

# B.S. Degree Handbook 2023-2024

## Top 5

Global University for  
Agricultural Sciences



Employment

Internships

Instruction

UMassAmherst

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Stockbridge School of Agriculture



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## OUR ACADEMIC MAJORS

### **Horticultural Science**

Concepts and practices vital to the preservation of natural resources in managed plant systems are stressed. This major provides students with the tools and knowledge to work in the horticultural field. Students receive scientific training in the production of herbaceous ornamentals, fruits, and vegetables. In addition, students have the option of taking business courses to complement their horticultural training or to further enhance their scientific training through more courses in basic science. The University-operated greenhouses, vegetable field, and orchard are used as laboratory spaces to provide hands-on experience related to knowledge acquired in the classroom. Successful graduates find employment in plant conservatories and arboreta as well as manage businesses, including direct-market farms, greenhouse operations, landscaping firms and nurseries, or they continue to graduate school for advanced degrees.

### **Plant and Soil Sciences**

Through theoretical and practical training, the Plant and Soil Sciences major prepares students to tackle real-world problems by integrating and applying knowledge they learn from different disciplines. This major includes rigorous training in biology and laboratory methods. Students focus their study in one of two general areas: plant science or soil science. They may also choose to focus their advanced course work in horticultural science, plant pathology, plant science and biotechnology, soil science or a related discipline. Many successful graduates work in research or applied aspects of the biotech industries, agricultural and horticultural businesses, environmental consulting arenas, and pest management. Others go on for advanced graduate training for careers in academia, business, or the public sector.

### **Sustainable Food and Farming**

The Sustainable Food and Farming major allows students who are interested in the practical, social, political and scientific issues of sustainable agriculture and food systems to seek a broad exposure to this discipline in the liberal arts tradition. Students can tailor their individual programs to prepare for careers in sustainable farming, policy, advocacy, community outreach and education in topics related to crop production, food access, and hunger issues, as well as many others. Graduates will be qualified to compete successfully for a wide array of emerging careers in the growing field of sustainable food systems.

### **Turfgrass Science and Management**

The Turfgrass Science and Management major is an applied science program that focuses on the production and maintenance of grassed areas, including home lawns, parks, golf courses and other athletic surfaces. This concentration integrates scientific theory with practical experience and covers such topics as grass and seed identification, turfgrass culture and physiology, pest control, and equipment maintenance. Students in this major have the option of selecting a business management or a science focus. Many graduates find employment in the golf course industry, while others choose to specialize in sports turf management. The lawn care industry also employs many of our graduates in jobs as varied as direct lawn maintenance, research, and sales.

## STOCKBRIDGE STUDENT LEARNING OBJECTIVES

### **Stockbridge School of Agriculture, B.S.**

- Graduates will have a strong background in those areas of fundamental and applied sciences that are relevant to the discipline of their program.
- Graduates will understand basic ecological principles pertaining to the interconnectedness of natural ecosystems and the impacts of human activities on the ecosystems that supply human society with critical goods and services.
- Graduates will understand scientific methodology and how to apply the scientific method of investigation, hypothesis generation, and testing.
- Graduates will demonstrate the ability to think clearly and creatively and to apply critical thinking skills when evaluating information.
- Graduates will possess written and oral communication skills necessary to clearly present information to professional peers, constituents, and stakeholders within their disciplinary specialty.
- Graduates will demonstrate the application of scientific principles and problem-solving skills relevant to their chosen discipline.
- Graduates will demonstrate mathematical skills sufficient to interpret and critically evaluate scientific information published for general audiences and to function efficiently and safely within the farming and green industries.
- Graduates will have the knowledge and skills to locate information (from written, web based, or other information sources), judge its efficacy and usefulness, and apply the information to management decisions.
- Graduates will demonstrate an appreciation of the value social, racial, and ethnic diversity and how differences among people are reflected in many intersecting ways from socio-economic status and religious beliefs to gender, sexual identity, disability, and veteran status.
- Graduates will understand the world's most pressing and enduring issues and appreciate how their actions affect both local and global communities.

### **Horticultural Science, B.S.**

- Students will demonstrate an understanding of basic plant and soil science principles, including a knowledge of botany and plant physiology and plant propagation principles and practices; basic principles of general soil science, soil fertility, and plant nutrient management; principles of plant pest management including plant pathology, weed science and entomology, and integrated pest management and biological control practices as applied to landscape plants.
- Students will demonstrate knowledge of horticultural practices including greenhouse and nursery operation and plant production; landscape plant materials identification and utilization, invasive plant management and desirable native plant alternatives; landscape plant installation and maintenance; sustainable energy and water use principles and technology; and compost-based growing media and non-chemical fertilizers.
- Students will demonstrate knowledge of managing a business including small business management and finance; marketing and retail sales of sustainable landscape products and services; basic principles of personnel management; and tax policy and government regulations affecting businesses and their employees.

### **Plant and Soil Sciences, B.S.**

- Graduates in Plant and Soil Sciences (P&SS) will have a foundation in basic general science adequate for successful application to graduate school, including chemistry, biology and mathematics.
- Graduates in P&SS will demonstrate knowledge of botany and plant physiology, and principles and practices of plant propagation.
- Graduates in P&SS will demonstrate an understanding of the principles of soil science, soil fertility, and plant nutrient management.
- Graduates in P&SS will know the principles of plant pest management, including plant pathology, weed science and plant-related entomology, as well as integrated pest management and biological control practices.
- Graduates in P&SS will recognize and be able to apply principles of ecology in natural and managed ecosystems.
- Graduates in P&SS will demonstrate advanced knowledge in at least one of the following areas: plant biotechnology, soil science, horticultural science and/or plant pathology.

### **Sustainable Food and Farming, B.S.**

- In Agricultural Leadership and Education, students will demonstrate critical and creative thinking skills, strong communication and leadership ability; systems thinking to understand and improve complex social and ecosystems; speaking, listening and professional as well as scientific writing skills; strategic planning and meta-analysis skills; leadership and collaboration skills through policy comprehension and application; pedagogical methods used for effective instruction; agricultural curriculum development and teacher training; comprehension of connection between sustainable food production systems for effective policy development and farmer advocacy; and developing rural and urban agriculture programs in support of food security within communities.
- In Sustainable Food Production, students will demonstrate knowledge of sustainable agricultural production systems; fruit, vegetable and grain production systems; animal husbandry practices for meat production and farm integration; ecological land and soil management for agricultural settings; comprehension of Integrated Pest Management principles and practices; strategies used for planning for food production; postharvest physiology, handling and food safety; energy needs and technology for small farms; market analysis and entrepreneurial enterprises for sustainable food production systems; and rural and urban agriculture production.
- In Agricultural Sciences, students will demonstrate a comprehension of agroecological principles; relevant understanding of botany, chemistry and soil science as it applies to agricultural systems; ecological principles and their application within agricultural systems; principles and practices of sustainability within an agriculture setting; permaculture principles and practices; relevant understanding of animal husbandry and integrated farming systems; and relevant understanding of plant physiology, nutrition, propagation and breeding.
- In Fundamentals of Agricultural Business and Non-Profit Management, students will demonstrate knowledge of management for small businesses or nonprofit organization; sustainable business management practices; financial record keeping, personnel and management systems, and market development; wholesale, retail and direct to consumer sales management and marketing strategies; working with restaurants, chefs, schools and other institutions; working with community-based coalitions & community development organizations; grassroots policy development & community change; community food systems and food security issues; acquisition of funding, grant writing and program development; and resources for beginning farmers.

## **Turfgrass Science and Management, B.S.**

- Students will demonstrate an understanding of basic plant and soil science principles including a knowledge of botany and plant physiology; principles of soil science, fertility, and plant nutrient management and their interaction; principles of pest management, including weed biology, plant pathology, and entomology as well as integrated pest management and biological control practices, in turfgrass systems.
- Students will demonstrate knowledge of sustainable turfgrass management practices including a knowledge of integrated environmental management, cultural practices and associated technologies for sustainable turf management under reduce water, nutrient, and energy input and suitability of various species and cultivars for golf, sports and lawn turf.
- Students will demonstrate knowledge of facility management including basic management principles of golf course or sports field turfgrass; basic business management and accounting for economically feasible turf management; management and interaction with employees and other stakeholders; and the ability to understand and work with individuals of diverse opinions.

## **GENERAL INFORMATION**

### **Curriculum Requirements**

The undergraduate curriculum in the Stockbridge School of Agriculture has been designed with the goal of allowing students to tailor their course work to best reflect individual academic interests and career objectives. The major encompasses a broad range of related disciplines dealing with applied biology and ecology. Specific majors include: Horticultural Science, Plant and Soil Sciences, Sustainable Food and Farming, and Turfgrass Science and Management.

Students begin their studies with introductory classes in the major and with general education courses required of all University students. These initial courses, which include biology, chemistry, ecology and mathematics, form the foundation for more advanced study in the major. The exact sequence of courses is determined by the student's selection of an area of study. Independent study and internships are available under each major providing students with the opportunity to integrate laboratory and field work into their curriculum.

All four majors share a common core of discipline areas:

- |   |   |
|---|---|
| • <b>Biological Science</b>             | two semesters of course work with labs in introductory biology, botany and/or soil science        |
| • <b>Chemistry</b>                      | one semester minimum of introductory chemistry with lab   |
| • <b>Ecosystems Studies</b>             | a course in the fundamentals of ecosystem ecology   |
| • <b>Math, Statistics and Reasoning</b> | two semesters in math, statistics and/or analytical reasoning                                     |
| • <b>Writing</b>                        | two semesters of writing: College Writing taken during the freshman year, and Junior Year Writing |



## **Independent Study and Internships**

Students are encouraged to enhance their major with an independent study research project or an internship experience. These opportunities provide students with experience and training that will be useful in career planning as well as in decision-making regarding fields of possible graduate study. Students must have attained at least sophomore status and be in good academic standing. The University allows up to 18 credits of internship to be applied towards the 120 credits required for graduation.

**Independent Study** - students wishing to complete a research project or independent learning project must select a faculty member within the major who will approve the project and provide guidance. An Independent Study form must be completed, which specifies the number of credits to be earned, a statement of objectives, planned activities, and criteria to be used for evaluation and grading. This form must be filed with the Director's Office before the project is initiated.

**Internships** - an internship is a summer or semester-long work experience that allows students to "apprentice" with professionals in their field. Internships are intended to be learning experiences, and do not necessarily provide significant monetary compensation. Instead, academic credits are earned. Students can earn 12 credits for a full time, semester long internship experience and 3 to 9 credits for a summer program. Prior to undertaking an internship, the student and his/her faculty sponsor must complete an Academic Contract (Independent Study/Practicum form), including planned activities, a statement of objectives, as well as criteria for evaluation and grading.

## **Major Requirements**

Students will complete a minimum of 30 course credits taken within the Stockbridge School of Agriculture. Specific course requirements vary by major.

## **Research Papers & Projects Assistance**

Two librarians are available to Stockbridge School of Agriculture students to provide assistance with finding reliable information for research papers and other projects. Students may contact them for an individual consultation by phone, email, skype, or in person. Please feel free to contact:

Paulina Borrego, Lederle Grad Research Center; 413-545-7891; pborrego@library.umass.edu  
Madeleine Charney, Du Bois Library; 413-577-0784; mcharney@library.umass.edu

## **UNIVERSITY REQUIREMENTS**

### **Credits**

A minimum of 120 credits must be earned, at least 45 of which must be earned in residence. Residence credits are defined as credits earned for work done while registered on the UMass Amherst campus or while enrolled in one of the University's formal exchange programs. In addition, students generally must complete their final year in residence, residence in this sense meaning continuous enrollment and regular attendance in classes conducted on the Amherst campus.

### **Grade Point Average (GPA)**

A cumulative average of at least C (2.0 GPA) overall, and a minimum C (2.0 cumulative GPA) for courses in the major.

## General Education (Gen Ed) Requirements

*Consult your Academic Requirements Report (ARR) and/or advisor for clarification*

### Analytic Reasoning

1 course 3 credits

- R2 course

### Basic Mathematics

1 course 0-3 credits

- R1 course

**OR**

- passing score on Tier I Math Exemption Exam

### Biological & Physical World

2 courses 8 credits

- BS (Biological Science) 1 course
- PS (Physical Science) 1 course

### Integrative Experience

1 course 3 credits

- IE (Integrative Experience) 1 course

### Social World

4 courses 16 credits

- AT/AL (Art/Literature) 1 course
- HS (Historical Studies) 1 course
- SB (Social & Behavioral Sciences) 1 course
- AL (Literature) **OR** 1 course
- AT (Art) **OR**
- I (Interdisciplinary) **OR**
- SB (Social & Behavioral Sciences) **OR**
- SI (Science Interdisciplinary)

Two courses within the Social World are needed to fulfill the **Social & Cultural Diversity** requirement

One course focusing on UNITED STATES diversity (designated as DU) and one course focusing on GLOBAL diversity (designated as DG)

Courses fulfilling Social and Cultural Diversity requirement are offered as joint designations with the Social World courses (i.e., ALU, ALDU, ALG, ALDG, etc.)

## General Education (Gen Ed) Requirements (cont.)

### Writing

2 courses 6 credits

- College Writing (CW) or exemption (see Writing Program)
- Junior Year Writing course within your major

### NOTE:

- Up to three courses can count for JYW, IE, and one additional Gen Ed requirement. One course from the major department can also count toward Diversity. There is no limit on Gen Ed or Diversity courses that can be counted toward major requirements.
- Interdisciplinary courses (I, IDU, IDG, SI, SIDU, SIDG) may only count toward the last Social World requirement. Additional Interdisciplinary courses may count toward the Social & Cultural Diversity requirement. No more than three I or SI courses will count toward Gen Ed and Diversity.
- Gen Ed courses cannot be taken on a pass/fail basis.
- To monitor your Gen Ed progress, regularly review your Academic Requirements Report (ARR) via SPIRE and consult with your advisor.

It is important to you plan your Gen Ed courses carefully with the help of your advisor. You want to choose subjects that interest you and that will create a unifying experience for you. You do not need to complete your Gen Ed courses at the start of your college career; plan to distribute them throughout your four years.

# HORTICULTURAL SCIENCE

Elsa Petit, Ph.D., Advisor

4-year Bachelor's Degree

CREDITS

## Core Requirements of the Major

### Biological Science

fall/spr	STOCKSCH 105	Soils (BS)	4
fall	STOCKSCH 108	Introductory Botany	4

### Chemistry

fall/spr	CHEM 111	General Chemistry-Science (PS)	4
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### Ecosystems Studies

SELECT ONE (1) OF THE FOLLOWING:

fall/spr	BIOLOGY 287	Introductory Ecology	3
fall	ENVIRSCI 101	Introduction to Environmental Science (BS)	4
spr	ENVIRSCI 214	Ecosystems, Biodiversity and Global Change	3
fall	NRC 100	Environment and Society (SI)	4

### Integrative Experience

spr	STOCKSCH 494I	Global Issues in Applied Biology	3
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### Junior Year Writing

fall/spr	NATSCI 387	CNS Junior Writing	3
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### Math, Statistics and Reasoning

SELECT COURSE(S) FROM BOTH CATEGORIES 1 & 2:

#### 1. Basic Mathematics (R1)

fall/spr	MATH 101	Precalculus Algebra with Functions & Graphs	3
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 104	Algebra, Analytic Geometry, & Trig (R1)	3

#### 2. Analytical Reasoning (R2)

fall/spr	STATISTC 111	Elementary Statistics (R2)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	STATISTC 240	Introduction to Statistics (R2)	4

**Total Core Requirements 28-32**

## Major Requirements

### Required Courses

#### Horticulture

fall/odd yrs	STOCKSCH 200	Plant Propagation	3
spr/even yrs	STOCKSCH 315	Greenhouse Management	4

## HORTICULTURAL SCIENCE

## CREDITS

### Pest Management

fall	STOCKSCH 505	General Plant Pathology	3
	<b>AND</b>	<b>AND</b>	<b>AND</b>
3 CREDITS MINIMUM IN ENTOMOLOGY:			
spr	STOCKSCH 101	Insects & Related Forms	2
fall	STOCKSCH 109	Insects of Ornamentals	3
fall	STOCKSCH 326	Insect Biology	3

### Plant Nutrition

SELECT ONE (1) OF THE FOLLOWING:

fall	STOCKSCH 530	Plant Nutrition	4
spr	STOCKSCH 580	Soil Fertility	3

### Plant Physiology

spr	STOCKSCH 384	Introduction to Plant Physiology	3
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### Restricted Electives

SELECT 15 CREDITS MINIMUM FROM COURSES LISTED BELOW

AT LEAST 6 CREDITS MUST BE AT OR ABOVE 500-LEVEL

6 CREDITS MAXIMUM MAY BE TAKEN OUTSIDE THE DEPARTMENT

COURSES CAN BE MIXED AND MATCHED ACROSS MORE THAN ONE SUBJECT AREA

CREDITS TAKEN TO SATISFY *MAJOR REQUIREMENTS* IN OTHER AREAS OF THE *CORE REQUIREMENTS FOR THE MAJOR* AND FOR OTHER *MAJOR REQUIREMENTS* **CANNOT** BE COUNTED AS RESTRICTED ELECTIVES

### Crop Physiology

fall	STOCKSCH 523	Plant Stress Physiology	3
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### Food Crops

fall/spr	STOCKSCH 120	Organic Farming and Gardening (BS)	4
fall	STOCKSCH 186	Introduction to Permaculture	3
fall	STOCKSCH 270	Sustainable Soil and Crop Management	3
fall	STOCKSCH 320	Organic Vegetable Production	3

### Greenhouse Horticulture

fall	SUSTCOMM 335	Plants in Landscape	4
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### Landscape Horticulture

fall	NRC 232	Principles of Arboriculture	3
fall	STOCKSCH 210	Retail Floral Design	3
fall	SUSTCOMM 335	Plants in Landscape	4

### Pest Management

fall	STOCKSCH 109	Insects of Ornamentals	3
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall	STOCKSCH 581	Integrated Pest Management	4
fall	STOCKSCH 587	Phyto/Bioremediation	3

## HORTICULTURAL SCIENCE

## CREDITS

### Plant Nutrition and Soils

fall	STOCKSCH 515	Microbiology of the Soil	3
fall	STOCKSCH 530	Plant Nutrition	4
fall	STOCKSCH 575	Environmental Soil Chemistry	4
spr	STOCKSCH 580	Soil Fertility	3

### Focus

SELECT **BUSINESS OR SCIENCE FOCUS**:

#### 1. Business Focus

SELECT FOUR (4) COURSES IN BUSINESS

THESE COURSES SHOULD BE DISTRIBUTED ACROSS FOUR OF THE FIVE CATEGORIES BELOW (a-e):

a. fall/spr	ACCOUNTG 221	Principles of Financial Accounting	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
spr	RES-ECON 324	Small Business Finance	3
b. fall/spr	ECON 103	Introduction to Microeconomics (SB)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	ECON 104	Introduction to Macroeconomics (SB)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	RES-ECON 102	Introduction to Resource Economics (SB)	4
c. fall/spr	HT-MGT 260	Human Resource Mgt/Hospitality Industry	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MANAGMNT 314	Human Resource Management	3
d. fall/spr	MANAGMNT 301	Principles of Management	3
e. fall/spr	MARKETNG 301	Fundamentals of Marketing	3

#### 2. Science Focus

SELECT FOUR (4) COURSES IN SCIENCE

CHOOSE ONE (1) COURSE FROM EACH OF THE FOUR CATEGORIES (a-d) BELOW:

a. fall/spr	BIOLOGY 151	Introductory Biology I (BS)	4
b. fall/spr	BIOLOGY 285	Cellular & Molecular Biology	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
spr	CHEM 250	Organic Chemistry	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	CHEM 261	Organic Chemistry	3
c. fall/spr	CHEM 112	General Chemistry-Science (PS)	4
d. fall/spr	MATH 127	Calculus for the Life and Social Sciences I (R2)	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 131	Calculus I (R2)	4

**Total Major Requirements 42-46**

## HORTICULTURAL SCIENCE

CREDITS

### SUMMARY OF REQUIREMENTS

**Total Core Requirements 28-32**

Biological Science	8
Chemistry	4
Ecosystems Studies	3-4
Integrative Experience	3
Junior Year Writing	3
Math, Statistics and Reasoning	7-10

**Total Major Requirements 46-50**

Required Courses	19-20
Restricted Electives	27-30

**Grand Total for Horticultural Science 74-82**

## PLANT AND SOIL SCIENCES

Michelle DaCosta, Ph.D., Advisor

4-year Bachelor's Degree

### Core Requirements of the Major

CREDITS

fall/spr	STOCKSCH 105	Soils (BS)	4
fall	STOCKSCH 108	Introductory Botany	4
spr	STOCKSCH 384	Introduction to Plant Physiology	3
fall	STOCKSCH 505	General Plant Pathology	3

**Total Core Requirements 14**

### Major Requirements

#### Basic Mathematics (R1)

fall/spr	MATH 101	Precalculus Algebra with Functions & Graphs	3
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 104	Algebra, Analytic Geometry, & Trig (R1)	3

#### Biological Science

fall/spr	BIOLOGY 151	Introductory Biology I (BS)	4
fall/spr	BIOLOGY 152	Introductory Biology II	3
fall/spr	BIOLOGY 285	Cellular & Molecular Biology	3
fall/spr	BIOLOGY 311	General Genetics	3

#### Chemistry

fall/spr	CHEM 111	General Chemistry-Science (PS)	4
fall/spr	CHEM 112	General Chemistry-Science (PS)	4

#### Ecosystems Studies

SELECT ONE (1) OF THE FOLLOWING SUGGESTED COURSES:

fall/spr	BIOLOGY 287	Introductory Ecology	3
fall	ENVIRSCI 101	Introduction to Environmental Science (BS)	4
spr	ENVIRSCI 214	Ecosystems, Biodiversity and Global Change	3
fall	NRC 100	Environment and Society (SI)	4
fall	STOCKSCH 490S	Soil Ecology	3
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3

#### General Science

SELECT 6 CREDITS MINIMUM FROM THE FOLLOWING SUGGESTED COURSES:

fall/spr	BIOCHEM 320	Elementary Biochemistry	3
fall/spr	CHEM 261	Organic Chemistry	3
fall/spr	CHEM 262	Organic Chemistry	3
fall/spr	MICROBIO 310	General Microbiology	3
fall/spr	MICROBIO 312	Microbiology Laboratory	3
fall/spr	PHYSICS 131/151	Introductory Physics I/General Physics I (PS)	4
fall/spr	PHYSICS 132/152	Introductory Physics II/General Physics II (PS)	4
fall/spr	STATISTC 111/240	Elementary Statistics/Intro to Statistics (R2)	4



## PLANT AND SOIL SCIENCES

## CREDITS

### Integrative Experience

spr	STOCKSCH 494I	Global Issues in Applied Biology	3
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### Junior Year Writing

fall/spr	NATSCI 387	CNS Junior Writing	3
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### Experimental Techniques Course or Independent Study

SELECT 2-4 CREDITS FROM THE FOLLOWING SUGGESTED COURSES:

fall/spr	BIOLOGY 153	Introductory Biology Lab	2
fall/spr	CHEM 269	Organic Chemistry Lab	2
spr	MICROBIO 385	BIOTECHniques Lab	3
fall/spr	NRC 585	Introduction to GIS	4

### Restricted Electives

SELECT 12 CREDITS MINIMUM AT OR ABOVE 300-LEVEL WITH 6 CREDITS MINIMUM AT 500-LEVEL COURSES MAY BE MIXED AND MATCHED ACROSS MORE THAN ONE SUBJECT AREA

#### Horticultural Science

fall	STOCKSCH 270	Sustainable Soil and Crop Management	3
fall	STOCKSCH 320	Organic Vegetable Production	3
fall	STOCKSCH 505	General Plant Pathology	3
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall	STOCKSCH 530	Plant Nutrition	4
fall	STOCKSCH 575	Environmental Soil Chemistry	4
spr	STOCKSCH 580	Soil Fertility	3

#### Plant Biotechnology

fall/spr	BIOLOGY 284	General Genetics Lab	2
spr	BIOLOGY 379H	Genomics and Bioinformatics	3
fall	BIOLOGY 383H	Gene and Genome Analysis	4
fall	STOCKSCH 530	Plant Nutrition	4
fall	STOCKSCH 587	Phyto/Bioremediation	3

#### Plant Pathology

fall/spr	MICROBIO 310	General Microbiology	3
fall/spr	MICROBIO 312	Microbiology Laboratory	3
fall	STOCKSCH 505	General Plant Pathology	3
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall	STOCKSCH 523	Plant Stress Physiology	3

#### Soil Science

fall	GEO-SCI 519	Aqueous Envrn Geochemistry	4
fall	GEO-SCI 563	Glacial Geology	4
spr	GEO-SCI 587	Hydrogeology	4
spr	NRC 568	Wetland Soils	2
fall	STOCKSCH 270	Sustainable Soil and Crop Management	3

## PLANT AND SOIL SCIENCES

## CREDITS

### Soil Science (cont.)

fall	STOCKSCH 515	Microbiology of the Soil	3
fall	STOCKSCH 575	Environmental Soil Chemistry	4
spr	STOCKSCH 580	Soil Fertility	3
spr	STOCKSCH 585	Inorganic Contaminants/Soil, Water, & Sediment	3
fall	STOCKSCH 587	Phyto/Bioremediation	3

**Total Major Requirements 53-59**

## SUMMARY OF REQUIREMENTS

**Total Core Requirements 14**

**Total Major Requirements 53-59**

Basic Mathematics	3-6
Biological Science	13
Chemistry	8
Ecosystems Studies	3-4
General Science	6
Integrative Experience	3
Junior Year Writing	3
Experimental Techniques Course or Independent Study	2-4
Restricted Electives	12

**Grand Total for Plant and Soil Sciences 67-73**

## SUSTAINABLE FOOD AND FARMING

Sarah Berquist, M.S., Advisor

4-year Bachelor's Degree

CREDITS

### Core Requirements of the Major

NOTE: some courses are offered online only (OLO).

#### Chemistry

fall/spr	CHEM 111	General Chemistry-Science (PS)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall	STOCKSCH 117	Agricultural Chemistry	3

#### Economic and Business Issues

SELECT AT LEAST ONE (1) OF THE FOLLOWING:

fall/spr	ACCOUNTG 221	Principles of Financial Accounting	3
fall/spr	MARKETNG 301	Fundamentals of Marketing	3
spr	STOCKSCH 266	Farm Management, Planning & Marketing	3
wtr (OLO)	STOCKSCH 354	Non-profit Mgt of Comm-based Frmng Prog	3

#### Environmental Issues

SELECT AT LEAST ONE (1) OF THE FOLLOWING:

fall	STOCKSCH 186	Introduction to Permaculture	3
fall	STOCKSCH 270	Sustainable Soil and Crop Management	3
smr (OLO)	STOCKSCH 378	Introductory Agroecology	3

#### Integrative Experience

fall	STOCKSCH 379	Agricultural Systems Thinking	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
spr	STOCKSCH 494I	Global Issues in Applied Biology	3

#### Junior Year Writing

fall/spr	NATSCI 387	CNS Junior Writing	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
spr	STOCKSCH 382	Professional Dev in Sustainable Food&Farming	3

#### Math, Statistics and Reasoning

SELECT COURSE(S) FROM BOTH CATEGORIES 1 & 2:

##### 1. Basic Mathematics (R1)

fall/spr	MATH 101	Precalculus Algebra with Functions & Graphs	3
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 104	Algebra, Analytic Geometry, & Trig (R1)	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 127	Calculus for the Life and Social Sciences I (R2)	3

##### 2. Analytical Reasoning (R2)

Advisor Approval Required	3
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## SUSTAINABLE FOOD AND FARMING

CREDITS

### Plant and Soil Sciences

fall/spr	STOCKSCH 105	Soils (BS)	4
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall	STOCKSCH 108	Introductory Botany	4

### Social and Community Issues

SELECT AT LEAST ONE (1) OF THE FOLLOWING:

fall	STOCKSCH 263	Agri. Leadership & Comm-based Educ	3
smr (OLO)	STOCKSCH 355	Community Food Systems	3
spr	STOCKSCH 358	Social Permaculture	3

### Sustainable Agriculture and Food Systems

fall	STOCKSCH 165	Intro to Sustainable Agri and Food Systems	3
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**Total Core Requirements 35-39**

## Electives and Practica Sustainable Agriculture & Food Systems

### 200-LEVEL ELECTIVES

SELECT 9 CREDITS MAXIMUM

fall/odd yrs	STOCKSCH 200	Plant Propagation	3
spr	STOCKSCH 209	Holistic Fruit Production	3
fall	STOCKSCH 210	Retail Floral Design	3
spr (OLO)	STOCKSCH 211	Pasture Management	3
smr&wtr (OLO)	STOCKSCH 258	Urban Agriculture	3
fall	STOCKSCH 263	Agri. Leadership & Comm-based Educ	3
spr	STOCKSCH 266	Farm Management, Planning & Marketing	3
spr	STOCKSCH 268	Small Farm Husbandry: Meat	3
fall	STOCKSCH 269	Small Farm Husbandry: Pigs & Poultry	4
fall	STOCKSCH 270	Sustainable Soil and Crop Management	3
fall (OLO)	STOCKSCH 280	Herbs, Spices and Medicinal Plants	4
smr&wtr (OLO)	STOCKSCH 281	Topics in Herbalism I	2
spr	STOCKSCH 286	Permaculture Design & Practice	3
fall	STOCKSCH 289	Forest Gardens: Perennial Agri for Eco Regen	3
spr (OLO)	STOCKSCH 290B	Cultivation of Edible Mushrooms	3
spr (OLO)	STOCKSCH 290N	Native American Food Systems	3
wtr (OLO)	STOCKSCH 297L	Intro to Food and Agricultural Law	3

### 300/400-LEVEL ELECTIVES

SELECT 6 CREDITS MINIMUM

spr/even yrs	STOCKSCH 315	Greenhouse Management	4
fall	STOCKSCH 320	Organic Vegetable Production	3
wtr (OLO)	STOCKSCH 354	Non-profit Mgt of Comm-based Farming Prog	3
fall (OLO)	STOCKSCH 365	Hydroponics	4
spr	STOCKSCH 376	Student Farm Mgt: Planning for Production	3
smr (OLO)	STOCKSCH 378	Introductory Agroecology	3

## SUSTAINABLE FOOD AND FARMING

## CREDITS

### 300/400-LEVEL ELECTIVES (cont.)

fall	STOCKSCH 379	Agricultural Systems Thinking	3
spr	STOCKSCH 384	Introduction to Plant Physiology	3
fall (OLO)	STOCKSCH 386	Sustainable Site Design & Planning	3
spr (OLO)	STOCKSCH 387	Global Food Systems	3
spr (OLO)	STOCKSCH 397FJ	Social Permaculture for Food Justice	3
spr	STOCKSCH 397R	Social Permaculture	3
fall	STOCKSCH 476	Student Farm Mgt II	3
fall	STOCKSCH 490S	Soil Ecology	3
spr	STOCKSCH 494I	Global Issues in Applied Biology	3

### 500-LEVEL ELECTIVES

#### SELECT 6 CREDITS MINIMUM

fall	STOCKSCH 505	General Plant Pathology	3
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall	STOCKSCH 515	Microbiology of the Soil	3
fall	STOCKSCH 523	Plant Stress Physiology	3
fall	STOCKSCH 530	Plant Nutrition	4
fall	STOCKSCH 575	Environmental Soil Chemistry	4
spr	STOCKSCH 580	Soil Fertility	3
fall	STOCKSCH 581	Integrated Pest Management	4
fall	STOCKSCH 587	Phyto/Bioremediation	3

### PRACTICA AND INDEPENDENT STUDY

#### SELECT 9 CREDITS MAXIMUM

fall/spr	STOCKSCH 396	Independent Study	1-6
fall/spr	STOCKSCH 496	Independent Study	1-6
fall/spr	STOCKSCH 398	Practicum	1-6
fall/spr	STOCKSCH 398D	HydroFarm Practicum	1
spr	STOCKSCH 398E	Farm Enterprise Practicum	3-6
fall/spr	STOCKSCH 398G	Greenhouse Practicum	1-9
fall/spr	STOCKSCH 496C	Teaching Assistant	2-4
fall/spr	STOCKSCH 498	Practicum	1-6
fall	STOCKSCH 498E	Farm Enterprise Practicum II	1-6

**Total Electives and Practica Requirements 30**

## SUMMARY OF REQUIREMENTS

<b>Total Core Requirements</b>	<b>35-39</b>
Chemistry	3-4
Economic and Business Issues	3
Environmental Issues	3
Integrative Experience	3
Junior Year Writing	3
Math, Statistics and Reasoning	6-9
Plant and Soil Sciences	8
Social and Community Issues	3
Sustainable Agriculture and Food Systems	3
<b>Total Electives &amp; Practica Sustainable Agriculture &amp; Food Systems</b>	<b>30</b>
200-level Electives	9
300/400-level Electives	6
500-level Electives	6
Practica and Independent Study	9
<b>Grand Total for Sustainable Food and Farming</b>	<b>65-69</b>

**TURFGRASS SCIENCE AND MANAGEMENT**

Michelle DaCosta, Ph.D., Advisor

4-year Bachelor's Degree

CREDITS

**Core Requirements of the Major****Biological Science**

fall/spr	STOCKSCH 105	Soils (BS)	4
fall	STOCKSCH 108	Introductory Botany	4

**Chemistry**

fall/spr	CHEM 111	General Chemistry-Science (PS)	4
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**Ecosystems Studies**

SELECT ONE (1) OF THE FOLLOWING:

fall/spr	BIOLOGY 287	Introductory Ecology	3
fall	ENVIRSCI 101	Introduction to Environmental Science (BS)	4
spr	ENVIRSCI 214	Ecosystems, Biodiversity and Global Change	3
fall	NRC 100	Environment and Society (SI)	4

**Integrative Experience**

spr	STOCKSCH 494I	Global Issues in Applied Biology	3
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**Junior Year Writing**

fall/spr	NATSCI 387	CNS Junior Writing	3
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**Math, Statistics and Reasoning**

SELECT COURSE(S) FROM BOTH CATEGORIES 1 &amp; 2:

**1. Basic Mathematics (R1)**

fall/spr	MATH 101	Precalculus Algebra with Functions & Graphs	3
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 104	Algebra, Analytic Geometry, & Trig (R1)	3

**2. Analytical Reasoning (R2)**

fall/spr	RES-ECON 212	Introductory Statistics/Social Sciences (R2)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	STATISTC 111	Elementary Statistics (R2)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	STATISTC 240	Introduction to Statistics (R2)	4

**Total Core Requirements 28-32**

**Major Requirements****Required Courses****Pest Management**

spr	STOCKSCH 101	Insects & Related Forms	2
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall	STOCKSCH 326	Insect Biology	3
spr	STOCKSCH 107	Turfgrass Insects	2
fall	STOCKSCH 505	General Plant Pathology	3

**Plant Nutrition**

SELECT ONE (1) OF THE FOLLOWING:

fall	STOCKSCH 530	Plant Nutrition	4
spr	STOCKSCH 580	Soil Fertility	3

**Plant Physiology**

spr	STOCKSCH 384	Introduction to Plant Physiology	3
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**Turf**

fall	STOCKSCH 230	Introductory Turfgrass Management	4
spr	STOCKSCH 275	Turfgrass Physiology & Ecology	3
spr	STOCKSCH 340	Advanced Turfgrass Management	3

**Restricted Electives**

CREDITS TAKEN TO SATISFY MAJOR REQUIREMENTS IN OTHER AREAS CANNOT BE COUNTED AS RESTRICTED ELECTIVES

SELECT 12 CREDITS MINIMUM FROM COURSES LISTED BELOW

AT LEAST 6 CREDITS AT OR ABOVE 500-LEVEL

MAXIMUM 6 CREDITS MAY BE TAKEN OUTSIDE THE MAJOR

fall/spr	BIOLOGY 311	General Genetics	3
fall	NRC 232	Principles of Arboriculture	3
fall/odd yrs	STOCKSCH 200	Plant Propagation	3
spr	STOCKSCH 234	Irrigation & Drainage	3
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall	STOCKSCH 515	Microbiology of the Soil	3
fall	STOCKSCH 523	Plant Stress Physiology	3
fall	STOCKSCH 530	Plant Nutrition	4
spr	STOCKSCH 580	Soil Fertility	3
fall	STOCKSCH 587	Phyto/Bioremediation	3
spr	STOCKSCH 597M	Topics in Turf Pathology	2-3
fall	SUSTCOMM 335	Plants in Landscape	4



# TURFGRASS SCIENCE AND MANAGEMENT

CREDITS

## Restricted Electives (cont.)

### Focus

SELECT BUSINESS OR SCIENCE FOCUS:

#### 1. Business Focus

SELECT FOUR (4) COURSES IN BUSINESS

THESE COURSES SHOULD BE DISTRIBUTED ACROSS FOUR OF THE FIVE CATEGORIES (a-e) BELOW:

a. fall/spr	ACCOUNTG 221	Principles of Financial Accounting	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
spr	RES-ECON 324	Small Business Finance	3
b. fall/spr	ECON 103	Introduction to Microeconomics (SB)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	ECON 104	Introduction to Macroeconomics (SB)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	RES-ECON 102	Introduction to Resource Economics (SB)	4
c. fall/spr	HT-MGT 260	Human Resource Mgt/Hospitality Industry	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MANAGMNT 314	Human Resource Management	3
d. fall/spr	MANAGMNT 301	Principles of Management	3
e. fall/spr	MARKETNG 301	Fundamentals of Marketing	3

#### 2. Science Focus

SELECT FOUR (4) COURSES IN SCIENCE

CHOOSE ONE (1) COURSE FROM EACH CATEGORY (a-d) BELOW:

a. fall/spr	BIOLOGY 151	Introductory Biology I (BS)	4
b. fall/spr	CHEM 112	General Chemistry-Science (PS)	4
c. spr	CHEM 250	Organic Chemistry	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	CHEM 261	Organic Chemistry	3
d. fall/spr	MATH 127	Calculus for the Life and Social Sciences I (R2)	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 131	Calculus I (R2)	4

**Total Major Requirements 47-52**

## SUMMARY OF REQUIREMENTS

**Total Core Requirements 28-32**

Biological Science	8
Chemistry	4
Ecosystems Studies	3-4
Integrative Experience	3
Junior Year Writing	3
Math, Statistics and Reasoning	7-10

**Total Major Requirements 47-52**

Required Courses	23-25
Restricted Electives	24-27

**Grand Total for Turfgrass Science and Management 75-84**

## STOCKBRIDGE SCHOOL (STOCKSCH) COURSE DESCRIPTIONS

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### STOCKSCH 100 (Gen Ed BS)

#### **Botany for Gardeners**

A holistic view of plants including ecology, plant form and function, inheritance and evolution, and the relationship between plants and human life.

4 credits/fall sem

### STOCKSCH 101

#### **Insects & Related Forms**

With lab. Introduction to insect recognition, development, damage, and control.

Seven-week course; meets first 7 weeks of the semester.

2 credits/spring sem

### STOCKSCH 104

#### **Plant Nutrients**

Functions of mineral nutrients in plants, effects of mineral deficiencies, and sources of these nutrients to prevent or alleviate deficiencies in crop production.

Seven-week course; meets first 7 weeks of the semester.

*Prerequisites: STOCKSCH 105; Stockbridge students only*

2 credits/spring sem

### STOCKSCH 105 (Gen Ed BS)

#### **Soils**

With lab. Interrelationship of soils and higher plants. Physical, chemical, and biological properties of soils. Practical approach to current problems through basic soil principles.

*Prerequisite: some knowledge of chemistry*

4 credits/both sem

### STOCKSCH 107

#### **Turfgrass Insects**

Principles and practical methods of controlling turf insect pests.

*Prerequisites: STOCKSCH 101 (may be taken concurrently); Turfgrass majors only*

2 credits/spring sem

### STOCKSCH 108

#### **Introductory Botany**

With lab. This introductory botany course covers the unique features of plants, how they function, how they are categorized, and how they fit into the ecosystem. Topics include classification of plants, analysis of cell structure and various plant tissues and organs, and study of sexual and asexual reproduction as well as structure and function of plant systems. In addition, students will develop a basic understanding of the processes of photosynthesis and cellular respiration.

4 credits/fall sem

## **STOCKSCH 109**

### **Insects of Ornamentals**

With lab. The recognition, biology, and control of major insect and mite pests attacking shade trees and woody ornamentals in the northeastern U.S. Emphasis on techniques and knowledge useful to the professional in tree care.

*Prerequisite: STOCKSCH 101*

3 credits/fall sem

## **STOCKSCH 111**

### **Introductory Plant Pathology**

With discussion. Applied introduction to plant pathology in horticultural crops. Identification, description, and management of diseases in modern horticultural production. Chemical, biological, cultural, and genetic controls and their integration.

Seven-week course; meets first 7 weeks of the semester.

*Prerequisites: STOCKSCH 108 or 100-level biology course; Stockbridge students only*

2 credits/spring sem

## **STOCKSCH 112**

### **Turfgrass Pathology Lab**

With lab. Diagnosis and management of turfgrass diseases. Diagnosis techniques and appropriate cultural, chemical, genetic, and biological management strategies.

Seven-week course; meets last seven weeks of the semester.

*Prerequisites: STOCKSCH 111; Turfgrass majors only*

2 credits/spring sem

## **STOCKSCH 117**

### **Agricultural Chemistry**

An introduction to chemical processes integral to understanding soils, agriculture and the environment, focused on basic chemistry principles as they effect carbon and nitrogen cycling, soil fertility, water contamination, organic matter and energy relations.

3 credits/fall sem

## **STOCKSCH 119**

### **Designing a Backyard Homestead**

Exploration of practical home-scale food production techniques covering kitchen essentials, season extension and food preservation techniques, carpentry skills, tool use and maintenance, as well as activities like sewing, smoking meat, fermentation and making soap and candles. Soil fertility, mini orchards, mushroom foraging, farm energy and water management, greenhouse construction and vegetable growing techniques are included. This course seeks to provide students with the knowledge necessary to live a healthy, fulfilling and sustainable lifestyle on their own homestead.

3 credits/fall sem

## **STOCKSCH 120**

### **Organic Farming and Gardening (Gen Ed BS)**

With discussion. Introduction to principles of soil fertility and crop management by organic procedures that are contrasted and evaluated against conventional chemical methods of farming.

4 credits/both sem

## **STOCKSCH 165**

### **Introduction to Sustainable Agriculture and Food Systems**

Exploration of ethical, practical and scientific aspects of agricultural sustainability, including economic, social and environmental impacts of food and farming. Uses systems thinking tools to compare industrial and ecological agriculture.

*Prerequisite: Sustainable Food and Farming majors only or consent of instructor*

3 credits/fall sem

## **STOCKSCH 170**

### **Pesticide Certification**

Independent preparation for the online state pesticide certification exam and licensure. The State Pesticide Exam Study Manual is used and available for purchase either online or at the UMass Extension Bookstore. All exam registrations, exam sessions, results, and license applications are online. For further information, please refer to:

[www.mass.gov/guides/applying-for-a-pesticide-exam-license-and-renewal-through-the-eplace-portal](http://www.mass.gov/guides/applying-for-a-pesticide-exam-license-and-renewal-through-the-eplace-portal)

*Prerequisite: consent of instructor*

1 credit/both sem

## **STOCKSCH 171**

### **Plagues, Food and People: Ecology of Food and Disease (Gen Ed BS)**

The ecology of major diseases related to food, from ergotism and the Salem Witch Trials to the Irish Potato famine to celiac disease and diabetes. How people, microbes and farming change our health and the environment.

4 credits/spring sem

## **STOCKSCH 172**

### **Plants in Our World (Gen Ed SI)**

The study of the intricate and often intimate relationship between plants and people. Focus on fundamental concepts in plant biology, including fundamental properties of life, food chains and food webs, plants as primary producers and humans as consumers. Society's historical connection to plants and how plants have made an impact on civilizations. Topics include current environmental problems that affect local and global food security and supply, alternative food sources and farming techniques supported by thought-provoking case studies, documentaries, and discussions.

4 credits/spring sem

## **STOCKSCH 186**

### **Introduction to Permaculture**

Foundation in permaculture history, ethics, principles, design process, and practical applications, rooted in the observation of natural systems. Students are trained as critical thinkers, observers, and analysts of the world(s) around them and are provided with the tools necessary for designing and inspiring positive change.

3 credits/fall sem

## **STOCKSCH 192F**

### **First Year Seminar**

An overview course designed to provide First-Year students with information, opportunities, and skills to ease their transition into college and build a successful foundation necessary to reach their educational goals.

*Prerequisite: Stockbridge freshmen only*

1 credit/fall sem

## **STOCKSCH 196**

### **Independent Study**

Independent work related to some area of the food crops and green industries.

*Prerequisite: consent of instructor*

1-6 credits/both sem

## **STOCKSCH 197S**

### **Soils Lab**

For students who have completed STOCKSCH 106, and wish to complete the lab component of STOCKSCH 105 that is required for completing the major or minor in this program.

*Prerequisites: STOCKSCH 106; consent of instructor*

1 credit/spring sem

## **STOCKSCH 198P**

### **Permaculture Gardening at UMass**

Students will learn about permaculture basics while maintaining UMass on-campus permaculture demonstration gardens.

1 credit/both sem

## **STOCKSCH 200**

### **Plant Propagation**

With lab. The basic principles and techniques for propagating plants by both sexual and asexual means, including seeds, cuttings, bulbs, and tissue culture. The hormonal and physiological factors affecting rooting, seed dormancy, grafting, budding, and layering.

*Prerequisite: STOCKSCH 108 or 100-level biology course*

3 credits/fall sem/odd years

## **STOCKSCH 209**

### **Holistic Fruit Production**

Principles and practices governing the establishment and management of fruit plantings from a holistic or systems perspective. The class will cover the four main small fruit or berry crops (strawberries, raspberries/blackberries, blueberries and grapes) and four main tree fruit crops (apples, pears, peaches and plums). Information covered will be oriented to growing conditions found in the Northeastern United States including traditional practices and innovations, organic, IPM and conventional practices.  
3 credits/spring sem

## **STOCKSCH 210**

### **Retail Floral Design**

Introductory principles and practices for designing marketable floral arrangements, including weddings and events.

*Prerequisite: Stockbridge students only*

3 credits/fall sem

## **STOCKSCH 211**

### **Pasture Management**

Potential of pasture to provide nutritional needs of livestock and the integration of well-managed pasture systems can contribute significantly to the sustainability of the farm. Major topics include a review of major forage species selection, grazing management, establishment of new pastures, and pasture renovation.

Online only (OLO) UWW class - University undergraduates contact Registrar's Office

3 credits/spring sem

## **STOCKSCH 230**

### **Introductory Turfgrass Management**

With lab. Basic principles of selecting and managing turfgrass for home lawns, parks, golf courses, and other turf areas. Topics include: climatic adaptation, grass identification, establishment practices, pest control, fertility, environmental stresses, etc.

*Prerequisites: STOCKSCH 105 and STOCKSCH 108 (may be taken concurrently)*

4 credits/fall sem

## **STOCKSCH 234**

### **Irrigation & Drainage**

Principles and management of irrigation systems for agricultural purposes (primary emphasis on golf courses and landscapes). Topics include hydraulics, water use and conservation methods, precipitation rate calculations, design and installation of irrigation systems, maintenance of irrigation system components, troubleshooting, and fiscal considerations. Drainage systems and impacts to turf environments also covered.

3 credits/spring sem

## **STOCKSCH 258**

### **Urban Agriculture**

Focus on innovative production methods and critical social, economic, and environmental dimensions of modern day urban agriculture. Scholarly articles and videos, a custom library research guide, and significant research support from the instructor provide a strong foundation for students to investigate important topics and evaluate the performance of real life urban farm systems.

Online only (OLO) UWW class

3 credits/winter sem

## **STOCKSCH 263**

### **Agricultural Leadership & Community-based Education**

Introduction to teaching methodologies, tools for leadership, and community-building strategies for community and farm-based education. Explores topics relevant to teaching food systems, agriculture, sustainability in a variety of settings including on-farm education, educational programs in non-profits or public schools.

*Prerequisite: Sustainable Food and Farming majors only or consent of instructor*

3 credits/fall sem

## **STOCKSCH 266**

### **Farm Management, Planning & Marketing**

Designed for students who foresee starting a farming operation in the future or who currently own, manage or work on a small diversified farm. The complexity of whole farm planning is covered through agricultural business planning, organizational design, decision making, leadership and management of employees, production systems and record keeping.

3 credits/spring sem

## **STOCKSCH 268**

### **Small Farm Husbandry: Cows, Sheep & Goats for Meat Production**

With discussion. A farmer's perspective on the sustainable management of cows, sheep and goats on a small farm. Focus on the planning and management of cows, sheep and goats for meat production. All aspects from breeding to marketing will be addressed.

*Prerequisite: Sustainable Food and Farming majors only or consent of instructor*

3 credits/spring sem

## **STOCKSCH 269**

### **Small Farm Husbandry: Pigs & Poultry**

With discussion. A farmer's perspective on the management, production and marketing of poultry and pigs on a small farm. This course will address the advantages of having pigs and poultry and will review basic care, processing options, regulations and marketing.

*Prerequisite: Sustainable Food and Farming majors only*

4 credits/fall sem

## **STOCKSCH 270**

### **Sustainable Soil & Crop Management**

With lab. Maintenance and enhancement of long-term productivity and sustainability of soil in food and feed production. Students will gain an integrated knowledge of soil and crop influences on cropping systems.

3 credits/fall sem

## **STOCKSCH 275**

### **Turfgrass Physiology & Ecology**

First half of the semester: an introduction to basic concepts in agricultural chemistry as related to the growth and culture of turf grasses. Second half of the semester: the overall growth and development of grasses, including such areas as soil fertility and mineral nutrition.

*Prerequisite: STOCKSCH 230; Turfgrass majors only*

3 credits/spring sem

## **STOCKSCH 280**

### **Herbs, Spices & Medicinal Plants**

With lab. Introduction to the growth, culture, and science related to the production and use of herbs, spices, and medicinal plants. Emphasis on plants used in the home; discussion of bioactivity of plant extracts. Practice in seeding, growing, oil extraction, and utilization of these plants.

Online only (OLO) UWW class - University undergraduates contact Registrar's Office

4 credits/fall sem

## **STOCKSCH 281**

### **Topics in Herbalism I**

Introduction to the broad field of herbalism through the eyes of a clinical and community herbalist, a survey course in multiple format (lecture, experiential, indoor, outdoor), topics including historical overview; comparison of major health models of allopathy and holism, introduction to diverse herbal-based health models (Western, Asian, Indigenous), in depth information on medicinal plants, plant ID, gathering/growing/preparation skills, diverse tools of an herbalist, food as medicine; ethics, politics, and legalities of herbalism.

Online only (OLO) UWW class

2 credits/summer&winter sessions

## **STOCKSCH 286**

### **Permaculture Design & Practice**

Focus on applied practice in permaculture design process and techniques. Development of a permaculture design and community engagement process.

*Prerequisites: STOCKSCH 186; Sustainable Food and Farming majors only or consent of instructor*

3 credits/spring sem



## **STOCKSCH 289**

### **Forest Gardens**

Offers students deepened understanding of forest gardens, with a focus on northeast temperate climates. Exploration of the resilience and benefits of forest systems and how we would tweak them for the creation of forest gardens.

*Prerequisite: STOCKSCH 186*

3 credits/fall sem

## **STOCKSCH 290B**

### **Cultivation of Edible Mushrooms**

Introduction to the kingdom of fungi and how we can integrate fungi into our lives. Focus on learning skills to find, identify, and cultivate mushrooms.

Online only (OLO) UWW class - University undergraduates contact Registrar's Office

3 credits/spring sem

## **STOCKSCH 290N**

### **Native American Food Systems**

Introduction to Native American Food Systems; focus on how individual tribal members and tribal governments express food sovereignty both on and off their reservations within 5 key sectors. Students will learn how plants and animals are viewed in both the spiritual and economic sense and how tribes and tribal citizens are creating sustainable food-related businesses for economic development.

Examination of organizations and individuals across the nation that are dedicated to uplifting Native American food systems.

Online only (OLO) UWW class - University undergraduates contact Registrar's Office

3 credits/spring sem

## **STOCKSCH 296**

### **Independent Study**

Sophomore-level educational project with a faculty member related to some area of the food crops or green industries.

*Prerequisite: consent of instructor*

1-6 credits/both sem

## **STOCKSCH 296T**

### **Stockbridge School Teaching Experience**

Students gain experience teaching introductory (100-200 level) courses. Students will be expected to demonstrate specific competencies related to labs and assisting students; lead review sessions; gain experience in all aspects of teaching a Stockbridge School class.

*Prerequisites: successful completion of the course and related prerequisites for the course in which the student plans to TA; consent of instructor*

1-2 credits/spring sem

## **STOCKSCH 297L**

### **Introduction to Food and Agricultural Law**

Designed to give future farmers, farm managers, and food entrepreneurs an introduction to the laws and government regulations related to food production. This course will seek to demystify how food regulations are made and enforced, and for students to better understand the interaction between food producer and government regulator. Focus on sustainable agriculture and food production, with an eye to both government regulation and government resources becoming available for small farmers.

Online only (OLO) UWW class

3 credits/winter session

## **STOCKSCH 298**

### **Practicum**

Pre-professional work experience related to some area of the food crops and green industries.

*Prerequisite: consent of instructor*

1-6 credits/both sem

## **STOCKSCH 298A**

### **Agricultural Practicum**

Description unavailable.

*Prerequisite: consent of instructor*

1-12 credits/spring sem

## **STOCKSCH 298P**

### **Permaculture Practicum**

Hands-on, in-depth experience of how to manage and implement an installation of a permaculture design.

*Prerequisite: consent of instructor*

1-6 credits/spring sem

## **STOCKSCH 315**

### **Greenhouse Management**

With lab. Introduction to the greenhouse environment and the technology used in production of greenhouse crops. Greenhouse experiments in crop production; exercises on greenhouse structures, heating and cooling, growing media, crop nutrition, photoperiod control and lighting, and crop scheduling; field trip to local greenhouses.

*Prerequisites: STOCKSCH 108 (may be taken concurrently) or 100-level biology course; Stockbridge students only or consent of instructor*

4 credits/spring sem/even years

## **STOCKSCH 320**

### **Organic Vegetable Production**

Focus on organic insect, disease, and weed control, greenhouse production and construction, irrigation practices, planting and fertility, harvesting and marketing techniques, as well as how to manage money, people and natural resources.

*Prerequisite: Sustainable Food and Farming majors only or consent of instructor*

3 credits/fall sem

## **STOCKSCH 326**

### **Insect Biology**

With optional lab and field trips. How insects solve their problems of maintenance, survival, reproduction, etc., and how entomologists apply this knowledge in managing them. Topics include insect evolution, plant and insect interactions, biodiversity and conservation of insects, behavior, and insect pest management. Emphasis on various insect models (e.g., *Drosophila*) as they relate to major research in biology.

3 credits/fall sem

## **STOCKSCH 340**

### **Advanced Turfgrass Management**

Management of environmental stress in turfgrass. Special practices in managing high-quality turfgrass areas such as golf courses, athletic fields, and ornamental areas.

*Prerequisite: STOCKSCH 275*

3 credits/spring sem

## **STOCKSCH 354**

### **Non-Profit Management of Community-based Farming Programs**

Covers the foundations of nonprofit work focused on local food systems, including how to start a nonprofit organization, planning successful programs, working with a community, grant writing, fundraising, board development, advocacy and marketing. Learn the basics of how community-based nonprofits are on the forefront of sustainable and local food initiatives across the nation.

Online only (OLO) UWW class

3 credits/winter session

## **STOCKSCH 355**

### **Community Food Systems**

Examines the movement of food from seed to table. Participants explore local and global food systems, and specific food related issues that impact health of communities. Focus on the opportunities and challenges required in making community food projects that create real lasting systems change.

Online only (OLO) UWW class

3 credits/summer

## **STOCKSCH 358**

### **Social Permaculture: Building Resilient Communities and Organizations**

Exploration of how to apply permaculture ethics and principles to a variety of social systems.

*Prerequisites: STOCKSCH 186; Sustainable Food and Farming majors only*

3 credits/spring sem

## **STOCKSCH 365**

### **Hydroponics**

Instruction in and practice on soilless culture of plants by hydroponics. Topics include plant nutrition, nutrient solutions, media, systems and techniques of hydroponics, and marketing.

Online only (OLO) UWW class - University undergraduates contact Registrar's Office

*Prerequisites: STOCKSCH 105 or STOCKSCH 120; chemistry recommended*

4 credits/fall sem

## **STOCKSCH 370**

### **Tropical Agriculture (Gen Ed BS)**

Tropical regions of the world, their environment and classification; influence of climate, population, and socio-economic conditions on agriculture; major crops and cropping systems of sub-humid tropics; introduction to dry land agriculture; importance of rainfall and irrigation on productivity; green revolution; desertification; present and future research needs of region, and state of agricultural technology.

4 credits/spring sem

## **STOCKSCH 376**

### **Student Farm Management I**

How to formulate a complete production plan for a 20 acre organic vegetable farm through the comprehension of introduced topics and activity. Topics include small farm business development, production planning for established markets, compliance with farm certifications for organic production and food safety regulations, soil health and fertility, and methods for plant production and crop maintenance.

*Prerequisites: STOCKSCH 105 and STOCKSCH 398E (taken concurrently); consent of instructor*

3 credits/spring sem

## **STOCKSCH 378**

### **Introductory Agroecology**

Overview of the ecology related to agricultural production, emphasizing crop production. Students will be introduced to ecological principles related to agricultural ecosystems, and to the ways these principles work in modern industrialized agriculture, in traditional agricultural systems, and in alternative systems such as organic agriculture.

Online only (OLO) UWW class

*Prerequisite: STOCKSCH 100 or STOCKSCH 108 or BIOLOGY 151*

3 credits/summer session

## **STOCKSCH 379**

### **Agricultural Systems Thinking**

With discussion. Systems thinking is a way of understanding complex real-world situations such as those often encountered in sustainable food and farming careers. Students will be introduced to systems tools for unraveling complexity and integrating their learning from previous courses and experience.

*Prerequisites: STOCKSCH 265; junior and senior Sustainable Food and Farming majors only or consent of instructor*

3 credits/fall sem

## **STOCKSCH 382**

### **Professional Development in Sustainable Food and Farming**

With discussion. Practice and improve writing skills while clarifying career goals and improving professional communication skills.

Satisfies the Junior Year Writing requirement for Sustainable Food and Farming majors.

*Prerequisites: ENGLWRIT 112; Sustainable Food and Farming majors only*

3 credits/spring sem

## **STOCKSCH 384**

### **Introduction to Plant Physiology**

Introduction to fundamental concepts of physiological processes governing plant growth and development, from cell to whole plant responses. Blending of concepts from traditional plant physiology and recent research advances to help provide insight on plant growth and function under various environmental conditions.

*Prerequisites: STOCKSCH 108 and CHEM 110 or CHEM 111*

3 credits/spring sem

## **STOCKSCH 386**

### **Sustainable Site Design & Planning**

Exploration into the fundamentals of sustainable landscape design with particular attention to integrating both existing and new buildings into the landscape with a view to reducing maintenance needs. Students investigate sustainable design strategies that address the ecological, water, energy and food system links between buildings and their supporting sites, as exemplified by the LEED (Leadership in Energy and Environmental Design) rating system and Sustainable Sites Initiative (SITES). Topics include: design principles and process, natural factors (e.g. topography, soils, vegetation), green roofs, green walls/vertical gardens, rainwater collection systems, native planting, edible landscapes and permaculture, sustainable forestry practices, post-industrial landscapes, and the human use of outdoor spaces. Emphasis will be placed on cost saving techniques for creating self-sustaining, low maintenance sites. Many real world examples will be discussed.

Online only (OLO) UWW class - University undergraduates contact Registrar's Office

3 credits/fall sem

## **STOCKSCH 387**

### **Global Food Systems**

Focus on social aspects of the agri-food systems as well as the political economy of food, agriculture and sustainability. Examination of the cultural, ecological and economic implications of the ways food is perceived, produced and consumed. From rural development to the controversy of GMOs, from land conservation to the politics of globalization, from local food systems to global food justice, students use interdisciplinary perspectives to comprehend, analyze and visualize improved global and local food systems.

*Prerequisite: Sustainable Food and Farming majors only*

3 credits/spring sem

## **STOCKSCH 390STB**

### **Livestock Marketing & Finance**

Opportunity to manage and organize meat sales through retail, wholesale and direct to consumer markets. Focus on understanding of pricing products, estimating yields and revenue, managing inventory in relation to sales, organization of business through Excel spreadsheets, marketing and interpersonal marketing management skills.

*Prerequisites: STOCKSCH 268 and STOCKSCH 269 or ANIMLSCI 232 and ANIMLSCI 252*

3 credits/fall sem

## **STOCKSCH 391B**

### **Turfgrass Science & Management**

Practical review of key subjects in turfgrass science and management. Specifically designed to prepare students for National Collegiate Turf Bowl competitions in the areas of golf course and sports turf management. Students from across the country participate in annual competitions to gain recognition for their university's turf programs and to network with industry professionals.

*Prerequisites: STOCKSCH 105, STOCKSCH 107, STOCKSCH 240 and STOCKSCH 275*

1 credit/fall sem

## **STOCKSCH 396**

### **Independent Study**

Upper-level project for students who have completed introductory courses in biology/botany, soils and/or entomology.

*Prerequisite: consent of instructor*

1-6 credits/both sem

## **STOCKSCH 397AL**

### **Agricultural Leadership & Community Education II**

This course will build upon STOCKSCH 263 (formerly STOCKSCH 297AL) through deepening students' understanding of teaching methodologies and community-building strategies for Sustainable Food and Farming majors.

*Prerequisite: STOCKSCH 263 (formerly STOCKSCH 297AL)*

3 credits/spring sem

## **STOCKSCH 397FJ**

### **Social Permaculture for Food Justice**

Focus on methodologies from the fields of permaculture design and social justice to enact change in the food system. Students learn tools to help them critique food system inequities, articulate goals for social change, and analyze their own power, privilege, and competencies as makers of change. Students are guided through a permaculture design process in which they create social design models to catalyze the changes they wish to see in the food system. Emphasis on maintaining personal sustainability as food justice activists and developing leadership skills.

Online only (OLO) UWW class - University undergraduates contact Registrar's Office

3 credits/spring sem

## **STOCKSCH 397R**

### **Social Permaculture: Building Resilient Communities and Organizations**

Explore how to apply permaculture ethics and principles to a variety of social systems. Focus on methods and strategies that build capacity and resilience while leading to long term systemic change.

*Prerequisite: Sustainable Food and Farming majors only*

3 credits/spring sem

## **STOCKSCH 398**

### **Practicum**

Internship or other pre-professional work experience in the field of plant and soil sciences.

*Prerequisites: course work in plant biology, soil science, and minimum two mid-level STOCKSCH courses; consent of instructor*

1-12 credits/both sem

## **STOCKSCH 398A**

### **Practicum**

Internship or other pre-professional work experience in the field of plant and soil sciences.

*Prerequisites: course work in plant biology, soil science, and minimum two mid-level STOCKSCH courses; consent of instructor*

1-12 credits/spring sem

## **STOCKSCH 398B**

### **Agricultural Practicum**

Description unavailable.

*Prerequisite: consent of instructor*

1-12 credits/both sem

## **STOCKSCH 398D**

### **HydroFarm Practicum**

The UMass HydroFarm Practicum is largely organized and run by students, who select crops, set up growing apparatus in the greenhouse, maintain it and grow the crops, then market and harvest them.

1 credit/both sem

## **STOCKSCH 398E**

### **Farm Enterprise Practicum**

Guided practicum experience providing students with practical experience in growing crops, as well as managing and marketing these crops in support of their educational goals. Students will develop, use and evaluate crop plans, including all aspects of production and marketing. Practical experience in management of soil fertility, water, and pests using IPM and organic methods.

Enrollment limited.

*Prerequisites: STOCKSCH 105 and STOCKSCH 376; juniors; consent of instructor*

3-6 credits/spring sem

## **STOCKSCH 398G**

### **Greenhouse Practicum**

Focus on greenhouse venting and temperature control, maintaining outdoor gardens, harvesting of floricultural crops, post-harvest handling of floricultural crops, fertilization, propagation (by seed, cuttings, division), greenhouse maintenance, operation of greenhouse equipment (fertilizer injector).

*Prerequisite: consent of instructor*

1-12 credits/both sem

## **STOCKSCH 398T**

### **Turf Practicum**

Internship or other pre-professional work experience in the field of turfgrass management, including but not limited to golf course management, athletic field maintenance, and professional lawn care.

*Prerequisites: STOCKSCH 230; consent of instructor*

1-12 credits/both sem

## **STOCKSCH 476**

### **Student Farm Management II: Harvesting, Marketing, and Management**

Practical application of harvesting and marketing techniques used for the sale of organic vegetable crops. Students will complete a financial analysis of the current growing season and make recommendations for the next production cycle.

*Prerequisites: STOCKSCH 376; should be taken concurrently with STOCKSCH 498E; consent of instructor*

3 credits/fall sem

## **STOCKSCH 485**

### **Sustainable Food and Farming Senior Capstone**

This course offers seniors an opportunity to study a current sustainable food and/or farming problem, review the literature related to the problem, develop management tactics and strategies to address the problem, and communicate their conclusions with others in a professional setting.

*Prerequisites: STOCKSCH 265 or STOCKSCH 379; Sustainable Food and Farming majors only*

3 credits/spring sem



## **STOCKSCH 490S**

### **Soil Ecology**

Introduction to soils as their own ecosystem. Throughout the course, students will weave together descriptions of the diversity of life found within soils, plant-soil interactions and biogeography to paint a mosaic of soil life, its complexity and global importance. Final portion of the course will address the global challenges facing soil ecosystems and the potential of the soil health movement.

*Prerequisite: STOCKSCH 105 or ENVIRSCI 364*

3 credits/fall sem

## **STOCKSCH 494I**

### **Global Issues in Applied Biology**

Course consists of three case study modules. Each module is a real-world problem that integrates knowledge from a biological, social, political, and economic perspective. The modules will mostly be about agriculture and the environment. Students are expected to transfer their knowledge from the broader General Education training into specific real-world issues.

*Prerequisites STOCKSCH 108 or BIOLOGY 151; juniors and seniors only*

3 credits/spring sem

## **STOCKSCH 496**

### **Independent Study**

Research or other independent upper-level project in plant and soil sciences.

*Prerequisites: course work in plant biology, soil science, chemistry, and minimum one upper-level STOCKSCH course; consent of instructor*

1-6 credits/both sem

## **STOCKSCH 496A**

### **Independent Study-Plant Science**

Plant science research in laboratory or greenhouse.

*Prerequisites: course work in plant biology, soil science, chemistry, and minimum one upper-level STOCKSCH course; consent of instructor*

1-6 credits/spring sem

## **STOCKSCH 496B**

### **IS-Soil Science**

Soil science research in laboratory or field setting.

*Prerequisites: course work in plant biology, soil science, chemistry, and minimum one upper-level STOCKSCH course; consent of instructor*

1-6 credits/spring sem

## **STOCKSCH 496C**

### **Teaching Assistant**

Assist with instruction/classroom preparation for Stockbridge School courses.

*Prerequisites: Independent Study Contract; FERPA certification if involved with grading; consent of instructor*

1-6 credits/both sem

## **STOCKSCH 496D**

### **Independent Study-Insect Science**

Upper-level project for students who have satisfactorily completed minimum one 500-level entomology-related class in addition to foundation course work in biology and/or entomology.

*Prerequisite: consent of instructor*

1-6 credits/spring sem

## **STOCKSCH 498**

### **Practicum**

Internship or other pre-professional work experience in the field of plant and soil sciences.

*Prerequisite: consent of instructor*

1-12 credits/both sem

## **STOCKSCH 498E**

### **Farm Enterprise Practicum II**

Continuation of STOCKSCH 398E. Students maintain crops planted in the spring semester and prepare fields for winter. Students will harvest, clean, store and market their crops.

*Prerequisites: STOCKSCH 398E; should be taken concurrently with STOCKSCH 476; consent of instructor*

1-6 credits/fall sem

## **STOCKSCH 498Y**

### **Practicum**

Description unavailable.

*Prerequisite: consent of instructor*

1-12 credits/both sem

## **STOCKSCH 505**

### **General Plant Pathology**

Students will learn to (1) recognize important categories of plant diseases, (2) diagnose the main types of pathogens (Fungi, Bacteria, Viruses and Nematodes) and (3) manage diseases sustainably. Through active learning and meeting with expert guest speakers, students will be able to identify and manage diseases in their surroundings.

*Prerequisite: STOCKSCH 108, MICROBIO 311, MICROBIO 312, and 100-level biology course or consent of instructor*

3 credits/fall sem

## **STOCKSCH 510**

### **Management and Ecology of Plant Diseases**

The ecology of plant, microbe, and human interactions in plant diseases, from wilderness to industrial farms. Epidemics, traditional farming, environmental impacts and sustainability issues. Ways in which agriculture, particularly plant production and plant disease management, change ecosystems.

*Prerequisite: STOCKSCH 108 or equivalent*

3 credits/spring sem

## **STOCKSCH 515**

### **Microbiology of the Soil**

Microbial processes in the soil and sediment environment; ecology of the various microbial communities; decomposition of organic matter, carbon transformation, nitrogen, sulfur, phosphorus and other mineral transformations. Chemistry of these reactions and their biogeochemical implications. Biological equilibrium, the rhizosphere, and microbial associations.

*Prerequisite: CHEM 250 or CHEM 261*

3 credits/fall sem

## **STOCKSCH 523**

### **Plant Stress Physiology**

Advanced course focusing on plant responses to major abiotic stresses. Current research topics in stress physiology will be discussed.

*Prerequisite: STOCKSCH 384 or BIOLOGY 510*

3 credits/fall sem

## **STOCKSCH 530**

### **Plant Nutrition**

With lab. The acquisition, translocation, distribution, and function of the essential inorganic elements in plants. Genetic control of plant nutrition and ecological adaptation to nutritional variables. Diagnosis of plant nutritional disorders.

*Prerequisites: CHEM 111, STOCKSCH 105 or STOCKSCH 117*

4 credits/fall sem

## **STOCKSCH 575**

### **Environmental Soil Chemistry**

With lab. Fundamental chemical concepts/processes in soils, such as ion exchange, precipitation/dissolution, redox reactions, partitioning and adsorption, and solution speciation and nature of soil minerals and organic matter. Examination of how chemical processes affect fate, transport, availability, and remediation of trace elements, heavy metals and organic contaminants in soils and sediments. Discussion on current environmental issues and problems.

*Prerequisites: CHEM 110 or CHEM 111 or consent of instructor; STOCKSCH 105 strongly recommended*

4 credits/fall sem

## **STOCKSCH 580**

### **Soil Fertility**

The role of mineral elements in the growth of plants; plant response to fertilizers and other soil amendments; soil reaction, mineral deficiencies and toxicities; environmental impact of soil fertility management practices.

*Prerequisites: STOCKSCH 105 and STOCKSCH 108 (or equivalents), and CHEM 110 or CHEM 111*

3 credits/spring sem

## **STOCKSCH 581**

### **Integrated Pest Management**

With lab. Theory and application of the principles of insect, disease, and weed pest management; emphasis on insects. Focus on pest and natural enemy sampling techniques, properties of available control strategies, underlying ecological and behavioral principles, model pest management systems and societal concerns.

4 credits/fall sem

## **STOCKSCH 585**

### **Inorganic Contaminants in Soil, Water, and Sediment**

Physical, chemical, and biological factors affecting the fate and transport of inorganic contaminants (including heavy metals) in soil, water and sediment. Sources, chemistry, pedogenic and geochemical behavior of these contaminants and methods used for their analysis. Risk assessment, and remediation technologies, options, and goals.

*Prerequisites: CHEM 111 and CHEM 112, knowledge of college algebra, basic soil science, and transition metal chemistry, or consent of instructor*

3 credits/spring sem

## **STOCKSCH 587**

### **Phyto/Bioremediation**

Various aspects of phytoremediation - the use of plants (both natural hyper-accumulators and transgenic) and their associated microbes with the purpose of environmental clean-up of contaminated soil, sediments and water. Various strategies for phytoremediation of a wide range of toxic pollutants, both organic and elemental, with special emphasis on toxic metals will be discussed.

*Prerequisite: STOCKSCH 108 , STOCKSCH 384, BIOLOGY 151 or BIOLOGY 152*

3 credits/fall sem

## **STOCKSCH 597M**

### **Topics in Turf Pathology**

Review and discussion of concepts and issues related with turfgrass diseases. Reading of scientific papers and trade journals required each week. Guest speakers from turfgrass industry present many of the topics and lead subsequent class discussion.

*Prerequisite: STOCKSCH 505*

2-3 credits/spring sem

## **STOCKSCH 598**

### **Practicum**

Internship or other pre-professional work experience in the field of plant and soil sciences.

*Prerequisites: course work in plant biology, soil science, and at least two mid-level STOCKSCH courses; consent of instructor*

1-6 credits/both sem

## ACADEMIC CALENDAR 2023 - 2024

### FALL 2023

September 5	Tuesday	First day of classes
September 11	Monday	Last day to ADD or DROP any class with no record
October 9	Monday	Holiday (Indigenous Peoples Day)
October 10	Tuesday	MONDAY CLASS SCHEDULE will be followed
October 31	Tuesday	Last day to DROP with 'W' and select 'P/F'
November 6	Monday	Registration begins for Spring 2024
November 11	Saturday	Holiday (Veterans' Day)
November 21	Tuesday	Thanksgiving recess begins after last class
November 27	Monday	Classes resume
December 8	Friday	Last day of classes
December 9	Saturday	Reading Day
December 11	Monday	Final examinations begin
December 15	Friday	Last day of final examinations; semester ends
December 21	Thursday	Final grades due by Midnight Number of class meetings: MTuWThF: 13

### SPRING 2024

February 1	Thursday	First day of classes
February 7	Wednesday	Last day to ADD or DROP any class with no record
February 19	Monday	Holiday (Presidents' Day)
February 22	Thursday	MONDAY CLASS SCHEDULE will be followed
March 17	Sunday	Spring recess begins
March 25	Monday	Classes resume
April 4	Thursday	Last day to DROP with 'W' and select 'P/F'
April 8	Monday	Registration begins for Fall 2024
April 12	Friday	MONDAY CLASS SCHEDULE will be followed
April 15	Monday	Holiday (Patriots' Day)
May 10	Friday	Last day of classes
May 11	Saturday	Reading Day
May 13	Monday	Final examinations begin
May 17	Friday	Last day of final examinations; semester ends
May 17	Friday	Commencement Weekend begins
May 19	Sunday	Commencement Weekend ends
May 23	Thursday	Final grades due by Midnight Number of class meetings: MTuWThF: 13