COLLEGE OF AGRICULTURAL & LIFE SCIENCES
University of Wisconsin-Madison

These requirements were last reviewed by the CALS Curriculum Committee in 2010-11 and must undergo their next review by 2014-15.

Curriculum Sheet
Bachelor of Science Degree
Biology Major

CALS Graduation Eligibility Requirements

_____Minimum of 120 degree credits
_____Minimum 2.0 Cumulative GPA
_____Last 30 Credits in Residence

UW Requirements

Courses may not double count within university requirements, but courses counted toward university requirements may also be used to satisfy a college requirement &/or a major requirement.

_____Communication Part A (2-3 cr.) Designated "a" in the Course Guide.
_____Communication Part B (2-3 cr.) Designated "b" in the Course Guide.
_____Quantitative Reasoning Part A (3 cr.) Designated "q" in the Course Guide.
_____Quantitative Reasoning Part B (3 cr.) Designated "r" in the Course Guide.

_____Ethnic Studies (3 cr.) Designated "e" in the Course Guide.
_____Humanities/Literature/Arts (6 cr.) Designated H, L, X, or Z in the Course Guide.
_____Social Sciences (3 cr.) Designated S, W, Y, or Z in the Course Guide.

CALS Requirements

Courses may not double count within college requirements, but courses counted toward college requirements may also be used to satisfy a university requirement &/or a major requirement.

_____First-Year Seminar (1 cr.) See DARS or
http://www.newstudent.wisc.edu/practices/CALS.php for full list.
Students who transfer into CALS after freshman year and continuing students who move to the B.S. degree should consult with Undergrad Programs & Services (116 Ag Hall) regarding completion of this requirement.

_____International Studies (3 cr.) List of eligible International Studies courses can be found at:
http://www.cals.wisc.edu/academics/curriculum-information/cals-international-studies-courses/
Must complete 3 credits of International Studies coursework.

_____Physical Science Fundamentals (3 cr.) Must complete one General Chemistry course from the following list: CHEM 103, 108, 109. Consult major requirements prior to selecting.
_____Biological Science (5 cr.) Designated B or Y in the Course Guide.
_____Additional Science (3 cr.) Designated B, P, N, W, X, or Y in the Course Guide.
_____Science Breadth (3 cr.) Designated B, P, N, S, W, X, or Y in the Course Guide.

Possible Overlaps Between UW, CALS, & Major Requirements

Communication Part B
Quantitative Reasoning Part B
Physical Science Fundamentals
Biological Science
Additional Science
Science Breadth

Biology Major Requirements

Courses may not double count within the major (unless specifically noted otherwise), but courses counted toward the major requirements may also be used to satisfy a university requirement &/or a college requirement. A minimum of 15 credits must be completed in the major that are not used elsewhere.

Mathematics and Statistics

This major requires calculus. Prerequisites may need to be taken before enrollment in calculus. Refer to the Course Guide for information about calculus prereqs.

_____MATH 221 (r) or MATH 171 (q) and 217 (r)

Biology and Neurobiology Options:
_____One course required from: MATH 222 (r), STAT 301 (r), 371 (r), or 541 (r)

Evolutionary Biology Option:
_____One course required from: STAT 301 (r), 371 (r), or 541 (r)

Plant Biology Option:
_____One course required from: MATH 222 (r), STAT 301 (r), STAT 371 (*r) recommended*

Chemistry
_____CHEM 103 (P) and 104 (P) or CHEM 109 (P)
_____CHEM 343 (P) and 344 (P) and 345 (P)

Physics
_____PHYSICS 103 (r, P), 201 (r, P), or 207 (r, P)
_____PHYSICS 104 (P), 202 (P), or 208 (P)

Required: 31 credits from the rest of the requirements below (Biology, Foundational Courses, Capstone and the Biology Major, Biology Major with Neurobiology Option, Biology Major with Evolutionary Biology Option, Biology Major with Plant Biology Option)

Introductory Biology
_____One of the following sequences:
A) BIOCORE 301 (381, effective Spr. 2014) (B), 303 (383, effective Spr. 2014) (B) 323 (485, effective Spr. 2014) (B), 333 (587, effective Spr. 2014) (B) and two of the following labs:
BIOCORE 302 (382, effective Spr. 2014) (b, B), 304 (384, effective Spr. 2014) (b, B), or 324 (486, effective Spr. 2014) (B)
B) BIOLOGY/BOTANY/ZOOLOGY 151 (B) and 152 (b, B), plus one foundational course
C) *Recommended* BOTANY 130 (B) and ZOOLOGY 101 (B) and 102 (B), plus one foundational course

For AP Biology policy, as it applies to Introductory Biology in the Biology Major visit:
http://www.biology.wisc.edu/Academic_Programs/Biology/Student_Resources/AP_Biology_Pol

icy.asp

Foundational Courses (not required for students completing BIOCORE)
Biology and Neurobiology Options:
_____One course required from: AGRONOMY 338 (B), BOTANY/GENETICS/ZOOLOGY 466 (B), MICROBIO 470 (B), BIOCHEM 501 (P), BMOLCHEM 503 (B)

Evolutionary Biology Option:
_____BOTANY/GENETICS/ZOOLOGY 466 (B) is required

Plant Biology Option:
_____One course required from: AGRONOMY 338 (B), BOTANY/GENETICS/ZOOLOGY 466 (B), or BIOCHEM 501 (P)

(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.)

Complete one of the Biology Major Options (see below for requirements)
_____One of the following tracks:
A) Biology Major: No option
B) Biology Major: Evolutionary Biology Option
C) Biology Major: Neurobiology Option
D) Biology Major: Plant Biology Option

Capstone
_____2 credits minimum required. With advisor approval, directed study or research-based senior thesis in a biological science discipline can count. The experience must be completed after the first year of an introductory biology sequence above. Also, a subset of laboratory courses has been approved for capstone. For additional information on capstone requirements or to view the approved course list, visit:
http://www.biology.wisc.edu/Academic_Programs/Biology/Student_Resources/Capstone.asp

A: Biology Major
_____Minimum of 13 credits required below. One course must be taken from a. Cellular and Subcellular Biology or b. Organismal Biology; one course from c. Ecology or d. Evolution and Systematics; and at least one other course from any other unused subset. See the Biology website for the specific courses that fulfill these requirements:
http://www.biology.wisc.edu/Academic_Programs/Biology/Requirements/Curriculum.asp

____ a. Cellular and Subcellular Biology OR b. Organismal Biology
____ c. Ecology OR d. Evolution and Systematics
____ An unused category from a-d or:
e. Applied Biology, Agriculture and Natural Resources

___A course(s) from above must include a lab/field component totaling at least 3 hours/week.

B. Biology Major with Evolutionary Biology Option
_____BIOLOGY 675: Undergraduate Evolutionary Biology Seminar

_____ Minimum 13 credits and a minimum of four courses required: Evolutionary Biology 410; one course from a. Cellular and Subcellular Biology or b. Organismal Biology; one course from c. Ecology; and one course from d. Evolution and Systematics. See the Biology website for the specific courses that fulfill these requirements:
http://www.biology.wisc.edu/Academic_Programs/Biology/Evolution/index.asp

____ANTHRO/BOTANY/ZOOLOGY 410 (B): Evolutionary Biology
____ a. Cellular and Subcellular Biology OR b. Organismal Biology
____ c. Ecology (Botany/Zoology 460 is recommended).
____ d. Evolution and Systematics

___A course(s) from above, or from list e. Applied Biology, Agriculture and Natural Resources, must include a lab/field component totaling at least 3 hours/week.

C. Biology Major with Neurobiology Option
_____ NEUROSCI 500 (B): Undergraduate Neurobiology Seminar

_____Minimum 13 credits and a minimum of five courses required: Neurobiology 523; Neurobiology 524; one course from Neurobiology a. Cellular and Molecular Neurobiology; one course from Neurobiology b. Systems Neurobiology; and one course from c. Ecology or d. Evolution and Systematics. See the Biology website for the specific courses that fulfill these requirements:
http://www.biology.wisc.edu/Academic_Programs/Biology/Neurobiology/index.asp

____NEUROSCI/PSYCH/ZOOLOGY 523 (B): Evolutionary Biology
____ NEUROSCI/PSYCH/ZOOLOGY 524 (B): Evolutionary Biology
____ a. Neurobiology Option-Cellular and Molecular Neurobiology
____ b. Neurobiology Option - Systems Neurobiology
____ c. Ecology OR d. Evolution and Systematics

___A course(s) from above, or lists e. Applied Biology, Agriculture and Natural Resources or f. Other Lab Courses, must include a lab/field component totaling at least 3 hours/week.

D. Biology Major with Plant Biology Option

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 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 Biotechnolc
Agronomy/ Botany/ Hort	339	4	3	Plant Biotechnology Principles Techniques I
Agronomy/ Botany/ Hort	340	4	3	Plant Biotechnology Principles Techniques II
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: Molecul Ecological Aspects *

b. Organismal Biology

Botany	300	4	4	Plant Anatomy
Pl Path	300	4	3	Introduction to Plant Pathology *
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

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 E *

d. Evolution and Systematics

Department	Number	Credits	Lab hours/week	Course Title
Anthro/ Botany/ Zoology	410	3	-	Evolutionary Biology
Botany	400	4	3	Plant Systematics
Botany	401	4	4	Vascular Flora of Wisco
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 *
Botany/ Genetics/ Med Genet	629	3	-	Evolutionary Genetics
Genetics	620	1	-	Population and Quantitative Genet

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

					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.

Log of Changes

12/20/2013: Sueryan updated international courses link to web site