

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		02-65a	App 4/15/03	App 4/29/03

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person Roberta M. Eddy	Email Address rmeddy@iup.edu
Proposing Department/Unit Chemistry	Phone 724-357-4482

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

☐ New Course
 ☐ Course Prefix Change
 ☐ Course Deletion
☐ Course Revision
 ☐ Course Number and/or Title Change
 ☐ Catalog Description Change

Current Course prefix, number and full title

Proposed course prefix, number and full title, if changing

2. Additional Course Designations: check if appropriate

☐ This course is also proposed as a Liberal Studies Course.
 ☐ Other: (e.g., Women's Studies, Pan-African)
☐ This course is also proposed as an Honors College Course.

3. Program Proposals

☐ New Degree Program
 ☐ Catalog Description Change
 ☒ Program Revision
☐ New Minor Program
 ☐ Program Title Change
 ☐ Other
☐ New Track

B.S. in Education -- Chemistry

Current program name

Proposed program name, if changing

4. Approvals

Date

Department Curriculum Committee
Chair(s)

Ruth S.

1/17/03

Department Chair(s)

Bruce Van Jossen Ramsey

1/17/03

College Curriculum Committee Chair

College Dean

John F. Eddy

02/11/03
2/11/02

Director of Liberal Studies *

Director of Honors College *

Provost *

Additional signatures as appropriate:

(include title)

Joseph Domaradzki TECC

12-13-03

UWUCC Co-Chairs

Gail S. Schuist

4/15/03

* where applicable

FEB 13 2003

LIBERAL STUDIES

Program Revision for B.S. in Education – Chemistry

Part II. Description of Curriculum Change

1. Catalog Description For The Revised Chemistry Education Program.

Bachelor of Science in Education—Chemistry (1)

Liberal Studies: As outlined in Liberal Studies section with the following specifications: 50

Mathematics: MATH 123

Natural Science: PHYS 111-121 and 112-122

Social Science: PSYC 101

Liberal Studies Electives: 4cr. MATH 124

College: 29

Professional Education Sequence:

COMM 103	Digital Instructional Technology	3sh
EDUC 242	Pre-student Teaching Clinical Experience I	1sh
EDUC 342	Pre-student Teaching Clinical Experience II	1sh
EDUC 441	Student Teaching	12sh
EDUC 442	School Law	1sh
EDSP 102	Educational Psychology	3sh
EDUC 451	Teaching Science in the Secondary School	3sh
EDSP 477	Assessment of Student Learning: Design and Interpretation of Educational Measures	3sh
EDEX 301	Education of Students with Disabilities in an Inclusive Secondary Settings	2sh

Major: 32

Required Courses:

CHEM 113	Concepts in Chemistry I (2)	4sh
CHEM 114	Concepts in Chemistry II (2)	4sh
CHEM 214	Intermediate Inorganic Chemistry	2sh
CHEM 231	Organic Chemistry I	4sh
CHEM 232	Organic Chemistry II	4sh
CHEM 321	Quantitative Analysis	4sh
CHEM 341	Physical Chemistry I	4sh
CHEM 343	Physical Chemistry Laboratory I	1sh
CHEM 499	Problems in Chemistry Education	1sh

Controlled Electives: (3)

Additional 4sh from the list:

CHEM 322, 342, 344, 351, 410, 411, BIOC 301, 311	4sh
--	-----

Other Requirements:

BIOL 111 Principles of Biology I	4sh
GEOS 111 or 113 Earth Science for Educators I or II	3sh
GEOS 112 or 114 Earth Science for Educators Lab I or II	1sh

Program Revision for B.S. in Education – Chemistry

Free Electives:

1

Total Degree Requirements (4)

120

- (1) See requirements leading to teacher certification, titled “Admission to Teacher Education,” in the College of Education and Educational Technology section of this catalog.
- (2) CHEM 111 and 112 can be substituted for CHEM 113 and 114 respectively for the B.S. in Education – Chemistry degree.
- (3) A minimum of 6sh of controlled electives, including either CHEM 351 or BIOC 301, is required for the ACS certified degree in Chemistry Education.
- (4) See advisory paragraph “Timely Completion of Degree Requirements” in the section on Requirements for Graduation.

2. Summary of Changes

- a. Table Comparing “Old” And “New” Chemistry Education Programs
(Changes are shown in bold and italics in the new program.)

“OLD” CHEMISTRY EDUCATION PROGRAM (1)		“NEW” CHEMISTRY EDUCATION PROGRAM (1)	
Liberal Studies: (56-57 sh) Mathematics: MATH 123 Natural Science: PHYS 111-121 and 112-122 Social Science: PSYC 101 Liberal Studies Electives: GEOS 111 or 113, MATH 124, no courses with CHEM prefix		<i>Liberal Studies: (50 sh)</i> Mathematics: MATH 123 Natural Science: PHYS 111-121 and 112-122 Social Science: PSYC 101 <i>Liberal Studies Electives: 4cr MATH 124</i>	
College:	32	<i>College:</i>	<i>29</i>
Professional Education Sequence:		<i>Professional Education Sequence:</i>	
COMM 103 Digital Instructional Technology	3sh	COMM 103 Digital Instructional Technology	3sh
EDUC 242 Pre-student Teaching Clinical Experience I	1sh	EDUC 242 Pre-student Teaching Clinical Experience I	1sh
EDUC 342 Pre-student Teaching Clinical Experience II	1sh	EDUC 342 Pre-student Teaching Clinical Experience II	1sh
EDUC 441 Student Teaching	12sh	EDUC 441 Student Teaching	12sh
EDUC 442 School Law	1sh	EDUC 442 School Law	1sh
EDUC 451 Teaching Science in the Secondary School	3sh	EDUC 451 Teaching Science in the Secondary School	3sh
EDSP 102 Educational Psychology	3sh	EDSP 102 Educational Psychology	3sh
EDSP 477 Assessment of Student Learning: Design and Interpretation of Educational Measures	3sh	EDSP 477 Assessment of Student Learning: Design and Interpretation of Educational Measures	3sh
EDEX 301 Education of Students with Disabilities in an Inclusive Secondary Setting	2sh	EDEX 301 Education of Students with Disabilities in an Inclusive Secondary Setting	2sh

Program Revision for B.S. in Education – Chemistry

a. Table Comparing “Old” And “New” Chemistry Education Programs Cont’d

“OLD” CHEMISTRY EDUCATION PROGRAM *		“NEW” CHEMISTRY EDUCATION PROGRAM (1)	
FDDED 102 American Education in Theory and Practice	3sh		
Major:	33-35	Major:	32
Required Courses:		Required Courses:	
CHEM 113 Concepts in Chemistry	4sh	CHEM 113 <i>Concepts in Chemistry I (2)</i>	4sh
CHEM 114 Basic Inorganic Chemistry	4sh	CHEM 114 <i>Concepts in Chemistry II (2)</i>	4sh
		CHEM 214 Intermediate Inorganic Chemistry	2sh
CHEM 231 Organic Chemistry I	4sh	CHEM 231 Organic Chemistry I	4sh
CHEM 232 Organic Chemistry II	4sh	CHEM 232 Organic Chemistry II	4sh
CHEM 321 Quantitative Analysis	4sh	CHEM 321 Quantitative Analysis	4sh
CHEM 322 Instrumental Analysis	4sh		
CHEM 341 Physical Chemistry I	4sh	CHEM 341 Physical Chemistry I	4sh
CHEM 343 Physical Chemistry Laboratory I	1sh	CHEM 343 Physical Chemistry Laboratory I	1sh
CHEM 498 Problems in Chemistry	1-2sh	CHEM 499 Problems in Chemistry Education	1sh
Controlled Electives:		Controlled Electives: (3)	
One additional chemistry course from the following: CHEM 342, 351, 411	3-4sh	4sh from the following list: CHEM 322, 342, 344, 351, 410, 411; BIOG 301, 311	4sh
Other Requirements:	5	Other Requirements:	8
BIOL 111 Principles of Biology I	4sh	BIOL 111 Principles of Biology I	4sh
		GEOS 111 or 113 Earth Science for Educators I or II	3sh
GEOS 112 or 114 Earth Science for Educators Lab I or II	1sh	GEOS 112 or 114 Earth Science for Educators Lab I or II	1sh
Free Electives:	0	Free Electives:	1
(#)Total Degree Requirements:	124-127sh	Total Degree Requirements: (4)	120sh

Program Revision for B.S. in Education – Chemistry

a. Table Comparing “Old” And “New” Chemistry Education Programs Cont’d

(*) See requirements leading to teacher certification, titled “Admission to Teacher Education,” in the College of Education and Educational Technology section of this catalog. (#) See advisory paragraph “Timely Completion of Degree Requirements” in the section on Requirements” for Graduation.	(1) See requirements leading to teacher certification, titled “Admission to Teacher Education,” in the College of Education and Educational Technology section of this catalog. (2) CHEM 111 and 112 can be substituted for CHEM 113 and 114 respectively for the B.S. in Education – Chemistry degree. (3) A minimum of 6sh of controlled electives, including either CHEM 351 or BIOC 301, is required for the ACS certified degree in Chemistry Education. (4) See advisory paragraph “Timely Completion of Degree Requirements” in the section on Requirements for Graduation.
---	--

b. List of All Associated Course Changes (new or revised courses, number, title, or description changes, and deletions)

Revised Courses with New Titles and New Descriptions:

- CHEM 113 Concepts in Chemistry I
- CHEM 114 Concepts in Chemistry II

Revised Course with New Description:

- CHEM 411 Advanced Inorganic Chemistry

New Courses:

- CHEM 214 Intermediate Inorganic Chemistry
- CHEM 499 Problems in Chemistry Education

Existing Course Additions:

- BIOC 301 Biochemistry I
- BIOC 311 Biochemistry I Lab
- CHEM 344 Physical Chemistry II Lab
- CHEM 410 Advanced Inorganic Lab

Course Deletions From Program:

- FDED 102 American Education in Theory and Practice
- CHEM 498 Problems in Chemistry

Program Revision for B.S. in Education – Chemistry

3. Rationale for Changes.

Overall, the changes are made to the B.S. in Education – Chemistry degree program for the following reasons: (a) to reduce the total degree requirements from 124-127sh to 120sh, (b) to upgrade the program, (c) to allow graduates to obtain an American Chemical Society (ACS) certified B.S. in Education – Chemistry degree, and (d) to be in keeping with the changes made to the B.S. in Chemistry degree to upgrade the program, meet the certification requirements of the American Chemical Society, and reduce the total degree requirements to 120sh.

The rationale for each specific type of change is described below.

Revised Courses with New Titles and New Descriptions:

CHEM 113 and 114 are revised under the new B.S. in Chemistry degree program. Some inorganic topics are removed from these courses and placed in the new course CHEM 214 Intermediate Inorganic Chemistry so that more time can be spent on the overarching basic principles of chemistry. The material is reorganized between CHEM 113 and 114 to provide a better flow of the concepts. The names of CHEM 113 and 114 are changed to Concepts in Chemistry I and II respectively to better reflect that these courses involve the basic concepts of chemistry.

Revised Courses with New Descriptions:

CHEM 411 Advanced Inorganic Chemistry is revised under the new B.S. in Chemistry degree program. The objectives and topics are updated to better prepare the students for graduate work and the workforce. This change upgrades the B.S. in Education – Chemistry program by being an option for an additional inorganic chemistry course under Controlled Electives. This gives the students more flexibility to suit their interests.

New Courses:

CHEM 214 Intermediate Inorganic Chemistry is established for both the B.S. in Education – Chemistry and the B.S. in Chemistry degree programs to upgrade the programs by devoting more time to inorganic chemistry.

CHEM 499 Problems in Chemistry Education is an independent study course designed specifically for the Chemistry Education majors. This course will give the students experience with research in chemistry education. CHEM 498 Problems in Chemistry is revised under the B.S. in Chemistry degree program so that it is specific to students who are pursuing careers and/or additional degrees in chemistry. Thus, CHEM 498 is no longer applicable to students who are seeking careers in teaching chemistry.

Existing Course Additions:

BIOC 301 Biochemistry I (3sh) is added to the B.S. in Education – Chemistry degree program as one of two selections for a biochemistry course under Controlled Electives. The addition of this course serves two purposes. First, it allows more flexibility for students who are seeking an ACS

Program Revision for B.S. in Education – Chemistry

certified B.S. in Education – Chemistry degree, which requires 33 semester hours of core and/or advanced chemistry and biochemistry courses. (See Appendix A for the 2003 Guidelines for ACS approved Chemistry Education programs.) Secondly, it allows students to choose a biochemistry course according to their interests. BIOC 301 emphasizes the structure and function relationships of proteins, enzymes, and vitamins; bioenergetics; and the metabolism of carbohydrates and lipids. CHEM 351 Biochemistry emphasizes the chemistry and biological functions of carbohydrates, lipids, proteins, minerals, vitamins, and hormones.

BIOC 311 Biochemistry I Lab (1sh) is added as an option under Controlled Electives to allow the students to gain hands-on experience with biochemistry techniques in the lab. Additionally, this course is added so that students can select the type of biochemistry course that suits their interests to acquire the necessary 4sh in the Controlled Electives category.

CHEM 344 Physical Chemistry II Lab (1sh) is added as an option under Controlled Electives to allow the students to gain more hands-on experience with the principles associated with physical chemistry. Additionally, this course is added so that the students can choose the area of physical chemistry to satisfy the necessary 4sh in the Controlled Electives category.

CHEM 410 Advanced Inorganic Lab is added as an option under Controlled Electives to provide the students with more hands-on experience with inorganic chemistry. Additionally, this course is added so that the students can choose the area of inorganic chemistry to satisfy the necessary 4sh in the Controlled Electives category.

Course Deletions From Program:

FDED 102 American Education in Theory and Practice is deleted because the content of this course is covered in the methods courses for the science education majors.

CHEM 498 Problems in Chemistry is deleted because it is revised under the new BS in Chemistry degree program and is no longer suitable for the chemistry education majors.

Part III. Implementation

1. How the Revisions will Affect Students Already in the Existing Chemistry Education Program.

The new B.S. in Education – Chemistry degree program is expected to start in Fall 2003. Students already in the existing degree program will not be affected by these changes because they still will be able to follow the degree requirements that they had upon entry to the program.

2. How the Proposed Revisions will Affect Faculty Teaching Loads.

The proposed revisions are not expected to affect faculty teaching loads. Presently, the Chemistry Department has five inorganic chemists who are qualified to teach the new CHEM 214 Intermediate Inorganic Chemistry course so there is adequate faculty load available to accommodate the addition of this course. BIOC 301 Biochemistry I and BIOC 311 Biochemistry

Program Revision for B.S. in Education – Chemistry

Laboratory I typically have room for a few more students. We expect a maximum of two Chemistry Education majors to take this course per year so the addition of this course to our program is not likely to cause another section of BIOC 301 or BIOC 311 to have to be offered. The workload associated with CHEM 499 Problems in Chemistry Education is the same as that for the old CHEM 498 Problems in Chemistry.

3. Adequacy of Other Resources.

Other resources (space, equipment, supplies, travel funds) are expected to be adequate.

4. Expectation of an Increase or Decrease in the Number of Students as a Result of These Revisions.

No increase or decrease in the number of Chemical Education students is expected as a result of these revisions.

Part IV. Periodic Assessment

The B.S. in Education – Chemistry degree program is evaluated regularly by the Coordinator of this degree program, the Chemistry Department Curriculum Committee, the Chemistry Department faculty, and the Chemistry Education majors. The Coordinator is responsible for ensuring that the Chemistry Education Degree Program meets the standards of our Learned Society, which is the National Science Teachers Association (NSTA), the Pennsylvania Department of Education, and the American Chemical Society. Every five years a detailed report is compiled for the National Council for Accreditation of Teacher Education (NCATE) and the Pennsylvania Department of Education (PDE) for these agencies to evaluate the program.

Periodically, feedback is obtained from the Chemistry faculty and the Cooperating Teachers of our student teachers, especially when deficiencies in the program are found. Past revisions to the program have taken into account this feedback. For example, the mathematics requirement was changed from MATH 121/122 to MATH 123/124 because the faculty who teach the physical chemistry courses provided feedback that the students needed more rigorous calculus courses.

Chemistry Education majors evaluate the program at the end of their student teaching experience on Professional Day by completing two different program assessment surveys. The first is the *ETS-Program Self-Assessment Service* survey administered by the College of Education and the second is the *Chemistry Education Program Student Evaluation* survey administered by the coordinator of the science education methods courses. See Appendix B for an example of the items on the *ETS-Program Self-Assessment Service* survey and for the *Chemistry Education Program Student Evaluation* survey.

Program Revision for B.S. in Education – Chemistry

Part V. Course Proposals

The following proposals for new and revised courses are part of this package. (See Appendix C.)

- CHEM 113 Concepts in Chemistry I
- CHEM 114 Concepts in Chemistry II
- CHEM 214 Intermediate Inorganic Chemistry
- CHEM 411 Advanced Inorganic Chemistry
- CHEM 499 Problems in Chemistry Education

Part V. Letters of Support

The following letter of support is part of this package. (See Appendix D.)

- Co-directors of the Biochemistry Program (Dr. Jonathan Southard and Dr. Narayanaswamy Bharathan)