***Twin Cities Campus***

# Plant Biology B.S.

*Plant and Microbial Biology*

**College of Biological Sciences**

- Program Type: Baccalaureate
- Requirements for this program are current for Spring 2012
- Required credits to graduate with this degree: 120
- Required credits within the major: 73 to 87
- Degree: Bachelor of Science

Plant biologists study all aspects of biology as they pertain to plants or fungi and make important contributions to analyzing and preserving biodiversity worldwide. They work to enhance the nutritional value of crops as well as their resistance to disease, pests, and drought while working to reduce the need for pesticides, fertilizer, and irrigation.

Current faculty research interests include genomics, gene expression, chromosome structure, plant growth substances, signal transduction, plant responses to stress, the plant cytoskeleton and cell morphogenesis, metabolic activities during development, cellular structure and ultrastructure of vascular and nonvascular plants, aquatic biology, lichenology, molecular evolution and systematics, fungal/plant interactions, biological rhythms, and fungal diversity.

Plant biology majors follow one of two tracks. One track fits the needs of students who are primarily interested in environmental biology, evolution, or other aspects of whole organisms; the other track is appropriate for students interested in molecular, cellular, and development biology. All plant biology majors are guaranteed experience in a research laboratory as long as they show satisfactory progress toward their degree and make arrangements by the middle of their junior year.

## Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

## Admission Requirements

Freshmen  students are usually admitted to pre-major status before admission to this major

A GPA above 2.0 is preferred for the following:

- 2.50 transferring from another University of Minnesota college
- 2.50 transferring from outside the University

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

## General Requirements

All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.Required courses for the major or minor in which a student receives a D grade (with or without plus or minus) do not count toward the major or minor (including transfer courses).

## Program Requirements

**Chemistry**

**Chemical Principles I**

CHEM 1021 *{Inactive}*[PHYS] (4.0 cr)

**Chemical Principles II**

CHEM 1022 *{Inactive}*[PHYS] (4.0 cr)

**Additional Chemistry**

BIOC 2331 *{Inactive}*(3.0 cr)

*or* CHEM 2301 - Organic Chemistry I (3.0 cr)

CHEM 2302 - Organic Chemistry II (3.0 cr)

CHEM 2311 - Organic Lab (4.0 cr)

*or* BIOC 4025W - Laboratory in Biochemistry [WI] (2.0 cr)

**Quantitative Requirement**

**Quantitative I**

MATH 1271 - Calculus I [MATH] (4.0 cr)

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**Quantitative II**
Take exactly 1 course(s) from the following:
- BIOL 3272 - Applied Biostatistics (4.0 cr)
- MATH 1272 - Calculus II (4.0 cr)
- STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)
- CSCI 3003 - Introduction to Computing in Biology (3.0 cr)

**Physics**
PHYS 1201W *{Inactive}*[PHYS, WI] (5.0 cr)
*or* PHYS 1301W - Introductory Physics for Science and Engineering I [PHYS, WI] (4.0 cr)
PHYS 1202W *{Inactive}*[PHYS, WI] (5.0 cr)
*or* PHYS 1302W - Introductory Physics for Science and Engineering II [PHYS, WI] (4.0 cr)

**General Biology**
BIOL 2002 *{Inactive}*[BIOL] (6.0 cr)
*or* BIOL 2002H *{Inactive}*[BIOL] (6.0 cr)
BIOL 2003 - Foundations of Biology for Biological Sciences Majors, Part II (3.0 cr)
*or* BIOL 2003H - Foundations of Biology for Biological Sciences Majors, Part II (3.0 cr)
BIOL 3004 - Foundations of Biology for Biological Sciences Majors, Part II Laboratory (3.0 cr)
*or* BIOL 3004H *{Inactive}*(3.0 cr)

**General Plant Biology**
PMB 3007W - Plant, Algal, and Fungal Diversity and Adaptation [WI] (4.0 cr)
*or* PMB 3002 - Plant Biology: Function (2.0 cr)
*with* PMB 3005W - Plant Function Laboratory [WI] (2.0 cr)

**Biology Core**
BIOC 3021 - Biochemistry (3.0 cr)
*or* BIOC 4331 - Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems (4.0 cr)
BIOL 3407 *{Inactive}*(3.0 cr)
*or* BIOL 3408W *{Inactive}*[WI] (3.0 cr)
*or* EEB 3807 - Ecology (4.0 cr)
*or* BIOL 3409 *{Inactive}*(3.0 cr)
BIOL 4003 - Genetics (3.0 cr)
BIOL 4004 - Cell Biology (3.0 cr)

**Plant Biology Major Electives**
One course must be completed from Group A and Group B. Courses from Group C may be used if additional credits are needed to reach 11 total credits. Other Group C electives can be approved by the director of undergraduate studies or a faculty mentor. Approval must be sent to CBS Student Services.
Take 11 or more credit(s) from the following:
**Group A: Organismal Biology**
Take 1 or more course(s) from the following:
- FNRM 3104 - Forest Ecology (4.0 cr)
- EEB 4068 - Plant Physiological Ecology (3.0 cr)
- PMB 4321 - Minnesota Flora (3.0 cr)
- PMB 4511 - Flowering Plant Diversity (3.0 cr)
- PLPA 5203 - Introduction to Fungal Biology (3.0 cr)

**•Group B: Cell Biology and Genetics**
Take 1 or more course(s) from the following:
- PMB 4601 - Topics in Plant Biochemistry (3.0 cr)
- PMB 5301 *{Inactive}*(3.0 cr)
- BIOL 5309 - Molecular Ecology And Ecological Genomics (3.0 cr)
- PMB 5412 - Plant Physiology and Development (3.0 cr)
- PMB 5514 *{Inactive}*(3.0 cr)
- PMB 4516W - Plant Cell Biology: Writing Intensive [WI] (3.0 cr)
  *or* PMB 5516 *{Inactive}*(3.0 cr)

**•Group C: Statistics, Mathematics, and Electives**
- EEB 3963 *{Inactive}*(3.0 cr)

*or* STAT 3011 - Introduction to Statistical Analysis [MATH] (4.0 cr)
*or* STAT 3021 - Introduction to Probability and Statistics (3.0 cr)

**Lab/Field Requirement**
Any course 3xxx or higher offered at the Lake Itasca Biological Station and Laboratories may be used to fulfill the Lab/Field Requirement. BIOL 3002 and 3005W or BIOL 3007W may be used for the Lab/Field Requirement if not used in the General Plant Biology area. Courses that are listed in both Major Electives Group A or B AND the Lab/Field Requirement can count in both areas.

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Take 2 or more course(s) from the following:
•BIOC 4025W - Laboratory in Biochemistry [WI] (2.0 cr)
•BIOC 4125 - Laboratory in Molecular Biology and Biotechnology (3.0 cr)
•BIOC 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•BIOC 4994 - Directed Research (1.0 - 7.0 cr)
•EEB 4068 - Plant Physiological Ecology (3.0 cr)
•EEB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•EEB 4994 - Directed Research (1.0 - 6.0 cr)
•EEB 5605 *{Inactive}*(2.0 cr)
•FNRM 3104 - Forest Ecology (4.0 cr)
•GCD 4025 - Cell Biology, Development & Regeneration Laboratory (3.0 cr)
•GCD 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•GCD 4994 - Directed Research (1.0 - 7.0 cr)
•MICB 3301 - Biology of Microorganisms (5.0 cr)
•MICB 4215 - Advanced Laboratory: Microbial Physiology and Diversity (3.0 cr)
•MICB 4225W - Advanced Laboratory: Microbial Genetics [WI] (3.0 cr)
•MICB 4235 - Advanced Laboratory: Virology, Immunology, and Microbial Genetics (3.0 cr)
•MICB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•MICB 4994 - Directed Research (1.0 - 7.0 cr)
•PMB 4321 - Minnesota Flora (3.0 cr)
•PMB 4511 - Flowering Plant Diversity (3.0 cr)
•PMB 4794W - Directed Research: Writing Intensive [WI] (3.0 - 5.0 cr)
•PMB 4994 - Directed Research (1.0 - 7.0 cr)

## Program Sub-plans

A sub-plan is not required for this program.

### Honors UHP

This is an honors sub-plan.

Students admitted to the University Honors Program (UHP) must fulfill UHP requirements in addition to degree program requirements. Honors courses used to fulfill degree program requirements will also fulfill UHP requirements.

Current departmental honors course offerings are listed at:
http://www.honors.umn.edu/academics/curriculum/dept_courses_current.html.

Honors students complete an honors thesis project in the final year, most often in conjunction with an honors thesis course, or with an honors directed studies or honors directed research course. Students select honors courses and plan for a thesis project in consultation with their UHP adviser and their departmental faculty adviser.

BIOL 2960H and 3960H are strongly recommended for CBS sophomores and juniors, respectively. Directed Research is the basis for an honors thesis completed in conjunction with BIOL 4960H.

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