

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

13-36c.

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

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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Proposing Department/Unit Biology	Phone 7-2352

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

3. Other Designations, as appropriate

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

Received
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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**

Proposed program name, if changing: _____

Liberal Studies

5. Approvals	Signature	Date
Department Curriculum Committee Chair(s)	<i>Sandra Newell</i>	30, Nov. 2012
Department Chairperson(s)	<i>[Signature]</i>	Nov 30 2012
College Curriculum Committee Chair	<i>[Signature]</i>	4/24/13
College Dean	<i>[Signature]</i>	4/29/13
Director of Liberal Studies (as needed)	<i>[Signature]</i>	9/13/13
Director of Honors College (as needed)		
Provost (as needed)	<i>Timothy S. Mondak (um)</i>	5/8/13
Additional signature (with title) as appropriate		
UWUCC Co-Chairs	<i>Gail S. Dechist</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

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

Liberal Studies Electives: 3 cr, no courses with BIOL prefix

Major: **36**

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

Controlled Biology Electives:

Biology electives (major courses only) 24cr (1)

Select one course from each area: Cell & Molecular Area, Ecology Area, Organismal Area (A list of courses in each area is available on the biology website or at the biology office.)

A minimum of 12 cr must be in courses at the 400-level.

Other Science Requirements: **23**

MATH 216 or 217 Probability and Statistics 3cr

PHYS 111 Physics I Lecture 3cr

PHYS 121 Physics I Lab 1cr

Ancillary Sciences Electives: 16cr

An additional 16 cr from the following (2):

BIOC: 301, 302, 311, 312, 401, 480, 490

CHEM: 231, 232, 321, 323, 351

GEOS: 201, 202, 203, 303, 310, 311, 312, 313, 351, 352, 353, 354, 362, 370, 371

MATH: 122, 417, 418

PHYS: 112, 122, 151, 161

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: **10-16**

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)

2. Summary of changes:

1. The Liberal Studies mathematics course is specified as MATH 121 instead of MATH 121 or 217; MATH 217 (or 216) has become a required course in the Other Science Requirements section. Related footnotes in the old text have been deleted.

2. CHEM 113-114 is included as a possible substitution for CHEM 111-112.

3. The number of credits for the major was reduced from 38 cr to 36 cr.

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.

5. BIOL 210 Botany, BIOL 220 General Zoology, and BIOL 250 Principles of Microbiology have been removed as required courses. Six credits from these courses remain in the Major requirements as controlled biology electives. These courses will count as controlled biology electives.

6. Stipulations have been placed upon the Controlled Biology Electives. Students must select one course from each of three areas: 1) Cell and Molecular Biology, 2) Organismal Biology, and 3) Ecology. Also, a minimum of 12 cr of the biology electives must be at the 400-level.

7. The Ancillary Science credits have changed from 20-21 to 16. Part of the change is due to moving the 3 cr mathematics course (MATH 216 or 217) to the list of required Other Science Requirements. The list of Ancillary Science courses has been updated and includes additional courses in biochemistry, geoscience, and physics. In addition, psychology courses have been added to the list. Footnote 2 in the new program has been revised from Footnote 4 of the old program, clarifying the nature of the exceptions to the list.

8. The final footnote about foreign language has been revised for clarity, removing the track-specific language, adding the GEOG prefix to the GEOG/RGPL courses, and adding one GEOG/RGPL course to the approved list of substitutions for foreign language.

9. The requirement of an assessment survey was added.

10. Free elective credits have been increased by the reduction in the number of biology major credits and by the reduction in the number of ancillary science credits.

Comparison of Old and New Programs:

Current:

Proposed:

Bachelor of Science – Biology		Bachelor of Science – Biology	
Liberal Studies: As outlined in Liberal Studies section with the following specifications:	44-45	Liberal Studies: As outlined in Liberal Studies section with the following specifications:	45
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: 3 cr, no courses with BIOL prefix		Liberal Studies Electives: 3 cr, no courses with BIOL prefix	
Major:	38	Major:	36
Required Courses:		Required Core Courses:	
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
BIOL 210 Botany	3cr		
BIOL 220 General Zoology	3cr		
BIOL 250 Principles of Microbiology	3cr		
BIOL 263 Genetics	3cr		
Controlled Electives:		Controlled Biology Electives:	
Biology electives (major courses only)	18cr (1)	Biology electives (major courses only)	24cr (1)
		Select one course from each area: Cell & Molecular Area, Ecology Area, Organismal Area (A list of courses in each area is available on the biology website or at the biology office.)	

		A minimum of 12 cr must be in courses at the 400-level.	
Other Requirements:	24-25 (2)	Other Science Requirements:	23
PHYS 111 Physics I Lecture	3cr	MATH 216 or 217	3cr
PHYS 121 Physics I Lab	1cr	PHYS 111 Physics I Lecture	3cr
		PHYS 121 Physics I Lab	1cr
Ancillary Science Courses:	20-21cr	Ancillary Science Electives:	16cr
An additional 20-21 cr from the following (3, 4):		An additional 16 cr from the following (2):	
BIOC: 301, 302, 311, 312		BIOC: 301, 302, 311, 312, 401, 480, 490	
CHEM: 231, 232, 321, 323, 351		CHEM: 231, 232, 321, 323, 351	
GEOS: 121 and 122, 131 and 132, 141, 310, 330, 331, 361		GEOS: 201, 202, 203, 303, 310, 311, 312, 313, 351, 352, 353, 354, 362, 370, 371	
MATH: 122, 417, 418		MATH: 122, 417, 418	
PHYS: 112 and 122, 151		PHYS: 112, 122, 151, 161	
		PSYC 290, 291, 315, 331, 341, 342 or 345, 350, 355, 356, 359, 372	
Other Requirements:	0-6	Other Requirements:	0-6
Foreign Language Intermediate Level	0-6cr (5)	Foreign Language Intermediate Level	0-6cr (3)
		Exit survey for assessment purposes	
Free Electives:	6-14	Free Electives:	10-16
Total Degree Requirements:	120	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.		(1) No more than 6cr total from Independent Study, Special Topics, or Internship applies to major; excess applied as free electives.	
(2) 21cr if the student elects MATH 121 in Liberal Studies or 22cr if the student elects to take MATH 217			
(3) If MATH 121 (4cr) is elected as the Liberal Studies MATH course the additional requirement is 20cr; if MATH 217 (3cr) is elected, the additional requirement is 21cr. The mathematics course counted in Liberal Studies cannot also count in ancillary courses.			
(4) Other appropriate major courses in		(2) Other appropriate major courses at	

<p>the above departments may be substituted for one or more of those on the above list with the approval of the student's advisor.</p>		<p>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.</p>	
<p>(5) Two courses beyond placement or intermediate level. 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 Regional Planning (from the following: RGPL 213, 314, 316, 415)</p>		<p>(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)</p>	

3. Rationale for changes:

1. All of the tracks within the B.S. in Biology require both Calculus I and Probability & Statistics. These two mathematics courses are essential for modern biology.

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. The reduction in major credits was made to comply with the 60 cr maximum mandated by PASSHE.

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 and 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 pre-requisite 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. BIOL 210, 220 and 250 are not being deleted, simply removed from the general program as required courses. These courses are required by certain tracks within the biology program, and they will be electives for the B.S. in Biology (no track). This will provide greater flexibility for students in developing their program, especially for students who are transferring credits from other institutions.

6. Students are required to take one course from each of three areas: 1) Cell and Molecular Biology, 2) Organismal Biology, and 3) Ecology. These three areas represent the broad spectrum of life sciences. At the undergraduate level many students have not identified a specific career path, and they need or want to be exposed to the breadth of biology, while maintaining the flexibility to focus in depth on an area of interest. This area approach is designed to give maximum flexibility to the student who has elected not to follow a specific track (such as pre-med or pre-vet), and who wants to be broadly trained in biology.

7. Removing one credit from the ancillary science credits, reducing ancillary sciences from 17 cr to 16 cr, makes it possible for students to fulfill the ancillary science credits with four 4cr courses; and many of the courses in the list are 4 cr. Also, this allows the credits to stay within the PASSHE mandated 60 cr for the major and ancillary sciences.

Updating included deleting obsolete course numbers, adding new courses that are relevant for biology majors. Psychology is closely allied with biology and highly relevant for many biology majors. Inclusion of psychology in the ancillary science will allow biology students who are interested in neuroscience to develop a program that includes a psychology minor.

8. The wording of the foreign language requirement is being changed to improve clarity. The GEOG prefix was included with the dual-listed courses to avoid confusion. An additional GEOG course was added because the content is relevant to biology majors. All tracks within the program will have the same foreign language requirement. This will reduce confusion and facilitate students transferring between tracks.

9. The exit survey is added to insure compliance so that assessment data are complete and reliable.

10. Biology major credits and ancillary science credits were reduced to comply with the PASSHE mandate of 60 cr in the major and ancillary sciences thereby increasing 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?

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, 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. Other than the change in BIOL 263 Genetics, the changes have no resource implications.

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

Foreign Languages

Geography

Geosciences

Mathematics

Natural Science

Physics

Psychology