UWUCC App 4/8/03

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Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person: **Ronald F. See**	Email Address: **rfsee@iup.edu**
Proposing Department/Unit: **Chemistry**	Phone: **7-4489**

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.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _X_Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

Bachelor of Arts in Chemistry ***Current* program name**	***Proposed* program name, if changing**

4. Approvals		**Date**
Dept Curriculum Committee Chair	Ronald F. See	2/11/03
Department Chair	Bruce VanTassel Ramsey	2/11/03
Coll. Curriculum Committee Chair		02/11/03
College Dean	John D. Fisk	02/11/03
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate:		
(include title)		
UWUCC Co-Chairs	Gail S. Sechrist	4/8/03

* where applicable

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Part II. Description of Curriculum Change

1. Catalog Description For The Revised Bachelor of Arts in Chemistry

Liberal Studies: As outlined in the Liberal Studies section with the following specifications: **Mathematics:** MATH 123 (4sh mathematics) **Natural Sciences:** PHYS 131-141 and 132-142 **Liberal Studies Elective:** 3sh		**49**
Major: **Required Courses:**		**30-33**
CHEM 113	Concepts in Chemistry I (1)	4sh
CHEM 114	Concepts in Chemistry II (1)	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
Controlled Electives: (2)		
At least 3sh from the list: CHEM 301, 322, 342, 351, 410, 411, 498; BIOC 301, 302, 311		3-6sh
Other Requirements:		**19-22**
Planned program (with advisor approval) in complementary field of at least 15sh, with at least 6sh of 300/400 level courses (3)		15sh
MATH 124	Calculus II for Physics, Chemistry, and Mathematics	4sh
Foreign Language Intermediate Level (4)		0-3sh
Free Electives:		**16-22**
Total Degree Requirements:		**120**

(1) CHEM 111 and 112 can be substituted for CHEM 113 and 114, respectively, for the chemistry B.A. degree.

(2) Students electing a concentration in Pre-Medicine must take CHEM 351(4sh) or BIOC 301 and 302(6sh).

(3) Students electing a concentration in Pre-Medicine must take BIOL 111, 151, 263, 331 and a 300-level BIOL elective.

(4) Intermediate-level foreign language may be included as Liberal Studies elective.

2. Summary of Changes

a) Side-by-side comparison of Present and Proposed programs (courses that represent change from the present curriculum in italics)

Present			**Proposed**		
Liberal Studies: As outlined in Liberal Studies section with the following specifications: **Mathematics:** MATH 121 or 123 **Natural Sciences:** PHYS 111-121 and 112-122 or PHYS 131-141 and 132-142 **Liberal Studies Electives:** MATH 122 or 124, no courses with CHEM prefix		**56-57**	**Liberal Studies:** As outlined in the Liberal Studies section with the following specifications: ***Mathematics: MATH 123*** **Natural Sciences:** PHYS 111-121 and 112-122 or PHYS 131-141 and 132-142 ***Liberal Studies Electives: 3sh***		**49**
Required Courses:		**29**	**Required Courses:**		***30-33***
CHEM 113	Concepts in Chemistry	4sh	CHEM 113	Concepts in Chemistry I (1)	4sh
CHEM 114	Basic Inorganic Chemistry	4sh	*CHEM 114*	*Concepts in Chemistry II (1)*	*4sh*
CHEM 231	Organic Chemistry I	4sh	*CHEM 214*	*Intermediate Inorganic Chemistry*	*2sh*
CHEM 232	Organic Chemistry II	4sh	CHEM 231	Organic Chemistry I	4sh
CHEM 321	Quantitative Analysis	4sh	CHEM 232	Organic Chemistry II	4sh
CHEM 322	Instrumental Analysis	4sh	CHEM 321	Quantitative 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
Controlled Electives:		**0**	***Controlled Electives: (2) At least 3sh from the list: CHEM 301, CHEM 322, CHEM 342, CHEM 351, CHEM 410, CHEM 411, BIOC 301, BIOC 302, BIOC 311***		*3-6sh*
Other Requirements:		**15-21**	**Other Requirements:**		***19-22***
Foreign Language Intermediate Level (3)		0-6sh	*MATH 124*	*Calculus II for Physics, Chemistry, and Mathematics*	*4sh*
Planned program in complementary field (advisor approval) with 6sh of 300/400 courses (1, 2)		15sh	*Planned program (with advisor approval) in complementary field of at least 15sh, with at least 6sh of 300/400 level courses (3, 4)*		*15sh*
			Foreign Language Intermediate Level (5)		*0-3sh*
Free Electives:		**17-24**	**Free Electives:**		***19-22***
Total Degree Requirements:		**124**	**Total Degree Requirements:**		***120***

(1) Recommended fields: Biology, Business, Computer Science, Criminology, Dietetics, Economics, English, Foreign Language, Geoscience, Mathematics, Safety Science, Physics, Political Science, Psychology.
(2) Chemistry Pre-Med program requires BIOL 111,112, 263, 331.
(3) Intermediate-level Foreign Language may be included in Liberal Studies electives.

(1) CHEM 111 and 112 can be substituted for CHEM 113 and 114, respectively, for the Chemistry B.A. degree.
(2) Students electing a concentration in Pre-Medicine must take CHEM 351(4sh) or BIOC 301 and 302(6sh).
(3) Students electing a concentration in Pre-Medicine must take BIOL 111, 151, 263, 331 and a 300-level BIOL elective.
(4) *Recommended fields: Biology, Business, Computer Science, Criminology, Dietetics, Economics, English, Foreign Language, Geoscience, Mathematics, Safety Science, Physics, Political Science, Psychology.* **(This note moved to text of catalog description.)**
(5) Intermediate-level foreign language may be included as Liberal Studies elective.

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
- CHEM 301 Introduction to Chemical Research
- CHEM 411 Advanced Inorganic Chemistry
- CHEM 498 Problems in Chemistry

New Courses:

- CHEM 214 Intermediate Inorganic Chemistry

Existing Course Additions:

- BIOL 151 Human Physiology (Pre-Medical concentration)
- CHEM 342 Physical Chemistry II
- CHEM 351 Biochemistry
- CHEM 410 Advanced Inorganic Laboratory
- CHEM 411 Advanced Inorganic Chemistry
- BIOC 301 Biochemistry I
- BIOC 311 Biochemistry I Laboratory

Course Deletions from Program:

- MATH 121
- MATH 122
- BIOL 112 Principles of Biology II (Pre-Medical concentration)

Changes in Required Courses

CHEM 113 and 114 are being revised as a result of our changes to the B.S. degree programs. The primary change to these courses will be the reduction of inorganic topics in 113 and 114. These topics are included in a new course, CHEM 214, which will be suggested for the spring semester of the sophomore year. Since these topics are fundamental to chemistry, we are including CHEM 214 in the proposed B.A. degree programs. Allowing CHEM 111 and 112 to substitute for 113 and 114 will make it easier for students who might start out in another science major to obtain a B.A. degree in chemistry. The topic list in CHEM 111/112 is similar to 113/114, but the focus, pedagogical approach, and the laboratory experiments differ considerably to meet the needs and develop skills appropriate for biology, geoscience and pre-professional majors. Therefore, students who have taken 111/112 will have adequate preparation if they decide to re-direct their focus toward a B.A. degree in chemistry. Also, for reasons that are detailed below, CHEM 322 will be moved from a required course to a controlled elective. The other courses previously required in the B.A. programs (CHEM 231, 232, 321, 341, 343) remain unchanged, although CHEM 321 will now be suggested for the fall semester of the sophomore year, rather than the junior year. Some IUP students have taken CHEM 321 as sophomores, and have reported that this may be a more natural sequence to take the course, since it expands on many of the concepts presented in the freshman year chemistry courses (CHEM 113 & 114).

Since students with a B.A. in chemistry may find employment in the chemical industry, or apply to graduate school in chemistry, we feel that it is important to ensure that they have an adequate mathematics background. Therefore, we are strengthening the math requirements by specifying that the B.A. chemistry majors take both MATH 123 and 124.

Introduction of a Controlled CHEM elective

It was decided that the B.A. degree program would better serve the students if it included one elective in the major area. Students will have the option of taking a course in analytical (CHEM 322, now required), physical (CHEM 342), inorganic (CHEM 410 and 411), biochemistry (CHEM 351 or BIOC 301), or they can fulfill the elective with undergraduate research (CHEM 301 and 498). We feel that this change will give increased flexibility to the B.A. degree.

Response to the Reduction of Total sh to 120

The change in the total credits required for graduation, and in Liberal Studies elective requirements, have necessitated some changes in the non-CHEM courses we require for our degree programs. Our present majors typically satisfied the Liberal Studies electives with two intermediate-level foreign language courses and MATH 124. After considering several options, the department has decided to change our foreign language requirement to a minimum of 3 semester hours at the intermediate level. This foreign language requirement can also be used by students to fulfill three semester-hours of Liberal Studies elective. We have also moved MATH 124 to "Other Requirements." These changes will retain 21-22 semester hours of free electives in the B.A. chemistry degree program.

Summary

Although this revision in the B.A. curriculum was prompted by the addition of Biochemistry to the certification requirements of the ACS for the B.S. Chemistry degree, the Chemistry Department has taken this opportunity to improve our B.A. chemistry curriculum. We propose an increase in the total semester hours of CHEM/BIOC courses in the major, as well as a restructuring of the undergraduate research component. We feel that these changes will not only meet the ACS requirements, but also improve the preparation of IUP chemistry majors for graduate school or employment. Because only one new course is being proposed, these changes can also be carried out at a minimal cost to both the department and the university.

Part III. Implementation

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

Changes will not affect students in existing program, except that students will probably take CHEM 321 in their junior year (old program) and students in the new program will take the same course in Fall 2004 during their sophomore year.

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

The faculty teaching load will increase by one contact hour in the fall and three contact hours in the spring. CHEM 301 (1 sh) is moved from spring to fall, and the four-contact-hour CHEM 214 is added in the spring. This small change can be accommodated by the present complement of 20 faculty members of the department.

In Fall 2004, CHEM 321 will have increased enrollment, as mentioned above. This may require one additional lab section for that semester only. Other courses, such as BIOC 301, will experience an increase in enrollment but not so much that any additional sections will be required.

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.

By updating the chemistry major programs, we are making them more attractive, so that they might attract/retain more majors. However, we do not foresee any change in numbers large enough to put any additional strain on the resources of the department as a result of this program revision.

Part IV. Periodic Assessment

There are two components proposed for the periodic assessment of this degree program. One is a survey of the senior students completing the degree program, and the other is a five-year re-evaluation of the program by the departmental curriculum committee.

Senior Survey – A requirement in the revised CHEM 498 will be the completion of a survey (Appendix B) by the seniors in the B.A. degree program that take this course. Additionally, advisors will encourage students in the B.A. degree program who do not take CHEM 498 to complete the survey before graduation. The chemistry department secretary will transcribe the results of these surveys, and then the anonymous results will be distributed to the chemistry department faculty.

Five-year Review – The American Chemical Society evaluates the B.S. degree programs for certification every five years. It is proposed that the chemistry department curriculum committee will conduct a formal review of the curriculum of both the B.A. and B.S. programs two years before this scheduled review. Among the items that the committee should review are the responses from the senior surveys and comments from colleagues about any potential changes in the degree program. The ACS is scheduled to review our program in 2003-2004 and in 2008-2009, so this process would start in Fall 2006, two years before the 2008 ACS review.

Part V. Course Proposals

The following course proposals are part of this package:

- CHEM 113 Concepts in Chemistry I
- CHEM 114 Concepts in Chemistry II
- CHEM 214 Intermediate Inorganic Chemistry
- CHEM 301 Introduction to Chemical Research
- CHEM 411 Advanced Inorganic Chemistry
- CHEM 498 Problems in Chemistry

Part VI. **Appendices**

A. Suggested sequence of courses in B.A. chemistry degree program

B. Senior survey

Letters of Support

Letters of support from the following are attached.

- N. Bharathan & J. Southard, Biochemistry Co-coordinators
- Carl Luciano, Biology Department Chairperson
- Charles R. McCreary, French and German Department Curriculum Committee Chair
- G. Stoudt, Mathematics Department Chair
- David A. Foltz, Spanish Department Curriculum Committee Chair

Appendix B – Suggested sequence for the B.A. in Chemistry (120 Total Credits)

1st Semester		S. H.		2nd Semester		S. H.
CHEM 113	Concepts in Chemistry I	4		CHEM 114	Concepts in Chemistry II	4
MATH 123	Calculus I for Chem, etc.	4		MATH 124	Calculus II for Chem, etc.	4
ENGL 101	College Writing	4		FDNT 143	Nutrition & Wellness (or)	3
ARHI 101	Intro to Art (or)	3		HPED 143	Health & Wellness	
MUHI 101	Intro to Music (or)			HIST 195	History & Mod. Era	3
THTR 101	Intro to Theater					
		15				**14**
3rd Semester				**4th Semester**		
CHEM 231	Organic Chemistry I	4		CHEM 232	Organic Chemistry II	4
CHEM 321	Quantitative Analysis	4			Complemen. Field course	3
PHYS 131	Physics I Lecture	3		PHYS 132	Physics II Lecture	3
PHYS 141	Physics I Lab	1		PHYS 142	Physics II Lab	1
ENGL 121	Humanities Literature	3		ENGL 202	Research Writing	3
					Social Science	3
		15				**17**
5th Semester				**6th Semester**		
CHEM 341	Physical Chemistry I	4		CHEM 214	Intermediate Inorganic Chemistry	2
	Complemen. Field course	3			Complemen. Field course	3
	Foreign Language	3			Philos./Relig. Studies	3
	Free Elective	3			Free Electives	6
	Non-Western Culture	3				
		16				**14**
7th Semester				**8th Semester**		
CHEM 343	Physical Chem I Lab	1		CHEM xxx	Chemistry Elective	3-4
	Complemen. Field course	3		LBST 499	Synthesis	3
	Social Science	3			Complemen. Field course	3
	Free Electives	9			Free Electives	3-4
		16				**13**

Appendix B

Chemistry Department Senior Survey

The faculty of the Chemistry Department would like to hear your opinions on the courses you took as a major in chemistry. Please fill out the survey below, and return it to the departmental secretary in the envelope provided. The secretary will transcribe your responses before any faculty member sees them, to ensure that your input remains as anonymous as possible. The faculty of the department will use the results of these surveys to make changes that will improve the experience for future chemistry majors.

1. Which degree will you be earning? (circle one)
   B.S. – Chemistry
   B.A. – Chemistry
   B.S. – Chemistry Education
   B.S. – Chemistry Pre-Med
   B.A. – Chemistry Pre-Med

2. What are your plans after graduation? (circle one)
   employment
   graduate school in chemistry
   other professional school (medical, law, MBA, etc.)
   not sure

3. How well prepared do you feel to take the next step after graduation in your career plans? Please explain any advantages or deficiencies that you feel your IUP education has given you.

4. What specific CHEM or BIOC courses were you positively, or negatively, impressed by in your degree program. Please focus your comments on the content and delivery of the course material, rather than the personality of the professor.

5. What do you consider to be the best part of your chemistry major program at IUP?

6. What do you consider to be the worst part of your chemistry major program at IUP?

7. Is there anything else you would like the faculty to know about your experiences as a chemistry major at IUP?

To: Curriculum Committee
The University Senate
IUP

From: Dr. N. Bharathan, Dr. Jonathan N. Southard,
Co-Coordinators
Biochemistry Program
IUP

Date: December 9, 2002

Subject: Program Revisions, B.S., B. S. Pre-Med, B. A., and B. A. Pre-Med Degrees in Chemistry

We are writing to support the program revisions submitted by Dr. Ronald See of the Chemistry Department. The changes in requirements for Biochemistry courses have been discussed and approved by the Biochemistry faculty. These revisions will not require any additional faculty complement in the Biochemistry Program. We fully support the program revisions described in this proposal.

From: "Carl Luciano" <luciano@iup.edu>
To: "Dr. Ronald F. See" <rfsee@iup.edu>
Cc: <luciano@iup.edu>,
"Art Hulse" <NTCC@iup.edu>,
"Barkley Butler" <bbutler@iup.edu>,
"Thomas Simmons" <tsimmons@iup.edu>

Subject: Re: chem revisions
Date: Thu, 12 Dec 2002

Ron

Sorry to take so long getting back tc you. This should not be a problem for us.

I am working on the Fall, 2003 schedule right now. Should I go ahead and add CHEM majors to the list of those allowed to register for BIOL 111?

Thanks, CL.

From: "Charles R. McCreary" <chasmc@iup.edu>
To: "Dr. Ronald F. See" <rfsee@iup.edu>
CC: Anita Henry <ahenry@grove.iup.edu>,
Foster Jones <ftjones@grove.iup.edu>,
LaurieHurt <lhurt@iup.edu>,
Irene Wallaert <wallaert@iup.edu>,
Peter Sullivan <psulliv@iup.edu>,
Ken Brode <kwbrode@iup.edu>,
Ludo op de Beeck <pzcc@iup.edu>,
Ludo op de Beeck <drlodb@hotmail.com>

Date: Tue, 10 Dec 2002 14:08:34 -0500
Subject: Re: letter for chem revisions

Dear Dr. See,

Thank you for your recent email concerning your response to the 120 credit hour mandate. On behalf of my colleagues in French and German, I would like to express our thanks to your department for its support of the foreign language requirement in your major. We are gratified that you recognize the importance of foreign languages in a well-rounded university degree.

We regret that you feel compelled to reduce your department's language requirement to a total of three credits; the 120 hour mandate is causing hardships throughout the university. In looking over your proposal, my colleagues and I noted three courses in your package; on which you might want some further background:
FRNC253 - Intermediate Compositon and Conversation: This is a course which is currently only offered as a part of our Summer in Nancy, France program. Only students who enroll in our study abroad program receive credit for this
GRMN201 - Intermediate German: This course had historically been offered on the "intensive accelerated" model, meaning that it granted six credit hours (i.e. this course substituted for GRMN251 AND GRMN252 together.) With the retirement of the colleague who taught this course, it is unclear whether we will be in a position to offer it in the future.
GRMN221 - Conversation III: Due to budgetary and staffing constraints, this course has not been offered in the past two years.

If you require any further clarification, please do not hesitate to contact me

Thank you

From: "Gary Stoudt" <gsstoudt@iup.edu>
To: "'Dr. Ronald F. See'" <rfsee@iup.edu>
Cc: "'Gary Stoudt'" <gsstoudt@iup.edu>
Subject: Letter of Support
Date: Mon, 9 Dec 2002 09:08:25 -0500

Ron,

The Mathematics Department is happy to support the requirement of MATH 123/124 for B.A. Chemistry majors. This change will benefit these students by better preparing them for further study in chemistry and other quantitative fields. This change also puts the B.A. program on a more equal footing with the B.S. in Chemistry program.

Our MATH 123/124 classes can handle the small increase in enrollment necessitated by this change. Likewise, the small decrease in MATH 121/122 enrollment will not adversely affect us.

Thank you for discussing your curricular changes with the Mathematics Department.

Gary

Gary Stoudt, Chairperson
Mathematics Department

From: "David's mail at iup;" <dafoltz@iup.edu>
To: <RFSee@iup.edu>
Cc: "roger smith" <rsmith@iup.edu>
Subject: Proposal for change in foreign language requirement
Date: Tue, 10 Dec 2002 11:00:53 -0500

Dear Dr. See.
Dr. Smith, the chair of the Spanish Department, has asked me to review the proposal from the Chemistry Department to change the Liberal Studies requirement in foreign languages, and then give you a response today. I am the chair of the Spanish Department Curriculum Committee, which met yesterday to review the proposal. We thank you for sharing it with us and for seeking our response or input. We have no objection to the proposed change in that we feel it will not substantially change the current requirement in Spanish. We appreciate that you have the wisdom to insist that an educated person in today's world should have an understanding and appreciation of a second language and its culture.

Sincerely,

David A. Foltz, chair
Spanish Department Curriculum Committee