

# BIOCHEMISTRY, BS

Program Director: Xiao-Ning Zhang, Ph.D.

The department of biology offers a program leading to the Bachelor of Science with a major in biochemistry. The biochemistry program has been accredited by American Society for Biochemistry and Molecular Biology (<https://www.sbu.edu/academics/biochemistry/asbmb-accreditation/>) and provides students with a basic understanding of living systems that emphasizes the molecular and cellular aspects of biology.

A new biotechnology lab equipped with environmentally controlled growth chambers, Real-time and End Point ThermoCyclers, electrophoresis equipment, gel imaging system, cell culture hoods, confocal fluorescent microscope and various microscopes, etc. provides the technical component for the program and affords research opportunities for students during their sophomore, junior and senior years. The final year of study features independent laboratory research.

Advances in the area of molecular biology and biochemistry have led to the expansion of job opportunities in the general field of biotechnology and bioengineering. The biochemistry program will be of special interest to students with a strong science and mathematics background who are preparing for graduate school, medical, pharmacy or dental school as well as pharmaceutical or biotechnology positions.

Code	Title	Credits
<b>Biology</b>		<b>24</b>
BIO-105 & BIOL-105	BIOLOGICAL SCIENCE I and BIOLOGICAL SCI. I LAB	
BIO-106 & BIOL-106	BIOLOGICAL SCIENCE II and BIOLOGICAL SCI. II LAB	
BIO-291	GENETICS	
BIO-371 & BIOL-371	BIOCHEMISTRY and BIOCHEMISTRY LAB	
BIO-418	RES. PARTICIPATION III	
BIO-419	RES. PARTICIPATION IV	
BIO-460	BIOCHEMISTRY SEMINAR	
BIO-466 & BIOL-466	MOLECULAR BIOLOGY and MOLECULAR BIOLOGY LAB	
<b>Chemistry</b>		<b>23</b>
CHEM-101	GENERAL CHEMISTRY I	
CHML-101	GEN CHEM I LAB	
CHEM-102	GENERAL CHEMISTRY II	
CHML-102	GEN CHEM II LAB	
CHEM-301	ORGANIC CHEMISTRY I	
CHML-301	ORGANIC CHEM I LAB	
CHEM-302	ORGANIC CHEMISTRY II	
CHML-302	ORGANIC CHEM II LAB	
CHEM-401	PHYSICAL CHEMISTRY I	
CHML-401	PHYSICAL CHEM I LAB	
CHEM-470	MECHANISMS IN BIOLOGICAL SYSTM	
<b>Mathematics</b>		<b>8</b>
MATH-151	CALCULUS I	
MATH-152	CALCULUS II	
<b>Physics</b>		<b>8</b>

PHYS-103	GENERAL PHYSICS I	
PHYL-103	GENERAL PHYSICS I LAB	
PHYS-104	GENERAL PHYSICS II	
PHYL-104	GENERAL PHYSICS LAB II	
<b>Foreign Language</b> <sup>1</sup>		<b>3</b>
<b>Mathematics &amp; Natural Science Electives</b> <sup>2</sup>		<b>16</b>
General Education Requirements ( <a href="https://catalog.sbu.edu/undergraduate/degree-requirements/">https://catalog.sbu.edu/undergraduate/degree-requirements/</a> )		<b>37</b>
<b>General Electives (enough to reach 120)</b> <sup>3</sup>		<b>1</b>
<b>Total Credits</b>		<b>120</b>

<sup>1</sup> The foreign language must be at the level of 202 or higher. Students not prepared to begin at this level will need to take additional courses in language.

<sup>2</sup> The Math & Natural Science electives (**a total of 16 credits**) must be chosen from among the following:

- One Biology with lab from: BIO-292, BIO-321/BIOL-321, BIO-331/BIOL-331, BIO-350/BIOL-350, BIO-362/BIOL-362, BIO-406/BIOL-406, BIO-472/BIOL-472, BIO-494/BIOL-494;
- One Chemistry with lab from: CHEM-201/CHML-201, CHEM-402/CHML-402, CHEM-431/CHML-431;
- One Math course from: MATH-117, MATH-207, MATH-241, MATH-251, MATH-252, MATH-322, MATH-323; and
- Minimum of two courses from: Biology, Chemistry or Mathematics electives in the listed courses above plus BIOL-293, BIO-318, BIO-319, BIO-390, and CHEM-441

<sup>3</sup> General electives are needed when a major course is also fulfilling one of the General Education Distributions.

The comprehensive requirement for Biochemistry majors is the successful completion of BIO-460.

First Year			
Fall	Credits	Spring	Credits
BIO-105 & BIOL-105	4	BIO-106 & BIOL-106	4
CHEM-101 & CHML-101	4	CHEM-102 & CHML-102	4
MATH-151	4	MATH-152	4
SBU-101	2	ENG-101	3
SBU-102	1		
		<b>15</b>	<b>15</b>
Second Year			
Fall	Credits	Spring	Credits
BIO-291	3	CHEM-302 & CHML-302	4
CHEM-301 & CHML-301	4	PHYS-104 & PHYL-104	4
PHYS-103 & PHYL-103	4	Math & Natural Science Electives <sup>1</sup>	3
ENG-102	3	Foreign Language 202 <sup>2</sup>	3
		<b>14</b>	<b>14</b>
Third Year			
Fall	Credits	Spring	Credits
BIO-371 & BIOL-371	4	BIO-419	2
CHEM-401 & CHML-401	4	BIO-466 & BIOL-466	4
Math & Natural Science Elective <sup>1</sup>	1	CHEM-470	3
THFS-101	3	General Education Requirements	6
General Education Requirement	3		
		<b>15</b>	<b>15</b>

## Fourth Year

Fall	Credits	Spring	Credits
BIO-418	2	BIO-460	1
Math & Natural Science Elective <sup>1</sup>	7	Math & Natural Science Elective <sup>1</sup>	6
General Education Requirement	6	General Education Requirement	9
General Elective	1		
	<b>16</b>		<b>16</b>

Total Credits 120

<sup>1</sup> The Math & Natural Science electives (a total of 16 credits) must be chosen from among the following:

1. One Biology with lab from: BIO-292, BIO-321/BIOL-321, BIO-331/BIOL-331, BIO-350/BIOL-350, BIO-362/BIOL-362, BIO-406/BIOL-406, BIO-472/BIOL-472, BIO-494/BIOL-494;
2. One Chemistry with lab from: CHEM-201/CHML-201, CHEM-402/CHML-402, CHEM-431/CHML-431;
3. One Math course from: MATH-117, MATH-207, MATH-241, MATH-251, MATH-252, MATH-322, MATH-323; and
4. Minimum of two courses from: Biology, Chemistry or Mathematics electives in the listed courses above plus BIOL-293, BIO-318, BIO-319, BIO-390, and CHEM-441

<sup>2</sup> The foreign language must be at the level of 202 or higher. Students not prepared to begin at this level will need to take additional courses in language.

Changes in the sequence of the program listed above may be desirable. These must be made in consultation with the student's academic adviser.

The comprehensive requirement for Biochemistry majors is the successful completion of BIO-460.