

Department of Chemistry
and Biochemistry
College of Science

Options for Teaching and Premedical/Pre dental;
Emphases in Chemical Education, Biochemistry, Environmental
Chemistry, Professional Chemistry, and Life Science

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Effective for students beginning degree Summer Sem. 2016 thru Spring Sem. 2017

Admission Requirements For This Major

1. New freshmen admitted to USU in good standing qualify for admission to this major.
2. Transfer students from other institutions need a 2.2 transfer GPA and students transferring from other USU majors need a 2.0 total GPA for admission to this major in good standing.

The Program

Chemistry is a subject addressing the properties of materials and the transformations that they undergo. Especially important are aspects of energy and structure related to chemical reactivity. Consequently, students of many disciplines take courses in chemistry to learn about the behavior of the substances they will use or reference. The Department of Chemistry and Biochemistry offers a wide variety of courses for those whose majors and/or anticipated careers require a knowledge of chemistry. These include nutrition, engineering, biology, agriculture, natural resources, medicine, law, and education, to name a few. Many students also choose chemistry as an elective course to better prepare themselves as citizens in a technological world.

The **Bachelor of Science (BS) Degree** entails considerable specialization in chemistry and related areas. The BS emphases require a common core of courses, but allow for a different concentration of advanced work according to the interests and career objectives of the student. The **Professional Chemistry** emphasis, the **Biochemistry** emphasis, and the **Environmental Chemistry** emphasis meet the requirements for certification by the American Chemical Society (ACS). The **Life Science** emphasis is popular for students wishing to go on to medical or dental graduate programs. The **Chemistry Teaching Major** and the **Composite Teaching Major in the Physical Sciences** are available to those who want a career in secondary education. ACS certification in **Chemical Education** is available to students who complete either of the ACS-certified BS emphases and the Teacher Education program. The certified degree emphases provide excellent preparation for immediate entry into the job market or for graduate school in chemistry, biochemistry, chemical engineering, molecular biology, nutrition, food science, materials science, and a wide variety of other fields. The life science emphasis is particularly appropriate for **premedical and pre dental** students who want a strong base for understanding the nature of chemical reactions in the body and the behavior of the drugs they will prescribe, or who want an attractive alternative should they decide ultimately not to pursue medical or dental

school. The **Bachelor of Arts (BA)** degree is an excellent choice for students with an interest in studying **law** or **business** and who have an interest in science.

The core of the program utilizes year-long sequences of classes. The first-year sequence introduces the basic principles of chemistry, as well as most of the major concepts of the science. The second year explores in greater depth the characteristics of carbon-based compounds that serve as the backbone for the chemistry of life; for most drugs and medicines; for petroleum; for most fibers, paints, and plastics; and for many other commercial products. The third year examines in greater depth the models, theories, and mathematical interpretation of the structures, rates of change, energetics, and other properties of chemicals. In addition, three one-semester courses examining the chemistry of life processes, the behavior of inorganic substances, and the analysis of the composition of substances are required. Many of the sequences have associated laboratory courses where students get hands-on practice. Here they synthesize compounds, measure physical properties, analyze samples, and determine structural features of compounds, using modern techniques and instrumentation.

The requirements of the BS and BA degrees in chemistry, along with University and University Studies requirements, are summarized in this program sheet.

The specific requirements for the teaching major and for the composite teaching major in the physical sciences are also included. Students are encouraged to keep this program guide and to use it to record progress toward the completion of their degree requirements. Students are also urged to study this requirement sheet and to visit with their advisors on a regular basis about progress toward the completion of their degrees or for any questions regarding complementary courses, career goals, etc.

Recommended High School Courses

Students interested in studying chemistry should take high school mathematics courses that will enable them to start calculus during their first semester at USU. High school coursework in chemistry and physics is also desirable. AP credit in chemistry may be counted toward the degree.

Career Opportunities

Chemistry degree holders work in a wide variety of professions, from physicians, lawyers, and professors, to research/development, sales, or production in the chemical, oil, pharmaceutical, metals, electronic, and biochemical industries. Government at all levels employs chemists, including the federal Departments of Defense, Health and Human Services, Agriculture, and Interior. Graduates with a bachelor's degree often begin work in chemical analysis or sales or may assist senior chemists in research and development. Graduates with a teaching major or chemistry education emphasis may teach in public schools. A graduate degree is usually needed to direct research or teach at the university level. Degree holders from the Department of Chemistry and Biochemistry have had excellent success in obtaining support for graduate studies, often at very prestigious institutions, and in obtaining employment directly following graduation. For further information, students should contact their advisor.

Degrees and Programs Offered

Chemistry:

Master of Science (MS) and Doctor of Philosophy (PhD)

Bachelor of Science (BS)

Emphases: Professional Chemistry, Biochemistry, Environmental Chemistry, Chemical Education, Life Science

Bachelor of Arts (BA)

Chemistry Teaching: BS

Composite Teaching—Physical Science (Chem): BS

Biochemistry: BS, MS, and PhD

Academic Advisement

All students should contact their academic faculty advisor for assistance with course selection, program planning, and meeting graduation requirements. Students should contact the department if you do not know your advisor.

Graduation Requirements:

BS and BA Degrees in Chemistry

Minimum University Requirements*

Total credits	120
Grade point average (most majors require higher GPA)	2.00 GPA
Credits of C- or better	100
Credits of upper-division courses (#3000 or above)	40
USU credits	30
(20 of which must be upper division, including 10 required by major)	

Completion of approved major program of study	See department
Credits in minor (if required by department)	12
Credits in American Institutions (ECN 1500; HIST 1700, 2700, or 2710; POLS 1100; or USU 1300).	3
University Studies requirements	See below

*Colleges and departments may require more credits or a higher GPA. See requirements on this sheet.

University Studies Requirements

Note: Approved University Studies courses and requirements are listed in the *General Catalog*. The most current listings are shown online at: <http://catalog.usu.edu/>

General Education Requirements (30-34 credits)

Competency Requirements (9-10 credits)

Communications Literacy (CL1 and CL2) (6 credits)

ENGL 1010 (CL1) (3 credits) or satisfactory AP, CLEP, IBO,ACT, or SAT score

AND

ENGL 2010 (CL2) (3 credits) or satisfactory IBO score

Quantitative Literacy (QL) (3-4 credits)

MATH 1030 or 1050 or STAT 1040 (3-4 credits)

OR

One MATH or STAT course requiring MATH 1050 as a prerequisite

OR

Satisfactory AP, CLEP, IBO, ACT, or SAT score

Breadth Requirements (18-20 credits)

Select at least one approved course from each of the following six categories: **American Institutions (BAI)**, **Creative Arts (BCA)**, **Humanities (BHU)**, **Life Sciences (BLS)**, **Physical Sciences (BPS)**, and **Social Sciences (BSS)**. (CLEP or AP credit may be used.) *CHEM 1220 will fulfill the Physical Sciences requirement for students in the Chemistry Major.*

Exploration Requirement (3-4 credits)

Choose an additional class from one of the following General Education categories: QL, BAI, BCA, BHU, BLS, BPS, or BSS. PHYS 2220 (BPS) will fulfill the Exploration Requirement for students in the Chemistry Major.

Depth Education Requirements

Communications Intensive (CI) (2 courses)

For most students, courses taken for the major will meet this requirement.

Quantitative Intensive (QI) (1 course)

For most students, a course taken for the major will meet this requirement.

Depth Course Requirements (4 credits minimum, including 2 credits minimum completed in each of two courses)

Complete at least 2 credits in approved 3000-level or above courses from each of the following two categories:

Depth Humanities and Creative Arts (DHA)

Depth Social Sciences (DSS).

Minimum College of Science

Requirements for BS Degree

Students in the biochemistry degree program will meet the College of Science requirements by taking MATH 1210, 1220 (8 credits) and the PHYS 2110, 2120 sequence or the PHYS 2210, 2220 sequence (8 credits).

Chemistry Limitations

No CHEM prefix course may be applied toward graduation with any major or minor in chemistry with an earned grade of less than C-. No CHEM prefix course may be taken on a *Pass/Fail* basis. No CHEM prefix course may be repeated more than one time to improve the grade to a C- or better. A student dropped from the chemistry program for failure to meet this standard may appeal to the Curriculum Committee for readmission. Exceptions to this policy are not generally made. However, a student may petition for permission to take a course a third time, which will normally be granted *only* in the event of documented extenuating circumstances, such as documented medical issues.

NOTE: Teaching majors must earn a grade of C in all CHEM prefix courses.

Changes in Graduation/Catalog Requirements

Students who can complete a baccalaureate degree within seven years of enrollment at USU can qualify for graduation by meeting

(1) the General Education/ University Studies requirements in effect when they initially enrolled and

(2) the major requirements in effect when they officially declared their major, even though there may have been changes in General Education/University Studies and major requirements since that time.

Students who have not completed the baccalaureate requirements within seven years of their initial enrollment at USU must have their General Education/University Studies and major requirements evaluated and approved by their department head and dean.

Undergraduate Course Expiration Policy

Coursework (including transfer credit) that is more than 10 years old and that is required by the major may be disallowed by the student's department. Students are given an opportunity to revalidate coursework that has been disallowed.

Chemistry Major Core Requirements

(66-67 credits)

The core curriculum is required for all BS and BA degrees in this department, with the exception of the Composite Teaching major. Ideally, the core should be completed in the first three years of study, except for CHEM 4990 (Undergraduate Seminar), because physical chemistry serves as a prerequisite for many advanced courses. To complete the degree in 8 semesters (four academic years), students must register for an average of 15-16 credits per semester.

Note: Students may satisfy the CHEM 1210 requirement with an AP score of 3 or 4. *Both* CHEM 1210 *and* 1220 may be satisfied with an AP score of 5.

A. First Year (30-32 credits)

1. Fall Semester (15-16 credits) Credits

- CHEM 1210 Principles of Chemistry I 4
- CHEM 1215 Chemical Principles Laboratory I 1
- MATH 1210 (QL) Calculus I 4
- University Studies courses 6-7

2. Spring Semester (15-16 credits)

- CHEM 1220 (BPS) Principles of Chemistry II 4
- CHEM 1225 Chemical Principles Laboratory II 1
- MATH 1220 (QL) Calculus II 4
- University Studies courses 6-7

B. Second Year (32 credits)

1. Fall Semester (16 credits)

- CHEM 2310 Organic Chemistry I 4
- CHEM 2315 Organic Chemistry Laboratory I 1
- CHEM 3000 (QI) Quantitative Analysis 3
- CHEM 3005 Quantitative Analysis Laboratory I 1
- PHYS 2210 (QI) General Physics—Science and Engineering I (4 cr) 4
- PHYS 2215 (QI) Physics for Scientists and Engineers Lab I (1 cr) 1
- MATH 2210 (QI) Multivariable Calculus 3

2. Spring Semester (16-17 credits)

- CHEM 2320 Organic Chemistry II 4
- CHEM 2325 Organic Chemistry Laboratory II 1
- CHEM 3510 Intermediate Inorganic Chemistry 2
- CHEM 3520 Inorganic Chemistry Laboratory 1
- PHYS 2220 (BPS/QI) General Physics—Science and Engineering II (4 cr) 4
- PHYS 2225 (QI) Physics for Scientists and Engineers Lab II (1 cr) 1
- University Studies course(s) 4-5

C. Third Year (29-31 credits)

1. Fall Semester (14-16 credits)

- CHEM 3060 (QI) Physical Chemistry 3
- CHEM 3080 (CI) Physical Chemistry Laboratory 1

CHEM 5700* General Biochemistry I (F-3 cr)

Or

CHEM 3700 Introductory Biochemistry (Sp- 3 cr) . . . 3

MATH 2250 (QI) Linear Algebra and Differential Equations (4 cr)

Or

STAT 3000 (QI) Statistics for Scientists (3cr) 3-4

University Studies courses 4-5

2. Spring Semester (15 credits)

- CHEM 3070 (QI) Physical Chemistry3
- CHEM 3090 (CI) Physical Chemistry Laboratory II 1
- CHEM 5640 Instrumental Analysis.....3
- CHEM 5650 Instrumental Analysis Laboratory2
- University Studies courses or electives for specific degree emphasis..... 6

D. Fourth Year (29-31 credits)

- CHEM 4990 (CI) Undergraduate Seminar2
- Advanced elective coursework for specific degree emphasis.....29-30
- *CHEM 5700 cannot be taken as an elective course if the CHEM 3700 option is taken.
- *The completion of MATH 2250 or STAT 3000 is optional for the Teaching Major.

Chemistry Degree Emphasis

Each of the following emphases describes courses required in addition to the Chemistry Major Core Requirements above.

American Chemical Society

Certified BS Degree Programs

Each of the following four emphases leads to listing as a certified graduate by the American Chemical Society when completed with a GPA of 2.25 or greater. These are the preferred emphases for those planning to seek a graduate degree in chemistry or biochemistry, for those wishing to teach chemistry and advanced placement chemistry in high school, or for those who will enter employment emphasizing professional training in chemistry or biochemistry. There is also an Honors plan for students desiring a BS degree with Honors in Chemistry.

A. Professional Chemistry Emphasis

(10 credits in addition to Chemistry core) Credits

- CHEM 5520 Advanced Inorganic Chemistry (F). 2
- 5530 Advanced Synthesis Laboratory (Sp) 2
- Advanced electives, as approved by department 6

B. Biochemistry Emphasis

(13 credits in addition to Chemistry core)

- CHEM 5710 General Biochemistry II (Sp). 3
- CHEM 5720 General Biochemistry Laboratory (Sp)... . 2
- BIOL 1610 Biology I + BIOL 1615 Lab (F) 4
- Advanced Biology electives, as approved by department .. 4

C. Environmental Chemistry Emphasis

(14-15 credits in addition to Chemistry core)

- CHEM 5670 Intermediate Environmental Chemistry (Sp)...3
- CHEM 5680 Environmental Chemistry Laboratory (Sp) . . 2
- Introductory environmental electives as approved by department6-7
- Advanced environmental electives as approved by department 3

D. Chemical Education Emphasis

(47-51 credits in addition to Chemistry core)

Note: All USU teacher education candidates will be required to take and pass the content exam approved by the Utah State Office of Education in their major content area prior to student teaching. (*Admission to STEP requires a 3.0 GPA*)

- Required Courses for the Secondary Teacher Education Program (STEP) (see details on page 6) 35
- Teaching minor (outside the Department of Chemistry and Biochemistry). 18-30

University Honors Program

The Honors Program admits incoming, transfer, and existing USU students based on application. High achieving students with at least one year remaining are encouraged to apply. A full description of USU Honors Program can be found at the website honors.usu.edu. There are several ways for Chemistry and Biochemistry majors to earn Honors Practical Application Points from activities within the department, including course contracts in upper division courses (3000-level or above); contracts for research, scholarship, or other project; or internship contracts. For details, see the departmental honors advisor or consult the University Honors Program Contract and Practical Application Handbook.

BS in Chemistry, Life Science Emphasis

(17 credits in addition to Chemistry core)

This is an excellent choice for students who intend to apply to medical or dental school or who wish to seek employment where a sound knowledge of the fundamentals of both chemistry and biology is desirable. It is also appropriate for students seeking graduate education in fields requiring a strong chemistry background and is accepted as such by most graduate programs in chemistry or in biochemistry.

In addition to the Chemistry Core Requirements (with the exception of CHEM 5640, 5650), students must complete the following:

- BIOL 1610 Biology I + BIOL 1615 Lab (F) 4 Credits
- BIOL 1620 (BLS) Biology II + BIOL 1625 Lab (Sp) (4 cr) or
- BIOL 2420 Human Physiology (F,Sp,Su) (4 cr). 4
- BIOL 3060 (QI) Principles of Genetics (F,Sp,Su) (4 cr) or
- BIOL 3300 General Microbiology (F,Sp) (4 cr). 4
- CHEM 5710 General Biochemistry II (Sp) 3
- CHEM 5720 General Biochemistry Laboratory (Sp) 2

BA in Chemistry

(18-23 credits in addition to Chemistry core)

This is an appropriate choice for students who wish to combine strong interest and preparation in chemistry with graduate study in law or business or who want to obtain a solid liberal arts and sciences education.

In addition to the Chemistry Core Requirements (with the exception of CHEM 5640, 5650), students must complete the following:

Credits

- CHEM 5520 Advanced Inorganic Chemistry (F) (2 cr)
or
CHEM 5640 Instrumental Analysis (Sp) (3 cr). . . . 2 or 3

Proficiency in one or more foreign languages. Specifically, the BA requirement may be completed in one of the following ways:

1. Demonstration of proficiency in *one* foreign language by successful completion of one course at the 2020-level or higher (or its equivalent).

Or

2. Demonstration of proficiency in American Sign Language by successful completion of COMD 4920 and COMD 4780, and by passing an exit interview.

Or

3. Demonstration of proficiency in *two* foreign languages by successful completion of the 1020 course level in one language *and* the 2010 course level in the second language (or its equivalent).

Or

4. Completion of an upper-division (3000-level or higher) foreign language grammar or literature course requiring the 2020 course level (or its equivalent) as a prerequisite. Conversation courses *cannot* be considered for satisfying this requirement.

Chemistry Teaching Major

(49-53 credits in addition to Chemistry core)

This option is appropriate for students who wish to teach chemistry in high school, but who do not seek the depth of study required for ACS certification.

Note: All USU teacher education candidates will be required to take and pass the content exam approved by the Utah State Office of Education in their major content area prior to student teaching. (*Admission to STEP requires a 3.0 GPA*)

In addition to the Chemistry Core Requirements (with the exception of MATH 2250 or STAT 3000, and CHEM 5640 and 5650), students must complete the following:

Credits

- Required Courses for the Secondary Teacher Education Program (STEP) (see details on page 6)35
Teaching minor (outside the Department of Chemistry and Biochemistry). 18-30

Composite Teaching Major in the Physical Sciences

(91-92 credits)

This degree is available through the Chemistry and Biochemistry Department or the Physics Department. Students with a Composite Teaching Major in the Physical Sciences should plan their programs carefully in order to meet the upper-division requirement for graduation. An overall 3.0 GPA in a minimum of 60 semester credits of approved University coursework is required for admission into the Secondary Teacher Education Program (STEP). A minimum overall GPA of 2.75 is required for graduation. Students who may wish to teach Integrated Science at the middle or junior high school level should talk to their advisor about completing the courses necessary for an Integrated Science endorsement.

Note: All USU teacher education candidates will be required to take and pass the content exam approved by the Utah State Office of Education in their major content area prior to student teaching. Specific for admission to this program, a student must have at least a 2.75 GPA in the following chemistry and physics courses: CHEM 1210, 1215, 1220, and 1225; PHYS 2210, 2215, 2220 and 2225. *This program does not include many aspects of the Chemistry Core (see pages 2 and 3 on this requirement sheet).*

A. Required Physics Courses (14 credits) Credits

- PHYS 1040 (BPS) Introductory Astronomy. 3
USU 1360 (BPS) Integrated Physical Science (3 cr).....3
PHYS 2210 and PHYS 2215(QI) General Physics—Science and Engineering I and Lab I (prereq: MATH 1210) (5 cr)
and
PHYS 2220 and Phys 2225(BPS/QI) General Physics—Science and Engineering II and Lab(5 cr)10
PHYS 1080 is sometimes listed as USU 1360, ST: Intelligent Life in the Universe.

B. Elective Physics Courses (5 credits)

Select 5 additional credits from PHYS courses from PHYS 2500, PHYS 2710, and/or at the 3000 level and above. Research in physics education may be included. USU Depth courses are not allowed.

C. Required Mathematics and Statistics Courses (11 credits)

- MATH 1210 (QL) Calculus I (F,Sp,Su) 4
MATH 1220 (QL) Calculus II (F,Sp,Su) 4
STAT 3000 (QI) Statistics for Scientists (F,Sp,Su) 3

D. Required Chemistry Courses (14-15 credits)

- CHEM 1210 Principles of Chemistry I (F,Sp). 4
CHEM 1215 Chemical Principles Laboratory I (F,Sp). . . . 1
CHEM 1220 (BPS) Principles of Chemistry II (F,Sp,Su). . . . 4
CHEM 1225 Chemical Principles Laboratory II (F,Sp). . . . 1

CHEM 2300 Principles of Organic Chemistry (F) (3 cr)

or

CHEM 2310 Organic Chemistry I (F) (4 cr) 3

CHEM 2315 Organic Chemistry Laboratory I (F). 1

E. Required Science Courses (12 credits)

- BIOL 1010 (BLS) Biology and the Citizen (F,Sp,Su) 3
- GEO 1110 (BPS) The Dynamic Earth: Physical Geology (F,Sp) . . . 4
- GEO 1115 Physical Geology Lab. 1
- PSC 2000 (BPS) The Atmosphere and Weather (F). 3

F. Secondary Teacher Education Program (STEP) (35 credits)

Enrollment in the Secondary Teacher Education Program (STEP) is *required* for the Composite Teaching Major in the Physical Sciences.

G. Integrated Science Endorsement

For further information, students should contact their advisor.

Secondary Teacher Education Program (STEP) (35 credits)

Prior to enrolling in these courses, students must be approved for admission to the STEP by the Emma Eccles Jones College of Education and Human Services.

A cumulative 3.0 GPA, ACT scores of 21 composite and 20 verbal/English and 19 mathematics/quantitative and 60 semester credits of approved University coursework are required for admission into the STEP. An earned grade of C or better is required in all letter graded STEP program courses. A minimum overall GPA of 2.75 is required for graduation. Specific for admission to any Chemistry Teaching program, a student must have *at least* a 2.75 GPA in CHEM 1210, 1215, 1220, and 1225.

All USU teacher education candidates will be required to take and pass the content exam approved by the Utah State Office of Education in their major content area prior to student teaching.

Students who may wish to teach Integrated Science at the middle or junior high school level should talk to their advisor about completing the courses necessary for an Integrated Science endorsement.

Level 1 (11 credits) Credits

- ITLS 4015 Technology Tools and Integration for Teachers 1
- SCED 3100 Motivation and Classroom Management 3
- SCED 3210 (CI/DSS) Educational and Multicultural Foundations 3
- SCED 3300 Clinical Experience I (30 hours minimum in field-department specific) 1
- SCED 3400 Teaching Science I (F) 3

Level 2 (12 credits)

- SPED 4000 Education of Exceptional Individuals (may be taken anytime) 2
- SCED 4200 Language, Literacy and Learning in the Content Areas 3
- SCED 4210 Assessment and Curriculum Design 3
- SCED 4300 Clinical Experience II (30 hours minimum in field-department specific) 1
- SCED 4400 Teaching Science II 3

Level 3 (12 credits) (Includes a minimum of 13 weeks of student teaching and a minimum of 10 weeks of Student Teaching Seminar)

- SCED 5500 Student Teaching Seminar 2
- SCED 5630 Student Teaching in Secondary Schools 10

Note: The courses in nonscience majors may differ from those listed here.

The Teaching Science I and II courses (SCED 3400 and 4400) are *only* taught once per year. Therefore, it is important for students to consult with their advisor to fit these courses in the correct sequence into their plan of study.

Chemistry Minor*

(20 credits)

Note: Biochemistry Majors *cannot* declare a Chemistry Minor.

A. Required Courses (10 credits) Credits

- CHEM 1210 Principles of Chemistry I (F,Sp). 4
- CHEM 1215 Chemical Principles Laboratory I (F,Sp) 1
- CHEM 1220 (BPS) Principles of Chemistry II (F,Sp,Su) 4
- CHEM 1225 Chemical Principles Laboratory II (F,Sp) 1

B. Electives (10 credits)

Select 10 credits from the following (as approved by department):

- CHEM 2300 Principles of Organic Chemistry (F) (3 cr)
- or
- CHEM 2310 Organic Chemistry I (F) (4 cr) 4
- CHEM 2315 Organic Chemistry Laboratory I (F). 1
- CHEM 2320 Organic Chemistry II (Sp). 4
- CHEM 2325 Organic Chemistry Laboratory II (Sp) 1
- CHEM 3000 (QI) Quantitative Analysis (F) 3
- CHEM 3005 Quantitative Analysis Laboratory (F) 1
- CHEM 3060 (QI) Physical Chemistry (F). 3
- CHEM 3070 (QI) Physical Chemistry (Sp) 3
- CHEM 3510 Intermediate Inorganic Chemistry (Sp) 2
- CHEM 3520 Inorganic Chemistry Laboratory (Sp) 1
- CHEM 3650 Environmental Chemistry (Sp) 3
- CHEM 3700 Introductory Biochemistry (Sp) 3
- CHEM 3710 Introductory Biochemistry Laboratory (Sp). 1
- CHEM 5700** General Biochemistry I (F) 3
- CHEM 5710 General Biochemistry II (Sp) 3
- CHEM 5720 General Biochemistry Laboratory (Sp) 3

*See *Chemistry Limitations* on page 3.

**CHEM 5700 cannot be taken as an elective course if the CHEM 3700 option is taken.

Chemistry Teaching Minor*

(17-19 credits)

A. Required Courses (14-15 credits) Credits

- CHEM 1210 Principles of Chemistry I (F,Sp) 4
- CHEM 1215 Chemical Principles Laboratory I (F,Sp) 1
- CHEM 1220 (BPS) Principles of Chemistry II (F,Sp,Su) 4
- CHEM 1225 Chemical Principles Laboratory II (F,Sp) 1
- CHEM 2300 Principles of Organic Chemistry (F) (3 cr)

or

- CHEM 2310 Organic Chemistry I (F) (4 cr) 3
- CHEM 2315 Organic Chemistry Laboratory I (F) 1

B. Electives (3-4 credits)

Select one three- or four-credit course from below: Credits

- CHEM 2320 Organic Chemistry II (Sp)
(if CHEM 2310 selected from above) 4
- CHEM 3000 (QI) Quantitative Analysis (F) 3
- CHEM 3060 (QI) Physical Chemistry (F) 3

- CHEM 3510 Intermediate Inorganic Chemistry (Sp) (2 cr)
and
- CHEM 3520 Inorganic Chemistry Laboratory (Sp) (1 cr) 3

- CHEM 3650 Environmental Chemistry (Sp) (3 cr)
- CHEM 3700 Introductory Biochemistry (Sp) (3 cr) 3

C. Secondary Teacher Education Program (STEP) (35 credits)

Enrollment in the Secondary Teacher Education Program (STEP) is *required* for the Chemistry Teaching Minor.

Chemistry Teaching Minors are required to complete the following courses in addition to STEP courses required for your teaching major:

- SCED 3300 Clinical Experience I (30 hours minimum in field-department specific) 1
- SCED 3400 Teaching Science I (F) 3
- SCED 4300 Clinical Experience II (30 hours minimum in field-department specific) 1
- SCED 4400 Teaching Science II 3

*See *Chemistry Limitations* on page 3.

Final Examination

Graduating seniors are required to take a final examination covering the content of their major. **The exam will *not* affect the graduation status of the student in any way, but will be used as an assessment tool.** The combined results of all the examinations will be used by the department to judge the effectiveness of the departmental curriculum, *not* the student.

Requirement Changes

Graduation requirements shown on this sheet are subject to change. Students should check with their assigned advisor concerning possible changes.

Materials for Persons with Disabilities

This requirement sheet is available in alternate formats upon request to the USU Disability Resource Center.

For information contact

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