CHEMISTRY (CHE)  416
214 Julian Hall, (309) 438-7661
https://Chemistry.IllinoisState.edu
Chairperson: Craig C. McLauchlan

General Department Information
The Department of Chemistry is on the Approved Program list of the American Chemical Society. Contact the department for specific certification requirements.

Honors in the Major: Chemistry
Biochemistry; Chemistry; Chemistry Teacher Education
Students in the Honors Program can choose to pursue various designations to earn upon graduation, including Honors in the Major. By completing Honors, students will:

1. engage in an enriched and extended learning experience;
2. develop as scholars and gain an edge over their peers by choosing a rigorous preparation in their field of study;
3. be recognized in the Commencement Book, transcript, and on the diploma.

Students earn this designation at graduation; requirements, including being in good standing with the Honors Program, are reviewed at the end of the final semester:

1. 3.30 cumulative GPA
2. 3.50 major GPA
3. Fulfill Honors Program participation requirements: one Honors Learning Experience per semester in the program, including the final semester (students are not required to complete an Honors Learning Experience when they are off-campus).
4. Complete two Honors Learning Experiences in CHE courses, specifically:
   - Honors selections of CHE 140 and 141 or an Honors Contract in a CHE course at the 200 level or higher.
   - Completion of four of the following courses with an Honors Contract in one course: CHE 301, 302, 315, 344, 350, 362, 372, 380, CHE/PHY 318.
5. Complete an Honors Capstone Experience, specifically:
   - 5 hours of CHE 290/299 (of which at least 3 hours are CHE 299) that culminates in a research presentation at a university, regional, or national and/or international conference or symposium.

Further details about the University Honors program are available at: Honors.IllinoisState.edu.

Chemistry Teacher Education Sequence
Students completing the Chemistry Teacher Education Sequence must have a 2.50 or higher GPA in Chemistry, a 2.50 or higher GPA in Professional Education courses, and a cumulative GPA of 2.50 or higher.

1. A grade of C or better is required in the following Chemistry courses:
   - CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361

2. For teaching licensure, a grade of C or better is required in all endorsement areas (including calculus, physics, and science competency courses), Chemistry, and Professional Education courses.

3. Students successfully completing this sequence will earn an American Chemical Society Certified Degree.

Pedagogy Emphasis Sequence
Students in the Pedagogy Emphasis Sequence must have a 2.30 or higher GPA in Chemistry, a 2.50 or higher GPA in Professional Education courses, and a cumulative GPA of 2.50 or higher.

1. A grade of C or better is required in the following Chemistry courses:
   - CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361

2. For teaching licensure, a grade of C or better is required in all endorsement areas (including calculus, physics, and science competency courses), Chemistry, and Professional Education courses.

3. Students successfully completing this sequence will earn an American Chemical Society Certified Degree.
Clinical Experiences Legend

relates to the type and kind of activity related to a specific course.

The following legend for course offering can be found with the appropriate course description in this Undergraduate Catalog. The following legend determines specific requirements needed each semester.

Education Center well in advance of clinical experiences to determine specific requirements needed each semester.

Candidates should consult with clinical course faculty and the Cecilia J. Lauby Teacher Education Center to determine specific requirements needed each semester. Criminal background checks must remain current as of the last day of the clinical experience. Candidates should consult the Teacher Education Center well in advance of clinical experiences to determine specific requirements needed each semester.

The approximate number of clinical hours associated with each course offering can be found with the appropriate course description in this Undergraduate Catalog. The following legend relates to the type and kind of activity related to a specific course.

Clinical Experiences in Teacher Education

A variety of clinical (pre-student teaching) experiences, as well as student teaching, are included in the teacher candidates professional preparation. Observations, small and large group instruction, tutoring, field experiences, and student teaching are included in the Clinical Experiences Program. The experiences offered prior to student teaching are integral parts of specific college courses. Clinical experiences are provided in off-campus professional development schools, local schools, campus laboratory schools, agencies and other approved non-school settings. The Cecilia J. Lauby Teacher Education Center monitors and documents all clinical experiences. Teacher candidates will show verification of having completed clinical experiences commensurate with attaining local, state, and national standards. Teacher candidates must provide their own transportation to clinical experiences sites.

Candidates are required to provide documentation of meeting all State of Illinois, district, and university requirements in regard to criminal background checks BEFORE beginning any clinical experiences. Criminal background checks must remain current as of the last day of the clinical experience. Candidates should consult with clinical course faculty and the Cecilia J. Lauby Teacher Education Center well in advance of clinical experiences to determine specific requirements needed each semester.

The approximate number of clinical hours associated with each course offering can be found with the appropriate course description in this Undergraduate Catalog. The following legend relates to the type and kind of activity related to a specific course.

Clinical Experiences Legend

- Observation (including field trips)
- Tutoring one-on-one contact
- Non-instructional assisting
- Small group instruction
- Whole class instruction
- Work with clinic client(s)
- Graduate practicum
- Professional meeting

MINOR IN CHEMISTRY

- 21 hours required in Chemistry, including at least 13 hours in courses numbered 200 or higher excluding CHE 204

Required courses:
- CHE 140, 141
- CHE 215 and 216 or 250 and 251
- CHE 220 or 230 and 231

Biochemistry Program

Degree Offered: B.S.

Major in Biochemistry

- 45 hours required in Chemistry, including at least 37 hours in courses numbered 200 or higher
- Biochemistry electives: The department strongly recommends that students take at least 6 hours of advanced electives. Advising options for various career objectives are available from the department office and on the department website.
- A course in the major may not be taken more than twice unless the course description states “Multiple enrollments are allowed.” An exception may be requested once during a student’s undergraduate career if the GPA in the major plan and overall GPA is 2.00 or higher.
- A grade of C or better is required in all areas (including calculus, physics, and science competency courses), Chemistry, and Professional Education courses.
- Students completing the Chemistry Pedagogy Emphasis sequence must have a 2.50 or higher GPA in Chemistry, a 2.50 or higher GPA in Professional Education courses, and a cumulative GPA of 2.50 or higher.
- The following course is strongly recommended: SED 344.

Clinical Experiences Program

A variety of clinical (pre-student teaching) experiences, as well as student teaching, are included in the teacher candidates professional preparation. Observations, small and large group instruction, tutoring, field experiences, and student teaching are included in the Clinical Experiences Program. The experiences offered prior to student teaching are integral parts of specific college courses. Clinical experiences are provided in off-campus professional development schools, local schools, campus laboratory schools, agencies and other approved non-school settings. The Cecilia J. Lauby Teacher Education Center monitors and documents all clinical experiences. Teacher candidates will show verification of having completed clinical experiences commensurate with attaining local, state, and national standards. Teacher candidates must provide their own transportation to clinical experiences sites.

Candidates are required to provide documentation of meeting all State of Illinois, district, and university requirements in regard to criminal background checks BEFORE beginning any clinical experiences. Criminal background checks must remain current as of the last day of the clinical experience. Candidates should consult with clinical course faculty and the Cecilia J. Lauby Teacher Education Center well in advance of clinical experiences to determine specific requirements needed each semester.

The approximate number of clinical hours associated with each course offering can be found with the appropriate course description in this Undergraduate Catalog. The following legend relates to the type and kind of activity related to a specific course.

Clinical Experiences Legend

- MAT 145 and 146
- PHY 110 and 111 or PHY 108 and 109
- PHY 110 and 111 are the preferred option; if PHY 108 and 109 are taken instead, the hours of MAT and PHY total 18.
- Professional Education requirements (25 hours): EAF 228 or 231 or 235; PSY 110, 215; TCH 212, 216, 219; STT 399A73 (8 hours). NOTE: PSY 110 is a prerequisite for PSY 215
- Science competency courses (11 hours):
  - BSC 197
  - PHY 205; or equivalent
- A course in the major may not be taken more than twice unless the course description states “Multiple enrollments are allowed.” An exception may be requested once during a student’s undergraduate career if the GPA in the major plan and overall GPA is 2.00 or higher.
- A grade of C or better is required in the following Chemistry courses:
  - CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361
- A grade of C or better is required in all areas (including calculus, physics, and science competency courses), Chemistry, and Professional Education courses.
- Students completing the Chemistry Pedagogy Emphasis sequence must have a 2.50 or higher GPA in Chemistry, a 2.50 or higher GPA in Professional Education courses, and a cumulative GPA of 2.50 or higher.
- The following course is strongly recommended: SED 344.
MAJOR IN CHEMISTRY (B.S.)

General Education (39 credit hours)
Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

| Communication and Composition (2 courses required) | 3   COM 110 Communication as Critical Inquiry  
|                                                   | 3   ENG 101 or ENG 101A10 Communication as Critical Inquiry |
| Mathematics (1 course required)                  | 4   MAT 145 Calculus I |
| Natural Science/Natural Science Alternatives (2 courses required) | 4   PHY 110 Physics for Science & Engineering I†  
|                                                   | 4   CHE 140 General Chemistry I |
| United States Traditions (1 course required)     |  
| Individuals & Civic Life (1 course required)     |  
| Fine Arts (1 course/3 credit hours required)***  |  
| Humanities (1 course required)***               |  
| Language in the Humanities (1 course required)***|  
| Quantitative Reasoning (1 course required)       | 4   MAT 146 Calculus II |
| Science, Math, & Technology (1 course required)  | Exempt for Chemistry majors |
| Social Sciences (1 course required)***           |  

Additional Graduation Requirements

<table>
<thead>
<tr>
<th></th>
<th>/120 minimum total credit hours</th>
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<tbody>
<tr>
<td></td>
<td>/42 minimum senior college hours</td>
</tr>
<tr>
<td></td>
<td>College of Arts &amp; Sciences language requirement</td>
</tr>
</tbody>
</table>

AMALI requirement
***certain courses in General Education fulfill the AMALI requirement
See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

B.S. Science, Math, & Technology (1 course required)
See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

MAJOR (min. 61 credit hours)

<table>
<thead>
<tr>
<th>45 hours in Chemistry required</th>
</tr>
</thead>
<tbody>
<tr>
<td>4   CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)</td>
</tr>
<tr>
<td>4   CHE 141 General Chemistry II (P: CHE 140)</td>
</tr>
<tr>
<td>3   CHE 215 Analytical Chemistry (P: C or better in CHE 141 and 230)</td>
</tr>
<tr>
<td>1   CHE 216 Analytical Chemistry Laboratory (P: CHE 215 or conc. reg.)</td>
</tr>
<tr>
<td>3   CHE 230 Organic Chemistry I (P: CHE 141)</td>
</tr>
<tr>
<td>1   CHE 231 Organic Chemistry Laboratory (P: CHE 141; conc. reg. in CHE 230)</td>
</tr>
<tr>
<td>3   CHE 232 Organic Chemistry II (P: CHE 230)</td>
</tr>
<tr>
<td>2   CHE 233 Organic Chemistry Laboratory II (P: CHE 231; conc. reg. in CHE 232)</td>
</tr>
<tr>
<td>3   CHE 250 Fundamentals of Inorganic Chemistry (P: C or better in CHE 230)</td>
</tr>
<tr>
<td>1   CHE 251 Fundamentals of Inorganic Chemistry Laboratory (P: CHE 250 or conc. reg.)</td>
</tr>
<tr>
<td>3   CHE 342 General Biochemistry I (P: C or better in CHE 232 or 1 year of organic chemistry)</td>
</tr>
<tr>
<td>3   CHE 360 Physical Chemistry I (P: C or better in CHE 141; PHY 109 or 111; MAT 146; 8+ earned hours in senior college CHE or PHY)</td>
</tr>
<tr>
<td>1   CHE 361 Physical Chemistry Laboratory I (P: CHE 360 or conc. reg.)</td>
</tr>
<tr>
<td>4   MAT 145 Calculus I (P: C or better in MAT 144 or placement)</td>
</tr>
<tr>
<td>4   MAT 146 Calculus II (P: C or better in MAT 145)</td>
</tr>
<tr>
<td>4   PHY 110† Physics for Science &amp; Engineering I (P: MAT 145 or conc. reg.)</td>
</tr>
<tr>
<td>4   PHY 111† Physics for Science &amp; Engineering II (P: PHY 110 and MAT 146 or conc. reg.)</td>
</tr>
</tbody>
</table>

Take 9 credit hours of additional Chemistry electives from the following courses: (CHE 315, 344, 350, 362)

<table>
<thead>
<tr>
<th>Required corresponding Chemistry labs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1   CHE 316† Instrumental Analysis Laboratory (P: C or better in CHE 216; 315 or conc. reg.)</td>
</tr>
<tr>
<td>2   CHE 343† Biochemistry Laboratory (P: CHE 242 or 342 or conc. reg.)</td>
</tr>
<tr>
<td>1   CHE 351† Advanced Inorganic Chemistry Laboratory (P: CHE 251; 350 or conc. reg.)</td>
</tr>
<tr>
<td>1   CHE 363† Physical Chemistry Laboratory II (P: C or better in CHE 361; 362 or conc. reg.)</td>
</tr>
</tbody>
</table>

† CHE 290, 299, 398A01 or 398A50 may substitute for one of these courses
† PHY 108 and 109 may substitute for PHY 110 and 111.

A grade of C or better is required in all the following Chemistry courses: CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361

Chemistry Courses visit:
https://coursefinder.illinoisstate.edu/directory/che/

All Courses:
https://coursefinder.illinoisstate.edu/directory/
MAJOR IN CHEMISTRY (B.S.)

Transfer Students

Illinois Articulation Initiative (min. 37 credit hours)
To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

Communication and Composition (3 courses required)
A grade of C or better required in ENG 101 and 145 or equivalents
________  3  C2 900  COM 110  Communication as Critical Inquiry
________  3  C1 900  ENG 101 or ENG 101A10  Composition as Critical Inquiry
________  3  C1 901  ENG 145  Writing in the Academic Disciplines

Mathematics (1 course required)
Please see major requirements for mathematics options
________  4  M1 900-1  MAT 145 Calculus I (College-level Calculus I)

Physical & Life Sciences (2 courses/7-8 hours required)
Students must complete 1 life science and 1 physical science course; at least one course must have a lab.
________  4  P1 902L  CHE 140 General Chemistry I

Humanities & Fine Arts (3 courses required)
At least one humanities and 1 fine arts course required

Social & Behavioral Sciences (3 courses required)
Two different disciplines must be represented

Additional Graduation Requirements
________/120 minimum total credit hours
________/42 minimum senior college hours
________ College of Arts & Sciences language requirement

AMALI requirement
See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

B.S. Science, Math, & Technology (1 course required)
See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.
________  4  CHE 141 General Chemistry II

Chemistry Courses visit:
https://coursefinder.illinoisstate.edu/directory/che/

All Courses:
https://coursefinder.illinoisstate.edu/directory/

Major (min. 61 credit hours)
45 hours in Chemistry required

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>4</td>
<td>CHE 140  General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)</td>
</tr>
<tr>
<td>4</td>
<td>CHE 141  General Chemistry II (P: CHE 140)</td>
</tr>
<tr>
<td>3</td>
<td>CHE 215  Analytical Chemistry (P: C or better in CHE 141 and 230)</td>
</tr>
<tr>
<td>1</td>
<td>CHE 216  Analytical Chemistry Laboratory (P: CHE 215 or conc. reg.)</td>
</tr>
<tr>
<td>3</td>
<td>CHE 230  Organic Chemistry I (P: CHE 141)</td>
</tr>
<tr>
<td>1</td>
<td>CHE 231  Organic Chemistry Laboratory (P: CHE 141; conc. reg. in CHE 230)</td>
</tr>
<tr>
<td>3</td>
<td>CHE 232  Organic Chemistry II (P: CHE 230)</td>
</tr>
<tr>
<td>2</td>
<td>CHE 233  Organic Chemistry Laboratory II (P: CHE 231; conc. reg. in CHE 232)</td>
</tr>
<tr>
<td>3</td>
<td>CHE 250  Fundamentals of Inorganic Chemistry (P: C or better in CHE 230)</td>
</tr>
<tr>
<td>1</td>
<td>CHE 251  Fundamentals of Inorganic Chemistry Laboratory (P: CHE 250 or conc. reg.)</td>
</tr>
<tr>
<td>3</td>
<td>CHE 342  General Biochemistry I (P: C or better in CHE 232 or 1 year of organic chemistry)</td>
</tr>
<tr>
<td>3</td>
<td>CHE 360  Physical Chemistry I (P: C or better in CHE 141; PHY 109 or 111; MAT 146; 8+ earned hours in senior college CHE or PHY)</td>
</tr>
<tr>
<td>1</td>
<td>CHE 361  Physical Chemistry Laboratory I (P: CHE 360 or conc. reg.)</td>
</tr>
<tr>
<td>4</td>
<td>MAT 145  Calculus I (P: C or better in MAT 144 or placement)</td>
</tr>
<tr>
<td>4</td>
<td>MAT 146  Calculus II (P: C or better in MAT 145)</td>
</tr>
<tr>
<td>4</td>
<td>PHY 110†  Physics for Science &amp; Engineering I (P: MAT 145 or conc. reg.)</td>
</tr>
<tr>
<td>4</td>
<td>PHY 111†  Physics for Science &amp; Engineering II (P: PHY 110 and MAT 146 or conc. reg.)</td>
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</table>

Take 9 credit hours of additional Chemistry electives from the following courses: (CHE 315, 344, 350, 362)

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<th>Course</th>
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Required corresponding Chemistry labs:

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<td>1</td>
<td>CHE 316‡  Instrumental Analysis Laboratory (P: C or better in CHE 216; 315 or conc. reg.)</td>
</tr>
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<td>2</td>
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<td>1</td>
<td>CHE 351‡  Advanced Inorganic Chemistry Laboratory (P: CHE 251; 350 or conc. reg.)</td>
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<tr>
<td>1</td>
<td>CHE 363‡  Physical Chemistry Laboratory II (P: C or better in CHE 361; 362 or conc. reg.)</td>
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‡ CHE 290, 299, 398A01 or 398AS0 may substitute for one of these courses
† PHY 108 and 109 may substitute for PHY 110 and 111.

A grade of C or better is required in all the following Chemistry courses: CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361
MAJOR IN CHEMISTRY
TEACHER EDUCATION SEQUENCE (B.S.)

General Education (39 credit hours)
Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

Communication and Composition (2 courses required)
___ 3 COM 110 Communication as Critical Inquiry
___ 3 ENG 101 or ENG 101A10 Composition as Critical Inquiry

Mathematics (1 course required)
___ 4 MAT 145 Calculus I

Natural Science/Natural Science Alternatives (2 courses required)
Students must complete 1 course from 2 different sciences.
___ 4 PHY 110† Physics for Science & Engineering I
___ 4 CHE 140 General Chemistry I

United States Traditions (1 course required)

Individuals & Civic Life (1 course required)

Fine Arts (1 course/3 credit hours required)***

Humanities (1 course required)***

Language in the Humanities (1 course required)***

Quantitative Reasoning (1 course required)
___ 4 MAT 146 Calculus II

Science, Math, & Technology (1 course required)
Exempt for Chemistry majors

Social Sciences (1 course required)***
___ 3 PSY 110 Fundamentals of Psychology

Additional Graduation Requirements
___/120 minimum total credit hours
___/42 minimum senior college hours
___ College of Arts & Sciences language requirement

AMALI requirement
*** Certain courses in General Education fulfill the AMALI requirement. See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

B.S. Science, Math, & Technology (1 course required)
See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.
___ 4 CHE 141 General Chemistry II

Major (min. 101 credit hours)
49 credit hours in Chemistry required
___ 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)
___ 4 CHE 141 General Chemistry II (P: CHE 140)
___ 2 CHE 161 Introduction to Teaching Science Seminar (P: B or better in CHE 140)
___ 3 CHE 215 Analytical Chemistry (P: C or better in CHE 141 and 230)
___ 1 CHE 216 Analytical Chemistry Laboratory (P: CHE 215 or conc. reg.)
___ 3 CHE 230 Organic Chemistry I (P: CHE 141)
___ 1 CHE 231 Organic Chemistry Laboratory (P: CHE 141; conc. reg. in CHE 230)
___ 3 CHE 232 Organic Chemistry II (P: CHE 230)
___ 2 CHE 233 Organic Chemistry Laboratory II (P: CHE 231; conc. reg. in CHE 232)
___ 3 CHE 250 Fundamentals of Inorganic Chemistry (P: C or better in CHE 230)
___ 1 CHE 251 Fundamentals of Inorganic Chemistry Laboratory (P: CHE 250 or conc. reg.)
___ 3 CHE 301 Teaching of Chemistry (P: C or better in TCH 216 or PSY 215 or conc. reg.)
___ 4 CHE 302 Student Teaching & Professional Seminar (P: CHE 301; conc. reg. in STT 399A73)
___ 3 CHE 342 General Biochemistry I (P: C or better in CHE 232 or 1 year of organic chemistry)
___ 3 CHE 360 Physical Chemistry I (P: C or better in CHE 141; PHY 109 or 111; MAT 146; 8+ earned hours in senior college CHE or PHY)
___ 1 CHE 361 Physical Chemistry Laboratory I (P: CHE 360 or conc. reg.)
Take 6 credit hours of additional electives:
(CHE 315, 344, 350, 362)

Take 2 courses (2-3 credit hours) of additional laboratory electives*:
(CHE 316, 343, 351, 363)

Required courses outside of CHE (27 credit hours):
___ 4 BSC 197 Molecular & Cellular Basis of Life
___ 4 GEO 100 Introduction to Environmental Systems
___ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
___ 4 MAT 146 Calculus II (P: C or better in MAT 145)
___ 4 PHY 110† Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
___ 4 PHY 111† Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)
___ 3 PHY 205 Origin of the Universe (P: MAT 113, 130, 120, or 145)

Professional Education requirements (25 credit hours):
___ 3 PSY 110 Fundamentals of Psychology
___ 3 PSY 215 Educational Psychology (P: PSY 110 or 111)
___ 2 TCH 212 The Teaching Profession in Secondary Schools (P: 45+ earned hours; 2.5 major & cum. GPA; ENG 101, COM 110)
___ 3 TCH 216 Principles & Practices for Teaching & Learning in Secondary Schools (P: TCH 212; 2.5 major & cum. GPA)
___ 3 TCH 219 Integrating Multiple Literacies & Technology Across the Secondary Curriculum (P: TCH 212, 216; 2.5 major & cum. GPA)
___ 8 STT 399A73 Student Teaching in Chemistry

Take one of the following courses (P: 45+ earned hours):
___ 3 EAF 228 Social Foundations
___ 3 EAF 231 Introduction to Philosophy of Education
___ 3 EAF 235 Historical Foundations

* CHE 290 or 299 may substitute for one of these courses.
† PHY 108 and 109 may substitute for PHY 110 and 111.

A grade of C or better is required in the following Chemistry courses: CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361.

SED 344 is strongly recommended.

Chemistry Courses visit:
https://coursefinder.illinoisstate.edu/directory/che/

All Courses: https://coursefinder.illinoisstate.edu/directory/
2019-2020 Catalog | Chemistry

MAJOR IN CHEMISTRY

TEACHER EDUCATION SEQUENCE (B.S.)

Transfer Students

Illinois Articulation Initiative (min. 37 credit hours)
To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

Communication and Composition (3 courses required)
A grade of C or better required in ENG 101 and 145 or equivalents
______ 3  C2 900  COM 110  Communication as Critical Inquiry
______ 3  C1 900  ENG 101 or ENG 101A10  Composition as Critical Inquiry
______ 3  C1 901  ENG 145  Writing in the Academic Disciplines

Mathematics (1 course required)
Please see major requirements for mathematics options
______ 4  M1 900-1  MAT 145 Calculus I (College-level Calculus I)

Physical & Life Sciences (2 courses/7-8 hours required)
Students must complete 1 life science and 1 physical science course; at least one course must have a lab.
______ 4  P1 902L  CHE 140  General Chemistry I
______ 4  L1 910L  BSC 197  Molecular & Cellular Basis of Life

Humanities & Fine Arts (3 courses required)
At least one humanities and 1 fine arts course required
______  ______  ______  ______  ______  ______  ______

Social & Behavioral Sciences (3 courses required)
Two different disciplines must be represented
______ 3  PSY 110  Fundamentals of Psychology
______  ______  ______  ______  ______  ______  ______  ______  ______

Additional Graduation Requirements
______/120 minimum total credit hours
______/42 minimum senior college hours
______ College of Arts & Sciences language requirement

AMALI requirement
See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.
______  ______  ______  ______  ______  ______  ______

B.S. Science, Math, & Technology (1 course required)
See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.
______ 4  CHE 141  General Chemistry II

Major (min. 101 credit hours)

49 credit hours in Chemistry required
______ 4  CHE 140  General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)
______ 4  CHE 141  General Chemistry II (P: CHE 140)
______ 2  CHE 161  Introduction to Teaching Science Seminar (P: B or better in CHE 140)
______ 3  CHE 215  Analytical Chemistry (P: C or better in CHE 141 and 230)
______ 1  CHE 216  Analytical Chemistry Laboratory (P: CHE 215 or conc. reg.)
______ 3  CHE 230  Organic Chemistry I (P: CHE 141)
______ 1  CHE 231  Organic Chemistry Laboratory (P: CHE 141; conc. reg. in CHE 230)
______ 3  CHE 232  Organic Chemistry II (P: CHE 230)
______ 2  CHE 233  Organic Chemistry Laboratory II (P: CHE 231; conc. reg. in CHE 232)
______ 3  CHE 250  Fundamentals of Inorganic Chemistry (P: CHE 250 or conc. reg.)
______ 1  CHE 251  Fundamentals of Inorganic Chemistry Laboratory (P: CHE 250 or conc. reg.)
______ 3  CHE 301  Teaching of Chemistry (P: C or better in TCH 216 or PSY 215 or conc. reg.)
______ 4  CHE 302  Student Teaching & Professional Seminar (P: CHE 301; conc. reg. in STT 399A73)
______ 3  CHE 342  General Biochemistry I (P: C or better in CHE 232 or 1 year of organic chemistry)
______ 3  CHE 360  Physical Chemistry I (P: C or better in CHE 141; PHY 109 or 111; MAT 146; 8+ earned hours in senior college CHE or PHY)
______ 1  CHE 361  Physical Chemistry Laboratory I (P: CHE 360 or conc. reg.)

Take 6 credit hours of additional electives:
( CHE 315, 344, 350, 362)
______  ______  ______  ______  ______  ______  ______

Take 2 courses (2-3 credit hours) of additional laboratory electives*:
( CHE 316, 343, 351, 363)
______  ______  ______  ______  ______  ______  ______

Required courses outside of CHE (27 credit hours):
______ 4  BSC 197  Molecular & Cellular Basis of Life
______ 4  GEO 100  Introduction to Environmental Systems
______ 4  MAT 145  Calculus I (P: C or better in MAT 144 or placement)
______ 4  MAT 146  Calculus II (P: C or better in MAT 145)
______ 4  PHY 110†  Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
______ 4  PHY 111†  Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)
______ 3  PHY 205  Origin of the Universe (P: MAT 113, 130, 120, or 145)

Professional Education requirements (25 credit hours):
______ 3  PSY 110  Fundamentals of Psychology
______ 3  PSY 215  Educational Psychology (P: PSY 110 or 111)
______ 2  TCH 212  The Teaching Profession in Secondary Schools (P: 45+ earned hours; 2.5 major & cum. GPA; ENG 101, COM 110)
______ 3  TCH 216  Principles & Practices for Teaching & Learning in Secondary Schools (P: TCH 212; 2.5 major & cum. GPA)
______ 3  TCH 219  Integrating Multiple Literacies & Technology Across the Secondary Curriculum (P: TCH 212, 216; 2.5 major & cum. GPA)
______ 8  STT 399A73  Student Teaching in Chemistry

Take one of the following courses (P: 45+ earned hours):
______ 3  EAF 228  Social Foundations
______ 3  EAF 231  Introduction to Philosophy of Education
______ 3  EAF 235  Historical Foundations

* CHE 290 or 299 may substitute for one of these courses.
† PHY 108 and 109 may substitute for PHY 110 and 111.

A grade of C or better is required in the following Chemistry courses: CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361.

SED 344 is strongly recommended.

Chemistry Courses visit:
https://coursefinder.illinoisstate.edu/directory/che/

All Courses: https://coursefinder.illinoisstate.edu/directory/
### MAJOR IN BIOCHEMISTRY (B.S.)

#### General Education (39 credit hours)
Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

#### Communication and Composition (2 courses required)
- 3 COM 110 Communication as Critical Inquiry
- 3 ENG 101 or ENG 101A10 Composition as Critical Inquiry

#### Mathematics (1 course required)
- 4 MAT 145 Calculus I

#### Natural Science/Natural Science Alternatives (2 courses required)
- 4 PHY 108 Physics for Science & Engineering I†
- 4 CHE 140 General Chemistry I

#### United States Traditions (1 course required)

#### Individuals & Civic Life (1 course required)

#### Fine Arts (1 course/3 credit hours required)***

#### Humanities (1 course required)***

#### Language in the Humanities (1 course required)***

#### Quantitative Reasoning (1 course required)
- 4 MAT 146 Calculus II

#### Science, Math, & Technology (1 course required)
Exempt for Biochemistry majors

#### Social Sciences (1 course required)***

#### Additional Graduation Requirements
- 120 minimum total credit hours
- 42 minimum senior college hours
- College of Arts & Sciences language requirement

#### AMALI requirement
***certain courses in General Education fulfill the AMALI requirement See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

#### B.S. Science, Math, & Technology (1 course required)
See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.
- 4 CHE 141 General Chemistry II

#### Major (75 credit hours)

45 hours in Chemistry required

- 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)
- 4 CHE 141 General Chemistry II (P: CHE 140)
- 3 CHE 215 Analytical Chemistry (P: C or better in CHE 141 and 230)
- 1 CHE 216 Analytical Chemistry Laboratory (P: CHE 215 or conc. reg.)
- 3 CHE 230 Organic Chemistry I (P: CHE 141)
- 1 CHE 231 Organic Chemistry Laboratory I (P: CHE 141; conc. reg. in CHE 230)
- 3 CHE 232 Organic Chemistry II (P: CHE 230)
- 2 CHE 233 Organic Chemistry Laboratory II (P: CHE 231; conc. reg. in CHE 232)
- 3 CHE 250 Fundamentals of Inorganic Chemistry (P: C or better in CHE 230)
- 1 CHE 251 Fundamentals of Inorganic Chemistry Laboratory (P: CHE 250 or conc. reg.)
- 3 CHE 342 General Biochemistry I (P: C or better in CHE 232 or 1 year of organic chemistry)
- 2 CHE 343 Biochemistry Laboratory (P: CHE 242 or 342 or conc. reg.)
- 3 CHE 344 General Biochemistry II (P: B or better in CHE 242 or C or better in CHE 342)
- 3 CHE 360 Physical Chemistry I (P: C or better in CHE 141; PHY 109 or 111; MAT 146; 8+ earned hours in senior college CHE or PHY)
- 1 CHE 361 Physical Chemistry Laboratory I (P: CHE 360 or conc. reg.)
- 3 CHE 372 Physical Biochemistry (P: C or better in CHE 342 & 360)
- 1 CHE 373 Physical Biochemistry Laboratory (P: C or better in CHE 361; CHE 372 or conc. reg.)
- 4 BSC 196 Biological Diversity
- 4 BSC 197 Molecular & Cellular Basis of Life
- 3 BSC 203 Cell Biology (P: BSC 196 & 197; CHE 110 & 112 or 141)
- 3 BSC 219 Genetics (P: BSC 196 & 197)
- 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
- 4 MAT 146 Calculus II (P: C or better in MAT 145)
- 4 PHY 110† Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
- 4 PHY 111† Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)

Take one of the following courses:
- 3 CHE 315 Instrumental Analysis (P: C or better in CHE 215 and 360)
- 3 CHE 350 Advanced Inorganic Chemistry (P: C or better in CHE 232 and 250; MAT 146; PHY 109 or 111)

Take one of the following lab courses:
- 1 CHE 316† Instrumental Analysis Laboratory (P: C or better in CHE 216; 315 or conc. reg.)
- 1 CHE 351† Advanced Inorganic Chemistry Laboratory (P: CHE 251; 350 or conc. reg.)

† CHE 290, 299, 398A01 or 398A50 may substitute for one of these courses.
† PHY 108 and 109 may substitute for PHY 110 and 111.

A grade of C or better is required in the following Chemistry courses: CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361.

#### Chemistry Courses visit:
https://coursefinder.illinoisstate.edu/directory/che/

#### All Courses:
https://coursefinder.illinoisstate.edu/directory/
MAJOR IN BIOCHEMISTRY, (B.S.)

Transfer Students

Illinois Articulation Initiative (min. 37 credit hours)
To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

Communication and Composition (3 courses required)
A grade of C or better required in ENG 101 and 145 or equivalents
_____ 3 C2 900 COM 110 Communication as Critical Inquiry
_____ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
_____ 3 C1 901 ENG 145 Writing in the Academic Disciplines

Mathematics (1 course required)
Please see major requirements for mathematics options
_____ 4 M1 900-1 MAT 145 Calculus I

Physical & Life Sciences (2 courses/7-8 hours required)
Students must complete 1 life science and 1 physical science course; at least one course must have a lab.
_____ 4 P1 902L CHE 140 General Chemistry I
_____ 4 L1 910L BSC 197 Molecular & Cellular Basis of Life

Humanities & Fine Arts (3 courses required)
At least one humanities and 1 fine arts course required

Social & Behavioral Sciences (3 courses required)
Two different disciplines must be represented

Additional Graduation Requirements

_____ /120 minimum total credit hours
_____ /42 minimum senior college hours
_____ College of Arts & Sciences language requirement

AMALI requirement
See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

B.S. Science, Math, & Technology (1 course required)
See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.
_____ 4 CHE 141 General Chemistry II

Major (75 credit hours)

45 hours in Chemistry required

_____ 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)
_____ 4 CHE 141 General Chemistry II (P: CHE 140)
_____ 3 CHE 215 Analytical Chemistry (P: C or better in CHE 141 and 230)
_____ 1 CHE 216 Analytical Chemistry Laboratory (P: CHE 215 or conc. reg.)
_____ 3 CHE 230 Organic Chemistry I (P: CHE 141)
_____ 1 CHE 231 Organic Chemistry Laboratory (P: CHE 141; conc. reg. in CHE 230)
_____ 3 CHE 232 Organic Chemistry II (P: CHE 230)
_____ 2 CHE 233 Organic Chemistry Laboratory II (P: CHE 231; conc. reg. in CHE 232)
_____ 3 CHE 250 Fundamentals of Inorganic Chemistry (P: C or better in CHE 230)
_____ 1 CHE 251 Fundamentals of Inorganic Chemistry Laboratory (P: CHE 250 or conc. reg.)
_____ 3 CHE 342 General Biochemistry I (P: C or better in CHE 232 or 1 year of organic chemistry)
_____ 2 CHE 343 Biochemistry Laboratory (P: CHE 242 or 342 or conc. reg.)
_____ 3 CHE 344 General Biochemistry II (P: B or better in CHE 242 or C or better in CHE 342)
_____ 3 CHE 360 Physical Chemistry Laboratory I (P: C or better in CHE 141; PHY 109 or 111; MAT 146; 8+ earned hours in senior college CHE or PHY)
_____ 1 CHE 361 Physical Chemistry Laboratory I (P: CHE 360 or conc. reg.)
_____ 3 CHE 372 Physical Biochemistry (P: C or better in CHE 342 & 360)
_____ 1 CHE 373 Physical Biochemistry Laboratory (P: C or better in CHE 361; CHE 372 or conc. reg.)
_____ 4 BSC 196 Biological Diversity
_____ 4 BSC 197 Molecular & Cellular Basis of Life
_____ 3 BSC 203 Cell Biology (P: BSC 196 & 197; CHE 110 & 112 or 141)
_____ 3 BSC 219 Genetics (P: BSC 196 & 197)
_____ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
_____ 4 MAT 146 Calculus II (P: C or better in MAT 145)
_____ 4 PHY 110* Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
_____ 4 PHY 111* Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)

Take one of the following courses:
_____ 3 CHE 315 Instrumental Analysis (P: C or better in CHE 215 and 360)
_____ 3 CHE 350 Advanced Inorganic Chemistry (P: C or better in CHE 232 and 250; MAT 146; PHY 109 or 111)

Take one of the following lab courses:
_____ 1 CHE 3164 Instrumental Analysis Laboratory (P: C or better in CHE 216; 315 or conc. reg.)
_____ 1 CHE 3514 Advanced Inorganic Chemistry Laboratory (P: CHE 251; 350 or conc. reg.)

‡ CHE 290, 299, 398A01 or 398A50 may substitute for one of these courses.
† PHY 108 and 109 may substitute for PHY 110 and 111.

A grade of C or better is required in the following Chemistry courses: CHE 140, 141, 215, 216, 230, 231, 232, 250, 251, 342, 360, 361.

Chemistry Courses visit:
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All Courses:
https://coursefinder.illinoisstate.edu/directory/