

# Agenda

CALS/L&S Joint Curriculum Committee Meeting  
Tuesday, October 8<sup>th</sup>, 2013, 12:00 p.m.  
Room 1220--Biochemical Sciences Building

___ Randy Jackson, Chr (2014)	___ Kirsten Brown, (2016)	___ James Steele (2016)
___ Jeri Barak, (2014)	___ Jack Kloppenburg, (2015)	___ Masarah Van Eyck, (2015)
___ Bill Bland, (2014)	___ Ahna Skop, (2016)	
	___ Susan Smith, (2016)	

**CALS Ex Officio:**

Sarah Pfatteicher \_\_\_  
Phil Gonsiska\_\_\_

**CASI Ex Officio:**

\_\_\_ Liv Sandberg (non-voting)

**Student Reps:** \_\_\_

**UP&S Office:** \_\_\_ Susan Gisler  
\_\_\_ Andrea Sotile

## JOINT SESSION

**Biochemistry curriculum changes**—Biochemistry no longer wishes to accept Physics 103 and 104 to satisfy its introductory physics requirement

## PROGRAM PROPOSALS

**Proposed Plant Biology Option for the Biology Major**—Agronomy, Botany, Horticulture, and Plant Pathology are proposing a new track in Biology to satisfy an unmet need for students interested in plant biology.

**Notice of Intent to Plan Neurobiology Major** –This is a precursor to a proposal to move the Neurobiology option in Biology in to a separate major administrated by the Zoology department.

## OTHER

**Discussion: Process for changes to shared programs and courses**

**Informational item: Liberal Arts and Science (LAS) designations, breadth, and level**

## CALS-ONLY SESSION

## MINUTES

September 24<sup>th</sup>, 2013

## STRATEGIC PLANNING

Continuation of Capacity Project discussion



## Biochemistry Department

Founded 1883

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July 31, 2013

RE: DARS coding of Intro to Physics requirement for Biochemistry

Dear Members of the CALS and L&S Curriculum Committees:

We are writing to request a change in the DARS coding of Physics 103 and 104. Currently, these 100-level physics courses are listed as fulfilling the introduction to physics requirements for the Biochemistry undergraduate degree program. However, these courses do not adequately prepare biochemistry majors for the demands of the degree, and we are requesting that these courses no longer be listed as acceptable. We request that this change be made effective beginning Spring 2014. (Note: both courses are encoded as unlisted acceptable courses in CALS DARS; physics 103 is coded as an unlisted acceptable course in L&S DARS.)

While the department is willing to evaluate and make exceptions to the preferred course sequence for extraordinary, individual situations, the algebra-based training provided in these 100-level physics courses does not provide the quantitative and analytical experience necessary for successful progression through the biochemistry degree program. As the coding stands, students who earned AP credit in high school for Physics 103 and 104 have already fulfilled their introduction to physics Biochemistry major degree requirement. This training is not sufficient for the program, in contrast to the calculus-based, 200-level physics courses currently listed correctly in DARS as meeting the degree's requirements (physics 201/202 and 207/208). These 200-level courses are prerequisites for Chemistry 565, a required course in the biochemistry major. It is also worth noting that our request is in line with analogous undergraduate programs on campus such as chemistry and genetics, both of which require 200-level physics courses to fulfill their introduction to physics requirements.

Currently the majority of our undergraduates have completed the 200-level physics course option. Our requested change will not impact the CALS and L&S biochemistry undergraduates who have already completed the 100-level sequence or AP equivalent. By removing physics 103 and 104 from the acceptable list of courses on the DARS, this action will exclude AP credit for Physics 103/104 and any credit in these courses from UW-Madison or college transfer credit. The change will be effective going forward only, beginning Spring 2014, if approved.

Sincerely,



Prof Elizabeth Craig  
Chair, Department of Biochemistry



Prof Sebastian Bednarek  
Chair, Biochemistry Undergraduate Curriculum Committee



Kelley S. Harris - Johnson  
Asst Faculty Associate, Department of Biochemistry  
Undergraduate Student Services

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**433 Babcock Drive  
Madison, WI 53706-1544 USA**

**Telephone: 608-262-9832  
Fax: 608-262-3453**

## **Proposed Plant Biology Option for the Biology Major**

*Revised:* May 26, 2013, addressing comments and questions from Jocelyn Millner, Sarah Pfatteicher, and Elaine Klein

Revised September 3, 2013 addressing additional comments and questions from Jocelyn Millner, Sarah Pfatteicher, and Elaine Klein

### *Plant Biology Steering Committee*

Agronomy: Dave Stoltenberg and Bill Tracy

Botany: Don Waller and Ken Sytsma

Horticulture: Irwin Goldman and Sara Patterson

Plant Pathology: Caitilyn Allen and Doug Rouse

## **1. Summary and Rationale**

The Departments of Agronomy, Botany, Horticulture, and Plant Pathology propose to create a **Plant Biology Option** within the Biology major. All four departments and the Biology Major Executive Committee have formally approved this option.

The Biology Major has achieved remarkable success as a magnet for undergraduate students interested in biology. The University of Wisconsin-Madison has a tremendous wealth of expertise in plant science and is known worldwide for the breadth and depth of its contributions in this field. Our proposal aims to connect Biology Majors with this world-class plant science faculty across our campus and offer an option for those students to pursue focused study in this area of biology.

We recognize that some biology majors may have an interest in plant science but may take very limited coursework in this area during their undergraduate work. We also appreciate the notion that providing options or tracks within the Biology Major may provide students with a “home within the major” that could increase the quality of their learning experience on our campus. Our proposal attempts to bring these two aspects together in a Plant Biology Option for the Biology Major.

We are aware that our departments each offer majors for students interested in plant science. However, the undergraduate enrollment in our four departments does not generally exceed approximately 125 students. We feel we have the capacity to add more students to our teaching and advising efforts and, perhaps more important, to serve the needs of students in the Biology Major who may find a plant science option an excellent way to gain more focus and direction in their studies.

## **2. Name of Program and Implementation**

"Plant Biology" captures the focus and disciplinary emphasis of this proposed Option within the Biology major. It does not duplicate the name of any department or program but comes closest to our CALS graduate program in "Plant Breeding / Plant Genetics." This should not present any ambiguity, however, as "biology" is considerably broader than "breeding" or "genetics" and because these programs exist on altogether different levels (undergraduate vs. graduate). All four Departments involved endorse and approve this name, emphasizing the common ground among us.

To implement this new Option, we will work together with the CALS and L&S Dean's Offices, departmental Curriculum Committees, and college Academic Planning Councils, as well as DARS programming, through the summer and fall of 2013. We expect the aforementioned governance committees to evaluate and approve this Option in the Fall of 2013. If approved, we anticipate implementing it starting in fall, 2014.

### **3. Administrative Structure and Governance in the Plant Biology Option**

A committee comprised of the four Curriculum Committee chairs from Agronomy, Botany, Horticulture, and Plant Pathology will constitute the governance committee for the Plant Biology Option. These individuals will serve two-year terms on the governance committee for the Plant Biology Option. In the second year of their two-year term, and in each succeeding year, two of the four departments will supply a second faculty member to join the governance committee, resulting in a total of six faculty in any given year serving on the governance committee after year 1. In this way, the governance committee will always possess individuals with at least one year of experience as new members join.

The committee will be chaired by one of the Curriculum Committee chairs, and the chair term will be two years. This committee will receive requests for course additions / deletions and serve as a sounding board for instructional and student issues related to the Plant Biology Option. Recently, the University Academic Planning Council endorsed a change in the governance structure for the Biology Major through the creation of a Biology Major Program Committee (BMPC). The Plant Biology Option governance committee described above will interact with the BMPC through the Plant Biology Option Committee Chair to the Executive Committee, who will attend regular meetings of the BMPC.

### **3. Admissions and Degree Requirements**

This option is available to any student pursuing a Biology Major in either CALS or L&S. There are no specific requirements for entry into and continuation in the option. Students may declare the option either simultaneously with declaring the major, or subsequent to declaring the major. Note that CALS students must declare their major (and any options or additional majors) prior to the start of their senior year.

### **4. Proposed Curriculum for the Biology Major with the Plant Biology Option**

UW-Madison provides exceptional breadth and depth of training in the plant sciences. The Plant Sciences Option of the Biology major draws on these assets to provide students with both broad training in the biology of plants including a broad choice of specialized and applied courses. Students interested in this Option should discuss their previous and planned courses carefully with an advisor before deciding to declare this Option. The Plant Biology Option can be chosen by students pursuing either a CALS or an L&S Biology major. Detailed questions regarding the curriculum or exceptions should be addressed to the Faculty Director.

In addition to fulfilling all University and College requirements, students must fulfill the requirements of the Biology Major (available at <https://www.cals.wisc.edu/wp-content/uploads/2011/03/Biology.pdf> for CALS), and also the following requirements of the Option. Please note that the Mathematics requirement section “b” is in addition to the Biology major’s mathematics requirements (section “a”). The chemistry and physics requirements are identical to those required for the Biology major.

1) **Mathematics**

- a) Math 171: Calculus with Algebra and Trigonometry I (5 cr) **AND** Math 217: Calculus with Algebra and Trigonometry II (5 cr) **OR** Math 221: Calculus and Analytic Geometry (5 cr)

AND

- b) Math 222 (5 cr) **OR** Stat 301 (3 cr) **OR** Stat 371: Introduction to Statistics for the Life Sciences (3 cr). Stat 371 *recommended*

2) **Chemistry**

- a) General Chemistry: ) Chem 103 and 104: General  
109: General and Analytical Chemistry (5 cr)

- b) Organic Chemistry: Chem 343: In  
Organic Chemistry Lab (2 cr) and Chem 345: Intermediate Organic Chemistry (3 cr)

3) **Physics**    Physics 103 or 201 or 207 plus Physics 104 or 202 or 208

**BIOLOGY COURSES** *(The total number of credits in sections 4, 5, 6, and 7 below must equal at least 31.)*

4) **Introductory Biology Courses**

- a) Option A - *recommended*: Biology/ Zoology 101: Animal Biology (3 cr), Biology/ Zoology 102: Animal Biology Lab (2 cr), Biology/ Botany 130: General Botany (5 cr)
- b) Option B: Biology/ Botany/ Zoology 151 and 152: Introductory Biology (5 cr)
- c) Option C: Biocore 301: Evolution, Ecology, and Genetics (3 cr), Biocore 303: Cellular Biology (3 cr), Biocore 323: Organismal Biology (3 cr), Biocore 333: Biological Interactions (3 cr)    AND the laboratory course Biocore 302: Evolution, Ecology, and Genetics Lab (2 cr) AND Biocore 304: Cellular Biology Lab (2 cr) OR Biocore 324: Organismal Biology Lab (2 cr)    *(Students who use Biocore 302 and*

*304 to fulfill the introductory biology requirement can use Biocore 324 to fulfill the intermediate lab or field course requirement described in part 5 below. Biocore courses fulfill both introductory and foundational course requirements.)*

Please note that Biocore courses will change numbers beginning in Spring, 2014. At that time, Biocore 301 will become Biocore 381. Biocore 302 will become Biocore 382. Biocore 303 will become Biocore 383. Biocore 304 will become Biocore 384. Biocore 323 will become Biocore 485. Biocore 324 will become Biocore 486. Biocore 333 will become Biocore 587.

**Advancement Placement:** If your AP Biology exam score was 4 or 5, you may be able to place out of some introductory courses. See the AP policy document.

**Foundational Course** *(course not required for those taking Option B to satisfy Introductory Biology):*

- Agronomy 338: Plant Breeding and Biotechnology
- OR Botany/Genetics/Zoology 466: General Genetics
- OR Biochem 501: Introduction to Biochemistry (3 cr)

*(Students are best prepared for graduate study or professional school by taking both a genetics course and a biochemistry course. A second course taken from this list will count toward requirement 5.)*

#### 5) **Intermediate/advanced courses** (15 credits minimum)

A minimum of **three courses** (at least 15 credits) at the intermediate/advanced level, selected from **three of the five areas listed** below, are needed to satisfy the biology breadth requirement. These courses must include **one or more lab or field courses with a total of 3 hours or more per week of laboratory/field instruction**. At least one course must be from category "a" or "b" and at least one course must be from category "c" or "d." In other words, these courses must include 3 hrs of lab/field, must include 3 of 5 categories, must include A or B, must include C or D, must include an E, and each of the previous 3 categories must be 2 credits or more.

For the **Plant Biology** option, students are required to meet this 15 credit requirement using the courses listed listed below (a subset of those listed for the general Biology major). They must also take at least one course from category "e." The course or courses used to satisfy any category must be at least, or add up to, 2 credits.

#### **a. Cellular and Subcellular Biology**

Department	Number	Credits	Lab hours/week	Course Title
Agronomy/ Hort	338	3	-	Plant Breeding and Biotechnology



Agronomy/ Botany/ Hort	339	4	3	<u>Plant Biotechnology Principles and Techniques I</u>
Agronomy/ Botany/ Hort	340	4	3	<u>Plant Biotechnology Principles and Techniques II</u>
Biochem	501	3	-	Introduction to Biochemistry
Biochem	507	3-4	-	General Biochemistry
Botany/ Genetics/ Hort	466	3	-	General Genetics
Botany/ Genetics/ Hort	561	3	2	Introductory Cytogenetics

Intermediate/Advanced Courses that meet the Biology Breadth Requirement and that require ADVANCED LEVEL prerequisites:

Biochem	508	3-4	-	General Biochemistry II
Biochem/ Botany	621	3	-	Plant Biochemistry
Botany/Entom/Pl Path	505	3	-	Plant-Microbe Interactions: Molecular and Ecological Aspects *

### **b. Organismal Biology**

Botany	300	4	4	Plant Anatomy
Pl Path	300	4	3	<u>Introduction to Plant Pathology</u> *
Botany	305	4	4	Principles of Plant Structure
Botany	330	3	4	Algae
Botany/ Pl Path	332	4	4	Fungi
Botany	360	3	-	Bryophytes
Botany/ F&W Ecol	402	2	4	Dendrology
Botany	500	4	3	Plant Physiology
Entom/ Zoology	302	4	3	Introduction to Entomology

Intermediate/Advanced Courses that meet the Biology Breadth Requirement and that require ADVANCED LEVEL prerequisites:

Pl Path	558	3	3	Biology of Plant Pathogens
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### **c. Ecology**

Agron / Bot / Soils	370	3	-	Grassland Ecology *
Botany/F&W Ecol	455	4	5	Vegetation of Wisconsin
Botany/F&W Ecol/ Zoology	460	4	3	General Ecology
F&W Ecol	550	3-4	2	Forest Ecology

Intermediate/Advanced Courses that meet the Biology Breadth Requirement and that require ADVANCED LEVEL prerequisites:

Botany/ Entom/Zoology	473	3	-	Plant-Insect Interactions
Botany/ Envir St/F&W Ecol/ Zoology	651	3	-	Conservation Biology
F&WE	565	3?		Principles of Landscape Ecology *

**d. Evolution and Systematics**

Department	Number	Credits	Lab hours/week	Course Title
Anthro/ Botany/ Zoology	410	3	-	<u>Evolutionary Biology</u>
Botany	400	4	3	Plant Systematics
Botany	401	4	4	Vascular Flora of Wisconsin
Botany	422	3	-	Plant Geography

Intermediate/Advanced Courses that meet the Biology Breadth Requirement and that require ADVANCED LEVEL prerequisites:

Botany	563	3	2	Phylogenetic Analysis of Molecular Data *
Botany/ Genetics/ Med Genet	629	3	-	Evolutionary Genetics
Genetics	620	1	-	Population and Quantitative Genetics

**e: Applied Biology, Agriculture & Natural Resources**

Department	Number	Credits	Lab hours/week	Course Title
AAE/Agronomy/Inter-Ag/ Nutr Sci	350	3	-	World Hunger and Malnutrition
Agronomy	300	3	-	Cropping Systems
Agronomy	302	3	-	Forage Management and Utilization
Agronomy/Hort	328	4	2	Integrated Weed Management

Agronomy	377	3	-	Cropping Systems of the Tropics
Agronomy/Hort	501	3	-	Principles of Plant Breeding
Amer Ind/Anthro/ Botany	474	3	-	Ethnobotany
F&W Ecol	410	3-4	3	Principles of Silviculture
F&W Ecol	415	3		Tree Physiology
Hort	320	3		Environment of Horticultural Plants
Hort	370	3	2	World Vegetable Crops
Hort	372	1	-	Colloquium in Organic Agriculture
Hort	374	2	-	Tropical Horticulture
Hort/ Path-Bio	500	3	3	Molecular Biology Techniques
Pl Path/ Soil Sci	323	2	-	Soil Biology
Pl Path	517	3		Plant Disease Resistance

Intermediate/Advanced Courses that meet the Biology Breadth Requirement and that require ADVANCED LEVEL prerequisites:

Botany	329	4	4	Microtechnique
Botany	403	1-4	SS	Field Collections and Identification
Plant Path	559	2	4	Diseases of Economic Crops
Botany/ Hort/ Soil Sci	626	3	-	Mineral Nutrition of Plants
Genetics/Hort	550	3	-	Molecular Approaches for Potential Crop Improvement

### 5. A Laboratory or Field Research Experience (2 credits minimum)

Additional laboratory or field research experience is required. Two credits of directed

study or research-based senior thesis in a plant science discipline can count. With advisor approval, these courses can also fulfill the CALS requirement for a capstone experience. With advisor approval, students may count any 699 credits offered through one of the four participating plant science departments for this section. 699 credits received simultaneously or prior to introductory biology (section 4 above), such as those received for Biology 152, cannot fulfill these requirements. Also, experiences that are focused on teaching assistance, even if the course number used is a 699 course, are not appropriate. This requirement can also be fulfilled with one or more intermediate/advanced laboratory or field biology courses involving a total of at least of 3 hours/week of lab or field instruction beyond that done for requirement 5. "Hours/week" refers to a normal 16-week semester and courses taken in other formats may be substituted where the total time commitment is equivalent. However, only a subset of the lab/field courses automatically fulfills the CALS requirement for a capstone experience. See [capstone policy](#) and list of approved courses.

The credits taken for requirements 5 and 6 must equal at least 17 and satisfy college requirements for 15 course credits in the [major in residence](#).

Questions concerning appropriate 699 credits for the Plant Biology Option should be directed to the Plant Biology Option Governance Committee.

## **6. Undergraduate Plant Science Seminar (1 credit)**

This new course will be developed and implemented if this proposal is approved and offered initially as an experimental course under these flexible numbers.

Agron/Bot/Hort/PlPath 375 ***Frontiers in Plant Biology***. Students selecting the Plant Biology Option will be required to take this 1-credit seminar at least once. Meets for an hour once/week. Limited to 24 students. Prerequisites: Junior standing and completion of an Introductory Biology sequence. Can be taken more than once for credit. Initially to be offered in Spring semester; will expand to a second Fall semester offering if warranted by demand.

**Rationale:** This seminar class is intended as a unifying academic experience for the Plant Biology Option. Its larger objective is to mediate substantive intellectual interactions among both the students and the faculty in the program.

**Description:** Two faculty members will co-teach each offering of *Frontiers in Plant Biology*. Faculty instructor pairs will come from different plant biology departments to ensure that each version of the class has an inclusive, interdisciplinary perspective. The instructors will choose a topic for the semester from a current area in which they have interest and expertise. (Sample topics might include: *Physiology of plant stress response to droughts and floods*; *Current topics in sustainable food production*; *Ecological and agronomic roles of endophytic microbes*; *Perspectives on genetically modified plants*; *Understanding the*

*functions of plant structure*). The teaching faculty will present initial foundational material and assemble a list of assigned papers in the topic area. Each week one or two students will present background material and lead a discussion on a current article from the peer-reviewed literature or other relevant source material. This course will be an active, participatory learning experience rather than a passive speaker-of-the-week seminar. The course will expose students to a challenging small-group experience involving extensive interaction with faculty. Because the topic will change each offering, this course may be taken more than once for credit. The course's projected learning outcomes are that students will: 1) acquire depth of knowledge in a specific sub-discipline; 2) develop skills in oral presentation of plant biology research; and 3) have advanced skills and confidence in critical scientific analysis.

## **7. Collaborations / Partnerships**

This proposed option represents the culmination of discussions that have taken place over a one year time span between faculty in four departments: Agronomy, Botany, Horticulture, and Plant Pathology. We see this proposal as a collective effort for the benefit of students interested in plant science on the UW-Madison campus. Our working group has a strong shared vision for the success of this option.

## **7. Demand / Enrollment Projections**

The Biology Major has approximately 1,500 students. Currently, there are two options open to those students within the major: neurobiology and evolutionary biology. The former serves about 200 students and the latter about 40. We would anticipate demand of about 75-100 students initially, and feel we have capacity to handle up to 200 students in this option without additional resources.

## **8. Advising in the Plant Biology Option**

All students within the Biology Major are assigned to a professional staff advisor upon declaring their major. Students in the Plant Biology Option will also be assigned a faculty advisor in an area of plant science that suits their interests (by the Plant Biology Chair who serves on the Biology Major Program Committee). The Plant Biology Option Working Group feels that faculty advising in this option would help the Biology Major by identifying faculty with specific interests in plant science and matching them with students in the option. While this may also draw new advisors to the Biology Major, its larger value to the campus would be a better fit between student and faculty member with regard to disciplinary interests. In some plant science-based majors on campus, there appears to be capacity to add undergraduate advising responsibilities for some faculty, a number of whom have not been advisors in the Biology Major. In addition, because faculty advising includes career counseling, internship advice and placement, and assistance with independent study opportunities, our group feels that faculty advising in the Plant Biology Option could offer a high quality experience for undergraduate students. There was a strong sentiment among the members of the Plant Biology Option Working Group that

plant scientists on campus would be more than happy to advise students seeking this option within the Biology Major.

## **9. List of Faculty**

AGRONOMY: Albrecht, J. Ane, Casler, Conley, Davis, de Leon, Duke, Henson, Jackson, Jahn, S. Kaeppler, H. Kaeppler, Kucharik, Lauer, Renz, Stoltenberg, Tracy, Undersander BOTANY: C. Ane, Baum, Cameron, Emshwiller, Fernandez, Gilroy, Givnish, Graham, Hotchkiss, Larget, Maeda, McCulloh, Otegui, Spalding, Sytsma, Waller, Zedler, HORTICULTURE: Bamberg, Bethke, Bussan, Colquhoun, Dawson, Endelman, Goldman, Harbut, Havey, Jansky, Jiang, Jull, Krysan, Nienhuis, Palta, Patterson, Simon, Spooner, Weng, Yandell, Zalapa PLANT PATHOLOGY: Ahlquist, Allen, Barak, Bent, Charkowski, Clayton, Gevens, Kabbage, Macguidwin, McManus, Rakotondrafara, Rouse, Smith.

Faculty in all four departments may advise students in this option and may obtain consultation on this option with their departmental representative to the Plant Biology Option governance committee.

## **10. Financial Support and Budget Implications**

We propose to support this option with existing faculty and staff resources up to approximately 200 students. We are offering to do additional advising to support this option and to teach a new course for students in the option. We are not asking for any additional course release or resources to perform these functions. The students in the option will already be Biology Majors and will be supported in the same fashion as other students in the major.

## **11. Overlap with Other Programs**

A student pursuing a Bachelor of Science with a major in one of our four departments could obtain a similar set of courses as a student pursuing the proposed option. However, for three of our departments, most of our undergraduate majors would be completing coursework that is not as strongly oriented toward basic-science as that which is proposed for this option. This option represents a new pathway toward a plant science education at UW-Madison; one that is nested within the Biology Major and its attendant rigor, but with a specialized track that allows students to pursue more focused studies in plant science and to become acquainted with faculty in this field of science. Despite its distinct nature, double majors in one of our departmental majors and in the Biology major with this option will not be allowed.

## **12. Assessment and Program Review Plan**

The proposed option will largely make use of the assessment tools provided by the Provost's Office and described in the UW-Madison Assessment Manual. In particular, we

will use the capstone experience and the seminar experience as ways to assess student learning in detail. In the seminar course, we will examine the 1) quality of student presentations/discussions of a selected paper; 2) student performance on a summative written exercise such as an in-class or take-home essay assignment; 3) and assess student's ability to participate in each week's discussions. We will also work with instructors in courses in each of our departments to develop course-embedded assessments for critical concepts. Students completing the Plant Biology Option in the Biology Major will possess a transdisciplinary understanding of key concepts in plant science, such as photosynthesis, plant anatomy, plant physiology, nutrient uptake and cycling, and inheritance. The option is designed to ensure that students have the ability to apply plant science broadly, based on an understanding of a diversity of plant materials and plant systems at the cellular/subcellular level, the organismal level, and the ecological/systemic level. Graduates will be prepared to pursue more specialized study in any subfield of plant sciences at the graduate level, or for employment in fields that rely on knowledge of biological systems and their interactions.

We will perform exit surveys with students completing the major. Working with our two Dean's Offices, we will convene a panel of faculty to conduct an external review of the program every five years. The proposed option would also be reviewed within the context of a typical review of the Biology Major.

September 13, 2013

To: CALS and L&S Academic Planning Councils

From: Donna Fernandez, L&S Co-Chair, Heidi Goodrich-Blair, CALS Co-Chair,  
Biology Major Program

Re: Proposal to create a Plant Biology Option within the Biology Major

At its April 2013 meeting, the Biology Major Executive Committee (BMEC) reviewed and unanimously approved a proposal to create a Plant Biology Option within the Biology major. According to the new governance structure put into place with the transfer of the Biology Major to CALS and L&S, the BMEC will be replaced by the Biology Major Program Committee (BMPC) this fall. As Co-Chairs of the major, we are working to ensure a smooth transition between these two committees. We do not anticipate any immediate changes in the structure of the major or any change in the relationship between the more specialized options and the general major. The Plant Biology Option proposal, both the original version and in its current revised form, outlines a curriculum that is closely aligned with the general major. The proposed governance structure is comparable to that of the two existing options, Neurobiology and Evolution. Curriculum changes are recommended by the governance committees of the options but are subject to review and approval by the BMEC, now the BMPC. Each option elects one representative to serve on the BMPC. We welcome, and are confident the rest of the BMPC will welcome, the addition of a third option and a cadre of enthusiastic faculty advisors to the Biology Major Program.



## **SOURCE: Undergraduate Catalogue**

([http://pubs.wisc.edu/ug/ls\\_ugstudy.htm#breadth](http://pubs.wisc.edu/ug/ls_ugstudy.htm#breadth))

### **Breadth: Ways of Knowing**

At the heart of any degree in the liberal arts and sciences is an active understanding of the variety and breadth of the many scholarly approaches to knowing the world. Every student in the College of Letters and Science experiences significant exposure to three principal fields of knowledge: the arts and humanities, the social sciences, and the natural sciences. These broad fields of knowledge are not the same as the areas of depth that we call "majors." In fact, any particular major—or even a particular course within a major—might well involve more than one of these fields of knowledge. (For example, imagine a seminar on "people and the environment" that combines historical background, research on social patterns of energy use, and scientific understandings of climate.) Working together, each of these three fields of knowledge represents a particular "way of knowing" about the world around us.

Courses in the **arts and humanities** attempt to know the world through the production and analysis of artistic, literary, and scholarly work. Some courses examine the fine and performing arts, or literature, presenting students with opportunities to interpret and think critically about these creative expressions of the human condition. Other courses help students to understand and compare religious and philosophical conceptions of humankind. Still other courses take on historical subjects, focusing on moments of change and periods of continuity for the peoples and regions of the world. These courses all encourage students to analyze the range of creative and cultural artifacts, expressions, and ideas of human existence—history, literature, art, culture, folklore—and to use that information to better understand humanity and to cultivate civic and social responsibility.

Courses in the **social sciences** demonstrate ways of knowing the world through the systematic study of human society, interactions, and institutions. The social sciences explore these issues from a wide range of perspectives and research techniques, both quantitative and qualitative. Through these courses students learn how to formulate research questions and determine what techniques are best used to answer those questions—for example, exploring ideas and developing theories, conducting surveys and building models, or observing and participating in social life itself. Developing such analytical skills assists students as they approach complex problems and seek to solve them in both the workplace and the community.

Courses in the **natural sciences** involve knowing the world through scientific inquiry—assembling objective information that can be used to explain observed natural phenomena in a way that is thorough and verifiable. The natural sciences are often divided into the **physical sciences** (dealing with matter and energy, or the study of the earth, atmosphere, and oceans) and the **biological sciences** (dealing with life and living systems, like plants, animals, and environments). The natural sciences also include computational sciences (like Mathematics, Statistics, and Computer Sciences), which deal with the systematic use of mathematical abstraction, logical reasoning, and analysis to problems in the biological, physical, and other sciences. Natural science courses often contain laboratory components that allow students to gain firsthand experience in scientific research methods. By completing this requirement, science and non-science majors alike will gain an appreciation for science as a way of systematically looking at the natural world, understanding how this process can be used to inform decision-making in a wide range of political, economic, and social contexts.

Together, these broad "ways of knowing" give students a complementary set of tools for seeing, imagining, and asking questions about the world—tools that enhance creative problem solving no matter what the field. And, because twenty-first-century knowledge is not neatly compartmentalized, it is worth noting that these areas of study intersect and overlap; courses in some areas draw upon strategies used in the others. Experiences in "breadth" courses can be life-changing: we frequently hear that a course taken to fulfill a breadth requirement introduced someone to a subject that became a new major, a new way of looking at a current major, or a lifelong interest.

For more on the breadth designation for courses, see the [section on breadth](#) in the L&S section of this catalog.

## Guidance regarding BREADTH DESIGNATIONS

Courses with breadth designation indicate to students that the course meets [university breadth requirements](#) as well as the additional [L&S breadth requirements](#). A course may be eligible for breadth if it has broad content in one of the breadth categories described below and satisfies criteria described under *at least one* of the Three Habits of the Mind (see attached document). To request a breadth designation for a course, a course change proposal must be submitted for L&S Curriculum Committee review, with a brief statement explaining why the breadth designation is appropriate. A course may only have one breadth designation, and the most appropriate may be requested from the following list:

**B**—Biological Science

**H**—Humanities

**L**—Literature

**N**—Natural Science. *Satisfies the Natural Science requirement but not the Biological or Physical Science requirement.*

**P**—Physical Science

**S**—Social Science

**W**—Either Social Science or Natural Science\*

**X**—Either Humanities or Natural Science\*

**Y**—Either Biological Science or Social Science\*

**Z**—Either Humanities or Social Science\*

**PURPOSE:** The goal of the descriptions below is to provide guidance and assist faculty and staff in determining whether a given course might be eligible for breadth designation in Liberal Arts and Science. This document is not intended to be prescriptive in terms of learning objectives, but rather, it is meant to convey the values and goals that are consistent with a Liberal Arts and Science perspective.

\*Please note that the four interdivisional breadth designations are reserved for those rare courses that will always meet *both* types of breadth represented, such that a student may appropriately be awarded credit for having completed either requirement.

### **THE ARTS & HUMANITIES** (Breadth designations H, L, or X)

Courses in the Arts and Humanities all share the pursuit of understanding and communicating the exploration of the human experience, and the meaning of historical and cultural phenomena, whether through creative expression, reflection, or interpretation. Students are required to take a Literature courses (L) as part of their Humanities requirement. Courses with L designation may meet literature requirements or the broader Humanities breadth requirements.

Ideally, after completing an Arts & Humanities course, a student should be able to:

- comprehend, and employ various approaches to interpreting and creating cultural artifacts such as works of art, literature, music, architecture, philosophy, film, etc.
- demonstrate knowledge of major movements, trends, or events in the development of world culture
- demonstrate an appreciation of the complexities of the interpretative process within a historical context
- apply critical approaches to the “texts”/works and alternative ways of considering them
- think critically about his or her own culture and the larger global community

### **SOCIAL SCIENCES** (Breadth Designations S, W, Y, or Z)

Courses in the Social Science discipline all rely upon methods of data collection (either qualitative or quantitative), data analysis, or data interpretation that characterize their factual, methodological, institutional, and theoretical inquiry into the systematic study of humans/groups and institutions/society.

Ideally, after completing a Social Science course, a student should be able to:

- think critically about their own societies and the larger global community
- demonstrate knowledge of one or more methodologies
- demonstrate knowledge of one or more theoretical approaches
- synthesize and apply social science concepts
- view issues from multiple perspectives

### **NATURAL SCIENCES**

Courses in the Natural Sciences are characterized by the systematic study of the natural and physical world, and with the use of abstraction and logical reasoning. These courses typically involve a laboratory component. As part of their overall Natural Sciences requirements, students are required to take both Biological and Physical Sciences (areas and designations described below). Courses that do not fit into those two categories, such as Computer Science, Mathematics, and Statistics, may have N, W, or Y designations.

#### **PHYSICAL SCIENCES** (Breadth designation P)

Courses in the Physical Sciences involve the systematic study of objective information about the physical world, broadly defined, and include areas of study such as Astronomy, Chemistry, Physics, Materials Science, and Earth Science (atmospheric science, oceanography). Students are required to take Physical Science credits as part of their Natural Sciences requirement. Courses with this designation may meet Physical Science requirements or the broader Natural Science breadth requirements.

#### **BIOLOGICAL SCIENCES** (Breadth designations B or Y)

Courses in the Biological Sciences all deal with the systematic study of the structure, function, growth, origin, evolution, distribution, and taxonomy of living organisms. Students are required to take Biological Science credits as part of their Natural Sciences requirement. Courses with this designation may meet Biological Science requirements or the broader Natural Science breadth requirements.

Ideally, after completing a Physical Science or Biological Science course, a student should be able to:

- demonstrate knowledge of scientific concepts and assumptions
- analyze and interpret scientific evidence
- demonstrate knowledge of the scientific method
- demonstrate understanding of scientific reasoning, and determine when scientific information supports a given conclusion.
- think critically about the impact of scientific discovery on society

## **Criteria for Liberal Arts and Science Courses**

*Approved by L&S Curriculum Committee December 5, 2005*

Courses requested for Liberal Arts and Science (LAS) credit should encourage students in one or more of the three “habits of the mind” of liberal arts education, as specified by the College of Letters and Science. These include:

1. Skilled written and verbal communication, excelling in formulating and expressing a point of view, reflecting and questioning current knowledge through reading, research and consideration of the views of others.

This criterion includes:

- a. fluency in reading, writing, and oral communication
  - b. ability to understand and use prose, analyze documents
  - c. ability to use quantitative information to understand, develop and respond to arguments
  - d. critical and reflective quantitative, reading, and communication skills
  - e. reasoned, well-organized, and sustained discussions of important issues or questions, including the ability to explain and evaluate different or opposing perspectives evenhandedly and dispassionately
2. The ability to draw flexibly upon and apply the modes of thought of the major areas of knowledge.

This criterion includes:

- a. understanding and application of the fundamental theory, methods of inquiry, and patterns of reasoning that characterize fields of knowledge within the arts, humanities, sciences, and social sciences, including the basic principles of logical, mathematical, and scientific reasoning
- b. recognizing and evaluating new information, integrating that information into existing frameworks of knowledge, and adapting those frameworks as necessary or appropriate, using standards of intellectual rigor or precision appropriate to different subject areas
- c. posing meaningful questions that advance knowledge and understanding
- d. analyzing arguments, evaluating the evidence supporting them, and framing reasonable and persuasive counter-arguments; similarly, constructing arguments, supporting them with relevant evidence, and anticipating likely counter-arguments
- e. connecting theory and application through analysis of research or conducting research
- f. making connections among diverse subject areas and modes of thinking
- g. applying the major areas of knowledge to the solution of individual and community problems

3. Knowledge of our basic cultural heritage as a multifaceted and often contested history.

This criterion includes:

- a. the ability to place key decisions and developments in broader social, cultural, and historical context
- b. self-critical appreciation of cultural and personal values.

Proposed courses, including those designed to convey technical skills or specialized pre-professional training, must have extensive coverage of these aspects of the liberal arts and sciences. Although no single course will cover all of these aspects, the Curriculum Committee will look for evidence that liberal arts aspects are woven throughout a course. Course design must clearly encourage and emphasize analytical, conceptual, and creative thinking. Liberal arts learning should be heavily represented in the course objectives, list of topics covered, requirements, and assessment. The syllabus must indicate in detail how and where the liberal arts aspects of the course are integrated into the course and specify how the assessment of students incorporates the liberal arts features of the course.

**CALS Curriculum Committee Meeting Minutes**  
**Tuesday, September 24, 2013**

Present: Jackson, Barak, Bland, Brown, Kloppenberg, Smith, Steele, Van Eyck, Pfatteicher, Gonsiska, Gisler, Sottile

Absent: Skop

Meeting called to order at 12:02pm

**MINUTES**

- September 10, 2013 Minutes
  - Approved by Steele; seconded by Van Eyck

**BUSINESS**

- Certificate in Business Management
  - 18 credits – 12 required and 6 electives
  - CALS students only
  - Letter of support from 7 schools, but not yet from the Business School
  - Desire for the certificate comes from Board of Visitors and as a result of the change in curriculum in 2010
  - Discussion:
    - Goal is to provide feedback to APC
    - Concerned about the number of required credits for students on 4-year plans. Perhaps greater flexibility should be considered.
    - Business school wants to keep seats open for CALS students in 310 and 311
    - Are 310 and 311 only open to Juniors?
    - What about this certificate is specific to CALS students? Is the goal to offer business aptitude within CALS?
- STS 201
  - Change in description and pre-requisites, Elementary to Intermediate level, and need prior college-level work in social studies or sciences or approval from the instructor
  - Changes align well with teaching the course with LSC 251
  - Motion to approve by Van Eyck; seconded by Bland – passed
  - Discussion:
    - If it's just an STS change, our interest is marginal
    - Opens greater opportunities for LSC students
- LSC 350
  - Change in pre-requisites, sophomore standing, open to all majors, designation to "Z," and Intermediate level
  - Changes would be retroactive for 2012-2013
  - Motion to approve by Van Eyck; seconded by Steele – passed
- F&W ECOL 515
  - Change in title to "Natural Resource Policy" because "renewable" has a connotation to energy, pre-requisites, and switch from biological science to social science fulfillment of breadth requirement
  - Motion to approve by Bland; seconded by Kloppenberg – passed
- SURG SCI 548

- Change description
- Motion to approve by Barak; seconded by Steele – passed
- Discussion:
  - Typo in proposal and will be communicated to proposer by Gonsiska
  - Conciseness no longer an issue with position descriptions given the new web-based catalog
- HORT 334 & 335
  - Change in the title, which would affect the lecture (334) and lab (335), because they grow more than ornamental plants now. Description will change to reflect this.
  - Motion to approve by Bland; seconded by Barak – passed
- MICROBIO 656
  - New course
  - Motion to not approve in present form, but to have proposer review and reconsider points mentioned in discussion. Motioned by Barak; seconded by Brown – passed. Gonsiska to be in contact with the proposer.
  - Discussion:
    - Submitter should perhaps research and articulate the relationship to other programs
    - Would not likely be able to handle more than 20 students, given the lab
    - Friendly suggestion could be made to review the grading scale
- AN SCI 444
  - Summer course of 12 students doing in vitro fertilization
  - Has already been taught before, so not a new course
  - Motion to approve with friendly feedback about grading scale by Barak; seconded by Bland – passed
- POP HLTH 845
  - Change to pre-requisites to state graduate level of microeconomics or econometrics
  - Has been taught before, but not as special topics
  - No signature from School of Medicine and Public Health
  - Motion to approve pending signature by Van Eyck; seconded by Steele – passed
  - Discussion:
    - AAE has signed off on it, which is our only investment

**AUTOMATIC CONSENT**

- COMP BIO 404
  - Has been taught since 2010 with no intention to teach in the future

Meeting adjourned 1:17pm