

**College of Science, Technology, Engineering and Mathematics**  
Program Requirements for:  
**BS Biochemistry**

Student Name		Banner #	
Cell Phone #		E-Mail Address	
Street Address		City/State/Zip Code	
Birth Date	Date Entered YSU	Date Declared Major	

Department	Chemistry	Dept. Location	5053 Ward Beecher Hall
Chairperson	Dr. Timothy Wagner <a href="mailto:trwagner@ysu.edu">trwagner@ysu.edu</a>	Dept. Web Address	<a href="http://chemistry.yosu.edu/">http://chemistry.yosu.edu/</a>
Dept. Phone #	330-941-3662	Effective Date of Program Requirements	

**Requirements for Graduation:** Request a Graduation Evaluation after you have completed 80-85 sh from the STEM Advising Center, 2325 Moser Hall, 330-941-2512. Apply for graduation during the *first three weeks of the semester* you plan to graduate.

	GER model complete	Not Req	Foreign Language through 2600 level (8 sh) (Not required for BS Biochemistry majors)		Minimum of 120 total sh for the degree
	Minimum 90 sh in major				Residency requirement (transfer students only)
Not Req	Minimum 0 sh in minor		Minimum 39 sh of upper-division credit		Minimum of 2.00 GPA

**General Education Requirements (GER)**

Subject	Crs. #	Course Title	SH	Gr
YSU	1500	Success Seminars	1	
ENGL	1550	Writing 1 (CRPT or ENGL 1539/1540)	3	
ENGL	1551	Writing 2 (ENGL 1550 or ACT ENGL 28+)	3	
CMST	1545	Communication Foundations (eligibility for ENGL 1550)	3	
MATH	1571	Calculus 1 (Level 70 on the MPT or MATH 1513)	4	

**General Education Knowledge Domains**

Some courses are categorized in more than one knowledge domain.  
Courses can only be used **once** within the General Education model.  
Consult the GER website or your advisor for the list of approved courses meeting General Education requirements: <https://cms.yosu.edu/general-education/ysu-general-education-courses>

**Arts & Humanities (AH): 2 courses (6 sh)**

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**Natural Sciences (NS): 2 courses, one must include a lab**  
(Courses below are required for the Biochemistry BS major.)

CHEM	1515/L	General Chemistry 1 & Lab	3+1	
CHEM	1516/L	General Chemistry 2 & Lab	3+1	

**Social Sciences (SS): 2 courses (6 sh)**

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**Social & Personal Awareness (SPA): 2 courses (6 sh)**

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**General Education Elective: 1 course**

BIOL	2601/L	Gen. Bio.: Molecules & Cells/lab	4+0	
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**All majors require a Capstone course to satisfy the GER.**  
See requirements listed under the major.

**Foreign Language (8 sh)\***

(\*May not be required for your major - check major/college requirements and your advisor.)

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**Advisement:**

Freshman, athletes, and students on warning and probation are **required** to meet with an advisor before registration.  
It is recommended that all majors meet with a faculty advisor every semester.

**Remedial Coursework**

Students take the following coursework based on scores from their placement exams or ACT/SAT scores. Please see your advisor to determine which courses you are required to complete.

**These courses do NOT count toward graduation hours.**

Subject	Crs. #	Course Title	SH	Gr
RSS	1510A	Advanced College Success Skills	3	
RSS	1510B	Basic College Success Skills	3	
RSS	1510C	STEM Adv College Success Skills	3	
ENGL	1509/12	Aca Conv for Non-native Speakers	3	
ENGL	1512	Eng Conv for Non-native Speakers	1	
ENGL	1539	Fundamentals of College Writing	4	
ENGL	1540	Introduction to College Writing	3	
MATH	1500	Mathematics Preparation for Algebra Placement	2	

The Undergraduate Catalog is found at:

<http://catalog.yosu.edu/courses/>

General Education courses can be found at:

<https://cms.yosu.edu/general-education/ysu-general-education-courses>

# BS Biochemistry

<b>Required Hours for the Major</b>	90
<b>Required Hours for the Minor</b>	Not Req.
<b>Required Upper-Division Hours for the Degree</b>	39
<b>Total Hours Required for the Degree</b>	120

Major and minor courses must earn a grade of C or better and cannot be taken as CR/NC. Courses cannot count toward both the major & minor. The Biochemistry major does not require a minor.

Subj.	Crs. #	Course Title	SH	Gr
<b>The following CHEM core courses are required (38 sh):</b>				
CHEM	1515	General Chemistry 1 ("C" or better in CHEM 1501 or equivalent; "C" or better in Math 1513 or "C" or better in Math 1510; concurrent: CHEM 1515L and CHEM 1515R)	3	
CHEM	1515L	General Chemistry 1 Lab (concurrent: CHEM 1515)	1	
CHEM	1515R	Recitation for Gen. Chemistry 1 (concurrent: CHEM 1515)	1	
CHEM	1516	General Chemistry 2 ("C" or better in CHEM 1515; "C" or better in CHEM 1515L; concurrent CHEM 1516L; CHEM 1516R)	3	
CHEM	1516L	General Chemistry 2 Lab (concurrent: CHEM 1516)	1	
CHEM	1516R	Recitation for Gen. Chemistry 2 (concurrent: CHEM 1516)	1	
CHEM	2604/L	Quantitative Analysis (Prereq: CHEM 1516)	5+0	
CHEM	3719/L	Organic Chemistry 1 & Lab ("C" or better in CHEM 1516)	4+0	
CHEM	3719R	Organic Chemistry Recitation 1 (concurrent CHEM 3719)	1	
CHEM	3720/L	Organic Chemistry 2 & Lab ("C" or better in CHEM 3719)	4+0	
CHEM	3720R	Organic Chemistry Recitation 2 (concurrent CHEM 3720)	1	
CHEM	3739	Physical Chemistry 1 ("C" or better in CHEM 3720; PHYS 2610; MATH 1572)	3	
CHEM	3739L	Physical Chemistry 1 Lab (Prereq or coreq: CHEM 3739)	1	
CHEM	3785	Biochemistry 1 ("C" or better in CHEM 3720)	3	
CHEM	3785L	Biochemistry 1 lab (Prereq or concurrent: CHEM 3785)	1	
CHEM	3786	Biochemistry 2 (Prereq: "C" or better in CHEM 3785)	3	
CHEM	5876	Enzyme Analysis (Prereq: CHEM 3785 or equivalent and CHEM 3785L or equivalent)	2	
<b>The following capstone is required (3 sh):</b>				
CHEM	4850	Chemistry Research (CHEM 2604 or CHEM 3719 and approval of dept. chairperson)	1	
CHEM	4851	Chemistry Research Project (CHEM 4850 and approval of dept. chairperson)	2	
<b>The following BIOL core courses are required (14 sh):</b>				
BIOL	2601/L	Gen. Bio.: Molecules & Cells/lab (Prereq or concurrent: CHEM 1515; concurrent: BIOL 2601L)	4+0	
BIOL	3702/L	Microbiology/lab (Prereq: BIOL 2601 or BIOL 2603; concurrent: BIOL 3702L)	4+0	
BIOL	3711	Cell Biol.: Fine Structure (Prereq: BIOL 2601 or BIOL 2603)	3	
BIOL	3721	Genetics (Prereq: BIOL 2601 or BIOL 2603)	3	
<b>The following support courses are required (22 sh):</b>				
MATH	1571	Calculus 1 (Prereq: "C" or better in MATH 1510 or "C" or better in both MATH 1510 and MATH 1511 or at least 70 on MPT)	4	
MATH	1572	Calculus 2 (Prereq: "C" or better in either MATH 1571 or MATH 1581H)	4	
STAT	3717	Statistical Methods (Prereq: One of MATH 1549, 1570, 1571, 1571H, 1581H or equivalent)	4	
or STAT	or 3743	Probability and Statistics (Prereq: MATH 1572 or 1585H)	4	
PHYS	2610/L	General Physics 1 & lab (HS physics or PHYS 1501 and prereq. or concurrent MATH 1571)	4+1	
PHYS	2611/L	General Physics 2 & lab (Prereq: PHYS 2610 & prereq or concurrent MATH 1572)	4+1	

## Required Electives:

Select 10 sh of upper-level CHEM electives (3000 or higher) from the list below. At least one course must include a laboratory.

CHEM	3729	Inorganic Chemistry (Prereq or concurrent: CHEM 3739)	3	
CHEM	3761	Intro. to Polymer Chemistry (Prereq: CHEM 3720)	1	
CHEM	3764	Chemical Toxicology (Prereq: CHEM 3720)	3	
CHEM	4851	Chemistry Research Project (Prereq or concurrent: CHEM 4850 and approval of department chairperson)	2-3	
CHEM	4891	Special Topics	1-3	
CHEM	5804/L	Chem. Instrumentation (Prereq: CHEM 3739)	4+0	
CHEM	5821	Intermed. Org. Chem. (Prereq: CHEM 3720)	3	
CHEM	5822/L	Advanced Organic Lab (Prereq: CHEM 3720)	4+0	
CHEM	5832/L	Solid State Struct. Meth. & Lab (Prereq: CHEM 3729)	3+0	

Select 3 sh of upper-level BIOL courses from the list below.

Subj.	Crs. #	Course Title	SH	Gr
BIOL	4800/L	Bioinformatics (Prereq: BIOL 3721 or BIOL 3759)	4+0	
BIOL	4801/L	Environ. Microbiology (Prereq: BIOL 3702)	4+0	
BIOL	4829	Microbial Physiology (Prereq: BIOL 3702 or BIOL 3711)	3	
BIOL	4837	Cell Biology: Protein Biology Lab. (Prereq: BIOL 3711 or consent of instructor)	1	
BIOL	4890	Molecular Genetics (Prereq: BIOL 3711 or 3721)	3	
BIOL	4890L	Molecular Genetics Laboratory (Prereq or concurrent: BIOL 4890)	1	
BIOL	5840	Advanced Microbiology (Prereq: BIOL 3702 or equivalent)	3	

**Total Semester Hours Required of the Major**     **90**

### Important Notes:

- View the online YSU *Undergraduate Catalog* (<http://catalog.ysu.edu/courses/>) for information including course descriptions and prerequisites, major and minor requirements, academic policies, etc.
  - An accumulated GPA of 2.00 or above is required to graduate.
  - All students must satisfy General Education requirements; some majors prescribe specific GE courses.
  - A grade of "C" or better is required in all required major and minor courses. Courses taken as "CR/NC" will not count towards the major or minor. Courses taken out of sequence will not count toward graduation.
  - Courses cannot count toward both the major and minor.
  - Courses taken for the major and minor may be applied toward satisfying General Education requirements but credit hours toward graduation cannot be double counted.
  - Eight semester hours of foreign language through the 2600 level are required of some majors; check your major requirements.
  - Course numbers of 3700 and higher are considered upper-division courses.
  - You must complete coursework totaling a minimum of 120 sh to graduate (at least 60 sh must be completed at the 2600 level or higher and 39 sh must be at the 3700 level or higher).
  - The following courses do NOT count as hours toward graduation: MATH 1500; ENGL 1509, 1512, 1539 and 1540; and RSS 1510A, 1510B and 1510C.
  - The residency rule requires the last 30 sh of your degree and at least 16 sh in your major and 21 sh in upper-division courses to be completed at YSU.
  - Eligibility to continue receiving federal financial aid is affected by your "satisfactory academic progress." Carefully review details on the Office of Financial Aid and Scholarship website: <http://www.ysu.edu/content/office-financial-aid-and-scholarships>
  - Meet with your advisor on a regular basis to ensure you are meeting requirements for graduation.
- Graduation Process**
- **One Year Before Expected Graduation**
    - Request a Graduation Evaluation after you have completed 100 sh from the STEM Advising Center, 2325 Moser Hall, 330-941-2512.
    - When your evaluation is complete, make an appointment with the chairperson of your department.
  - **Semester You Plan To Graduate**
    - Apply for graduation during the *first three weeks of the semester* you plan to graduate (you must have a graduation evaluation completed in advance).

**College of Science, Technology, Engineering and Mathematics**  
Program Requirements for:  
**BS Degree in Biochemistry**

**Suggested 4-Year Semester Sequence**

Year 1 - Fall Semester					Year 1 – Spring Semester				
Subj.	Course #	Course Title	SH	Gr	Subj.	Course #	Course Title	SH	Gr
CHEM	1515	General Chemistry 1	3		CHEM	1516	General Chemistry 2	3	
CHEM	1515L	General Chemistry 1 Lab	1		CHEM	1516L	General Chemistry 2 Lab	1	
CHEM	1515R	Recitation for Gen. Chem. 1	1		CHEM	1516R	Recitation for Gen. Chem. 2	1	
MATH	1571	Calculus 1	4		MATH	1572	Calculus 2	4	
ENGL	1550	Writing 1	3		BIOL/L	2601/L	Molecules and Cells and Lab	4	
YSU	1500	Success Seminars	1		ENGL	1551	Writing 2	3	
*STEM	1551	STEM Careers (recommended)	1						
<b>TOTAL</b>					<b>TOTAL</b>				
<b>14</b>					<b>16</b>				

Year 2 - Fall Semester					Year 2 – Spring Semester				
Subj.	Course #	Course Title	SH	Gr	Subj.	Course #	Course Title	SH	Gr
CHEM	3719/L	Organic Chemistry 1 and lab	4		CHEM	3720/L	Organic Chemistry 2 and lab	4	
CHEM	3719R	Recitation for Organic Chem. 1	1		CHEM	3720R	Recitation for Organic Chem. 2	1	
CHEM	2604/L	Quantitative Analysis	5		PHYS	2611/L	General Physics 2 and lab	5	
PHYS	2610/L	General Physics 1 and lab	5		STAT	3717 or 3743	Statistical Methods or Probability and Statistics	4	
<b>TOTAL</b>					<b>TOTAL</b>				
<b>15</b>					<b>14</b>				

Year 3 - Fall Semester					Year 3 – Spring Semester				
Subj.	Course #	Course Title	SH	Gr	Subj.	Course #	Course Title	SH	Gr
CHEM	3785	Biochemistry 1	3		CHEM	3786	Biochemistry 2	3	
CHEM	3785L	Biochemistry 1 lab	1		CHEM	5876	Enzyme Analysis	2	
CHEM	3739	Physical Chemistry 1	3		BIOL	3711	Cell Biol.: Fine Structure	3	
CHEM	3739L	Physical Chemistry 1 Lab	1		BIOL	3702/L	Microbiology and Lab	4	
BIOL	3721	Genetics	3		GER			3	
GER			6						
<b>TOTAL</b>					<b>TOTAL</b>				
<b>17</b>					<b>15</b>				

Year 4 - Fall Semester					Year 4 – Spring Semester				
Subj.	Course #	Course Title	SH	Gr	Subj.	Course #	Course Title	SH	Gr
CHEM	4850	Chemistry Research	1		CHEM		Upper-Level chem electives	4	
CHEM	4851	Chemistry Research Project	2		BIOL		Upper-Level electives	3	
CHEM		Upper-Level chem electives	6		GER			6	
CMST	1545	Communication Foundations	3				Elective (recommend taking a lab with upper level biology elective)	1	
GER			3						
<b>TOTAL</b>					<b>TOTAL</b>				
<b>15</b>					<b>14</b>				

\*If you choose not to take STEM 1551 you will need to complete 1 sh of course work elsewhere in your curriculum

<b>Required Hours for the Major</b>	90
<b>Required Hours for the Minor</b>	N/A
<b>Required Upper-Division Hours for the Degree</b>	39
<b>Total Hours Required for the Degree</b>	120