

Department of Chemistry

Undergraduate Coordinator: Deb MIsna

Advisors: Professors Bill Henry and Steven Gwaltney

1115 Hand Chemical Laboratory

Chemistry is concerned with the properties and compositions of substances and the transformations which they undergo. Because chemistry is a basic science to many careers, two undergraduate degree programs and three concentrations are offered to provide the needed flexibility for majors. These degrees are the B.S. and the B.A. degrees. A minimum of 124 hours is required for the B.S. degree and the B.A. degree. The department also offers the M.S. and the Ph.D. graduate degrees. Students in other majors may earn a minor in Chemistry by achieving at least a 2.00 average in a total of 22 hours of chemistry with 14 of the hours in upper-division courses and a minimum of 11 of the total hours completed at MSU.

The American Chemical Society (ACS) has continually approved the department and its curriculum since 1941, and awards a certificate to students who complete the ACS program with their BS degree. The ACS program is primarily intended as preparatory for graduate study in chemistry leading to a career in basic research. Graduates could also go directly into research and development positions in industry. Students seeking information on the ACS certification should contact a major advisor.

The B.A. degree program has a stronger liberal arts emphasis and could serve as a preparation for a secondary teaching career, chemical sales, or further study in a professional school.

B.S. in Chemistry

General Education and Degree Requirements

English Composition

| | | |
|------------|----------------------------|---|
| EN 1103 | English Composition I | 3 |
| or EN 1163 | Accelerated Composition I | |
| EN 1113 | English Composition II | 3 |
| or EN 1173 | Accelerated Composition II | |

Foreign Language

| | |
|--|---|
| 2 semesters - one Foreign Language (see advisor) | 6 |
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Humanities

| | |
|-----------------------------------|---|
| Literature - see A&S requirements | 3 |
| History - see A&S requirements | 3 |

Mathematics

| | | |
|---------|-------------|---|
| MA 1713 | Calculus I | 3 |
| MA 1723 | Calculus II | 3 |

Fine Arts

| | |
|----------------------|---|
| See A&S requirements | 3 |
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Natural Sciences

| | |
|--|------|
| See Major Core - Consult Advisor for specifics | 9-12 |
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Social Sciences

| | | |
|---|--|--|
| Must be from 2 different areas and must be selected from University/ A&S Core | 6 | |
| PSY 1013 | General Psychology (required for pre-medicine) | |

Major Core

Student should check for prerequisites for all courses. See advisor.

| | | |
|---------|--------------------------------------|---|
| CH 1141 | Professional Chemistry: Paths | 1 |
| CH 1234 | Integrated Chemistry I ¹ | 4 |
| CH 1244 | Integrated Chemistry II ² | 4 |
| CH 2141 | Professional Chemistry: Tools | 1 |
| CH 2311 | Analytical Chemistry I Laboratory | 1 |
| CH 2313 | Analytical Chemistry I | 3 |
| CH 3141 | Professional Chemistry: Literature | 1 |
| CH 4141 | Professional Chemistry: Research | 1 |
| CH 4213 | Advanced Inorganic Chemistry I | 3 |
| CH 4351 | Analytical Chemistry Laboratory II | 1 |

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| CH 4353 | Analytical Chemistry II | 3 |
| CH 4554 | Integrated Organic I ³ | 4 |
| CH 4564 | Integrated Organic II ⁴ | 4 |
| CH 4711 | Senior Seminar | 1 |

Oral Communication Requirement

Satisfied by successful completion of CH 1141, 2141, 3141, 4141, and 4711.

Writing Requirement

Satisfied by successful completion of CH 3141, 4141, and 4711.

Computer Literacy

Satisfied by successful completion of CH 1141, 2141, 2313, 3141, 4141, 4351, and 4711.

- CH 1234 can be replaced by CH 1213 and CH 1211
- CH 1244 can be replaced by CH 1223 and CH 1221
- CH 4554 can be replaced by CH 4513 and CH 4511
- CH 4564 can be replaced by CH 4523 and CH 4521

Choose one of following paths to complete the B.S. degree:

B.S. with non-A.C.S. certification

Choose one of the following:

| | | |
|---------------------------------|--|---|
| CH 4413 & CH 4411 | Thermodynamics and Kinetics and Physical Chemistry Laboratory I | 4 |
| CH 4423 & CH 4421 | Quantum Mechanics and Spectroscopy and Physical Chemistry Laboratory II | |
| CH 4403 & CH 4411 | Biophysical Chemistry and Physical Chemistry Laboratory I | |
| CH 4403 & CH 4421 | Biophysical Chemistry and Physical Chemistry Laboratory II | |
| Chemistry Elective ¹ | | 6 |
| PH 2213 or PH 1113 | Physics I General Physics I | 3 |
| PH 2223 or PH 1123 | Physics II General Physics II | 3 |
| PH 2233 or PH 1133 | Physics III General Physics III | 3 |

General Electives

Number of credit hours needed to bring the total number of credit hours to 124. Consult advisor. 43

Total Hours 124

- Advisor approved chemistry or biochemistry courses 3000-level and above.

A.C.S. concentration

| | | |
|----------|------------------------------------|---|
| CH 3213 | Inorganic Chemistry | 3 |
| CH 4212 | Advanced Inorganic Laboratory | 2 |
| CH 4413 | Thermodynamics and Kinetics | 3 |
| CH 4411 | Physical Chemistry Laboratory I | 1 |
| CH 4423 | Quantum Mechanics and Spectroscopy | 3 |
| CH 4421 | Physical Chemistry Laboratory II | 1 |
| CH 4603 | Undergraduate Research | 3 |
| BCH 4603 | General Biochemistry | 3 |
| PH 2213 | Physics I | 3 |
| PH 2223 | Physics II | 3 |
| PH 2233 | Physics III | 3 |

| | | |
|---------|--------------|---|
| MA 2733 | Calculus III | 3 |
|---------|--------------|---|

General Electives

Number of credit hours needed to bring the total number of credit hours to 124. Consult advisor.

| | | |
|--------------------|--|------------|
| Total Hours | | 124 |
|--------------------|--|------------|

Pre-Medical concentration

Student should check for prerequisites for all courses. See advisor.

| | | |
|------------|-----------------------|---|
| CH 4404 | Biophysical Chemistry | 4 |
| BCH 4603 | General Biochemistry | 3 |
| BCH 4613 | General Biochemistry | 3 |
| PH 2213 | Physics I | 3 |
| or PH 1113 | General Physics I | |
| PH 2223 | Physics II | 3 |
| or PH 1123 | General Physics II | |
| PH 2233 | Physics III | 3 |
| or PH 1133 | General Physics III | |

Technical and General Electives

| | | |
|-------------|----------------------|---|
| BIO 1134 | Biology I | 4 |
| BIO 1144 | Biology II | 4 |
| BIO 2103 | Cell Biology | 3 |
| or BCH 4713 | Molecular Biology | |
| BIO 3304 | General Microbiology | 4 |
| BIO 3103 | Genetics I | 3 |
| or BIO 4133 | Human Genetics | |
| BIO 3504 | Comparative Anatomy | 4 |
| BIO 4413 | Immunology | 3 |
| BIO 4514 | Animal Physiology | 4 |

General Electives

Number of credit hours needed to bring the total of credit hours to 124. Consult advisor.

| | | |
|--------------------|--|------------|
| Total Hours | | 124 |
|--------------------|--|------------|

Pre-Pharmacy Requirements

The pre-pharmacy program is intended for students who wish to attend the School of Pharmacy at the University of Mississippi. Students may choose to obtain the B.S. with non-ACS certification degree or complete only the pre-pharmacy requirements, for which a degree is not awarded from MSU. The courses listed below will satisfy the requirements for the School of Pharmacy at the University of Mississippi. Most pharmacy schools have similar requirements. However, students who wish to attend other pharmacy schools should check the specific requirements for that school.

Required Courses

| | | |
|-------------|--|---|
| CH 1213 | Chemistry I ¹ | 3 |
| CH 1211 | Investigations in Chemistry I ¹ | 1 |
| CH 1223 | Chemistry II ² | 3 |
| CH 1221 | Investigations in Chemistry II ² | 1 |
| CH 4513 | Organic Chemistry I ³ | 3 |
| CH 4511 | Organic Chemistry Laboratory I ³ | 1 |
| CH 4523 | Organic Chemistry II ⁴ | 3 |
| CH 4521 | Organic Chemistry Laboratory II ⁴ | 1 |
| BCH 4603 | General Biochemistry | 3 |
| or BCH 4013 | Principles of Biochemistry | |
| BCH 4713 | Molecular Biology | 3 |
| or BIO 2103 | Cell Biology | |
| BIO 1134 | Biology I | 4 |

| | | |
|-------------|---------------------------------|---|
| BIO 1144 | Biology II | 4 |
| BIO 4514 | Animal Physiology | 4 |
| BIO 3304 | General Microbiology | 4 |
| BIO 4405 | Pathogenic Microbiology | 5 |
| BIO 4413 | Immunology | 3 |
| BIO 3103 | Genetics I | 3 |
| or BIO 4133 | Human Genetics | |
| PHI 3323 | Medical Ethics | 3 |
| EN 1103 | English Composition I | 3 |
| EN 1113 | English Composition II | 3 |
| ST 2113 | Introduction to Statistics | 3 |
| MA 1713 | Calculus I | 3 |
| PH 1113 | General Physics I | 3 |
| PH 1123 | General Physics II | 3 |
| CO 1003 | Fundamentals of Public Speaking | 3 |
| EC 2123 | Principles of Microeconomics | 3 |

Electives

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|--|---|
| Social and Behavioral Science Electives ⁵ | 6 |
| Humanities and Fine Arts Electives ⁶ | 9 |

General Electives

To bring the total number of credit hours up to 92

- CH 1213 and CH 1211 can be replaced by CH 1234
- CH 1223 and CH 1221 can be replaced by CH 1244
- CH 4513 and CH 4511 can be replaced by CH 4554
- CH 4523 and CH 4521 can be replaced by CH 4564
- At MSU EC 2113 Principles of Macroeconomics is a pre-requisite for the required course EC 2123 (see above), and EC 2113 will count as one social science elective. In addition to EC 2113 one course from either Psychology, Sociology, Political Science, or Anthropology is required.
- At least 3 credit hours required in each of the two main areas. Humanities Electives should be chosen from the areas: English Literature, Foreign Language, History, Religion or Philosophy

B.A. in Chemistry**General Education and College Requirements****English Composition**

| | | |
|------------|----------------------------|---|
| EN 1103 | English Composition I | 3 |
| or EN 1163 | Accelerated Composition I | |
| EN 1113 | English Composition II | 3 |
| or EN 1173 | Accelerated Composition II | |

Foreign Language

| | |
|--|---|
| 3 semesters - one Foreign Language (see advisor) | 9 |
|--|---|

Humanities

| | |
|---|---|
| Literature - see General Education courses | 3 |
| History - see General Education courses | 3 |
| Philosophy - see A&S Core | 3 |
| Electives (Must be from 2 different areas) See A&S Core | 9 |

Math

| | |
|----------------------|---|
| See A&S requirements | 6 |
|----------------------|---|

Fine Arts

| | |
|----------------------|---|
| See A&S requirements | 3 |
|----------------------|---|

Natural Sciences

| | |
|--|------|
| See Major Core - Consult advisor for specifics | 9-12 |
|--|------|

Social Sciences

| | |
|--|-------|
| See A&S requirements | 6 |
| Social Sciences Electives - See advisor ⁵ | 12 |
| Major Core | |
| Student should check for prerequisites for all courses. See advisor. | |
| CH 1141 Professional Chemistry: Paths | 1 |
| CH 1234 Integrated Chemistry I ¹ | 4 |
| CH 1244 Integrated Chemistry II ² | 4 |
| CH 2141 Professional Chemistry: Tools | 1 |
| CH 2311 Analytical Chemistry I Laboratory | 1 |
| CH 2313 Analytical Chemistry I | 3 |
| CH 3141 Professional Chemistry: Literature | 1 |
| CH 3213 Inorganic Chemistry | 3 |
| or CH 4213 Advanced Inorganic Chemistry I | |
| CH 4141 Professional Chemistry: Research | 1 |
| CH 4554 Integrated Organic I ³ | 4 |
| CH 4564 Integrated Organic II ⁴ | 4 |
| CH 4711 Senior Seminar | 1 |
| Chemistry Electives - See advisor ⁶ | 7 |
| PH 1113 General Physics I | 3 |
| or PH 2213 Physics I | |
| PH 1123 General Physics II | 3 |
| or PH 2223 Physics II | |
| PH 1133 General Physics III | 3 |
| or PH 2233 Physics III | |
| Oral Communication Requirement | |
| Satisfied by successful completion of CH 1141, 2141, 3141, 4141, and 4711. | |
| Writing Requirement | |
| Satisfied by successful completion of CH 3141, 4141, and 4711. | |
| Computer Literacy | |
| Satisfied by successful completion of CH 1141, 2141, 2313, 3141, 4141, and 4711. | |
| General Electives | 20-23 |
| Number of credit hours needed to bring the total number of credit hours to 124. Consult advisor. | |
| Total Hours | 124 |

¹ CH 1234 can be replaced by CH 1213 and CH 1211

² CH 1244 can be replaced by CH 1223 and CH 1221

³ CH 4554 can be replaced by CH 4513 and CH 4511

⁴ CH 4564 can be replaced by CH 4523 and CH 4521

⁵ Must be from 2 different areas and must cross 4 disciplines over the 18 hours. Only one Economics allowed.

⁶ Advisor approved chemistry courses 3000-level and above