 Biology Field Studies (2)  
OR
- \_\_\_ BI 589-591 Biological Research (2)

**Choose 6 Hours From:**

- \_\_\_ BI404 Cell Biology (3)
- \_\_\_ BI414 Current Problems in Cell and Molecular Biology (3)
- \_\_\_ BI441 Virology (3)
- \_\_\_ BI442 Immunology (3)
- \_\_\_ BI443 Epidemiology (3)
- \_\_\_ BI445 Microbial Physiology (3)
- \_\_\_ BI/BT450 Investigative Molecular Biology and Biotechnology (3)
- \_\_\_ BI460 Intro to Toxicology
- \_\_\_ BI543 Pathogenic Microbiology (2)
- \_\_\_ BI544 Pathogenic Microbiology Lab (1)
- \_\_\_ BO445 Plant Physiology (3)
- \_\_\_ ZO331 Animal Physiology (3)
- \_\_\_ ZO414 Developmental Biology (3)
- \_\_\_ ZO441 Parasitology (3)

**Electives: Choose 8 Hours**

- \_\_\_ Any BI, BO, ZO, BT courses, 300 level and above

**Non-Biology Requirements:**

- \_\_\_ CH186 Foundations of Inorganic Chemistry (3)
- \_\_\_ CH187 Inorganic Chemistry and Qualitative Analysis Lab (2)
- \_\_\_ CH341 Foundations of Organic Chemistry (4)
- \_\_\_ CH342 Organic Chemistry Lab I (1)
- \_\_\_ CH531/UI331 Foundations of Biochemistry (3)

**University Studies Requirements (not already listed above):**

UI100 First Year Seminar, EN100 English Composition, Artistic Expression, Written Expression, Oral Expression, Literary Expression, Behavioral Systems, Development of a Major Civilization, Economic Systems, Political Systems, Social Systems, and one IU/UI3XX\*, and one UI4XX.

\*Note: Two IU/UI3xx courses are required if CH531 Foundations of Biochemistry is taken rather than UI331 Foundations of Biochemistry.

**SAMPLE FOUR-YEAR PLAN**
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Requirements for the 2014-2015 Undergraduate Bulletin

	Fall Semester		Spring Semester	
	Course #	Hrs	Course #	Hrs
<b>FIRST YEAR</b>	UI100	3	EN100	3
	BI151	3	BI153	4
	CH185/085/005	5	CH186	3
	MA134	3	CH187	2
			Additional Math course	3
	<b>Total</b>	<b>14</b>	<b>Total</b>	<b>15</b>
<b>SECOND YEAR</b>	BI154	4	BI200	3
	CH341	4	BI245	3
	CH342	1	CH343#	3
	Artistic Expression	3	CH344#	2
	Written Expression	3	Literary Expression	3
			Elective	2
	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>16</b>
<b>THIRD YEAR</b>	BI381	3	MCM option course	3
	PH120/020#	5	PH121/021#	5
	Behavioral Systems	3	Biology elective	3
	Oral Expression	3	Economic Systems	3
	<b>Total</b>	<b>14</b>	<b>Total</b>	<b>14</b>
<b>FOURTH YEAR</b>	MCM option course	3	BI489	2
	Biology Elective	3	Biology elective	2
	Experiential Learning Crs	2	CH533#	2
	Develop of a Major Civ	3	Political Systems	3
	UI331	3	Social Systems	3
IU/UI3XX	3	UI4XX	3	
	<b>Total</b>	<b>17</b>	<b>Total</b>	<b>15</b>

#Suggested non-biology elective courses

**Degree requirements for all students:** a minimum of 120 credit hours, completion of University Studies program, career proficiencies (CL001-004), Writing Proficiency Exam (WP003), and completion of the Measure of Academic Proficiency and Progress (MAP) at the freshman and senior levels.

A minimum 2.00 GPA in the major and overall are required to graduate with a BS in Biology degree.

Refer to the Undergraduate Bulletin or DegreeWorks for additional graduation requirements (i.e. minimum GPA and coursework) for your program of study.

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02/20/2014

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