

Program Modification

Program modifications must be submitted by October 15, 2013, and finalized by the end of that fall semester for catalog production.

Enter data in **YELLOWED** areas.

Date (Change date if modified and update the file name with the new date): 2014 2015 Catalog Copy 8.26.13

Program Area: **Chemistry: Subject Matter Preparation in Teaching Chemistry Option, B.A.**

Semester /Year First affected: FALL 2014

Instructions: Please use this Program Modification form for changes to existing program requirements, units, outcomes, emphases or options, or for other programmatic concerns. For minor changes (faculty or address changes, additions of approved electives, minor editing for clarity, and other minor updates) use the Program Update form, available at the Curriculum website.

Paste the latest approved version of your entire program in the left AND right boxes below. Make your deletions in the LEFT column by using the strikeout feature in Word or underlining, and highlight. Insert new language or other changes to the program on the RIGHT and highlight in **YELLOW** for easy identification. If possible, please align the two columns so that changes appear side-by-side with the original text.

SUMMARY OF CHANGES

The combined lecture and lab CHEM 460 has been broken into two courses CHEM 460 and CHEM 461. The combined lecture and lab CHEM 461 has broken into two courses, CHEM 462 and CHEM 463.

JUSTIFICATION

Splitting these courses allows students more flexibility in their scheduling.

CURRENTLY APPROVED PROGRAM

**Chemistry: Subject Matter Preparation
in Teaching Chemistry Option, B.A.**

(120 units)

PROPOSED PROGRAM

**Chemistry: Subject Matter Preparation
in Teaching Chemistry Option, B.A.**

(120 units)

Summary of Units

Lower Division Requirements	43-44
Upper Division Requirements	24-25
Upper Division Chemistry Electives	8
Required Supporting, Other GE Courses and Free electives	43-45
Total Units Required	120

Lower Division Requirements - 43-44 units

Students must obtain a grade of C or better in these courses to apply them to the chemistry major.

1. Chemistry

- [CHEM 121 - General Chemistry I](#) Units: 4
- [CHEM 122 - General Chemistry II](#) Units: 4
- [CHEM 250 - Quantitative Analysis](#) Units: 3
- [CHEM 251 - Quantitative Analysis Laboratory](#) Units: 1

2. Biology

- [BIOL 200 - Principles of Organismal and Population Biology](#) Units: 4
- [BIOL 201 - Principles of Cell and Molecular Biology](#) Units: 4

3. Math

- [MATH 150 - Calculus I](#) Units: 4
- [MATH 151 - Calculus II](#) Units: 4

4. Physics

Summary of Units

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- [CHEM 121 - General Chemistry I](#) Units: 4
- [CHEM 122 - General Chemistry II](#) Units: 4
- [CHEM 250 - Quantitative Analysis](#) Units: 3
- [CHEM 251 - Quantitative Analysis Laboratory](#) Units: 1

2. Biology

- [BIOL 200 - Principles of Organismal and Population Biology](#) Units: 4
- [BIOL 201 - Principles of Cell and Molecular Biology](#) Units: 4

3. Math

- [MATH 150 - Calculus I](#) Units: 4
- [MATH 151 - Calculus II](#) Units: 4

4. Physics

Choose one of the following: • PHYS 100 - Introduction to Physics I Units: 4 • PHYS 200 - General Physics I Units: 4 Choose one of the following: • PHYS 101 - Introduction to Physics II Units: 4 • PHYS 201 - General Physics II Units: 4 5. Astronomy Choose one of the following: • ASTR 105 - Introduction to the Solar System (Cross-listed as PHYS 105) Units: 4 • PHYS 107 - The Stars and Beyond Units: 3 6. Earth Science • GEOL 121 - Physical Geology Units: 4 Upper Division Requirements - 24-25 units <i>Students must obtain a grade of C or better in these courses to apply them to the chemistry major.</i> 1. Chemistry • CHEM 305 - Computer Applications in Chemistry Units: 1	Choose one of the following: • PHYS 100 - Introduction to Physics I Units: 4 • PHYS 200 - General Physics I Units: 4 Choose one of the following: • PHYS 101 - Introduction to Physics II Units: 4 • PHYS 201 - General Physics II Units: 4 5. Astronomy Choose one of the following: • ASTR 105 - Introduction to the Solar System (Cross-listed as PHYS 105) Units: 4 • PHYS 107 - The Stars and Beyond Units: 3 6. Earth Science • GEOL 121 - Physical Geology Units: 4 Upper Division Requirements - 24-25 units <i>Students must obtain a grade of C or better in these courses to apply them to the chemistry major.</i> 1. Chemistry • CHEM 305 - Computer Applications in Chemistry Units: 1	
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- [CHEM 311 - Organic Chemistry I](#) **Units: 3**
- [CHEM 312 - Organic Chemistry I Laboratory](#) **Units: 1**
- [CHEM 314 - Organic Chemistry II](#) **Units: 3**
- [CHEM 315 - Organic Chemistry II Laboratory](#) **Units: 1**
- [CHEM 330 - The History of Science: Nonwestern Origins and the Western Revolution \(Cross-listed as HIST 330\)](#) **Units: 3** ¹
- [CHEM 371 - Physical Chemistry I](#) **Units: 3**
- [CHEM 372 - Physical Chemistry Laboratory](#) **Units: 1**
- [CHEM 499 - Chemistry Capstone](#) **Units: 2**

2. Earth Science

Choose one of the following:

- [BIOL 335 - The Biosphere](#) **Units: 3**
- [GEOL 300 - Foundations of Earth Science](#) **Units: 4**

3. Education

- [EDUC 330 - Introduction to Secondary Schooling](#) **Units: 3**

Note:

(Sixteen units of the above courses will be counted toward lower-division GE Categories B1, B2, B3, B4, and D)

Upper Division Chemistry Electives - 8

- [CHEM 311 - Organic Chemistry I](#) **Units: 3**
- [CHEM 312 - Organic Chemistry I Laboratory](#) **Units: 1**
- [CHEM 314 - Organic Chemistry II](#) **Units: 3**
- [CHEM 315 - Organic Chemistry II Laboratory](#) **Units: 1**
- [CHEM 330 - The History of Science: Nonwestern Origins and the Western Revolution \(Cross-listed as HIST 330\)](#) **Units: 3** ¹
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- [CHEM 372 - Physical Chemistry Laboratory](#) **Units: 1**
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Upper Division Chemistry Electives - 8

units

A total of **8** units of electives from those listed below are needed, lab courses are denoted ^L. Students must obtain a grade of C or better in these courses to apply them to the chemistry major.

- [CHEM 301 - Environmental Chemistry - Atmosphere and Climate](#) **Units: 3**
- [CHEM 302 - Environmental Chemistry - Soil and Water](#) **Units: 4** ^L
- [CHEM 313 - Organic Chemistry I Problem Solving](#) **Units: 1**
- [CHEM 316 - Organic Chemistry II Problem Solving](#) **Units: 1**
- [CHEM 373 - Physical Chemistry II](#) **Units: 3**
- [CHEM 410 - Advanced Organic Synthesis](#) **Units: 4** ^L
- [CHEM 415 - Molecular Structure Determination](#) **Units: 4** ^L
- [CHEM 420 - Advanced Inorganic Chemistry](#) **Units: 3**
- [CHEM 450 - Instrumental Analysis and Laboratory](#) **Units: 4** ^L
- [CHEM 460 – Biochemistry I](#) **Units: 4** ^L
- [CHEM 461 – Biochemistry II](#) **Units: 4** ^L
- [CHEM 465 - Bioinorganic Chemistry](#) **Units: 4** ^L
- [CHEM 490 - Special Topics in Chemistry](#) **Units: 1-3**
- [CHEM 491 - Special Laboratory Topics in Chemistry](#) **Units: 1-3** ^L
- [CHEM 492 - Internship/Service Learning](#) **Units: 1-3** ^{L,R}
- [CHEM 494 - Independent Research](#) **Units: 1-3** ^{L,R}
- [CHEM 497 - Directed Studies](#) **Units: 1-3** ^R

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- [CHEM 450 - Instrumental Analysis and Laboratory](#) **Units: 4** ^L
- [CHEM 460 - Biochemistry I](#) **Units: 3**
- [CHEM 461- Biochemistry Lab](#) **Units: 1** ^L
- [CHEM 462 - Biochemistry II](#) **Units: 3**
- [CHEM^L 463 – Advanced Biochemistry Lab](#) **Units: 1** ^L
- [CHEM 465 - Bioinorganic Chemistry](#) **Units: 4** ^L
- [CHEM 480 – Beer, Wine, and Spirits: The Art and Science and Fermentation](#) **Units: 4** ^L
- [CHEM 490 - Special Topics in Chemistry](#) **Units: 1-3**
- [CHEM 491 - Special Laboratory Topics in Chemistry](#) **Units: 1-3** ^L

Note:

^R No more than a combined total of **6** units of [CHEM 492](#) , [CHEM 494](#) , and [CHEM 497](#) may be applied as electives. No more than one [CHEM 492](#) or [CHEM 494](#) may be (by petition) considered a laboratory elective.

Required Supporting, Other GE & Elective Courses - 43-45 units

American Institutions Requirement	6
Other Courses in GE Categories A-E	33
Electives in Any Discipline	4-6

Recommended Electives

Choose from the following:

Second Language

(One semester is required)

- One Additional Semester of a Second Language **3**

Interdisciplinary General Education Courses

According to the GE requirements, students must take **9** units from those interdisciplinary courses numbered 330-349 and 430-449. **Six** of the **9** units can be double counted and **three** of the **9** units must be outside the major and not cross listed with the CHEM prefix.

- ([CHEM 330](#) and [EDUC 330](#) are required)
- [SPED 345 - Individuals with Disabilities in Society \(Cross-listed as PSY 345\)](#) Units: **3**

Prerequisite Courses in Education

- [CHEM 492 - Internship/Service Learning](#) Units: **1-3** ^{L, R}
- [CHEM 494 - Independent Research](#) Units: **1-3** ^{L, R}
- [CHEM 497 - Directed Studies](#) Units: **1-3** ^R

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(For CI Credential Program) • EDUC 512 - Equity, Diversity and Foundations of Schooling Units: 3 • EDUC 520 - Observing and Guiding Behavior in Multilingual/Multicultural and Inclusive Classrooms Units: 3 • EDUC 521 - Field Experience Units: 1 • EDSS 515 - Adolescent Development for Secondary Educators Units: 3 • ENGL 475 - Language in Social Context Units: 3	• (CHEM 330 and EDUC 330 are required) • SPED 345 - Individuals with Disabilities in Society (Cross-listed as PSY 345) Units: 3 Prerequisite Courses in Education (For CI Credential Program) • EDUC 512 - Equity, Diversity and Foundations of Schooling Units: 3 • EDUC 520 - Observing and Guiding Behavior in Multilingual/Multicultural and Inclusive Classrooms Units: 3 • EDUC 521 - Field Experience Units: 1 • EDSS 515 - Adolescent Development for Secondary Educators Units: 3 • ENGL 475 - Language in Social Context Units: 3	

Proposer of Program Modification

Date

APPROVAL SHEET

Program:

If your course has a General Education Component or involves Center affiliation, the Center will also sign off during the approval process.

Multiple Chair fields are available for cross-listed courses.

The CI program review process includes a report from the respective department/program on its progress toward accessibility requirement compliance. By signing below, I acknowledge the importance of incorporating accessibility in course design.

Program Chair		
	Signature	Date

Curriculum Chair		
	Signature	Date

AVP		
	Signature	Date