

**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**

Career preparation is part of the mission of Southeast. In fact, more than 90% of Southeast students participate in internships, clinical opportunities, student teaching, research assistantships, and study abroad. Graduates find ready placement in industry and matriculate to prestigious graduate programs.

Professional career counselors are available for all students. The Office of Career Services in Academic Hall 057 can provide students with professional career counseling, resume critiques, practice interviews, job search strategies, career events, networking opportunities, and more.

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.

**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
- Biokwora
- 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  
www.semo.edu

**To explore the College**  
of Science, Technology and  
Agriculture online, visit  
www.semo.edu/costa

**For advising**  
Center for Academic Advising - North  
(573) 651-5090  
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advisingnorth@semo.edu

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This is a guide based on the 2016-2017 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**

*"Critical Courses" are italicized and bolded. Data shows that students who have completed this course in the first two years and have earned the noted grade are most likely to complete this program of study.*

**Required Courses:**

- \_\_\_ BI163 Evolution & Ecology (4)
- \_\_\_ BI173 Cell & Organismal Biology (4)
- \_\_\_ BI283 Genetics (4)
- \_\_\_ BI389 Career Development in Biology (1)
- \_\_\_ CH185/085/005 General Chemistry (5)

## Choose one math course:

- \_\_\_ MA134 College Algebra (3)
- \_\_\_ MA137 Precalculus (5)
- \_\_\_ MA139 Applied Calculus (3)
- \_\_\_ MA140 Analytical Geometry & Calculus I (5)

## Choose one additional math course:

- \_\_\_ MAxxx Additional math (MA133 or higher) (3)

## Experiential Learning Requirement: 2 hours

- \_\_\_ BI 471-473 Internships in Biology (2)
- \_\_\_ BI 551-553 Biology Field Studies (2)
- \_\_\_ BI 589-591 Biological Research (2)
- \_\_\_ BI 570 Development of Instructional Materials (1)

**Microbiology, Cellular and Molecular Biology, & Biotechnology Option Required Courses:**

- \_\_\_ BI245 Lab Methods in Biotechnology (3)
- \_\_\_ BI310 General Microbiology (4)

## Choose 6 Hours From:

- \_\_\_ BI404 Cell Biology (3)
- \_\_\_ BI413 Molecular Genetics (3)
- \_\_\_ BI442 Immunology (3)
- \_\_\_ BI445 Microbial Physiology (3)
- \_\_\_ BI/BT450 Investigative Molecular Biology and Biotechnology (3)
- \_\_\_ BI543 Pathogenic Microbiology (2)
- \_\_\_ BI544 Pathogenic Microbiology Lab (1)
- \_\_\_ ZO414 Developmental Biology (3)

**Biology Electives: Choose 10 Hours**

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

**Non-Biology Requirements: 13 hours**

- \_\_\_ 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**

	Fall Semester		Spring Semester	
	Course #	Hrs	Course #	Hrs
<b>FIRST YEAR</b>	UI100	3	EN100	3
	BI163	4	BI173	4
	CH185/085/005	5	CH186	3
	MA134/137/139/140	3-5	CH187	2
			Additional Math course	3
	<b>Total</b>	<b>15-17</b>	<b>Total</b>	<b>15</b>
Milestone: maintain 2.0 cumulative GPA				

<b>SECOND YEAR</b>	BI283	4	BI245	3
	CH341	4	BI310	4
	CH342	1	CH343#	3
	Artistic Expression	3	CH344#	2
	Written Expression	3	Literary Expression	3
	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>15</b>
Milestone: maintain 2.0 cumulative GPA				

<b>THIRD YEAR</b>	MCM option course	3	MCM option course	3
	BI389	1	PH121/021#	5
	PH120/020#	5	Biology elective	3
	Behavioral Systems	3	Economic Systems	3
	Oral Expression	3		3
	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>14</b>
Milestone: maintain 2.0 cumulative GPA				

<b>FOURTH YEAR</b>	Biology Elective	3	CH533#	2
	Biology Elective	3	Biology Elective	1
	Experiential Learning Crs	2	Political Systems	3
	UI331/CH531	3	Social Systems	3
	Develop of a Major Civ	3	UI4XX	3
	IU/UI3XX	3	Elective	3
	<b>Total</b>	<b>17</b>	<b>Total</b>	<b>15</b>
	Milestone: maintain 2.0 cumulative GPA			

**A "Milestone" signifies a significant stage for a student in the completion of a degree.**

#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 (MAPP) at the senior level.

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.

Revised  
2/23/2016