Curriculum Proposal Cover Sheet - form is available on-line as an interactive PDF 13-36d.

LSC Use Only Proposal No:

LSC Action-Date: App-9|12|13

UWUCC Use Only Proposal No: 12 1370

UWUCC Action-Date: App-12/3/13

Senate Action Date: App-12/3/13

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

0 1 15 11				
Contact Person(s) Sandra Newell		Email Address sjnewell@iup.edu		
Proposing Department/Unit		Phone		
Biology Check all appropriate lines and complete all information. Use a s	senarate cover sheet for each course proposal ar	357-2352		
Course Proposals (check all that apply)				
New Course	Course Prefix Change	Course Deletion		
Course Revision	Course Number and/or Title Change	Catalog Description	n Change	
Current course prefix, number and full title:				
Proposed course prefix, number and full title, if cha	anging:			
2. Liberal Studies Course Designations, as app	propriate			
This course is also proposed as a Liberal S	Studies Course (please mark the approp	oriate categories below)		
Learning Skills Knowledge Area	Global and Multicultural Awarer	ness Writing Intensive (in	clude W cover sheet)	
Liberal Studies Elective (please mark the d	lesignation(s) that applies - must meet	at least one)		
Global Citizenship	Information Literacy	Oral Communication		
Quantitative Reasoning	Scientific Literacy	Technological Literacy	Received	
3. Other Designations, as appropriate			APR 2 9 2013	
Honors College Course Oth	ner: (e.g. Women's Studies, Pan Africar		AIN DO LOIG	
			eral Studies	
4. Program Proposals				
Catalog Description Change X P	Program Revision Program	Title Change	New Track	
New Degree Program Ne	w Minor Program Liberal Stud	lies Requirement Changes	Other	
Current program name: Bachelor of Science	- Biology/Cell and Molecular Biology	Track		
Proposed program name, if changing:				
5. Approvals	Sign	ature	Date	
Department Curriculum Committee Chair(s)	San Solewell		1 Feb 2013	
Department Chairperson(s)	(1) has		FUL 2013	
College Curriculum Committee Chair	of N lon (7	4/29/13	
College Dean	(T) es la la		4/19/12	
Director of Liberal Studies (as needed)	N 11 Diale		913113	
Director of Honors College (as needed)	D-/ N / VIII	11	1/12/12	
Provost (as needed)	the Color	a Car	5/2/13	
Additional signature (with title) as appropriate	wen so went		14/13	
JWUCC Co-Chairs	acos Sodaint	_	11/10/12	
	1			

Part II. Description of Curriculum Change

1. Catalog description for the revised program in the appropriate form.

Bachelor of Science – Biology/		
Cell and Molecular Biology Track		
Liberal Studies: As outlined in Liberal Studies section with the following		45
specifications:		
Mathematics: MATH 121		
Natural Science: CHEM 111-112 or CHEM 113-114		
Liberal Studies Electives: 3 cr, no courses with BIOL prefix		
Major:		37
Required Core Courses:		
BIOL 201 Principles of Ecology & Evolution	4cr	
BIOL 202 Principles of Cell & Molecular Biology	4cr	
BIOL 203 Principles of Genetics & Development	4cr	
Required Biology Courses:		
BIOL 123 Perspectives in Cell and Molecular Biology	1 cr	
BIOL 401 Laboratory Methods in Biology and Biotechnology	3cr	
BIOL 405 Biology of the Cell	3cr	
BIOL 410 Molecular Biology Topics	3cr	
BIOL 466 Virology	3cr	
BIOL 499 Research Biology/BIOL 493 Biology Internship/BIOL 482 Independent	3cr	
Study/ BIOL 483 Honor's Thesis Independent Study	501	
Controlled Biology Electives:	o (a)	
BIOL 151, 210, 220, 250, 262, 269, 271, 281 (2), 310, 323, 331, 352, 362, 363,	9 cr (1)	
364, 453, 460, 477, 481 (2), 482 (2), 483, 484, 493, 499 (2), or other biology major		
courses by permission of advisor and department chairperson		
Other Science Requirements:		23
Organic Chemistry Sequence:	_	
CHEM 231 Organic Chemistry I	4cr	
CHEM 232 Organic Chemistry II	4cr	
Biochemistry Sequence:	2	
BIOC 301 Biochemistry I	3cr	
BIOC 302 Biochemistry II BIOC 311 Biochemistry Laboratory I	3cr 1cr	
BIOC 312 Biochemistry Laboratory II	1cr	
Other Science/Mathematics Requirements:	101	
PHYS 111 Physics I Lecture	3cr	
PHYS 121 Physics I Lab	1cr	
MATH 216 or 217 Probability and Statistics	3cr	

Other Requirements:

0-6

0-6cr (4)

Foreign Language Intermediate Level Exit survey for assessment purposes

Free Electives:

9-15

Total Degree Requirements:

120

- (1) No more than 6cr total from Independent Study, Special Topics, or Internship applies to major; excess applied as free electives.
- (2) No more than 3cr may count toward Controlled Elective requirements.
- (3) Other appropriate major courses at 200-level and above (excluding liberal studies courses) in the above departments may be substituted with permission of the advisor and the biology department chairperson in advance of taking the course.
- (4) a) Two courses in one language, including the placement course; or b) intermediate level. In lieu of a foreign language, students may elect to take a sequence of courses in either Computer Science, exclusive of COSC 101 (COSC 110 and 210 recommended), or Geography/Regional Planning (from the following: GEOG/RGPL 213, 314, 316, 415, 417)

2. Summary of changes:

- 1. The mathematics requirement was restored to MATH 121, correcting an error that occurred in the fast tracking of Liberal Studies revisions in spring 2012.
- 2. CHEM 113-114 was added as a substitute for CHEM 111-112.
- 3. PHYS 111 is no longer a Liberal Studies elective, but has been moved to an Ancillary Science requirement.
- 4. The number of credits for the major was reduced from 38 to 37 cr. This was achieved by reducing the number of credits in controlled electives from 11 to 9 (while adding one credit to the Principles series).
- 5. BIOL 111 Principles of Biology I, BIOL 112 Principles of Biology II, and BIOL 263 Genetics have been replaced by BIOL 201 Principles of Ecology & Evolution, BIOL 202 Principles of Cell & Molecular Biology, and BIOL 203 Principles of Genetics & Development. BIOL 263 Genetics, a 3 credit course, has been replaced by BIOL 203, a 4 credit course. These three courses, BIOL 201 Principles of Ecology & Evolution, BIOL 202 Principles of Cell & Molecular Biology, and BIOL 203 Principles of Genetics & Development, constitute the biology core courses. The course proposals are attached. BIOL 210 Botany, BIOL 220 General Zoology, and BIOL 250 Principles of Microbiology were removed as required courses.
- 6. BIOL 405 Biology of the Cell, BIOL 466 Virology, and BIOL 499 or BIOL 493 or BIOL 482 or BIOL 483 were added as required courses in the major.
- 7. The list of controlled biology electives was updated, adding several new courses.
- 8. MATH 216 was added as a substitution for MATH 217.
- 9. The category of Science/Mathematics Electives (4 cr) was eliminated along with its footnote.

- 10. An exit survey for assessment purposes was added.11. The number of free electives increases from 7-14 to 9-15.
- 12. Wording in Footnote 4 was revised and the foreign language requirement was modified to include GEOG/RGPL as an alternative.

Comparison of Old and New Programs:

Current: Proposed:

Current.		Proposeu:		
Bachelor of Science – Biology/		Bachelor of Science – Biology/		
Cell and Molecular Biology		Cell and Molecular Biology		
Track		Track		
Liberal Studies: As outlined in	44-45	Liberal Studies: As outlined in		45
Liberal Studies section with the		Liberal Studies section with the		
following specifications:		following specifications:		
Mathematics: MATH 121 or 217		Mathematics: MATH 121		
Natural Science: CHEM 111-112		Natural Science: CHEM 111-112 or		
		CHEM 113-114		
Liberal Studies Electives: 3cr, PHYS		Liberal Studies Electives: 3cr, no		
111, no courses with BIOL prefix		courses with BIOL prefix		
Major:	38	Major:		37
Required Courses:		Required Core Courses:		
BIOL 111 Principles of Biology I	4cr			
BIOL 112 Principles of Biology II	4cr			
		BIOL 201 Principles of Ecology and	4cr	
		Evolution		
		BIOL 202 Principles of Cell and	4cr	
		Molecular Biology		
		BIOL 203 Principles of Genetics and	4cr	
		Development		
		Required Biology Courses:		
BIOL 123 Perspective in Cell and	lcr	BIOL 123 Perspectives in Cell and	lcr	
Molecular Biology		Molecular Biology		
BIOL 210 Botany	3cr			
BIOL 220 General Zoology	3cr			
BIOL 250 Principles of Microbiology	3cr			
BIOL 263 Genetics	3cr			
BIOL 401 Laboratory Methods in	3cr	BIOL 401 Laboratory Methods in	3cr	
Biology and Biotechnology		Biology and Biotechnology		
BIOL 410 Molecular Biology Topics	3cr	BIOL 405 Biology of the Cell	3cr	
		BIOL 410 Molecular Biology Topics	3cr	
		BIOL 466 Virology	3cr	
		BIOL 499 Research Biology/BIOL 493	3cr	
		Biology Internship/BIOL 482		
		Independent Study/ BIOL 483 Honors		

		Thesis Independent Study	
Controlled Electives: (1)		Controlled Biology Electives:	
BIOL 151, 269, 271, 281 (2), 323, 331,	llcr	BIOL 151, 250, 262, 269, 271, 281 (2),	9cr (1)
352, 362, 363, 364, 453, 460, 466, 477,	1	310, 323, 331, 352, 362, 363, 364, 453,	
481 (2), 482 (2), 493 (2)		460, 477, 481 (2), 482 (2), 483, 484,	
	ĺ	493 (2), or other biology major courses	
		by permission of advisor and	
		department chairperson	
Ancillary Science Requirements:	24	Other Science Requirements:	23
Organic Chemistry Sequence:		Organic Chemistry Sequence:	
CHEM 231 Organic Chemistry I	4cr	CHEM 231 Organic Chemistry I	4cr
CHEM 232 Organic Chemistry II	4cr	CHEM 232 Organic Chemistry II	4cr
Biochemistry Sequence:		Biochemistry Sequence:	
BIOC 301 Biochemistry I	3cr	BIOC 301 Biochemistry I	3cr
BIOC 302 Biochemistry II	3cr	BIOC 302 Biochemistry II	3cr
BIOC 311 Biochemistry Laboratory I	lcr	BIOC 311 Biochemistry Laboratory I	lcr
BIOC 312 Biochemistry Laboratory II	lcr	BIOC 312 Biochemistry Laboratory II	1cr
Other Science/Mathematics		Other Science/Mathematics	
Requirements:	1	Requirements:	
		PHYS 111 Physics I Lecture	3cr
PHYS 121 Physics I Lab	1cr	PHYS 121 Physics I Lab	lcr
MATH 217 Probability and Statistics	3cr	MATH 216 or 217 Probability and	3cr
,		Statistics	
Science/Mathematics Elective:	4cr (3)		
An additional 4cr in ancillary			
science/mathematics from the			
following: BIOC 480, 481, CHEM			
321, 323, 331, 340, MATH 122, PHYS			
112, 122	ļ		-
Other Requirements:	0-6	Other Requirements:	0-6
Foreign Language Intermediate Level	0-6cr (4)	Foreign Language Intermediate Level	0-6cr (3)
		Exit survey for assessment purposes	
Free Electives:	7-14	Free Electives:	9-15
Total Degree Requirements:	120	Total Degree Requirements:	120
Total Degree Requirements.	120	Total Degree Reduitements.	
(1) No more than 6cr total from	 	(1) No more than 6cr total from	
Independent Study, Special Topics, or		Independent Study, Special Topics, or	
Internship applies to major; excess		Internship applies to major; excess	
applied as free electives.		applied as free electives.	
(2) No more than 3cr may count		(2) No more than 3cr may count	
toward Controlled Elective	-	toward Controlled Elective	

requirements.	requirements.
(3) Other appropriate majors courses in these departments may be substituted for one or more of those on the above list with the approval of the student's advisor.	
(4) Two courses beyond placement or intermediate level. Foreign Language course may count as Liberal Studies Elective (see Liberal Studies section). In lieu of a foreign language the student may elect to take a sequence of courses in Computer Science exclusive of COSC 101 (COSC 110 and 210 recommended).	(3) a) Two courses in one language, including the placement course; or b) intermediate level. In lieu of a foreign language, students may elect to take a sequence of courses in either Computer Science, exclusive of COSC 101 (COSC 110 and 210 recommended), or Geography/Regional Planning (from the following: GEOG/RGPL 213, 314, 316, 415, 417)

3. Rationale for changes:

- 1. The Mathematics requirement is being corrected after an error in the Fast Track revisions for Liberal Studies.
- 2. Students who are adequately prepared may take a higher level of freshman chemistry than CHEM 111-112. We are clarifying this option for students by including it here.
- 3. PHYS 111 is no longer a Liberal Studies elective, but has been moved to an Ancillary Science requirement.
- 4. Biology major credits were reduced to comply with the PASSHE mandate of 60 cr in the major and ancillary sciences. Having 9 credits rather than 11 credits of controlled electives is justified in that the courses are 3-credit courses.
- 5. The revision of the core courses is a complete restructuring of the Principles of Biology. We are revising our core curriculum to create three pillars of biology: BIOL 201 Principles of Ecology & Evolution, BIOL 202 Principles of Cell & Molecular Biology, and BIOL 203 Principles of Genetics & Development. The change in the core curriculum constitutes a shift in philosophy, moving away from a lengthy list of topics to a more integrated and focused cluster of courses. Also, we are shifting away from the old-fashioned botany-zoology dichotomy to a modern levels-of-organization approach.

BIOL 201 Principles of Ecology & Evolution is designed to be the first biology course for freshman biology majors. We have reversed the order of the material, placing the more familiar concepts of ecology and evolution in the first semester and moving the less familiar concepts of molecular and cellular biology into the second semester. BIOL 201 will replace BIOL 112 Principles of Biology II. BIOL 112 included evolution, ecology, and reproduction and development. The new course will focus only on ecology and evolution. As BIOL 201

Principles of Ecology & Evolution is proposed to be the first biology course for incoming students, the amount of content is being reduced to better serve the needs of students with diverse levels of preparation for college-level work.

BIOL 202 Principles of Cell & Molecular Biology will replace BIOL 111 Principles of Biology I. Placing the cell and molecular topics in the spring semester allows for the prerequisite of CHEM 111 or CHEM 113 to better prepare students for these topics.

BIOL 203 Principles of Genetics & Development will replace BIOL 263 Genetics. Modern developmental biology emphasizes cell, molecular, and genetic aspects of development, so development is being shifted to the third and final course in the core, linking it with genetics. The subject of genetics has expanded into a multidisciplinary science that covers material from population genetics to molecular genetics. The current system only allows two 50 minute lectures a week, which results in the elimination of a great deal of material from the course. A schedule with 3 lectures a week would allow for a more complete coverage for the student. In order to provide the level of rigor necessary, the course needs additional time in the lecture component.

The numbering system follows the model of the Geoscience department, in which majors courses begin at the 200-level and the 100-level courses are designated for nonmajors and liberal studies courses.

- 6. BIOL 405 Biology of the Cell was added to the curriculum after the track was created. It is a highly relevant course for students in this track. Therefore, it is being added to the list of required courses. BIOL 466 is being added as a requirement as recent work in the field of Cell and Molecular Biology utilizes viruses and this course will adequately prepare the student for this work. Finally, a 3cr research course (BIOL 499 or BIOL 482 Independent Study, BIOL 483 Honors Thesis Independent Study, or BIOL 493 Biology Internship) is being added to require the student to complete an independent research project. This is necessary in order to properly prepare the student to enter the workforce in this field.
- 7. The change in controlled electives represents the availability of new courses.
- 8. MATH 216 can be substituted for MATH 217.
- 9. The Science/Mathematics Electives category was eliminated when PHYS 111 was moved from Liberal Studies Elective to Other Science Requirements.
- 10. The exit survey is added to insure compliance so that assessment data are complete and reliable.
- 11. Free elective credits were increased by reducing Biology major credits and Ancillary Science credits, to comply with the PASSHE mandate of 60 cr in the major and ancillary sciences.
- 12. Footnote 3 (old footnote 4) was revised to expand options for the foreign language requirement. The current B.S. in Biology (no track) offers the substitution of computer science courses or geography courses for foreign language. This option is being expanded to include the Cell and Molecular Track since computer skills and geography skills are relevant to this field.

All tracks within the program will have the same foreign language requirement. This will reduce confusion and facilitate students transferring between tracks.

Part III. Implementation

1. How will the proposed revision affect students in the existing program?

Students may elect to finish with the requirements of the catalog at the time of their matriculation, or students may choose to switch to the new requirements.

2. Are faculty resources adequate?

The overall credits in the major have been reduced by one credit, so faculty resources are adequate. By removing BIOL 210, 220, and 250 from the list of required courses for the B.S. Biology (no track) as well as from this track, the enrollment in these courses will likely decrease and fewer sections of each will be necessary.

3. Are other resources adequate?

Other resources are adequate.

4. Do you expect an increase or decrease in the number of students as a result of these revisions?

We do not expect the revisions to affect the number of students in the program.

Part IV. Periodic Assessment

1. Describe the evaluation plan.

The Biology Department conducts a review of all programs every five years. Criteria include both quantitative and qualitative evaluation of the programs. In addition, every year the outgoing seniors will be surveyed, using the required exit survey, for feedback about the nature of their experiences in the various programs within the department.

Part V. Course Proposals

BIOL 201 Principles of Ecology & Evolution - proposal attached

BIOL 202 Principles of Cell & Molecular Biology - proposal attached

BIOL 203 Principles of Genetics & Development - proposal attached

Part VI. Letters of Support or Acknowledgment

Allied Health Professions: Clinical Laboratory Science Biochemistry

Chemistry
Computer Science
Foreign Languages
Geography
Geosciences
Mathematics
Natural Science
Physics
Psychology