

# Department of Chemistry

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**Undergraduate Coordinator: Deb MIsna**

**Advisors: Professors Joseph Emerson 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 <sup>1</sup>	4
CH 1244	Integrated Chemistry II <sup>2</sup>	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

CH 4353	Analytical Chemistry II	3
CH 4554	Integrated Organic I <sup>3</sup>	4
CH 4564	Integrated Organic II <sup>4</sup>	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.

<sup>1</sup> CH 1234 can be replaced by CH 1213 and CH 1211<sup>2</sup> CH 1244 can be replaced by CH 1223 and CH 1221<sup>3</sup> CH 4554 can be replaced by CH 4513 and CH 4511<sup>4</sup> 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 <sup>1</sup>		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.

**Total Hours** 124<sup>1</sup> 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 I	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 4403 & CH 4411	Biophysical Chemistry and Physical Chemistry Laboratory I	4
BCH 4603	General Biochemistry I	3
BCH 4613	General Biochemistry II	3
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

**Technical and General Electives**

BIO 1134	Biology I	4
BIO 1144	Biology II	4
BIO 2103 or BCH 4713	Cell Biology Molecular Biology	3
BIO 3304	General Microbiology	4
BIO 3103 or BIO 4133	Genetics I Human Genetics	3
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 <sup>1</sup>	3
CH 1211	Investigations in Chemistry I <sup>1</sup>	1
CH 1223	Chemistry II <sup>2</sup>	3
CH 1221	Investigations in Chemistry II <sup>2</sup>	1
CH 4513	Organic Chemistry I <sup>3</sup>	3
CH 4511	Organic Chemistry Laboratory I <sup>3</sup>	1
CH 4523	Organic Chemistry II <sup>4</sup>	3
CH 4521	Organic Chemistry Laboratory II <sup>4</sup>	1
BCH 4603	General Biochemistry I	3
BIO 1134	Biology I	4
BIO 1144	Biology II	4
BIO 3014	Human Physiology	4
BIO 3304	General Microbiology	4
BIO 4405	Pathogenic Microbiology	5
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**

Social and Behavioral Science Electives <sup>5</sup>		6
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Humanities and Fine Arts Electives <sup>6</sup>		9
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**General Electives**

To bring the total number of credit hours up to 92		
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<sup>1</sup> CH 1213 and CH 1211 can be replaced by CH 1234

<sup>2</sup> CH 1223 and CH 1221 can be replaced by CH 1244

<sup>3</sup> CH 4513 and CH 4511 can be replaced by CH 4554

<sup>4</sup> CH 4523 and CH 4521 can be replaced by CH 4564

<sup>5</sup> 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.

<sup>6</sup> 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
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or EN 1163	Accelerated Composition I	
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EN 1113	English Composition II	3
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or EN 1173	Accelerated Composition II	
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**Foreign Language**

3 semesters - one Foreign Language (see advisor)		9
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**Humanities**

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

See A&S requirements		6
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**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**

See A&S requirements		6
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Social Sciences Electives - See advisor <sup>5</sup>		12
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**Major Core**

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

CH 1141	Professional Chemistry: Paths	1
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CH 1234	Integrated Chemistry I <sup>1</sup>	4
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CH 1244	Integrated Chemistry II <sup>2</sup>	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
CH 4141	Professional Chemistry: Research	1
CH 4554	Integrated Organic I <sup>3</sup>	4
CH 4564	Integrated Organic II <sup>4</sup>	4
CH 4711	Senior Seminar	1
Chemistry Electives - See advisor <sup>6</sup>		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

<sup>1</sup> CH 1234 can be replaced by CH 1213 and CH 1211

<sup>2</sup> CH 1244 can be replaced by CH 1223 and CH 1221

<sup>3</sup> CH 4554 can be replaced by CH 4513 and CH 4511

<sup>4</sup> CH 4564 can be replaced by CH 4523 and CH 4521

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

<sup>6</sup> Advisor approved chemistry courses 3000-level and above