

Curriculum Proposal Cover Sheet – form is available on-line as an interactive PDF

13-36h

LSC Use Only Proposal No:	UWUCC Use Only Proposal No: <del>12-137h</del>	Senate Action Date: App-12/3/13
LSC Action-Date: App-9/12/13	UWUCC Action-Date: App-11/19/13	

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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Proposing Department/Unit <b>Biology</b>	Phone <b>7-2352</b>

Check all appropriate lines and complete all information. Use a separate cover sheet for each course proposal and/or 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. Liberal Studies Course Designations, as appropriate**

This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)  
 Learning Skills     Knowledge Area     Global and Multicultural Awareness     Writing Intensive (include W cover sheet)  
 Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)  
      Global Citizenship                       Information Literacy                       Oral Communication  
      Quantitative Reasoning                       Scientific Literacy                       Technological Literacy

Received

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**3. Other Designations, as appropriate**

Honors College Course                       Other: (e.g. Women's Studies, Pan African)

Liberal Studies

**4. Program Proposals**

Catalog Description Change     Program Revision     Program Title Change     New Track  
 New Degree Program     New Minor Program     Liberal Studies Requirement Changes     Other

Current program name: **Bachelor of Science – Biology/Environmental Health Track**

Proposed program name, if changing: \_\_\_\_\_

5. Approvals	Signature	Date
Department Curriculum Committee Chair(s)	<i>Sandra Newell</i>	7 Dec 2012
Department Chairperson(s)	<i>Thomas Simmons</i>	Dec 7 2012
College Curriculum Committee Chair	<i>Anne Beards</i>	4/24/13
College Dean	<i>Gregory Smith</i>	4/29/13
Director of Liberal Studies (as needed)	<i>D. H. Pickett</i>	9/13/13
Director of Honors College (as needed)		
Provost (as needed)	<i>Tracy S. Moreland</i>	5/2/13
Additional signature (with title) as appropriate		
UWUCC Co-Chairs	<i>Gail Sechrist</i>	11/19/13

## Part II. Description of Curriculum Change

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

### **Bachelor of Science – Biology/Environmental Health Track**

**Liberal Studies:** As outlined in Liberal Studies section with the following specifications: 45

**Mathematics:** MATH 121

**Natural Science:** CHEM 111-112 or CHEM 113-114

**Social Science:** ECON 101, PSYC 101 or SOC 151

**Liberal Studies Electives:** 3 cr, BTED/COSC/IFMG 101, no courses with BIOL prefix

#### **Major:**

41

##### **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 151 Human Physiology 4cr

BIOL 210 Botany 3cr

BIOL 220 General Zoology 3cr

BIOL 221 Environmental Health and Protection 4cr

BIOL 250 Principles of Microbiology 3cr

BIOL 323 Introduction to Toxicology and Risk Assessment 3cr

BIOL 460 Fundamentals of Environmental Epidemiology 3cr

**Controlled Biology Electives:** 6cr (1)

BIOL 262, 310, 363, 466, 476, 481, 482, 483, 484, 493, or other biology major courses by permission of advisor and department chairperson

##### **Other Science Requirements:**

19

CHEM 231 Organic Chemistry I 4cr

CHEM 351 Biochemistry 4cr

MATH 216 or 217 Probability and Statistics 3cr

PHYS 111 Physics I Lecture 3cr

PHYS 121 Physics I Lab 1cr

**Ancillary Science and Technical Electives (2):** 4cr

CHEM: 232, 323

GEOG/RGPL 415, 417, GEOG 419, 425

GEOS: 201, 202, 312, 313

MATH: 122

PHYS: 112, 122

PSYC 290, 291, 315, 331, 341, 342 or 345, 350, 355, 356, 359, 372

##### **Other Requirements:**

0-6

Foreign Language Intermediate Level 0-6cr (3)

Exit survey for assessment purposes

**Free Electives: (4)**

**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) 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.

(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)

(4) Recommended free electives: MGMT 310; PLSC 250, 370; SAFE 101, 220.

## 2. Summary of changes:

1. CHEM 113-114 was added as a substitution for CHEM 111-112.

2. The reference to a nonwestern culture course was deleted from the Social Sciences listing.

3. The number of credits in the major was increased from 40 credits to 41 credits.

4. 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. This increases the total required biology credits from 40 credits to 41 credits.

5. The controlled biology electives list was updated.

6. MATH 217 was added as a substitute for MATH 216.

7. Psychology was added to the list of Ancillary Science and Technical Electives.

8. The Ancillary Science and Technical Electives credits were reduced from 9 credits to 4 credits, thereby reducing the Other Requirements credits from 24 credits to 19 credits.

9. The requirement of an assessment survey was added.

10. A footnote was added to indicate that students may substitute other courses in the same departments as listed in the Ancillary Science Electives with the appropriate permission.

11. The wording of the foreign language footnote was modified to be consistent with other tracks; the actual foreign language requirement remains unchanged.

12. Recommended free electives list was updated, removing SAFE 410, a course that is not in the catalog.

13. The free electives credits are increased from 5-11 credits to 9-15 credits.

Comparison of Old and New Programs:

Current:

Proposed:

<b>Bachelor of Science – Biology/ Environmental Health Track</b>		<b>Bachelor of Science – Biology/ Environmental Health Track</b>	
<b>Liberal Studies:</b> As outlined in Liberal Studies section with the following specifications:	<b>45</b>	<b>Liberal Studies:</b> As outlined in Liberal Studies section with the following specifications:	<b>45</b>
<b>Mathematics:</b> MATH 121		<b>Mathematics:</b> MATH 121	
<b>Natural Science:</b> CHEM 111-112		<b>Natural Science:</b> CHEM 111-112 or CHEM 113-114	
<b>Social Science:</b> ECON 101, PSYC 101 or SOC 151, nonwestern culture required		<b>Social Science:</b> ECON 101, PSYC 101 or SOC 151	
<b>Liberal Studies Electives:</b> 3 cr, BTED/COSC/IFMG 101, no courses with BIOL prefix		<b>Liberal Studies Electives:</b> 3 cr, BTED/COSC/IFMG 101, no courses with BIOL prefix	
<b>Major:</b>	<b>40</b>	<b>Major:</b>	<b>41</b>
<b>Required Core Courses:</b>		<b>Required Core Courses:</b>	
BIOL 111 Principles of Biology I	4cr		
BIOL 112 Principles of Biology II	4cr		
		BIOL 201 Principles of Ecology & Evolution	4cr
		BIOL 202 Principles of Cell & Molecular Biology	4cr
		BIOL 203 Principles of Genetics & Development	4cr
		<b>Required Biology Courses:</b>	
		BIOL 151 Human Physiology	4cr
BIOL 210 Botany	3cr	BIOL 210 Botany	3cr
BIOL 220 General Zoology	3cr	BIOL 220 General Zoology	3cr

BIOL 250 Principles of Microbiology	3cr	BIOL 250 Principles of Microbiology	3cr
BIOL 263 Genetics	3cr		
<b>Additional Required Biology Courses:</b>			
BIOL 151 Human Physiology	4cr		
BIOL 221 Environmental Health and Protection	4cr	BIOL 221 Environmental Health and Protection	4cr
BIOL 323 Introduction to Toxicology and Risk Assessment	3cr	BIOL 323 Introduction to Toxicology and Risk Assessment	3cr
BIOL 460 Fundamentals of Environmental Epidemiology	3cr	BIOL 460 Fundamentals of Environmental Epidemiology	3cr
<b>Controlled Biology Electives:</b>	6cr (1)	<b>Controlled Biology Electives:</b>	6cr (1)
BIOL 262, 270, 310, 363, 466, 476, 481, 482, 483, 484, 493		BIOL 262, 310, 363, 466, 476, 481, 482, 483, 484, 493, or other biology major courses by permission of advisor and department chairperson	
<b>Other Requirements:</b>	<b>24</b>	<b>Other Science Requirements:</b>	<b>19</b>
CHEM 231 Organic Chemistry I	4cr	CHEM 231 Organic Chemistry I	4cr
CHEM 351 Biochemistry	4cr	CHEM 351 Biochemistry	4cr
MATH 216 Probability and Statistics for Natural Sciences	3cr	MATH 216 or 217 Probability and Statistics	3cr
PHYS 111 Physics I Lecture	3cr	PHYS 111 Physics I Lecture	3cr
PHYS 121 Physics I Lab	1cr	PHYS 121 Physics I Lab	1cr
<b>Ancillary Science and Technical Electives:</b>	9cr	<b>Ancillary Science and Technical Electives (2):</b>	4cr
CHEM: 232, 323		CHEM: 232, 323	
GEOG/RGPL 415, 417, GEOG 419, 425		GEOG/RGPL 415, 417, GEOG 419, 425	
GEOS: 201, 202, 312, 313		GEOS: 201, 202, 312, 313	
MATH: 122		MATH: 122	
PHYS: 112 and 122		PHYS: 112, 122	
		PSYC 290, 291, 315, 331, 341, 342 or 345, 350, 355, 356, 359, 372	
SAFE 330, 430		SAFE 330, 430	
<b>Other Requirements:</b>	<b>0-6</b>	<b>Other Requirements:</b>	<b>0-6</b>
Foreign Language Intermediate Level (2)	0-6cr	Foreign Language Intermediate Level	0-6cr (3)
		Exit survey for assessment purposes	
<b>Free Electives: (3)</b>	<b>5-11</b>	<b>Free Electives: (4)</b>	<b>9-15</b>
<b>Total Degree Requirements:</b>	<b>120</b>	<b>Total Degree Requirements:</b>	<b>120</b>

(1) No more than 6cr total from Independent Study, Special Topics, or Internship applies to major; excess applied as free electives.		(1) No more than 6cr total from Independent Study, Special Topics, or Internship applies to major; excess applied as free electives.	
		(2) 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.	
(2) 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, students in programs or tracks other than the Pre-Medical Track and the Pre-Veterinary Track 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: Geography/RGPL 213, 314, 316, or 415)		(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) Recommended free electives: MGMT 310; PLSC 250, 370; SAFE 101, 220, 410.		(4) Recommended free electives: MGMT 310; PLSC 250, 370; SAFE 101, 220.	

### 3. Rationale for changes:

1. 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.
2. The reference to a nonwestern course is obsolete. All students are expected to meet the Global and Multicultural Awareness requirement, and reference to that requirement does not need to be stated here.
3. The one credit increase is due to the replacement of BIOL 263 Genetics, a 3 credit course, by BIOL 203 Principles of Biology: Genetics and Development, a 4 credit course.
4. 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 Cellular & 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.

5. The controlled biology elective list was simply updated.
6. While a course in Probability and Statistics is essential, it does not need to be a calculus-based course. Either MATH 216 or 217 is acceptable.
7. Psychology is being added to the list of courses for the B.S. in Biology (no track), and these courses are also relevant for this track within the B.S. in Biology.
8. Ancillary Science and Technical Electives credits were reduced to meet the PASSHE mandate of a maximum of 60 credits in the major.
9. The exit survey is added to insure compliance so that assessment data are complete and reliable.
10. The added footnote makes this track consistent with other tracks and allows greater flexibility in the track.

11. The wording of the foreign language footnote was changed to be consistent with other tracks. The foreign language requirement has not changed.

12. Recommended free electives list was updated, removing SAFE 410, a course that is not in the catalog.

13. Ancillary Science and Technical Electives credits were reduced to comply with the PASSHE mandate of 60 cr in the major and ancillary sciences thereby increasing the free elective credits.

### **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?

Faculty resources are adequate. In order to add the one credit of load (replacing BIOL 263 Genetics at 3 cr to BIOL 203 Principles of Genetics & Development at 4 cr), load will be shifted from other biology courses as needed. By removing BIOL 210, 220, and 250 from the list of required courses in other tracks, 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 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

Geography

Geosciences

Mathematics

Natural Science

Physics

Psychology