

# Biochemistry Major (with ASBMB certification) - Bachelor of Science (BS)

## Major requirements

(All colleges, excluding teacher certification programs)

46 credits (29-33 additional credits including BIO, MIC, MTH, and PHY requirements)

Code	Title	Credits
<b>Core</b>		
CHM 103	General Chemistry I	5
CHM 104	General Chemistry II	5
CHM 271	The Chemical Community	1
CHM 301	Analytical Chemistry	5
CHM 303	Organic Chemistry Theory I	3
CHM 304	Organic Chemistry Theory II	3
CHM 305	Organic Chemistry Laboratory	2
CHM 407	Biophysical Chemistry <sup>1</sup>	3
CHM 417	Biochemistry I: Macromolecules	4
CHM 418	Biochemistry II: Metabolism and Genetic Information	3
CHM 419	Advanced Biochemistry Lab	3
BIO 435	Molecular Biology	3
BIO 436	Molecular Biology Laboratory	1
<b>Electives</b>		
Select five credits from the elective list below.		5
CHM 331	Fundamentals of Inorganic Chemistry	
CHM 403	Advanced Organic Chemistry	
CHM 405	Advanced Organic Synthesis	
CHM 424	Spectroscopy	
CHM 431	Inorganic Synthesis and Methods	
CHM 441	Instrumental Analysis	
CHM 445	Biochemistry of Antimicrobials	
CHM 479	Field Research Station Experience (Field Research Station Experience)	
CHM 499	Research <sup>2</sup>	
MIC 310	Immunology	
MIC 407	Pathogenic Bacteriology	
MIC 410	Immunology Laboratory	
MIC 420	Introductory Virology	
MIC 421	Virology Laboratory	
BIO 408	Developmental Biology	
BIO 424	Human Endocrinology	
BIO 432	Biology of Cancer	
BIO 440	Bioinformatics	
BIO 443	Molecular Mechanism of Disease and Drug Action	
BIO 449	Advanced Microscopy and Biological Imaging	
BIO 465	Neurophysiology	

BIO 466	Human Molecular Genetics	
BIO 467	Neurobiology Laboratory Techniques	
BIO 468	Human Molecular Genetics Lab	
BIO 483	Cell Signaling	
<b>Total Credits</b>		<b>46</b>

## Required prerequisite courses (29 credits minimum):

Code	Title	Credits
<b>Select an additional 29-33 credits to meet prerequisites for required courses including the following:</b>		
BIO 105	General Biology	4
MTH 207	Calculus I	5
MTH 208	Calculus II <sup>1</sup>	4
or MTH 265	Mathematical Models in Biology	
PHY 103	Fundamental Physics I	4
or PHY 203	General Physics I	
PHY 104	Fundamental Physics II	4
or PHY 204	General Physics II	
<b>Select either the biology or the microbiology prerequisite tracks below</b>		<b>8-12</b>

### Biology track prerequisites

Code	Title	Credits
Introductory course – select one of the following:		
BIO 202	Introduction to Biological Data Analysis and Interpretation	2-4
BIO 203	Organismal Biology	
BIO 312	Human Anatomy and Physiology I	
MIC 230	Fundamentals of Microbiology	
Intermediate courses:		
BIO 306	Genetics	4
BIO 315	Cell Biology	4
<b>Total Credits</b>		<b>10-12</b>

### Microbiology track prerequisites

Code	Title	Credits
MIC 230	Fundamentals of Microbiology	4
MIC 416	Prokaryotic Molecular Genetics	4
<b>Total Credits</b>		<b>8</b>

<sup>1</sup> To fulfill the (bio)physical chemistry portion of their degree, students may take the CHM 309 and CHM 310 sequence instead of CHM 407. If students choose this route, they **must** take **both** MTH 208 and MTH 310 for an additional 4 credits of prerequisites. Students choosing this route are also encouraged to take PHY 203 and PHY 204 to fulfill the physics requirement. Conversely, students who plan to take CHM 407 do not need to take MTH 310 and can choose the math and physics courses as described above.

<sup>2</sup> Only two credits from CHM 499 may count toward the major.

### Exam and survey requirement

During the student's last semester on campus, completion of the following is required in order to graduate:

1. The Department of Chemistry and Biochemistry Learning Environment Survey and
2. A standardized exam covering the major subject areas.

## Degree requirements

All students must complete the general education, college core, major/minor, and university degree requirements in order to qualify for a degree. The easiest way to track all of these requirements is to refer to the Advisement Report (AR) found in the Student Information System (WINGS) Student Center. All enrolled students have access to the AR.

- General education (<http://catalog.uwlax.edu/undergraduate/generaleducation/>)
- College core (p. 2)
- Baccalaureate degree requirements (p. 2)

## College of Science and Health (CSH) Bachelor of Science core requirements

B.S. and B.A. students graduating from the College of Science and Health are required to take two natural laboratory science courses selected from the general education laboratory science category (GE 05) and/or from BIO 203, BIO 304, BIO 210, CHM 104, GEO 221, GEO 222, PHY 104 or PHY 204, and they either must take two mathematics courses or one math course and one computer science course from the math/logical systems category of the general education requirements (GE 02). One of the two science courses must be from a department outside of the student's major department.

**Note:** Math courses can be pairs, i.e. 150 and 151; MTH/CS majors can use two science courses from same department.

**For the Bachelor of Science degree**, in addition to all other College of Science and Health core requirements, students from non-exempted programs<sup>1</sup> must complete one of the following options. It is recommended that courses are selected in consultation with students' academic advisor.

1. Complete a second major; or
2. Complete a minor outside the major; or
3. Complete two certificates outside the major with at least 12 combined credits at the 300/400 level; or
4. Complete an individualized option, consisting of 18 credits
  - a. At least 12 credits must be earned at the 300/400 level outside the major department.
  - b. The remaining six credits should come from
    - i. 100 level or higher courses outside the major (General education courses may apply provided they are not being used to fulfill minimum general education requirements.); or
    - ii. 300/400 level courses inside major not being used to fulfill major requirements.
  - c. Internship credits may not count toward the individualized option.

<sup>1</sup> The list of exempted CSH programs is below.

## Baccalaureate degree requirements

Candidates for the Bachelor of Arts or the Bachelor of Science degrees must accomplish the following:

1. Fulfill the general education requirements.
2. Complete at least one ethnic studies (diversity) course.
3. Complete the courses prescribed by the Undergraduate Curriculum Committee for the degree desired in the respective school or college.
4. Earn a minimum of 120 semester credits with at least a 2.00 cumulative GPA.<sup>1, 2</sup>
5. At least 40 credits must be earned in 300/400 level courses. Transfer courses earned or transferred at the 300/400 level apply to this requirement.
6. Complete major and minor requirements with at least a 2.00 GPA<sup>1, 2</sup> in each major and minor (and concentration or emphasis, if selected).
7. A minimum of 30 semester credits in residence at UWL is required for graduation. (See undergraduate resident requirement (<http://catalog.uwlax.edu/undergraduate/academicpolicies/graduation/#undergraduate-residence-requirement>.)
8. Submit an application for graduation via the "Apply for Graduation" link in the WINGS Student Center as soon as the student has registered for his or her final semester or summer term in residence. December and winter intersession graduates should apply by May 1. May and summer graduates should apply by December 1.

<sup>1</sup> Grade point average requirements for some programs will be considerably higher than 2.00. Re-entering students may be required to earn credits in excess of the 120 needed for graduation in any curriculum in order to replace credits earned in courses in which the content has changed substantially in recent years. Each case will be judged on its own merit.

<sup>2</sup> The grade point average recorded at the time the degree is awarded will not be affected by future enrollment.

**No degree will be awarded unless all requirements are fulfilled and recorded within 30 days after the official ending date of each term.**

## Sample degree plan

Below is a sample degree plan that can be used as a guide to identify courses required to fulfill the major and other requirements needed for degree completion. A student's actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Also, this sample plan assumes readiness for each course and/or major plan, and some courses may not be offered every term. Review the course descriptions or the class timetable (<http://www.uwlax.edu/records/regISTRATION/>) for course offering information.

The sample degree plans represented in this catalog are intended for first-year students entering UWL in the fall term. Students should use the Advisement Report (AR) in WINGS (<https://wings.uwlax.edu>) and work closely with their faculty advisor(s) and college dean's office to ensure declaration and completion of all requirements in a timely manner.

### General Education Program

The general education curriculum (Gen Ed) is the common educational experience for all undergraduates at UWL. Sample degree plans include Gen Ed placeholders to ensure completion of the general education requirements. Courses may be rearranged to fit the needs or recommendations of the student's program of study. Gen Ed courses

may be taken during winter term (January between the semesters) and summer to reduce the course load during regular terms (fall and spring). Students should consult with their advisor and/or the college academic services director in their college/school for assistance with course and schedule planning. Refer to the general education requirements (<http://catalog.uwlax.edu/undergraduate/generaleducation/>) for more specific details.

At least 40 credits of the 120 credits required must be earned at the 300/400-level.

**Note:** New students and transfer students with less than 12 credits earned are required to take FYS 100 First-Year Seminar (3 cr.) during one of their first two semesters at UWL.

*This sample degree plan does not establish a contractual agreement. It identifies the minimum requirements a student must successfully complete, to qualify for a degree, in a format intended to assist the student in planning their academic career. Actual degree plans may differ.*

The two **biochemistry sample plans** below follow the **biology track prerequisites**. See catalog for **microbiology track prerequisites** and adjust the CSH Core and/or minor credits as needed.

## Plan of study for students eligible to begin in MTH 207 (Calculus I)

Year 1		
Fall	Credits Spring	Credits
CHM 103 (Gen Ed Natural Lab Science)	5 CHM 104	5
BIO 105 (Gen Ed Natural Lab Science)	4 MTH 265	4
MTH 207 (Gen Ed Math)	5 BIO 203	4
ENG 110 or 112 (Gen Ed Literacy-Written)	3 FYS 100 (Gen Ed First-Year Seminar)	3
	<b>17</b>	<b>16</b>
Year 2		
Fall	Credits Spring	Credits
CHM 303	3 CHM 304	3
BIO 306	4 CHM 305	2
BIO 312	4 Gen Ed Global Studies	3
CHM 271	1 BIO 315	4
CST 110 (Gen Ed Literacy-Oral)	3 BIO 313	4
	<b>15</b>	<b>16</b>
Year 3		
Fall	Credits Spring	Credits
CHM 417	4 CHM 418	3
PHY 103 or 203 (Gen Ed Natural Lab Science)	4 CHM 419	3
Gen Ed Arts	2-3 PHY 104 or 204	4
CHM 301	5 Gen Ed Humanistic Studies	3
	Gen Ed Health & Well-Being	3
	<b>15</b>	<b>16</b>
Year 4		
Fall	Credits Spring	Credits
BIO 435	3 CHM 407	3
BIO 436	1 CSH Core or Minor (BIO minor may be met) <sup>1</sup>	3
Biochem elective - see list	2-3 Biochem elective - see list	3
CSH Core or Minor (BIO minor may be met) <sup>1</sup>	3 Gen Ed Minority Cultures	3
Gen Ed Self & Society	3 Gen Ed Arts	2

Gen Ed World History	3 Exam and survey requirement <sup>2</sup>	
	<b>15</b>	<b>14</b>

**Total Credits: 124**

- See CSH BS Core Requirements (<http://catalog.uwlax.edu/undergraduate/scienceandhealth/#Core>) for information on completing the individualized option. 300/400 requirements for graduation may be impacted.
- Exam and survey requirement** - During the student's last semester on campus, completion of the following is required in order to graduate
  - The Department of Chemistry and Biochemistry Learning Environment Survey and
  - A standardized exam covering the major subject areas.

## Plan of study for students beginning with MTH 151 (PreCalculus)

Year 1		
Fall	Credits Spring	Credits
CHM 103 (Gen Ed Natural Lab Science)	5 CHM 104	5
BIO 105 (Gen Ed Natural Lab Science)	4 MTH 207 (Gen Ed Math)	5
ENG 110 or 112 (Gen Ed Literacy-Written)	3 BIO 203	4
MTH 151 (Gen Ed Math)	4 FYS 100 (Gen Ed First-Year Seminar)	3
	<b>16</b>	<b>17</b>
Year 2		
Fall	Credits Spring	Credits
CHM 303	3 CHM 304	3
BIO 306	4 CHM 305	2
BIO 312	4 BIO 315	4
CHM 271	1 BIO 313	4
MTH 265 (Gen Ed Math)	4 CST 110 (Gen Ed Literacy-Oral)	3
	<b>16</b>	<b>16</b>
Year 3		
Fall	Credits Spring	Credits
CHM 417	4 CHM 418	3
PHY 103 or 203 (Gen Ed Natural Lab Science)	4 CHM 419	3
Gen Ed Arts	2-3 PHY 104 or 204	4
CHM 301	5 Gen Ed Humanistic Studies	3
	Gen Ed Health & Well-Being	3
	<b>15</b>	<b>16</b>
Year 4		
Fall	Credits Spring	Credits
BIO 435	3 CHM 407	3
BIO 436	1 CSH Core or Minor (BIO minor may be met) <sup>1</sup>	3
Biochem elective - see list	2-3 Biochem elective - see list	3
Gen Ed Self & Society	3 Gen Ed Minority Cultures	3
CSH Core or Minor (BIO Minor may be met) <sup>1</sup>	3 Gen Ed World History	3
Gen Ed Arts	2-3 Exam and survey requirement <sup>2</sup>	
Gen Ed Global Studies	3	
	<b>17</b>	<b>15</b>

**Total Credits: 128**

<sup>1</sup> See CSH BS Core Requirements (<http://catalog.uwlax.edu/undergraduate/scienceandhealth/#Core>) for information on completing the individualized option. 300/400 requirements for graduation may be impacted.

<sup>2</sup> **Exam and survey requirement** - During the student's last semester on campus, completion of the following is required in order to graduate:

1. The Department of Chemistry and Biochemistry Learning Environment Survey and
2. A standardized exam covering the major subject areas.