

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 trwagner@ysu.edu	Dept. Web Address	http://chemistry.ysu.edu/
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) <small>(May not be required for your major-check major/college requirements.)</small>		Minimum of 120 total sh for the degree
	Minimum 90 sh in major				Residency requirement <small>(transfer students only)</small>
<small>Not Req</small>	Minimum 0 sh in minor		Minimum 48 sh of upper-division credit		Minimum of 2.00 GPA

General Education Requirements (GER)

Subject	Crs. #	Course Title	SH	Gr
STEM	1520	STEM First Year Orientation	2	
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 <small>(eligibility for ENGL 1550)</small>	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.ysu.edu/general-education/ysu-general-education-courses>

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

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	4+0	
CHEM	1516/L	General Chemistry 2 & Lab	4+0	

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

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

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.)

		Not Required		
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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	1501	Elementary Algebraic Models	5	
MATH	1505	Intermediate Algebra with Applications	5	
MATH	1507	Intermediate Algebra	3	

The Undergraduate Catalog is found at:

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

General Education courses can be found at:

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

BS Biochemistry

Required Hours for the Major	90
Required Hours for the Minor	Not Req.
Required Upper-Division Hours for the Degree	48
Total Hours Required for the Degree	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
The following CHEM core courses are required (38 sh):				
CHEM	1515/L	General Chemistry 1 & Lab (CHEM 1501 or equivalent; MATH 1513 or equivalent; concurrent 1515R)	4+0	
CHEM	1515R	Recitation for Gen. Chemistry 1 (concurrent CHEM 1515)	1	
CHEM	1516/L	General Chemistry 2 & Lab ("C" or better in CHEM 1515; concurrent 1516R)	4+0	
CHEM	1516R	Recitation for Gen. Chemistry 2 (concurrent CHEM 1516)	1	
CHEM	2604/L	Quantitative Analysis (CHEM 1516)	5+0	
CHEM	3719/L	Organic Chemistry 1 & Lab ("C" or better in CHEM 1516; concurrent 3719R)	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; concurrent 3720R)	4+0	
CHEM	3720R	Organic Chemistry Recitation 2 (concurrent CHEM 3720)	1	
CHEM	3739/L	Physical Chemistry 1 & Lab ("C" or better in CHEM 3720; PHYS 2611/2611L; MATH 1572)	4+0	
CHEM	3785	Biochemistry 1 (CHEM 3720)	3	
CHEM	3785L	Biochemistry 1 lab (prereq. or concurrent: CHEM 3785)	1	
CHEM	3786	Biochemistry 2 (CHEM 3785)	3	
CHEM	5876	Enzyme Analysis (CHEM 3785 or equivalent and CHEM 3785L or equivalent)	2	
The following capstone is required (3 sh):				
CHEM	4850/L	Chemistry Research and Lab	1+2	
The following BIOL core courses are required (14 sh):				
BIOL	2601/L	Gen. Bio.: Molecules & Cells/lab (prereq or concurrent: CHEM 1515)	4+0	
BIOL	3702/L	Microbiology/lab (BIOL 2601)	4+0	
BIOL	3711	Cell Biol.: Fine Structure (BIOL 2601)	3	
BIOL	3721	Genetics (BIOL 2601)	3	
The following non-CHEM courses are required (22 sh):				
MATH	1571	Calculus 1 (MATH 1513 or level 50 on MPT)	4	
MATH	1572	Calculus 2 (MATH 1571)	4	
STAT	3717	Statistical Methods (MATH 1549 or 1570 or 1571 or 1585H or equivalent)	4	
or STAT	or 3743	or Probability and Statistics (MATH 1572 or 1585H)		
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 (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 4 sh must include an upper-level laboratory.				
CHEM	3729	Inorganic Chemistry (prereq or concurrent: CHEM 3739)	3	
CHEM	3764	Chemical Toxicology (CHEM 3720)	3	
CHEM	4850L	Chemistry Research Lab (Prereq. or concurrent: CHEM 4850 and approval of department chairperson)	2-3	
CHEM	4891	Special Topics	1-3	
CHEM	5804/L	Chem. Instrumentation (CHEM 3739)	4+0	
CHEM	5821	Intermed. Org. Chem. (CHEM 3720)	3	

CHEM	5822/L	Advanced Organic Lab (CHEM 3720)	4+0	
CHEM	5832/L	Solid State Struct. Meth. & Lab (CHEM 3729)	3+0	
Select 3 sh of upper-level BIO courses from the list below.				
Subj.	Crs. #	Course Title	SH	Gr
BIOL	4800/L	Bioinformatics (BIOL 3721)	4+0	
BIOL	4801/L	Environ. Microbiology (BIOL 3702)	4+0	
BIOL	4829	Microbial Physiology (BIOL 3702 or BIOL 3711)	3	
BIOL	4836/L	Cell Biology: Molecular Mechanisms (BIOL 3711 or consent of instructor)	3+0	
BIOL	4837	Cell Biology: Protein Biology Lab. (BIOL 3711 or consent of instructor)	1	
BIOL	4890	Molecular Genetics (BIOL 3711 or 3721)	3	
BIOL	4890L	Molecular Genetics Laboratory (Prereq or concurrent: BIOL 4890)	1	
BIOL	5840	Advanced Microbiology (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 124 sh to graduate (at least 60 sh must be completed at the 2600 level or higher and 48 sh must be at the 3700 level or higher).
- The following courses do NOT count as hours toward graduation: MATH 1500, 1501, 1502, 1503, 1504, 1505 and 1507; 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 80-85 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 semester* you plan to graduate evaluation compl

College of Science, Technology, Engineering and Mathematics

Program Requirements for:

BS 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/L	General Chemistry 1 and lab	4		CHEM	1516/L	General Chemistry 2 and lab	4	
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	
STEM	1520	STEM First Year Orientation	2		ENGL	1515	Writing 2	3	
TOTAL			14		TOTAL			16	

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	
TOTAL			15		TOTAL			14	

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	3	
CHEM	3785L	Biochemistry 1 lab	1		CHEM	5876	Enzyme Analysis	2	
CHEM	3739/L	Physical Chemistry 1 and Lab	4		BIOL	3711	Cell Biol.: Fine Structure	3	
BIOL	3721	Genetics	3		BIOL	3702/L	Microbiology and Lab	4	
GER			6		GER			3	
TOTAL			17		TOTAL			15	

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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	4850L	Chemistry Research Lab	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		TOTAL			14	
TOTAL			15		TOTAL			14	

Required Hours for the Major	90
Required Hours for the Minor	N/A
Required Upper-Division Hours for the Degree	48
Total Hours Required for the Degree	120