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Curriculum Proposal Cover Sho	eet - University-W	ide Undergrad		
Contact Person: Ronald F. See		Email Address: rfsee@iup.edu		
Proposing Department/Unit: Chemistry		Phone: 7-4489		
Check all appropriate lines and concourse proposal and for each program	nplete information n proposal. 	as requested.	Use a separate cove	er sneet for each
Course Proposals (check all that aNew Course	pply) Course Prefix Char	nge	Course Do	eletion
Course Revision	Course Number and/or Title ChangeCatalog Description Change			
		Proposed coul	rse prefix, number an	d full title, if
Current Course prefix, number and	full title	changing		~
2. Additional Course Designations: c This course is also proposed This course is also proposed	as a Liberal Studies	s Course.	Other: (e.g., \ Pan-African)	Women's Studies,
3. Program Proposals	Catalog De	escription Chang	gePrograi	m Revision
New Degree Program Program Program Title Change X Other				- Track Revision
New Minor Program	New Track	•		
Bachelor of Arts in Chemistry -				
Concentration: Pre-Medicine				
Current program name		<u>Proposed</u> pro	gram name, if changi	ing
4. Approvais				Date
Dept Curriculum Committee Chair	Kuht	F. S.		2/11/03
Department Chair	Rentialla	instage	entansey	2/11/03
Coll. Curriculum Committee Chair	11/2	-		oc/11/03
College Dean	South	10 5	0	02/11/03
Director of Liberal Studies *		1		
Director of Honors College *				
Provost *				
Addditional signatures as appropriate:				
(include title	)			
UWUCC Co-Chair	8			

\* where applicable

**FEB 1 19 2003** 

# Part II. Description of Curriculum Change

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

Liberal Studies: As outlined in the Liberal Studies section with				
the following:	specifications:			
Mathematics:	MATH 123 (4sh mathematics)			
Natural Scien	ces: PHYS 131-141 and 132-142			
Liberal Studi	es Elective: 3sh intermediate-level foreign			
language	_			
Major:			30-33	
Required Cou	ırses:			
CHEM 113	Concepts in Chemistry I (1)	4sh		
CHEM 114	Concepts in Chemistry II (1)	4sh		
<b>CHEM 214</b>	Intermediate Inorganic Chemistry	2sh		
<b>CHEM 231</b>	Organic Chemistry [	4sh		
CHEM 232	Organic Chemistry II	4sh		
<b>CHEM 321</b>	Quantitative Analysis	4sh		
CHEM 341	Physical Chemistry I	4sh		
CHEM 343	Physical Chemistry Laboratory I	1 sh		
Controlled E	lectives: (2)			
At least 3sh fr	om the list:	3-6sh		
CHEM 301, 3	22, 342, 351, 410, 411, 498, BIOC 301, 302, 311			
Other Requirements:			19	
Planned progr	am (with advisor approval) in complementary field	15sh		
of at least 15s	h, with at least 6sh of 300/400 level courses (3)			
MATH 124	Calculus II for Physics, Chemistry, and	4sh		
	Mathematics			
Free Electives:			19-22	
<b>Total Degree</b>	Requirements:		120	
(1) OTTEN	4 111 and 112 can be surbatituted for CHEM 112 and	114 rechect	ivaly for the	

- (1) CHEM 111 and 112 can be substituted for CHEM 113 and 114, respectively, for the chemistry B.A. degree.
- (2) Students with a concentration in Pre-Medicine must take CHEM 351(4sh) or BIOC 301 and 302(6sh).
- (3) Students with a concentration in Pre-Medicine must take BIOL 111, 151, 263, 331 and a 300-level BIOL elective.

#### 2. Summary of Changes

a) Side-by-side comparison of Present and Proposed Chemistry B.A. – Pre-Medical concentration (courses that represent change from the present curriculum in italics).

Present			Proposed		
Bachelor of A	rts - Chemistry, Pre-Medical c	oncentrat	ion		
Liberal Studies: As outlined in Liberal		56-57	Liberal Studies: As outlined in the Liberal		49
Studies section with the following			Studies section	n with the following	
specifications:	Mathematics: MATH 121 or		specifications:	:	
123				Mathematics: MATH 123	
Natural Sciences: PHYS 111-121 and 112-			Natural Sciences: PHYS 111-121 and 112-		
122 or PHYS 131-141 and 132-142			122 or PHYS	122 or PHYS 131-141 and 132-142	
Liberal Studies Electives: MATH 122 or			Liberal Studi	Liberal Studies Electives: 3sh	
124, no course:	s with CHEM prefix		intermediate-level foreign language		
Required Courses		29	Required Courses		31-33
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	2sh
				Chemistry	
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	1sh	CHEM 343	Physical Chemistry	lsh
	Laboratory I			Laboratory I	
Controlled El	ectives	0	Controlled Electives		4-6sh
			One of the following:		l
			CHEM 351 Biochemistry (4sh) or BIOC 301		
			& 302 Biochemistry I & II (6sh)		
Other Requirements		17-23	Other Requirements		21
Foreign Language (1)		0-6sh	MATH 124	Calculus II for Physics,	4sh
				Chemistry, and Mathematics	
BIOL 111, 112, 263, 331		14sh	BIOL 111, 151, 263, 331		14sh
Elective 300/400 level BIOL/BIOC/CHEM		3-4sh	Elective 300/400 level BIOL course		3sh
course					ļ
Free Electives		14-22	Free Electives		17-19
Total Degree Requirements		124	Total Degree Requirements		120

<sup>(1)</sup> Many be included as Liberal Studies elective.

<sup>(1)</sup> CHEM 111 and 112 can be substituted for CHEM 113 and 114, respectively, for the Chemistry B.A. degree.

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

#### **New Courses:**

• CHEM 214 Intermediate Incrganic Chemistry

## **Existing Course Additions:**

- CHEM 351 Biochemistry
- BIOL 151 Human Physiology
- BIOC 301 Biochemistry I
- BIOC 302 Biochemistry II

#### **Course Deletions from Program:**

- CHEM 322 Instrumental Analysis
- BIOL 112 Principles of Biology II
- Reduction of the foreign language requirement to three semester hours of foreign language with at least one course at the intermediate level (see Appendix A).

## 3. Rationale for Changes.

#### Introduction

This revision to the B.A. Pre-Medical concentration in chemistry was necessitated by our revision of the B.S. degree program, which was in turn prompted by a change in the certification requirements of the American Chemical Society (ACS). These proposed changes to the B.S. degree program involve changes in courses that are also required for the B.A. degree, so the B.A. program must also adapt to the new course offerings. Additionally, it was also decided that the pre-medical students would strongly benefit from the substitution of CHEM 351 (Biochemistry) for CHEM 322 (Instrumental Analysis) in their concentration. We have also decided to require MATH 123 and 124, to ensure that graduates from the B.A. degree program have a sufficient background in this area. Finally, the reduction of the graduation requirements to 120 semester hours, and the change in the liberal studies requirements, have forced some changes in the chemistry B.A. degree requirements. Each of these changes is explained below.

#### **Changes in Required Courses**

CHEM 113 and 114 are being revised as a result of our changes to the B.S. degree program. The primary change to these courses will be the reduction of inorganic topics in 113 and 114. These topics will be 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 program. 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. The other courses required in the proposed B.A. program (CHEM 231, 232, 321, 341, 343) are unchanged, although CHEM 321 will now be suggested for the fall semester of the sophomore year, rather than the junior year as is now the case. Some IUP students have taken CHEM 321 as a sophomore, 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.

#### Substitution of CHEM 351 or BIOC 301 & 302 for CHEM 322

Biochemistry is an important area of knowledge for students who wish to attend medical school. Our proposed B.A. chemistry degree changes CHEM 322 from a required course to one of a list of potential electives; this list also includes CHEM 351 (Biochemistry) and the two-semester sequence of BIOC 301 and 302. However, for the pre-medical student, a biochemistry course is clearly a requirement, so we are giving students in the B.A. chemistry pre-medical concentration the choice of CHEM 351 (one 4sh course) or BIOC 301 and 302 (two course, 3sh each) to satisfy their chemistry elective. Either alterative gives the pre-medical student a broad background in biochemistry, which they will need for the MCAT and medical school.

#### 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 satisfy the new, three-semester-hour Liberal Studies elective. We have also moved MATH 124 to "Other Requirements." These changes will retain 17-19 semester hours of free electives in the B.A. chemistry pre-medical concentration.

# Changes Complementary Field courses for the Pre-Medical B.A.

After consultation with faculty in the biology department, we have determined that the BIOL courses appropriate for the proposed B.A. Chemistry with a concentration in pre-medicine are BIOL 111 (Principles of Biology I), 151 (Human Physiology), 263 (Genetics) and 331 (Animal Developmental Physiology). These courses, along with a 300-level BIOL elective, will satisfy the complementary field requirement in the B.A. degree. As shown in Appendix A, the suggested

sequence of these courses is designed to prepare the student to take the MCAT in the spring of their junior year.

#### **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 the focus the B.A. chemistry pre-medical concentration. No new courses, other than those proposed for the B.S. program revision, will be required to make these changes.

## Part III. Implementation

# 1. How the Revisions will Affect Students Already in the Existing Chemistry Education 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 sopnomore year.

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

Two additional semester hours will be introduced in the spring by the creation of CHEM 214. 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, may 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 Incrganic Chemistry

#### Part VI. Appendices

- A. Suggested sequence of courses in B.A. chemistry pre-medical 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 A – Suggested sequence for the B.A. in Chemistry – Concentration: Pre-Medicine (120 Total Credits)

	1 <sup>st</sup> Semester	S. H.		2 <sup>nd</sup> 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
BIOL 111	Principles of Biology I	4	ENGL 101	College Writing	4
HIST 195	History & Mod. Era (or)	3	HIST 195	History & Mod. Era (or)	3
ARHI 101	Intro to Art (or)		ARHI 101	Intro to Art (or)	
MUHI 101	Intro to Music (or)		MUHI 101	Intro to Music (or)	
THTR 101	Intro to Theater		THTR 101	Intro to Theater	
		15			15
	3 <sup>rd</sup> Semester			4 <sup>th</sup> Semester	
CHEM 231	Organic Chemistry I	4	CHEM 232	Organic Chemistry II	4
CHEM 321	Quantitative Analysis	4	PHYS 132	Physics II Lecture	3
PHYS 131	Physics I Lecture	3	PHYS 142	Physics II Lab	1
PHYS 141	Physics I Lab	1	BIOL 263	Genetics	3
ENGL 121	Humanities Literature	3	ENGL 202	Research Writing	3
			FDNT 143	Nutrition & Wellness (or)	3
			HPED 143	Health & Wellness	
		15			17
	5 <sup>th</sup> Semester			6 <sup>th</sup> Semester	
CHEM 341	Physical Chemistry I	4	CHEM 214	Intermediate Inorganic	2
CHEM 351	Biochemistry	4	BIOL 151	Human Physiology	4
BIOL 331	Animal Dev. Biology	3		BIOL elective	3
	Foreign Language	3		Philos./Relig. Studies	3
				Free Elective	3
		14			15
	Fth C	-		8 <sup>th</sup> Semester	
CHEN 4 0 40	7 <sup>th</sup> Semester	++	I DCT 400	Synthesis	3
CHEM 343	Physical Chem I Lab	1 1	LBST 499	Social Science	3
	Non-Western Culture	3			8
	Social Science	3		Free Electives	
	Free Electives	8			14
		15			14_

#### 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?

B.S. - Chemistry Education

(circle one)

B.S. – Chemistry

B.S. – Chemistry Pre-Med

B.A. – Chemistry

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 to 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.

Page 12

From: "Charles R. McCreary" <c.nasmc@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@iur.edu>,

Peter Sullivan <psulliv@iup.edu>,

Ken Brode <a href="mailto:kwbrode@iup.edu">kwbrode@iup.edu</a>,

Ludo op de Beeck <pzcc@iup.edu>,

Ludo op de Beeck <drlodb@hotmail.com>

Date: Tue, 10 Dec 2002 14:08:34 -0:500 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 Composition 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 -C500

#### 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