

**STOCKBRIDGE**  
**SCHOOL OF AGRICULTURE**  
UMASS AMHERST

**B.S. DEGREE**

**2020 - 2021**





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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.

## 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:

- **Biological Science** two semesters of course work with labs in introductory biology, botany and/or soil science
- **Chemistry** one semester minimum of introductory chemistry with lab
- **Ecosystems Studies** a course in the fundamentals of ecosystem ecology
- **Math, Statistics and Reasoning** two semesters in math, statistics and/or analytical reasoning
- **Writing** 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

1. Course designated R2

#### Basic Math Skills 1 course

1. Basic Math Skills (R1)

**OR**

2. Student may be exempt if sufficient score is achieved on Mathematics Placement Exam or the Basic Math Skills Exemption Exam

#### Biological and Physical World 3 courses

1. Biological Science (BS) 1 course
2. Physical Science (PS) 1 course
3. Biological Science (BS) or Physical Science (PS) 1 course

#### Integrative Experience 1 course

1. Integrative Experience (IE)

## **Interdisciplinary Option**

Substitution of up to three Interdisciplinary (I) courses for some General Education requirements. No substitutions allowed for College Writing (CW), Basic Math Skills (R1), or Analytic Reasoning (R2).

Students may substitute up to three Interdisciplinary (I) courses in the other areas subject to the restriction that all students must take at least one course in each of the following areas: Literature (AL), Historical Studies (HS), Social and Behavioral Sciences (SB), Biological Sciences (BS), and Physical Sciences (PS). An Interdisciplinary (I) course will fulfill a Diversity requirement only if it is designated ID.

## **Social World 6 courses**

Courses in the curriculum areas of Arts, Literature, Historical Studies, and Social and Behavioral Sciences. Also required are courses devoted to the study of diversity in human cultures and societies.

- |  |           |
|--|-----------|
| 1. Literature (AL)   | 1 course  |
| 2. Arts (AT) or Literature (AL)                              | 1 course  |
| 3. Historical Studies (HS)                                   | 1 course  |
| 4. Social and Behavioral Sciences (SB)                       | 2 courses |
| 5. Social World (AL, AT, HS, or SB) or Interdisciplinary (I) | 1 course  |

The diversity requirement is met by taking two courses designated as having a Social and Cultural Diversity (D) component. These may be courses which also fulfill other General Education requirements, and bear both letter designations (ALD, ATD, HSD, SBD, or ID), or one or both Diversity courses may have only a Diversity designation (D).

## **Writing 2 courses**

1. College Writing (CW) during freshman year
2. Junior Year Writing within the major

## **Notes:**

- a. Your major department:
  - only one course counts towards Gen Ed requirements
  - one additional course can fulfill a Diversity requirement
- b. Gen Ed courses cannot be taken on a Pass/Fail basis

# HORTICULTURAL SCIENCE

Dr. Amanda (Mandy) Bayer, Advisor

CREDITS

## Core Requirements of the Major

### Biological Science

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

### Chemistry

fall	CHEM 110	General Chemistry (PS)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	CHEM 111*	General Chemistry-Science (PS)	4

(\*Students selecting Science focus should complete CHEM 111)

### Ecosystems Studies

SELECT ONE OF THE FOLLOWING:

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

### Integrative Experience

spr	NATSCI 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	2
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	2
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 104	Algebra, Analytic Geometry, & Trig (R1)	3

#### 2. Analytic 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)	3

**Total Core Requirements 27-30**



## HORTICULTURAL SCIENCE

CREDITS

### Major Requirements

#### Required Courses

##### Horticulture

SELECT TWO OF THE FOLLOWING:

fall/odd yrs	STOCKSCH 200	Plant Propagation	3
fall/even yrs	STOCKSCH 315	Greenhouse Management	4
spr	STOCKSCH 335	Prin & Practices of Greenhouse Cultivation	4
fall/odd yrs	STOCKSCH 360	Landscape Plant Production	4

##### Pest Management

fall	STOCKSCH 505	General Plant Pathology	4
	<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 OF THE FOLLOWING:

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

##### Plant Physiology

SELECT ONE OF THE FOLLOWING:

spr	BIOLOGY 510	Plant Physiology	4
spr	STOCKSCH 384	Introduction to Plant Physiology	3

#### 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

spr	BIOLOGY 510	Plant Physiology	4
fall	STOCKSCH 523	Plant Stress Physiology	3
spr	STOCKSCH 545	Postharvest Biology	4
spr	STOCKSCH 550	Plant Hormones and Applied Plant Physiology	3

## HORTICULTURAL SCIENCE

## CREDITS

### Food Crops

fall/spr	STOCKSCH 120	Organic Farming and Gardening (BS)	4
fall/odd yrs	STOCKSCH 300	Deciduous Orchards Science	3
fall/even yrs	STOCKSCH 305	Small Fruit Production	3
fall	STOCKSCH 310	Principles of Weed Management	3
fall	STOCKSCH 320	Organic Vegetable Production	3
fall	STOCKSCH 350	Sustainable Soil and Crop Management	3

### Greenhouse Horticulture

spr	STOCKSCH 255	Herbaceous Plants	3
fall/even yrs	STOCKSCH 315	Greenhouse Management	4
spr	STOCKSCH 335	Prin and Practices of Greenhouse Cultivation	4
fall/odd yrs	STOCKSCH 360	Landscape Plant Production	4
fall/even yrs	STOCKSCH 397PT	Plant Trends in Landscape Horticulture	3
fall	SUSTCOMM 335	Plants in Landscape	4

### Landscape Horticulture

fall	NRC 232	Principles of Arboriculture	3
spr	STOCKSCH 255	Herbaceous Plants	3
fall	STOCKSCH 310	Principles of Weed Management	3
spr	STOCKSCH 335	Prin and Practices of Greenhouse Cultivation	4
fall/odd yrs	STOCKSCH 360	Landscape Plant Production	4
fall/even yrs	STOCKSCH 397PT	Plant Trends in Landscape Horticulture	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 587	Phyto/Bioremediation	3

### 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>
fall/spr	RES-ECON 324	Small Business Finance	3

## HORTICULTURAL SCIENCE

## CREDITS

### 1. Business Focus (cont.)

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	Introductory 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 COURSES IN SCIENCE

CHOOSE ONE 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 47-53**

## SUMMARY OF REQUIREMENTS

**Total Core Requirements 27-30**

Biological Science	8
Chemistry	4
Ecosystems Studies	3-4
Integrative Experience	3
Junior Year Writing	3
Math, Statistics and Reasoning	6-8

**Total Major Requirements 47-53**

Required Courses	20-23
Restricted Electives	27-30

**Grand Total for Horticultural Science 74-83**

## PLANT AND SOIL SCIENCES

Dr. Susan Han, Advisor

### 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	4

**Total Core Requirements 15**

### Major Requirements

#### Basic Mathematics (R1)

fall/spr	MATH 101	Precalculus Alg with Functions & Graphs	2
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	2
	<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
	<b>OR</b>	<b>OR</b>	<b>OR</b>
spr	STOCKSCH 390A	Plant Biotechnology and Tissue Culture	4
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 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
spr	STOCKSCH 390N	Ecosystem Processes	3
fall	STOCKSCH 490S	Soil Ecology	3

#### General Science

SELECT 6 CREDITS MINIMUM FROM THE FOLLOWING SUGGESTED COURSES:

fall/spr	BIOCHEM 420	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

## PLANT AND SOIL SCIENCES

## CREDITS

### General Science (cont.)

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)	4/3

### Integrative Experience

spr	NATSCI 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
spr	BIOLOGY 383H	Gene and Genome Analysis	4
fall/spr	CHEM 269	Organic Chemistry Lab	2
spr	MICROBIO 385	Introduction to Biotechnology Laboratory	4
fall/spr	NRC 585	Introduction to GIS	4
spr	STOCKSCH 390A	Plant Biotechnology and Tissue Culture	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/odd yrs	STOCKSCH 300	Deciduous Orchards Science	3
fall/even yrs	STOCKSCH 305	Small Fruit Production	3
fall	STOCKSCH 310	Principles of Weed Management	3
fall/even yrs	STOCKSCH 315	Greenhouse Management	4
fall	STOCKSCH 320	Organic Vegetable Production	3
spr	STOCKSCH 335	Prin and Practices of Greenhouse Cultivation	4
fall	STOCKSCH 350	Sustainable Soil and Crop Management	3
fall/odd yrs	STOCKSCH 360	Landscape Plant Production	4
fall	STOCKSCH 397GB	Grapevine Biology	3
fall/even yrs	STOCKSCH 397PT	Plant Trends in Landscape Horticulture	3
fall	STOCKSCH 505	General Plant Pathology	4
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall/odd yrs	STOCKSCH 525	Mycology	4
fall	STOCKSCH 530	Plant Nutrition	4
spr/odd yrs	STOCKSCH 535	Diagnostic Plant Pathology	4
spr	STOCKSCH 545	Postharvest Biology	4
spr	STOCKSCH 550	Plant Hormones and Applied Plant Physiology	3
fall/even yrs	STOCKSCH 572	Nematology	4
fall	STOCKSCH 575	Environmental Soil Chemistry	4
spr	STOCKSCH 580	Soil Fertility	3

## PLANT AND SOIL SCIENCES

			CREDITS
<b>Plant Biotechnology</b>			
fall/spr	BIOLOGY 284	General Genetics Lab	2
spr	BIOLOGY 379H	Genomics and Bioinformatics	3
spr	BIOLOGY 383H	Gene and Genome Analysis	4
spr	BIOLOGY 510	Plant Physiology	4
fall	STOCKSCH 530	Plant Nutrition	4
fall	STOCKSCH 587	Phyto/Bioremediation	3
<b>Plant Pathology</b>			
fall/spr	MICROBIO 310	General Microbiology	3
fall/spr	MICROBIO 312	Microbiology Laboratory	3
fall	STOCKSCH 505	General Plant Pathology	4
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall	STOCKSCH 523	Plant Stress Physiology	3
spr/odd yrs	STOCKSCH 535	Diagnostic Plant Pathology	4
spr	STOCKSCH 545	Postharvest Biology	4
fall/even yrs	STOCKSCH 572	Nematology	4
<b>Soil Science</b>			
fall	GEO-SCI 519	Aqueous Envrn Geochemistry	4
fall/even yrs	GEO-SCI 563	Glacial Geology	4
spr	GEO-SCI 587	Hydrogeology	4
spr	NRC 568	Wetland Soils	2
fall	STOCKSCH 350	Sustainable Soil and Crop Management	3
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, & Sedimnt	3
fall	STOCKSCH 587	Phyto/Bioremediation	3
spr	STOCKSCH 590M	Microbe-Mineral-Organic Matter/Soils	3
<b>Total Major Requirements</b>			<b>53-58</b>

## SUMMARY OF REQUIREMENTS

<b>Total Core Requirements</b>	<b>15</b>
<b>Total Major Requirements</b>	<b>53-58</b>
Basic Mathematics	3-4
Biological Science	13-14
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
<b>Grand Total for Plant and Soil Sciences</b>	<b>68-73</b>

## SUSTAINABLE FOOD AND FARMING

Professor Sarah Berquist, Advisor

CREDITS

### Core Requirements of the Major

#### Biological Science

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

#### Chemistry

fall	CHEM 110	General Chemistry (PS)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	CHEM 111	General Chemistry-Science (PS)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall	CHEM 121H	Honors General Chemistry-Science (PS)	4

#### Ecosystems Studies

SELECT ONE OF THE FOLLOWING

OTHER ECOSYSTEMS COURSES MAY BE SUBSTITUTED WITH ADVISOR APPROVAL

fall/spr	BIOLOGY 287	Introductory Ecology	3
fall	STOCKSCH 186	Introduction to Permaculture	3

#### Food/Land Policy or Agricultural Education

SELECT ONE OF THE FOLLOWING:

fall	STOCKSCH 297AL	Agricultural Leadership & Community Educ	3
fall/even yrs	STOCKSCH 356	Food Justice and Policy	3

#### Integrative Experience

spr	NATSCI 494I	Global Issues in Applied Biology	3
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall	STOCKSCH 379	Agricultural Systems Thinking	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 Alg with Functions & Graphs	2
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	2
	<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. Analytic Reasoning (R2)

Advisor Approval Required	3
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**Total Core Requirements 30-31**

## SUSTAINABLE FOOD AND FARMING

CREDITS

### Major Requirements

#### Agricultural Science and Practice

SELECT 18 CREDITS MINIMUM WITH 12 CREDITS AT OR ABOVE 200-LEVEL

spr	ANIMLSCI 103	Introductory Animal Management	4
fall	ANIMLSCI 220	Physiology & Anatomy of Domestic Animals	4
spr	STOCKSCH 101	Insects & Related Forms	2
spr	STOCKSCH 111	Introductory Plant Pathology	2
fall/spr	STOCKSCH 120	Organic Farming and Gardening (BS)	4
spr	STOCKSCH 182	Principles of Pesticide Management	2
fall	STOCKSCH 186	Introduction to Permaculture	3
spr	STOCKSCH 190P	Personal Wellness for Farmers & Gardeners	3
fall/odd yrs	STOCKSCH 200	Plant Propagation	3
spr	STOCKSCH 235	Pruning Fruit Crops	2
spr	STOCKSCH 255	Herbaceous Plants	3
spr	STOCKSCH 258	Urban Agriculture	3
fall	STOCKSCH 265	Sustainable Agriculture	3
fall	STOCKSCH 269	Small Farm Husbandry: Pigs & Poultry	3
spr	STOCKSCH 286	Permaculture Design and Practice	3
spr	STOCKSCH 290W	Organic Weed Control	3
fall	STOCKSCH 297AL	Agricultural Leadership & Community Educ	3
fall/odd yrs	STOCKSCH 300	Deciduous Orchards Science	3
fall/even yrs	STOCKSCH 305	Small Fruit Production	3
fall	STOCKSCH 310	Principles of Weed Management	3
fall/even yrs	STOCKSCH 315	Greenhouse Management	4
fall	STOCKSCH 320	Organic Vegetable Production	3
fall	STOCKSCH 326	Insect Biology	3
fall/odd yrs	STOCKSCH 355	Community Food Systems	3
fall/even yrs	STOCKSCH 356	Food Justice and Policy	3
spr	STOCKSCH 370	Tropical Agriculture	3
spr	STOCKSCH 376	Student Farm Management I	3
spr	STOCKSCH 390G	Sustainable Grape Production	3
spr	STOCKSCH 398E	Farm Enterprise Practicum	3-6
fall/spr	STOCKSCH 398G	Greenhouse Practicum	1-18
fall	STOCKSCH 476	Student Farm Management II	3
fall	STOCKSCH 498E	Farm Enterprise Practicum II	1-6
fall	STOCKSCH 505	General Plant Pathology	4
spr	STOCKSCH 510	Management and Ecology of Plant Diseases	3
fall	STOCKSCH 530	Plant Nutrition	4
spr	STOCKSCH 580	Soil Fertility	3

#### Professional Electives

COURSES MAY ALSO BE USED TO MEET GEN ED REQUIREMENTS

SELECT 18 CREDITS MINIMUM ACROSS THE THREE CATEGORIES

WITH ONE COURSE MINIMUM FROM EACH CATEGORY

COURSES MAY BE TAKEN FROM OTHER DEPARTMENTS OR FROM ONE OF  
THE OTHER FIVE COLLEGES WITH ADVISOR APPROVAL



## SUSTAINABLE FOOD AND FARMING

CREDITS

### Professional Electives (cont.)

EXAMPLES OF PRE-APPROVED COURSES ARE LISTED BELOW

OTHER COURSES MAY FULFILL THIS REQUIREMENT WITH ADVISOR APPROVAL

#### 1. Biophysical Systems

EXAMPLES

fall	BIOLOGY 421	Plant Ecology	4
	Most STOCKSCH courses		3-4

#### 2. Economic Systems

EXAMPLES

fall/spr	ECON 308	Political Economy of the Environment	3
fall/spr	ECON 366	Economic Development	3
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
fall/spr	MANAGMNT 301	Principles of Management	3
fall/spr	MARKETNG 301	Fundamentals of Marketing	3
fall/spr	RES-ECON 212	Introductory Statistics/Social Sciences (R2)	4
spr	RES-ECON 262	Environmental Economics (SB)	4
fall	RES-ECON 263	Natural Resource Economics (SB)	4
fall	RES-ECON 324	Small Business Finance	3

#### 3. Social Systems

EXAMPLES

spr	EDUC 377	Introduction to Multicultural Education	4
spr	NRC 309	Natural Resource Policy & Administration	3

12 CREDITS MAXIMUM OF RESTRICTED ELECTIVES CAN BE SATISFIED BY INTERNSHIP/PRACTICUM APPROVAL REQUIRED OF ACADEMIC ADVISOR AND DEAN OF UNDERGRADUATE AFFAIRS

fall/spr	STOCKSCH 396	Independent Study	1-6
fall/spr	STOCKSCH 398	Practicum	1-12
fall/spr	STOCKSCH 496	Independent Study	1-6
fall/spr	STOCKSCH 498	Practicum	1-12

#### Advanced Courses

SELECT TWO ADDITIONAL STOCKSCH COURSES AT OR ABOVE 500-LEVEL

6 CREDITS MINIMUM

COURSES NOT FROM STOCKSCH MUST BE APPROVED BY ADVISOR

**Total Major Requirements 42**

#### Minimum Required Credits

30 STOCKSCH CREDITS MINIMUM

## SUSTAINABLE FOOD AND FARMING

CREDITS

### SUMMARY OF REQUIREMENTS

<b>Total Core Requirements</b>	<b>30-31</b>
Biological Science	8
Chemistry	4
Ecosystems Studies	3
Food/Land Policy or Agricultural Education	3
Integrative Experience	3
Junior Year Writing	3
Math, Statistics and Reasoning	6-7
<b>Total Major Requirements</b>	<b>42</b>
Agricultural Science and Practice	18
Professional Electives	18
Advanced Courses	6
<b>Grand Total for Sustainable Food and Farming</b>	<b>72-73</b>

# TURFGRASS SCIENCE AND MANAGEMENT

CREDITS

## Core Requirements of the Major

### Biological Science

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

### Chemistry

fall	CHEM 110	General Chemistry (PS)	4
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	CHEM 111*	General Chemistry-Science (PS)	4
	<i>(*Students selecting Science focus should complete CHEM 111)</i>		

### Ecosystems Studies

SELECT ONE 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	NATSCI 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 Alg with Functions & Graphs	2
	<b>AND</b>	<b>AND</b>	<b>AND</b>
fall/spr	MATH 102	Analytic Geometry & Trigonometry (R1)	2
	<b>OR</b>	<b>OR</b>	<b>OR</b>
fall/spr	MATH 104	Algebra, Analytic Geometry, & Trig (R1)	3

#### 2. Analytic 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)	3

**Total Core Requirements 27-30**

**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	4

**Plant Nutrition**

SELECT ONE 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
fall	STOCKSCH 310	Principles of Weed Management	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	2
spr	STOCKSCH 240	Applied Calculations in Turf Management	2
spr	STOCKSCH 255	Herbaceous Plants	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 550	Plant Hormones and Applied Plant Physiology	3
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 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	Introductory 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 COURSES IN SCIENCE

CHOOSE ONE 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 & 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 51-56**

## SUMMARY OF REQUIREMENTS

**Total Core Requirements 27-30**

Biological Science	8
Chemistry	4
Ecosystems Studies	3-4
Integrative Experience	3
Junior Year Writing	3
Math, Statistics and Reasoning	6-8

**Total Major Requirements 51-56**

Required Courses	27-29
Restricted Electives	24-27

**Grand Total for Turfgrass Science and Management 78-86**

## STOCKBRIDGE SCHOOL COURSE DESCRIPTIONS

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### STOCKSCH 101

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

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

Seven-week course; 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; 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.

*Prerequisite: STOCKSCH 101 (may be taken concurrently)*

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; first 7 weeks of the semester.

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

2 credits/spring sem

## **STOCKSCH 118**

### **Introduction to Sustainable Food and Farming**

Highly interactive and participatory introduction to the Sustainable Food and Farming major, focused on academic preparation, internships and careers. Especially for first year students and transfers into the major.

*Prerequisite: Sustainable Food and Farming majors only*

1 credit/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 170**

### **Pesticide Certification**

Independent preparation for the state pesticide certification examination and licensure. The State Pesticide Exam Study Manual is used and available for purchase either online or at the UMass Extension Bookstore. Exams are given at various times throughout the state. Students must apply to take the exam; applications must be submitted by the deadline date (one week prior to the exam). Refer to [www.mass.gov/agt/pesticides](http://www.mass.gov/agt/pesticides) or call 617-626-1841 for dates of Massachusetts exams.

*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 182**

### **Principles of Pesticide Management**

Topics include state and federal pesticide laws and regulations, pesticides and the environment, handling and storage of pesticides, classes and formulations of pesticides, safety and application equipment, understanding the pesticide label, toxicity, proper calculation and mixing of pesticides, and history of pesticide use. Includes preparation for the Massachusetts Pesticide Core Exam.

2 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 190P**

### **Personal Wellness for Farmers & Gardeners**

Development of skills and understanding for maintaining a healthy lifestyle while being a successful farmer or gardener. Students will learn basic anatomy for safe and sustainable manual labor and practice applying safe body mechanics to typical farming labor tasks.

*Prerequisite: Sustainable Food and Farming majors only*

3 credits/spring 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.

*Prerequisite: STOCKSCH 106*

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 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 of hydraulics and system design for turf and landscapes with an emphasis on golf courses. Irrigation systems, equipment performance, installation practices, operation procedures and troubleshooting. Drainage of sports turf also included.

2 credits/spring sem

## **STOCKSCH 235**

### **Pruning Fruit Crops**

With lab. Theory and practice of pruning deciduous fruit plants/trees. Emphasis on practical, hands-on experience.

2 credits/spring sem

## **STOCKSCH 240**

### **Applied Calculations in Turf Management**

Calculations involving area and volume measurements, fertilizer and pesticide requirements, cost analysis, seed calculations, irrigation calculations, and calculations relating to spreader and sprayer calibrations.

*Prerequisite: STOCKSCH 230*

2 credits/spring sem

## **STOCKSCH 255**

### **Herbaceous Plants**

Study and identification of herbaceous plants; their uses as ornamental plants for home, park, and business.

*Prerequisite: Stockbridge students only*

3 credits/spring sem

## **STOCKSCH 258**

### **Urban Agriculture**

Explores innovative production methods and critical social, economic, and environmental dimensions of modern day urban agriculture.

3 credits/spring sem

## **STOCKSCH 265**

### **Sustainable Agriculture**

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 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*

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*

3 credits/spring sem

## **STOCKSCH 281**

### **Topics in Herbalism I**

Introduction to the broad field of herbalism through the eyes of a clinical and community herbalist. Topics include 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.

2 credits/fall sem

## **STOCKSCH 286**

### **Permaculture Design and Practice**

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

*Prerequisites: STOCKSCH 186 (formerly STOCKSCH 197G); Sustainable Food and Farming majors only or consent of instructor*

3 credits/spring sem

## **STOCKSCH 290W**

### **Organic Weed Control**

Focus on organic weed control by exploring various systems and approaches to weed management to reduce losses to crop yield and quality.

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 level (100-200) 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 in which the student plans to TA; consent of instructor*

1-2 credits/both sem

## **STOCKSCH 297AL**

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

Focus on learning to work with community groups and schools as a community educator.

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

3 credits/fall sem

## **STOCKSCH 297B**

### **Forest Gardens: Perennial Agriculture for Ecological Regeneration**

Focus on deepened understanding of forest gardens, with a focus on northeast temperate climates. Exploration of the resilience and benefits of forest systems and how they could be tweaked for the creation of forest gardens.

3 credits/fall sem

## **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*

1-6 credits/both sem

## **STOCKSCH 298FS**

### **USDA Farm Services Agency Practicum**

Participants work under the direction of USDA Farm Service Agency personnel, provide assistance to the farm loan process, participate in government assistance programs, and work with USDA FSA outreach.

*Prerequisite: consent of instructor*

1-5 credits/both sem

## **STOCKSCH 298G**

### **Gardenshare Practicum**

Student-led practicum experience utilizing a plot of land on campus to grow edible and ornamental crops. Although offered every semester, specific garden activities depend on the season of the year. Students may enroll more than once for credit.

*Prerequisite: consent of instructor*

1 credit/fall 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/both sem

## **STOCKSCH 300**

### **Deciduous Orchards Science**

With lab. Principles and practices involved in the establishment and management of deciduous orchards.

*Prerequisite: STOCKSCH 108 (may be taken concurrently)*

3 credits/fall sem/odd years

## **STOCKSCH 305**

### **Small Fruit Production**

With lab. Principles and practices governing the establishment and management of small fruit plantings.

*Prerequisite: STOCKSCH 108 (may be taken concurrently)*

3 credits/fall sem/even years

## **STOCKSCH 310**

### **Principles of Weed Management**

With lab. History of weed control; importance of weeds and their relationship to people and the environment; ecology of weeds, competition, persistence and survival mechanisms; reproduction, seed germination, and dormancy; methods of weed control, cultural, biological, chemical, and integrated pest management strategies; classification of herbicides and their selectivity; soil factors affecting herbicide performance, persistence and degradation; application equipment and calibration of sprayers; weed management systems for various crops and non-crop areas.

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

3 credits/fall 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/fall 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*

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 335**

### **Principles and Practices of Greenhouse Cultivation**

With lab. Greenhouse culture of spring greenhouse crops.

*Prerequisites: STOCKSCH 108; Horticultural Science and Plant and Soil Sciences majors only*

4 credits/spring 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 350**

### **Sustainable Soil and 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.

*Prerequisite: STOCKSCH 105 (may be taken concurrently) or consent of instructor*

3 credits/fall sem

## **STOCKSCH 355**

### **Community Food Systems**

With lab. 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.

3 credits/fall sem/odd years

## **STOCKSCH 356**

### **Food Justice and Policy**

With lab. Focus on the role of policy in determining what we eat, who experiences barriers to access safe, healthy, local foods, and how we create equity and sustainability in our local food system. Basic components of our food system will be discussed: production, distribution, and consumption. Systemic structures of race, class, citizenship and ability as they relate to access to healthy local food will be examined.

*Prerequisites: STOCKSCH 265; Sustainable Food and Farming majors only or consent of instructor*  
3 credits/fall sem/even years

## **STOCKSCH 360**

### **Landscape Plant Production**

With lab. Cultural practices of field and container production; how these practices and environmental factors influence nursery crop growth and development. Topics include: site selection, planting and spacing, mineral nutrition, harvesting, irrigation practices, pest management, and overwintering. Basic economic management of nursery crops production and marketing reviewed.

*Prerequisites: STOCKSCH 105; SUSTCOMM 335 highly recommended*  
4 credits/fall sem/odd years

## **STOCKSCH 370**

### **Tropical Agriculture**

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.

3 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)*  
3 credits/spring sem

## **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**

Satisfies the Junior Year Writing requirement for Sustainable Food and Farming majors. Practice and improve writing while clarifying career goals and improving professional communication skills.

*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 390A**

### **Plant Biotechnology and Tissue Culture**

With lab. Focus on the basic knowledge of plant tissue culture, recombinant DNA and gene expression technology required for transformation and assessment of genetically engineered crops.

Students will be introduced to the application of biotechnology to address global food and nutritional security issues and controversies about the genetically modified crops (GMOs).

*Prerequisites: BIOLOGY 151 or BIOLOGY 152, and CHEM 111 or CHEM 112*

4 credits/spring sem

## **STOCKSCH 390G**

### **Sustainable Grape Production**

With lab. Exploration of grape origins, domestication, and fundamental principles of grape growing, both domestically and globally. Practices specific to the winter such, as pruning, will be included.

Seven-week course; first 7 weeks of the semester

3 credits/spring sem



## **STOCKSCH 390N**

### **Ecosystem Processes**

The flows of energy, carbon, and nutrients within ecosystems, tracing the key processes that define ecosystem function will be covered. Development of the connections between organisms, abiotic factors and ecosystem processes. The effects of environmental change on ecosystem processes will be highlighted.

*Prerequisites: STOCKSCH 105, GEOLOGY 101, or ENVIRSCI 214; CHEM 111 recommended*  
3 credits/spring 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 397GB**

### **Grapevine Biology**

With lab. Viticultural practices, culture and grapevine biology related to fall production. Emphasis will be on the challenges and opportunities of the local cold climate and sustainable practices.

*Prerequisites: STOCKSCH 105 and STOCKSCH 108 or consent of instructor*  
3 credits/fall sem

## **STOCKSCH 397PT**

### **Plant Trends in Landscape Horticulture**

Description unavailable.

*Prerequisite: STOCKSCH 108*  
3 credits/fall sem/even years

## **STOCKSCH 397R**

### **Social Permaculture**

How to apply permaculture ethics and principles to a variety of social systems. Use of 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 faculty advisor*

1-12 credits/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*

1-18 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**

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 490S**

### **Soil Ecology**

Introduction to soils as their own ecosystem. Descriptions of the diversity of life found within soils, plant-soil interactions and biogeography will be weaved together 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. Course includes three field trips during regular scheduled lecture time.

*Prerequisite: STOCKSCH 105 or ENVIRSCI 364*

3 credits/fall 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/both sem

## **STOCKSCH 496B**

### **Independent Study-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/both sem

## **STOCKSCH 496C**

### **Independent Study-Teaching Assistant**

Assist with instruction/classroom preparation for Stockbridge School courses.

*Prerequisites: consent of instructor teaching the course; Independent Study contract; FERPA certification if involved with grading*

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/both 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 505**

### **General Plant Pathology**

With lab. Causes, nature, and control of plant diseases. Diagnosis of plant diseases. Mechanisms, biochemistry, and genetics of plant disease induction, development, and control.

*Prerequisite: STOCKSCH 384 or MICROBIO 310 or 100-level biology course or consent of instructor*

4 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: BIOLOGY 151 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.

*Prerequisites: CHEM 250 or CHEM 261 and basic biology course*

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 525**

### **Mycology**

Biology, ecology, classification and identification of fungi and fungal-like organisms. Includes consideration of fungi as causes of diseases in animals, humans, and plants, and their uses in biotechnology applications.

*Prerequisite: BIOLOGY 151*

4 credits/fall sem/odd years

## **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: STOCKSCH 105 and STOCKSCH 108, and either CHEM 110 or CHEM 111 or equivalent courses*

4 credits/fall sem

## **STOCKSCH 535**

### **Diagnostic Plant Pathology**

Methods of diagnosing plant diseases caused by fungi, bacteria, viruses, nematodes, and abiotic agents considered using specimens collected by students.

*Prerequisite: STOCKSCH 505*

4 credits/spring sem/odd years

## **STOCKSCH 545**

### **Postharvest Biology**

The basic biochemical and physiological processes occurring in fruits, vegetables, and flowers after harvest; postharvest treatments to modify these processes.

*Prerequisites: STOCKSCH 384, and either CHEM 110 or CHEM 111*

4 credits/spring sem

## **STOCKSCH 550**

### **Plant Hormones and Applied Plant Physiology**

The influence of naturally occurring plant hormones on regulating physiology, growth, and development in plants. Uses and potential uses of synthetic plant growth regulators, cultural techniques, and horticultural practices to improve the production of food, fiber and ornamental plants.

*Prerequisites: STOCKSCH 108 or 100-level biology course; STOCKSCH 384 recommended*

3 credits/spring sem

## **STOCKSCH 572**

### **Nematology**

With lab. Biology and identification of soil nematodes. Parasitism of plants and management practices stressed.

*Prerequisite: STOCKSCH 505 or BIOLOGY 153*

4 credits/fall sem/even years

## **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 either CHEM 110 or CHEM 111*

3 credits/spring 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 384, BIOLOGY 151, or BIOLOGY 152*

3 credits/fall sem

## **STOCKSCH 590M**

### **Microbe-Mineral-Organic Matter Interactions in Soils**

Fundamental interactions between microbes, minerals, and organic matter responsible for carbon cycling, mineral weathering, and nutrient dynamics in soils. Examination of the importance of these interactions for soil development, carbon storage, and fertility. Discussion of the underlying mechanisms and suitable analytical methods for their investigation. How these mechanisms respond to global environmental change will be examined, and how this response in turn impacts soil functioning.

*Prerequisites: STOCKSCH 105 and either CHEM 110 or CHEM 111; STOCKSCH 575, CHEM 261, and MICROBIO 310 recommended*

3 credits/spring sem

## **STOCKSCH 591A**

### **Plant Biotech Journal Club**

Open to both graduate students and advanced undergraduate students who have an interest in reviewing the current scientific literature in the field of plant biotechnology.

1 credit/both 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

## ACADEMIC CALENDAR 2020 - 2021

### FALL 2020

August 24	Monday	First day of classes
September 7	Monday	Holiday (Labor Day) CLASSES WILL BE HELD
September 7	Monday	Last day to ADD or Drop any class with no record
October 12	Monday	Holiday (Columbus Day) CLASSES WILL BE HELD
October 16	Friday	Last day to Drop with 'W' and select 'P/F'
October 26	Monday	Registration begins for Spring 2021
November 11	Wednesday	Holiday (Veterans' Day) CLASSES WILL BE HELD
November 20	Friday	Last day of classes
November 20	Friday	Thanksgiving recess begins following end of classes
November 27	Friday	Reading Day
November 28	Saturday	Reading Day
November 30	Monday	Final exams begin; exams to be administered remotely
December 4	Friday	Last day of final examinations; semester ends
December 14	Monday	Final grades due by Midnight

Number of class meetings: MTuWThF: 13

### SPRING 2021

February 1	Monday	First day of classes
February 12	Friday	Last day to ADD or Drop any class with no record
February 15	Monday	Holiday (Presidents' Day) CLASSES WILL BE HELD
February 24	Wednesday	Wellbeing Wednesday Observed NO CLASSES
March 1	Monday	WEDNESDAY CLASS SCHEDULE will be followed
March 29	Monday	Last day to Drop with 'W' and select 'P/F'
April 5	Monday	Registration begins for Fall 2021
April 14	Wednesday	Wellbeing Wednesday Observed NO CLASSES
April 19	Monday	Holiday (Patriot's Day) CLASSES WILL BE HELD
April 20	Tuesday	WEDNESDAY CLASS SCHEDULE will be followed
May 4	Tuesday	Last day of classes
May 5	Wednesday	Reading Day
May 6	Thursday	Final examinations begin
May 8	Saturday	Reading Day
May 12	Wednesday	Last day of final examinations; semester ends
May 14	Friday	Undergraduate Commencement (Virtual or In Person)
May 17	Monday	Final grades due by Midnight

Number of class meetings: MTuWThF: 13





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