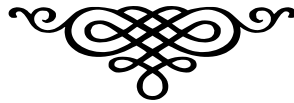


**Department of Plant, Soil, & Insect Sciences
University of Massachusetts at Amherst**



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Plant and Soil Sciences

Program Updates

The Department of Plant and Soil Sciences recently merged with the Department of Entomology, and we also added several new faculty members in the field of plant pathology. In the year ahead, we will be actively expanding our undergraduate program to include curriculum options in the areas of entomology and plant health. We are excited to be consolidating the teaching and research missions of these various related disciplines with those of the Plant and Soil Sciences' major. To reflect the expanded mission and academic offerings of our interdisciplinary team of faculty and professionals, we anticipate the name of our program to be changing soon to **Plant, Soil, and Insect Sciences**.

The Major

The Department of Plant, Soil, and Insect Sciences is the academic home to faculty, staff, and students interested in environmentally-conscious and socially-responsible management of plant, soil, and entomological systems. This includes managed crop production and the interface of managed and natural systems within urban and suburban settings, focusing on plant, soil, and water resource management. Research, teaching, and out-reach programs emphasize the study and technology transfer related to growth of food and ornamental crops, protection of soil and water resources, improvement of plants, development of new crops, management of harvested materials, remediation of pollution in soil and water, and use of urban and agricultural by-products. A degree in Plant, Soil, and Insect Sciences is for students interested in such issues as:

- Producing locally grown food and feed crops
- Reducing land and water pollution
- Enhancing the beauty of homes, towns, cities, and businesses
- Expanding enjoyment of parks, athletic fields, and other green areas
- Improving outdoor and indoor air quality
- Developing new crops and cropping systems
- Increasing world food supply, safety, and quality
- Maintaining the health of ornamental, edible, and forage crops
- C Understanding ecological relationships in the natural environment

Much of the students' learning comes through work with actual problems in the classroom, laboratory, greenhouse, and field settings. The department has a number of greenhouses on campus, and off-campus facilities include a 200-acre experimental orchard, a research and teaching farm for weed science, vegetable and field crops, as well as an experimental turf farm. Faculty members in the department are actively engaged in research which facilitates instruction on the most up-to-date information and technologies.

The Curriculum

The undergraduate curriculum in Plant, Soil, and Insect Sciences is unique in that students can tailor their course work to best reflect individual academic interests and career goals. The major encompasses a broad range of related disciplines dealing with plants, soils, insects, and the environment in general. Programs of study currently available include ornamental horticulture, turfgrass management, soil science, sustainable agriculture and crop production, food systems studies, plant disease management, and entomology. Several of these program areas allow the option of selecting between either a business management or an applied science focus.

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, soils, math, and chemistry, 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 Concentration. Independent studies and internships are available under each of the concentrations, providing students with the opportunity to integrate laboratory and field work into their curriculum.

Career and Graduate School Opportunities

Plant and Soil Sciences graduates are highly employable within their field of specialization. Our graduates are employed in professions as varied as environmental consulting, agronomic and horticultural crop production, secondary school instruction, and golf course and parks management, just to name a few.

Recent Plant and Soil Sciences graduates are employed as:

- i Growers of ornamental and edible crops
- i Regulatory officials
- i Sales representatives of agricultural products
- i Managers of golf courses, parks, garden centers, greenhouses, and nurseries
- i Teachers of vocational agricultural and high-school biology
- i Supervisors of landscape construction and maintenance organizations
- i Scientists, research technicians, and consultants
- i Surveyors of soils and wetlands

A significant number of our graduates continue working towards advanced degrees which provide additional opportunities in research, teaching, consulting and public service in their chosen area of specialization. Several recent graduates are presently enrolled in M.S. and Ph.D. programs studying environmental soil chemistry, wetland science, developmental plant biology, and plant pathology.

Areas of Concentration

General Studies is for students who want a diverse sampling of courses in plant, soil, and insect sciences and a wide variety of experiences in their studies. Students select courses from a number of subject areas, giving them a broad-based foundation and making them competitive for a variety of employment opportunities requiring broad horticultural knowledge. Students wishing to emphasize insect sciences or plant pathology in their curriculum should select the General Studies program.

Ornamental Horticulture focuses on the identification, production, marketing, and use of herbaceous and woody ornamental plants. Course work includes classes in plant identification, greenhouse management, woody plant production, floricultural crop production, plant propagation, and integrated pest management. Cultural practices and environmental effects on plant growth and health are covered in detail. The curriculum provides up-to-date information on relevant topics such as optimizing plant yield and quality, reducing groundwater pollution, conserving energy, and using environmentally safe and economically feasible methods of pest control. The Ornamental Horticulture concentration prepares students for rewarding careers in private industry, state and federal agencies, public gardens, and conservatories.

Soil Science examines the role of soil in the environment, focusing on physical, biological, chemical, and morphological properties. Courses also focus on the need for productive soils in plant growth, prevention of soil degradation, bio-remediation, pollution transport processes, waste treatment, wetland issues, and control of water pollution by soil-borne contaminants. With an emphasis on protecting valuable resources, students study soil chemistry, plant nutrition, soil physics, soil microbiology, soil and water conservation, and soil classification. Graduates of this program are eligible for professional certification at both regional and national levels. Employment is found in both public and private sectors, working for state and federal natural resource agencies, environmental consulting firms, and research institutions.

Sustainable Agriculture - Crop Production focuses on the production of food, fiber, and other plant commodities through ecologically sound, economically viable, and socially conscience approaches. Students have the opportunity to focus their studies in the areas of agronomy, fruit and/or vegetable production. The curriculum emphasizes sustainable crop production, cultural requirements, crop physiology, soil productivity, prevention of soil and water degradation, integrated pest management, food quality, and post-harvest handling and storage. The University's location in the Pioneer Valley, a major vegetable production area, affords students access to local farms for first-hand views of modern cultural practices. Our nearby orchard serves as a living laboratory where students study commercial apple production as well as learning about stone fruits, small fruits, and berry crop production. The program stresses the concepts and practices vital to the preservation of natural resources in managed plant systems.

Sustainable Agriculture - Food Systems prepares students for careers in policy, advocacy, community outreach and education on topics related to crop production, food access, and

hunger issues, just to name a few. The curriculum combines a solid foundation in horticulture and pest management, and then allows customizing by the student in areas such as business administration, non-profit organization, sociology, political science, community outreach and education, among others. By combining crop production training with skills in communication, education, grant writing, nutrition, resource economics, land use planning, cultural sensitivity, community organizing, and/or policy development, students will gain a broader understanding of the many socioeconomic aspects surrounding food production, access and distribution. Graduates will be uniquely qualified to compete successfully for a wide array of emerging careers in the growing field of food systems.

Turf Management 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. 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 research, sales, and direct lawn maintenance. Excellent career opportunities exist in turf management, and job placement of our graduates is nearly 100 percent.

Program Options

Most of our program areas can be further customized by selecting either a Business Management Track or a Science Track. Selection of a track is usually dependent upon a student's long-term career goals. Consultation with an academic advisor is recommended if a student is not certain which Track is most appropriate.

Business Management Track

This option emphasizes the managerial, marketing, and economic aspects of a career in plant and soil sciences. Course work may be supplemented with internships or Cooperative Education experiences, providing students with firsthand experience of the marketplace and competitive economic systems. This track is appropriate for those students desiring careers as managers of nurseries, greenhouses, or landscaping firms; or as superintendents of golf courses; or as directors of landscape/grounds departments for major athletic stadiums, as well as public or private park systems. This track is also suitable for those seeking to become entrepreneurs with a desire to own their own wholesale or retail horticultural business. The Business Management Track is available to students pursuing the following program areas: General Studies, Ornamental Horticulture, Turf Management, and Sustainable Agriculture-Crop Production.

Science Track

This option prepares students for careers in research and development, graduate

school study, or other work in the scientific aspects of the field. Students are encouraged to gain additional insight into their fields of study by participating in laboratory and field research projects with faculty.

Graduates completing our Science Track have found employment in major conservatories and arboreta around the country. Others work as research technicians studying aspects of plant breeding, disease and/or pest management, or work for industry in agrochemical product development. Other former students are employed as soil conservationists, soil scientists, or private consultants in natural resource protection (just to name a few examples).

Internships and Independent Study

The Department of Plant, Soil, and Insect Sciences encourages majors to enhance their programs of study with an Internship experience or an Independent Study. These opportunities provide students with experience and training that will be useful in career planning as well as in decision-making about fields of possible graduate study. Students must have attained at least sophomore status and be in good academic standing. No more than three (3) credits of independent study or internship can be used to satisfy departmental credit requirements.

Internships: An Internship is a summer or semester-long work experience which allows students to “apprentice” with professionals from their field. Internships are intended to be a learning experience, and most do not provide significant monetary compensation. Instead, academic credits are earned. Usually 12 credits are earned during one semester and 3 to 6 credits are earned for a summer program. Prior to undertaking an internship, an Academic Contract must be completed by the student and his/her faculty sponsor including planned activities, a statement of objectives, as well as criteria for evaluation and grading. Note: The University will accept up to 15 practicum credits 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 department 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 Department’s Undergraduate Program Office before the project is initiated.

Department of Plant, Soil, and Insect Sciences Major Requirements

All departmental majors must complete the following courses:

' Botany / Plant Biology	PLSOILIN 102 (Fall) or BIOLOGY 103 (Fall)
' Introductory Soils	PLSOILIN 105 (Spring)
' Plant Physiology	PLSOILIN 397P (Spring) or BIOLOGY 510 (Fall)
' Junior Year Writing	PLSOILIN 380 (Fall & Spring)
' Pre-calculus Math	MATH 104 (Fall & Spring) or MATH 101 & 102
' Statistics	RES-ECON 211 or STATISTC 111 (Fall & Spring)

In addition to the courses above, all majors must complete at least twenty-three (23) additional departmental credits at the 200-level or above, including at least six (6) credits at the 500-level. Note: Up to three (3) credits of Independent Study / Internship may be used towards the 23 required department credits. Restrictions: Independent study credits cannot be used to satisfy the 500-level course requirement. All courses used to satisfy major requirements must be graded (cannot be taken pass/fail).

Additional Requirements Based Upon Selected Track Option

Business Management Track

' Chemistry (one semester)	CHEM 110 (Fall) or CHEM 111 (Fall & Spring)
' Intro. Resource Econ.	RES-ECON 102 (Fall & Spring)
' Personnel Management	HTM 260 or MANAGMNT 314 (Fall & Spring)
' Business Management	MANAGMNT 301 (Fall & Spring)
' Marketing	RES-ECON 241 (Spring) or MARKETNG 301
' Accounting	ACCOUNTG 221 (Fall & Spring)

Science Track

' Intro. Biology I *	BIOLOGY 100 (Fall) * SEE IMPORTANT NOTE *
' Chemistry I	CHEM 111 (Fall & Spring)
' Chemistry II	CHEM 112 (Fall & Spring)
' Calculus I	MATH 127 or MATH 131 (Fall & Spring)
' Chem / Biochem 200+	CHEM 250/252, 261/263; BIOCHEM 205, 285, 420; BIOTECH 385.

Note for Science Track Option

* Note: BIOLOGY 100 is only required for those Science Track students choosing to satisfy the department's botany requirement with PLSOILIN 102 instead of BIOLOGY 103.

Curricular Descriptions by Concentration Area

General Studies

Ornamental Horticulture

Sustainable Agriculture - Crop Production

Sustainable Agriculture - Food Systems

Soil Science

Turfgrass Management

GENERAL STUDIES

Available under both the Business Management and Science Options

Restrictions:

**At least 6 credits at the 500-level

**Not more than 3 credits at 100-level

**Independent study cannot be used to satisfy 500-level credit requirement

**Not more than 3 credits of independent study or Internship

Must select 23+ credits from the following courses: (all courses 3 credits unless noted)

PLSOILIN

' 115	Plants, Soils, and the Environment	' 305	Small Fruit Production
' 120	Organic Farming and Gardening	' 310	Weed Management
' 126	Insects and Human Society	' 315	Greenhouse Management (4 cr.)
' 130	The Science of Animal Behavior	' 321	Greenhouse Crop Production I
' 160	Plant Diseases: Feast/Famine	' 325	Vegetable Crop Production (4 cr.)
' 200	Plant Propagation	' 326	Insect Biology
' 210	Retail Floral Design	' 335	Greenhouse Crop Prod. II (4 cr.)
' 230	Intro. Turf Management	' 342	Pesticides, Public Policy & Envir.
' 235	Pruning Fruit Crops (2 cr.)	' 350	Crop Science
' 255	Herbaceous Plant Materials	' 360	Nursery Management (4 cr.)
' 265	Sustainable Agriculture	' 365	Hydroponics (4 cr.)
' 271	Using Insects in the Classroom	' 370	Tropical Agriculture
' 280	Herbs, Spices, & Medicinal Plants	' 375	Soil and Water Conservation
' 265	Sustainable Agriculture	' 397C	Community Food Systems
' 275	Turfgrass Physiology & Ecology	' 397K	Insect Ecology & Mgt.
' 290S	Sustainable Living	' 397T	Molecular Systematics Laboratory
' 300	Deciduous Orchard Science	' 497A	Natural Products Marketing

All 500-level courses are acceptable: Minimum of six credits required

PLNTSOIL

' 510	Ecol./Mgt. of Plant Disease
' 515	Microbiology of Soil
' 520	Crop Physiology
' 525	Mycology
' 530	Plant Nutrition
' 535	Diagnostic Plant Pathology
' 536	Forest & Shade Tree Path.
' 540	Plant Breeding
' 545	Post-harvest Physiology
' 550	Plant Growth Regulators
' 555	Env. Stress & Plant Growth
' 560	Weed Science
' 565	Soil Formation & Classif.
' 570	Soil Physics
' 572	Nematology
' 575	Envir. Soil Chemistry
' 580	Soil Fertility
' 597A	Phyto/Bioremediation

ENTOMOL

' 597L	Wetland Delineation
' 597O	Organic Contaminants in Soil
' 597P	Origin & Future of Crops
' 597S	Agricultural Systems Thinking
' 597W	Artificial Treatment Wetlands
' 597X	Inorganic Contaminants in Soils
' 511	Insect Behavior
' 523	Biologic Control
' 533	Animal Parasitology
' 572	Forest & Shade Tree Entomol.
' 574	Medical Entomology
' 576	Aquatic Invertebrates
' 580	Insect Control
' 581	Integrated Pest Management
' 597A	Insect-Plant Interactions

General Studies Requirements –Continued.

Restricted Electives (11+ credits)

- ' General Plant Pathology PLNTOIL 505 (Fall) -formerly MICROBIO 530
- ' CHEM 112 General Chemistry II (4 cr.)
(Note: Additional course may be substituted if student elects Science Option)

- ' "Open" Electives (3+ cr.): Physics, geology, additional math, biology, or chemistry (See list below. Approval must be sought for substitution of a unlisted course.)

Open Elective List

BIOLOGY 283	General Genetics	PHYSIC 152	General Physics II
BIOLOGY 285	Cell & Molecular		
BIOLOGY 287	Introductory Ecology		
BIOLOGY 421	Plant Ecology		
BIOLOGY 426	New England Flora		
BIOLOGY 485	Aquat. Vasc. Plants		
BIOLOGY 504	Plant Morphology		
BIOLOGY 510	Plant Physiology		
BIOLOGY 524	Coastal Plant Ecology		
BIOLOGY 526	Plant Geography		
BIOTECH 385	Biotech. Lab		
CHEM 312	Analytical Chemistry		
CHEM 250	Organic Chemistry		
CHEM 261/262	Organic Chemistry I/II		
CHEM 315	Quantitative Analysis		
GEO-SCI 101	Earth		
GEO-SCI 105	Dynamic Earth		
GEO-SCI 131	Experiencing Geology		
GEO-SCI 201	History of the Earth		
GEO-SCI 285	Environmental Geology		
GEO-SCI 311	Mineralogy		
GEO-SCI 415	Intro. Geochemistry		
GEO-SCI 485	Appl. Env. Geology		
GEO-SCI 519	Aqu. & Env. Geochem		
GEO-SCI 560	Geomorphology		
GEO-SCI 563	Glacial Geology		
GEO-SCI 587	Hydrogeology		
MATH 127,131	Calculus I		
MATH 128, 132	Calculus II		
MICROBIO 310	Gen. Microbiology		
MICROBIO 330	Microbial Genetics		
PHYSIC 131	Intro. Physics I (lab opt.)		
PHYSIC 132	Intro. Physics II		
PHYSIC 139	Intro to Physics		
PHYSIC 151	General Physics I		

ORNAMENTAL HORTICULTURE

Available under Business Management or Science Option

Required Department Courses

- ' PLSOILIN 200 Plant Propagation (3 cr. / Fall)
- ' PLSOILIN 315 Greenhouse Mgt (4 cr. / Fall)
- ' PLSOILIN 321 Greenhs Crop Prod. I (3 cr. / Fall)
- ' PLSOILIN 360 Nursery Mgt (4 cr. / Spring)
- ' PLNTSOIL 505 General Plant Pathology (4 cr. / Fall) -formerly MICROBIO 530

Select at least one of the following:

- ' PLSOILIN 255 Herbaceous Plants (3 cr. / Spring)
- ' ENVIRDES 335 Plants in Landscape I (4 cr. / Fall)

Select at least one of the following PLSOILIN courses:

- ' 310 Weed Management (3 cr. / Fall)
- ' 335 Greenhouse Crop Production II (4 cr. / Spring)

Select two PLNTSOIL 500-level courses for a total of at least six credits

- ' 530 Plant Nutrition (4 cr. / Fall)
- ' 535 Diagnostic Plant Pathology (4 cr. / Spring, odd years)
- ' 536 Forest & Shade Tree Pathology
- ' 540 Plant Breeding (3 cr. / Fall)
- ' 545 Post Harvest Physiology (4 cr. / Spring)
- ' 550 Plant Growth Regulators (3 cr. / Spring)
- ' 555 Environmental Stress & Plant Growth (3 cr. / Fall, odd years)
- ' 560 Advanced Weed Science (3 cr. / Spring)
- ' 580 Soil Fertility (3 cr. / Fall)
- ' 597P Origin & Future of Crops (3 cr. / Spring)

Restricted Electives : Select one of the following groupings

- ' PLSOILIN 101: Insects & Related Forms (2 cr. / Spring) **PLUS**
- ' PLSOILIN 397F: Greenhouse IPM (2 cr. /Spring)

- OR** ' PLSOILIN 101: Insects & Related Forms (2 cr. / Spring) **PLUS**
- ' PLSOILIN 109: Insects of Ornamentals (3 cr. / Fall)

- OR** ' PLSOILIN 397K: Insect Ecology & Mgt. (3 cr. / Fall)

SUSTAINABLE AGRICULTURE - CROP PRODUCTION

Available under Business Management or Science Option

Required Departmental Courses

'	PLSOILIN 120	Organic Farming and Gardening	(3 cr. / Spring)
'	PLSOILIN 265	Sustainable Agriculture	(3cr. / Fall)
'	PLSOILIN 310	Weed Management	(3 cr. / Fall)
'	PLSOILIN 350	Crop Science	(3 cr. / Spring)
'	PLNTSOIL 505	General Plant Pathology	(4cr. / Fall)

Select at least one of the following production courses:

'	PLSOILIN 280	Herbs, Spices, and Medicinal Plants	(3 cr. / Spring)
'	PLSOILIN 300	Deciduous Orchard Science	(3 cr. / Fall, odd yrs)
'	PLSOILIN 305	Small Fruit Production	(3 cr. / Fall, even yrs)
'	PLSOILIN 325	Vegetable Production	(4 cr. / Spring)
'	PLSOILIN 370	Tropical Agriculture	(3 cr. / Fall)

Select at least two PLNTSOIL 500-level courses

'	520	Crop Physiology	(3 cr. / Fall)
'	530	Plant Nutrition	(4 cr. / Fall)
'	535	Diagnostic Plant Pathology	(4 cr. / Spring, odd years)
'	540	Plant Breeding	(3 cr. / Fall)
'	545	Post Harvest Physiology	(4 cr. / Spring)
'	550	Plant Growth Regulators	(3 cr./ Spring)
'	555	Environmental Stress & Plant Growth	(3 cr. / Fall, odd years)
'	560	Advanced Weed Science	(3 cr. / Spring, odd years)
'	565	Soil Formation and Classification	(4 cr. / Spring)
'	575	Environmental Soil Chemistry	(4 cr. / Spring)
'	580	Soil Fertility	(3 cr. / Fall)
'	597P	Origin and Future of Crops	(3 cr. / Spring)

Select from following list to bring credit total to at least 23 credits

'	PLSOILIN 200	Plant Propagation	(3 cr. / Fall)
'	PLSOILIN 235	Pruning Fruit Crops	(2 cr. / Spring)
'	PLSOILIN 315	Greenhouse Management	(4 cr. / Fall)
'	PLSOILIN 365	Hydroponics	(4 cr. / Spring)
'	PLSOILIN 375	Soil and Water Conserv.	(3 cr. / Fall, even years)
'	PLSOILIN 397C	Community Food Systems	(3 cr. / Spring)
'	PLSOILIN 397S	Dialogue of Agricult. Issues	(2 cr. / Fall)

Restricted Electives: Select at least one of the following

'	ENTOMOL 581	Integrated Pest Mgt		
'	ENTOMOL 523	Biologic Control	'	PLSOILIN 326 Insect Biology
'	ENTOMOL 580	Insect Control	'	PLSOILIN 397K Insect Ecol & Mgt
'	ENTOMOL 597A	Insect-Plant Interact.		

SUSTAINABLE AGRICULTURE - FOOD SYSTEMS

This concentration stands alone.
Students interested in Business Management or Science Option should select Sustainable Agriculture-Crop Production.

Foundation Courses:

' Botany or Plant Biology	PLSOILIN 102 -OR- BIOLOGY 103 (4 cr. / Fall)
' Soil Science	PLSOILIN 105 Soils (4 cr. / Spring)
' Chemistry with lab	CHEM 110 or 111 (4 cr. / both semesters)
' Plant Physiology	PLSOILIN 397P (3 cr. / Spring)
' Pre-calculus Math	MATH 104 (3 cr.) -OR- MATH 101 (2 cr.) & 102 (2 cr.)
' Technical Writing	PLSOILIN 380 (3 cr. / both semesters)

Required Departmental Courses (30+ credits)

' Community Food Systems	PLSOILIN 397C (3cr. / Spring)
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Select at least four (4) core production courses from the following list: (12+ credits)

' PLSOILIN 120	Organic Farming and Gardening (3 cr. / Spring)
' PLSOILIN 265	Sustainable Agriculture (3 cr. / Fall)
' PLSOILIN 280	Herbs, Spices, and Medicinal Plants (3 cr. / Spring)
' PLSOILIN 300	Deciduous Orchard Science (3 cr. / Fall, alternate years)
' PLSOILIN 305	Small Fruit Production (3 cr. / Fall, alternate years)
' PLSOILIN 315	Greenhouse Management (4 cr. /Fall)
' PLSOILIN 325	Vegetable Crop Production (4 cr. / Spring)
' PLSOILIN 350	Crop Science (3 cr. / Spring)
' PLSOILIN 365	Hydroponics (4 cr. / Spring)
' PLSOILIN 370	Tropical Agriculture (3 cr. / Fall)

Select at least two (2) pest management courses from the following list:

' PLSOILIN 310	Weed Management (3 cr. / Fall)
' PLSOILIN 397K	Insect Ecology & Mgt. (3 cr. / Fall) -OR- ENTOMOL 597A : Insect-Plant Interactions (3cr. / Fall) -or- ENTOMOL 523: Biological Control (3 cr./ even

Springs)

' PLNTOIL 505	General Plant Pathology (4 cr. / Fall)
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Select at least six (6) credits of PLNTOIL 500-level or above

' _____	(see complete list of available courses in
' _____	Appendix A)

Practicum Requirement

' Complete at least three (3) credits of related/approved Practicum: (3-15 credits)

Sustainable Agriculture-Food Systems – continued.

Community Course Work: (18+ credits)

A concentration of six courses from the list below, approved by your advisor and the Departmental Undergraduate Program Office. Other courses can be proposed for approval.

'	Biophysical Systems	_____	'	_____
'	Economic Systems	_____	'	_____
'	Social Systems	_____	'	_____

Biophysical Systems

ENVIRSCI 213	Introduction to Environ. Policy	GEO-SCI 444	Sense of Place & Environ. Perception
GEO-SCI 362	Land Use and Society (SB)	GEO-SCI 497S	Indigenous People and Conservation
GEO-SCI 370	Urban Geography (SB)	GEO-SCI 530	Population and Environment
GEO-SCI 392E	Earth System Science	NAREST 409	Natural Resources Policy & Admin.
GEO-SCI 420	Human Impacts on Environ.	POLSCI 382	Environmental Policy
NUTRITN 130	Nutrition for Healthy Lifestyle (BS)	POLSCI 383	Land and Resource Policy
NUTRITN 230	Basic Nutrition	REG PL 553	Resource Policy and Planning (Sustainable Communities)
ENVIRSCI 497	Env.Problem Solving in Community (I & II)		

Economic Systems

ECON 308	Political Economy of the Environ.	RES-ECON 102	Intro to Resource Economics (SB)
ECON 374	Capitalism, Socialism, & Democracy: Utopias & their Critics	RES-ECON 211	Statistics, Life Sciences (R2)
GEO-SCI 360	Economic Geography (SBU)	RES-ECON 212	Statistics, Social Sciences (R2)
MGT 301	Principles of Management	RES-ECON 241	Intro to Food Marketing Economics
MGT 314	Human Resource Management	RES-ECON 262	Environmental Economics (SB)
MGT 330	Organizational Behavior	RES-ECON 263	Natural Resource Economics (SB)
MTKG 301	Fundamentals of Marketing	RES-ECON 324	Small Business Finance
MTKG 491A	Marketing for Non-profit Organizations and Services	SOCIO 212	Elementary Statistics (R2)
		STATISTC 111	Elementary Statistics (R2)

Social Systems

AFROAM 236	History Civil Rights Movement (HSU)	LEGAL 497N	Environmental Law and Policy
AFROAM 262	Radical Tradition in Amer. History	NUR 397D	Holistic Health and Healing
ANTHRO 205	Inequality and Oppression (SBU)	POLSCI 203	American Political Thought (HS)
ANTHRO 208	Human Ecology (SBG)	POLSCI 280	Public Policy (SB)
ANTHRO 233	Kinship and Social Organization	POLSCI 380	Social Welfare Policy
ANTHRO 397H	Grassroots Community Development	POLSCI 382	Environmental Policy
COMMHLTH 602	Community Development	SOCIO 224	Social Class Inequality (SBU)
COMMHLTH 603	Group Dynamics	SOCIO 327	Social Change
EDUC 210	Social Diversity in Education (IU)	SOCIO 329	Social Movements & Collective Behavior
EDUC 229	International Education (SBG)	SOCIO 565	Sociology and Ecology of Community
EDUC 377	Intro to Multicultural Education		
EDUC 649	Training for Non-formal Education		
EDUC 766	Partnerships for Interorganizational Development		
GEO-SCI 102	The Human Landscape (SBG)		
LEGAL 250	Intro. to Legal Studies (SBU)		
LEGAL 391B	Law and Social Activism		

SOIL SCIENCE

Available under Science Option Only

Required Departmental Courses

' PLNTOIL 565 Soil Formation & Classification (4 cr. / Spring)

Select at least 7 credits from the following list:

' PLSOILIN 375 Soil & Water Conservation 3 cr. / Fall, even years
' PLNTOIL 515 Microbiology of Soil 3 cr. / Spring
' PLNTOIL 570 Soil Physics 3 cr. / Fall alternate years
' PLNTOIL 575 Environmental Soil Chemistry 4 cr. / Fall
' PLNTOIL 580 Soil Fertility 3 cr. / Fall

Select from these additional courses to bring total to at least 23 credits if needed:

' PLNTOIL 597A Phytoremediation 3 cr. / Fall
' PLNTOIL 597L Wetland Delineation 3 cr. / Fall, odd years
' PLNTOIL 597O Organic Contaminants 3 cr. / Fall, even yrs
' PLNTOIL 597W Artificial Wetlands for WWT 3 cr. / Fall
' PLNTOIL 597X Inorganic Contaminants in Soils 3 cr. / Spring

Restricted Electives (10+ credits)

' PHYSIC 131 & 133 Intro. Physics I, with lab 4 cr.
' GEO-SCI 101 -or- 105 The Earth (or The Dynamic Earth) 3 cr.
' Choose at least one course from list of recommended supplemental courses (3 cr.)

Suggested Supplemental Courses:

BIOLOGY 426	New England Flora	GEO-SCI 311	Mineralogy
BIOLOGY 485	Aquatic Vascular Plants	GEO-SCI 321	Petrology
CHEM 312	Analytical Chemistry	GEO-SCI 415	Intro. Geochemistry
CHEM 315	Quantitative Analysis	GEO-SCI 485	Appl. Env. Geology
CHEM 471	Elem. Physical Chemistry	GEO-SCI 519	Aqu. & Env. Geochem
CHEM 513	Instrument Analysis	GEO-SCI 560	Geomorphology
GEO-SCI 131	Experiencing Geology	GEO-SCI 563	Glacial Geology
GEO-SCI 201	History of the Earth	GEO-SCI 587	Hydrogeology
GEO-SCI 285	Environmental Geology	MICROBIO 310	Gen. Microbiology

Notes:

- C Soil Science students must complete organic chemistry under Science Option.
- C Organic Chemistry lab must be completed for Professional (SSSA) Certification
- C Economics recommended as General Education course (also needed for professional certification).

TURF MANAGEMENT

Available Under both the Business Management and Science Options

Required Departmental Courses

'	PLSOILIN 230	Intro. Turf Management	(3 cr. / Fall)
'	PLSOILIN 234	Irrigation and Drainage	(3 cr. / Spring)
'	PLSOILIN 240	Applied Computations in Turf	(2 cr. / Spring)
'	PLSOILIN 275	Turf Physiology & Ecology	(3 cr. / Spring)
'	PLSOILIN 310	Weed Management	(3 cr. / Fall)
'	PLSOILIN 340	Adv. Turf Management	(3 cr. / Spring)
'	PLSOILIN 101	Insects & Related Forms	(2 cr. / Spring)
'	PLSOILIN 107	Turf Insects	(2 cr. / Spring)
'	PLNTSOIL 505	General Plant Pathology	(4 cr. / Fall)

Select two PLNTSOIL 500-level courses for a total of at least six credits

'	530	Plant Nutrition	(4 cr. / Fall)
'	535	Diagnostic Plant Pathology	(4 cr. / Spring, odd years)
'	550	Plant Growth Regulators	(3 cr. / Spring)
'	555	Environmental Stress	(3 cr. / Fall, alternate tears)
'	560	Advanced Weed Science	(3 cr. / Spring, alternate years)
'	565	Soil Formation & Classification	(4 cr. / Spring)
'	570	Soil Physics	(3 cr. / Fall, alternate years)
'	572	Nematology	(4 cr.)
'	575	Environmental Soil Science	(4 cr. / Fall)
'	580	Soil Fertility	(3 cr. / Fall)
'	597V	Integrated Turf Management	(3 cr. / Spring)

Suggested Supplemental Courses from other departments:

'	ENVIRDES 335	Plants in Landscape I	(4 cr. / Fall)
'	FOREST 332	Principles of Arboriculture	(3 cr. / Fall)

Suggested Supplemental Courses within PLSOILIN

'	200	Plant Propagation	(3 cr. / Fall)
'	232	Turf Machinery	(3 cr./ Fall)
'	255	Herbaceous Plants	(3 cr. / Spring)
'	375	Soil and Water Conservation	(3 cr. / Fall, alternate years)
'	397K	Insect Ecology & Mgt	(3 cr. / Fall)

Graduation and General Education Requirements

University requirements for graduation include the following:

Total Credits

A minimum of 120 credits must be obtained, 45 of which must be earned in residence. Residence credits are defined as credits earned for work done while registered at the Amherst campus or while enrolled in one of the University's formal exchange programs.

Minimum Overall GPA

A cumulative average of at least a C (2.0 grade point average) is required. The official grading system runs from A (4.0) to F (0.0).

Minimum Major GPA

A minimum cumulative average of 2.0 is required for those courses comprising the major.

University General Education Requirements

Writing: College Writing (CW) taken during the freshman year and completion of the Junior Year Writing Requirement (PLNTSOIL 380).

Social World: Six to eight courses including the following categories:

*Historical Studies (HS), *Social and Behavioral Sciences (SB), *Literature (AL), *Visual or performing arts (AT), and (I) Interdisciplinary. In addition, two of the courses in the Social World area must also have a Social and Cultural Diversity designation: one must be a (U) course which addresses diversity issues within the United States; and one course must be coded (G) which covers global diversity issues. Note: The diversity designation can be combined with another social category (for example: HSU), reducing the total required courses from eight to six.

'	AL	_____	'	HS	_____
'	AL/AT/I	_____	'	AL/AT/SB/HS/I	_____
'	SB	_____	'	'U' Diversity	_____
'	SB/I	_____	'	'G' Diversity	_____

Biological and Physical World: Three courses with at least one course in the Biological Sciences (BS) and at least one course in a Physical Science (PS).

'	BS	<u>PLSOILIN 105: Soils</u>	'	BS/PS/SI	- usually filled by
'	PS	<u>CHEM 110 or 111</u>			additional biology or chemistry

Tier I and Tier II - Analytical Reasoning: The Tier I requirement may be fulfilled by achieving a sufficiently passing score on the Math Placement Exam which is offered during summer orientation and at the beginning of each semester, or by completing MATH 104 (Pre-calculus), which is a department requirement. The Tier II requirement is fulfilled by completion of a required statistics course (RES-ECON 211).

Honors Program

Cum Laude is awarded to all students graduating with a 3.2 GPA who complete at least 48 graded credits in residence. Participation in the Honors Program is not necessary for this designation. Some students choose to enrich their academic experience by joining the Honors Program (known as Commonwealth College).

Commonwealth College students must complete a minimum of eight (8) honors courses with grades of “B” or better. Specific restrictions apply, and students are encouraged to contact Commonwealth College as early as possible to obtain a listing of current requirements. Accommodations may be made for those students entering the college after the freshmen year. The term “honors course” includes colloquia, enriched courses, and Commonwealth College seminars. All students enrolled in Commonwealth College must complete a “culminating experience project” in the form of an honors thesis or project.

Honors Program students who complete the above requirements and maintain a minimum 3.2 GPA will graduate as “Commonwealth Scholars” in addition to Cum Laude. This is the most flexible honors option since students may take their honors course work in any department. Students seeking to graduate Magna or Summa Cum Laude must achieve minimum GPAs of 3.5 and 3.8, respectively, and they must also complete a Departmental Honors Program track that requires a research component.

Students interested in learning more about Commonwealth College should call the College office at (413) 545-2483, e-mail them at [“comcol@acad.umass.edu”](mailto:comcol@acad.umass.edu) or go to their main office in Room 504, Goodell Building.

Department Facilities

Buildings

The Department of Plant, Soil, and Insect Sciences is housed in several buildings on campus. The major buildings are Fernald Hall (where the primary administrative offices are located), French Hall, Stockbridge Hall, Bowditch Hall, Clark Hall, and the Agricultural Engineering Building.

Fernald Hall is located on the eastern side of campus. The main administrative offices of the department are located here. The building contains numerous classrooms, offices, and research laboratories. Faculty in Fernald Hall are those with interests in entomology, ecology, insect physiology, insect genetics and molecular biology, and plant pathology.

French Hall is also located on the eastern side of campus. The office of the Undergraduate Program Director is located here in room 103. The building contains numerous classrooms, offices, research laboratories, and attached greenhouse facilities. Faculty in French Hall are those with interests in floriculture, plant genetics, and ornamental horticulture.

Stockbridge Hall is located on the northwestern side of campus, near the Campus Center. The building contains the administrative offices of the College of Natural Resources and the Environment in addition to classrooms and research laboratories. Plant and Soil Sciences faculty in Stockbridge Hall have interests in soil science, medicinal and aromatic plants, weed science, and turfgrass management.

Bowditch Hall is located on the northwestern side of campus. The building includes several classrooms and research laboratories in addition to attached greenhouse facilities. Faculty in Bowditch Hall have interests in agronomy, pomology, vegetable crops, and sustainability studies.

Agricultural Engineering Building is located on the northwestern side of campus (in the vicinity of Stockbridge and Bowditch Halls). This building includes several classrooms, offices, and research facilities. Faculty housed in this building have interests in insect biology and ecology, integrated pest management, and extension outreach in entomology.

Research & Teaching Facilities

The Department has numerous **greenhouses** on campus which include more than 11,000 square feet of bench space. These facilities are located adjacent to French Hall and Bowditch Hall, and they are utilized extensively for classroom exercises and student research activities. Students enrolled in such courses as plant propagation, greenhouse management, horticultural crop production, herbaceous plants, hydroponics, organic farming, plant nutrition, as well as herbs, spices and medicinal plants receive hands-on training within the greenhouse facilities.

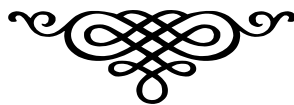
Off-campus facilities include over 300 acres of farm land utilized for studies in turf, ornamental, vegetable, agronomic, small fruits, and orchard crops.

The **South Deerfield Farm**, in South Deerfield, Massachusetts, encompasses more than 100 acres dedicated to the study of agronomic crop production, including integrated pest management practices, nutrient management, and organic crop production (just to name a few). Students are able to actively participate in several on-going research projects at the farm during the spring, summer, and fall months.

The **Joseph Troll Turf Research Facility** in South Deerfield, Massachusetts, encompasses 14 acres dedicated to the study of turfgrass culture and management. A state-of-the-art building was erected on the property in the Spring of 2005 to be used for teaching and research activities and various outreach functions.

The **Horticultural Research Center** in nearby Belchertown, Massachusetts, encompasses more than 200 acres and includes an experimental orchard as well as a controlled-atmosphere storage facility for post-harvest studies. With over 80 planted acres of land, the Horticultural Research Center orchard is a living laboratory where students learn pruning, tree training, cultivar identification, post harvest handling, integrated pest management, and other production practices.

The Department also maintains and manages the **Durfee Conservatory**, a University plant resource located adjacent to French Hall. This arboretum, which dates back to the mid 1800's, contains many rare plants and collections including a small "rain forest." Amid the hustle and bustle of campus, the Conservatory and its many gardens offer students and visitors a treat for the senses. Several departmental courses utilize the Conservatory as a living laboratory to examine the unique collection of tropical and foliage plants.



Appendix A
List of Course Offerings

Plant, Soil, and Insect Sciences Current Course Offerings

PLSOILIN

100 -- Basic Plant Science (Fall & Spring)

(BS) 3 cr, Gerber (Fall) / Autio (Spring), 210 French/205 Bowditch.

Lecture. Stresses general aspects of plant growth, physiological responses of plants to the environment, and manipulation of the plants and their environment to further horticultural production.

Required text: Hartmann's Plant Science. Three exams. Prerequisite: none, high school chemistry recommended.

101 – Insects & Related Forms (Spring, first seven weeks)

2 cr, Childs, 204 Ag. Eng.

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

Prerequisite: none. **Formerly: ENTOMOL 104.**

102 -- Introductory Botany (Fall)

4 cr, Han, 204-B French

Lecture, lab, discussion. Structure, function, and reproduction of economic crop plants. Emphasis on the flowering plants. Lab quizzes, hour exams, final. Prerequisite: none. Stockbridge and PLSOIL majors only.

103 – Plant Science (Spring, first seven weeks)

2 cr, Gerber, 308 Bowditch

Lecture. For Stockbridge students only. This class is an introduction to basic plant physiology. The objective of the course is to examine primary means by which environmental factors influence plant growth and development. Three exams. Prerequisites: none.

104 – Plant Nutrients (Spring, first seven weeks)

2 cr, Cox, 210 French

Lecture. For Stockbridge students only. Functions of mineral nutrients in plants, effects of mineral deficiencies, and sources of these nutrients to prevent or alleviate deficiencies in crop production. Three one hour exams. Prerequisite: PLSOILIN 105.

105 -- Soils (Fall - Stockbridge only / Spring open enrollment)

(BSL) 4 cr, Picking, 103 French (Fall version) // Simkins, 12A Stockbridge (Spring version)

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

Three hour-exams. Prerequisite: high school chemistry or equivalent.

106 – Soils (Spring)

(BS) 3 cr, Simkins, 12A Stockbridge

Lecture only. Same as PLSOILIN 105 described above.

107 -- Turfgrass Insects (Spring, second eight weeks)

2 cr, Vittum, 316 Ag. Eng.

Lecture. Principles and practical methods of controlling turf insect pests. Prerequisite: PLSOILIN 101. **Formerly listed as: ENTOMOL 107.**

109 -- Insects of Ornamentals (Fall)

3 cr, Childs, 204 Ag. Eng.

Lecture and 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: PLSOILIN 101, senior standing, or consent of instructor. **Formerly listed as: ENTOMOL 105.**

111 – Horticultural Plant Pathology (Fall)

3 cr, Cooley, Clark Hall

Lecture. Stockbridge Students only. 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. Prerequisite: PLSOILIN 102. **Formerly listed as: MICROBIO 104.**

112 – Lab Plant Pathology –Turf (Fall)

1 cr, Wick, 109 Fernald

Lab. Stockbridge Turfgrass students only. Diagnosis and management of turfgrass diseases. Diagnosis techniques and appropriate cultural, chemical, genetic, and biological management strategies. Prerequisite: PLSOILIN 111. **Formerly listed as: MICROBIO 105.**

113 – Lab Plant Pathology – Woody Plants (Fall)

1 cr, Lab. Stockbridge students only. A field laboratory on the diagnosis and management of the health problems of woody plants. Students learn to recognize the major plant diseases of trees and shrubs using materials on campus. Disease management options presented on an individual basis in a clinical context. Prerequisite: PLSOILIN 111. **Formerly listed as: MICROBIO 106.**

114 - Lab Plant Pathology – Flori, Fruits & Veg (Fall)

1 cr, Lab. Stockbridge Horticulture and Fruit & Vegetable Crops students only. Students learn to use a microscope, and culture for fungi and bacteria from diseased plants. Emphasis on important diseases of floriculture and vegetable crops in the northeast. Prerequisite: PLSOILIN 111 (may be taken concurrently). **Formerly listed as: MICROBIO 107.**

115 -- Plants, Soils, and the Environment (Spring)

(SI) 3 cr, Picking, 103 French

Lecture, discussion. Introduction to understanding the biological and physical relationships among plants, soils and the environment. Exploring how various human activities impact the environment with specific attention to plant and soil resources. Topics include: ecosystem sustainability, ecosystem structure and function; agriculture and the impacts of biotechnology; pest control and food access; soil conservation; wetlands; water pollution and treatment technologies; and resource conservation. Text: Environmental Science, 8th edition, Nebel and Wright. Three hour exams, class discussions, three short writing assignments, and Saturday field trip. Prerequisites: none.

120 -- Organic Farming and Gardening (Fall & Spring)

(BSL) 3 cr, Barker, 202 Bowditch

Lecture, lab/discussion. Introduction to principles of soil fertility and crop management by organic procedures which are contrasted and evaluated against conventional chemical methods of farming. A science course. Texts: Notes on Organic Farming and Gardening, Barker, 2004; and notes from the PLSOIL 120 web page (<http://www.unix.oit.umass.edu/~plsoil120>), Guide to Fertilization of Garden and Landscape Plants, Barker, 1999. Exams or quizzes, lab reports, essays.

126-- Insects & Human Society (Fall & Spring)

(BS) 3 cr, faculty and staff

Lecture. Survey with emphasis on the successful design of insects and their innovative features. Aspects of insect biology, including communication, defense, feeding, and mating behaviors. Social behavior with a focus on termite, ant, and honey bee societies. Beneficial uses of insect such as silk and pollination, and negative interactions with humans, including disease vectors, parasites, and crop pests. Slides, videos, and live insects used extensively. Not for majors in biological sciences. Prerequisite: none. **Formerly listed as: ENTOMOL 126.**

130 – Science of Animal Behavior

(BS) 3 cr, Lecture. Examines the discipline of animal behavior. Topics include an introduction to scientific hypothesis testing; how social influences have influenced the study of animal behavior; the evolutionary, genetic, and neurobiological causes of behavior; and major modern areas of study within the discipline such as foraging, sexual selection, and cognition. Examples will be drawn from across animal groups. Writing assignments are a focus. No prerequisites.

Formerly listed as: ENTOMOL 130.

160 – Plant Diseases: Feast / Famine

(BS) 3 cr, Cooley/Manning

Lecture. Plant diseases and their effects on food supplies and human history. Biology of pathogens that cause plant diseases, pesticide use, disease resistance, biologic control, and diseases that threaten important world crops. **Formerly listed as: MICROBIO 170.**

166– Practical Beekeeping

3 cr, Noonan

Lecture. The practical aspects of beekeeping understood in terms of the life cycle of the bee and the bee colony, and the place of bees in our world. Learning how to acquire, set up, and manage bee colonies. Dissection may be required. Prerequisite: none. **Formerly listed as: ENTOMOL 166.**

181– Introduction to Integrated Pest Management

2 cr, Lecture. Topics include a survey of the biological, chemical, and cultural tools for control of insect, weed, and disease pests and how to select and combine control methods in an effective and environmentally responsible manner. Prerequisite: senior standing in Stockbridge School of Agriculture or consent of instructor. **Formerly listed as: ENTOMOL 181.**

182-- Principles of Pesticide Management (Spring)

2 cr, Childs, 204 Ag. Engin.

Lecture. 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 Examination. Prerequisite: none. **Formerly listed as: ENTOMOL 182.**

190C– Biodiversity

3 cr, Lecture. Explores the question, “Why are there so many different kinds of living things?” Topics include the nature, origins, and co-existence of species; adaptive radiations; patterns of diversity across Earth’s history and geography; and the causes of extinction, both ancient and modern. Intended primarily for non-science majors with a strong interest in the natural world. Prerequisite: none, but high school biology and basic knowledge of world geography are recommended. **Formerly listed as: ENTOMOL 190C.**

200 -- Plant Propagation (Fall)

3 cr, Lecture, 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. Text (recommended): Plant Propagation, Principles and Practices, Hartmann, Kester, Davies, and Geneve; 6th ed. Lab quizzes, hour exams, final. Prerequisite: BIOLOGY 103 or equivalent (may be taken concurrently)

210 -- Retail Floral Design (Fall)

3 cr, Garrabrants, 103 Stockbridge

Lecture, lab. Emphasis on the techniques and diversity of styles utilized by professional florists. The principles involved in creating and constructing marketable floral arrangements including wedding and funeral designs. Term project, two exams, weekly grading of lab projects. Open to PLNTSOIL and Stockbridge horticulture majors only or with consent of instructor.

230 -- Introductory Turfgrass Management (Fall)

3 cr, Ebdon, 12F Stockbridge

Lecture, 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, mowing, etc. Text: Turfgrass Management, Turgeon. Lab quizzes, two one-hour exams, final. Prerequisites: PLSOILIN 102 and 105 (may be taken concurrently) or consent of instructor.

232 -- Turf Machinery (Spring, last eight weeks)

2 cr, Griffin, 12-D Stockbridge

Lecture. Preventative maintenance, small engine operation, carburetors, fuels, electrical systems, and hydraulic systems. Must have web access to take class.

234 -- Irrigation and Drainage (Spring)

4 cr, Griffin, 12-D Stockbridge

Lecture, discussion. 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 is also covered.

235 -- Pruning Fruit Crops (Spring)

2 cr, Autio, 205 Bowditch

Lecture, lab. Theory and practice of pruning deciduous fruit plants/trees. Practical, hands-on experience is the focus of the class. Grades will be based on several quizzes and class participation.

240 – Applied Calculations in Turfgrass Mgt (Spring)

2 cr, Ebdon, 12F Stockbridge

Lecture. 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: PLSOILIN 230.

255 -- Herbaceous Plants (Spring)

3 cr, Cox, 210 French

Lecture, lab. Study and identification of herbaceous plants; their uses as ornamental plants for home, park, and business. Weekly quizzes, two exams, one lab final, and a term project.

265 -- Sustainable Agriculture (Fall)

3 cr, Gerber, 308 Bowditch

Lecture, lab. This course is designed for both agriculture and non-agriculture students who want to explore ethical, practical, scientific and personal aspects related to the quest for long-term agricultural sustainability. Students will evaluate specific farming, food systems, and lifestyle practices from economic, social, and environmental perspectives. The course includes field trips, lectures, readings, discussion of current topics, and individual research. No prerequisites, but some knowledge of basic agricultural principles helpful.

271– Using Insects in the Classroom (Fall)

(BS) 3 cr, Stoffolano, 204A Fernald

Lecture. Hands-on, open-ended experiences with live insects used in the classroom. Development of integrated educational units that use insects but focus on art, history, music, and mathematics. Experiences in using microscope, raising live insects, collecting and observing insects, making an insect collection. The biology of the insect compared to the human system. Prerequisite: none.

Formerly listed as: ENTOMOL 271.

275 -- Turfgrass Physiology and Ecology (Spring)

3 cr, Lecture. An introduction to basic concepts in agricultural chemistry as related to the growth and culture of turfgrasses for the first half of the semester. The second half of the semester details the overall growth and development of grasses including such areas as soil fertility and mineral nutrition. Prerequisite: PLSOILIN 230.

280 -- Herbs, Spices, and Medicinal Plants (Spring)

(BS) 3 cr, Craker, 12A Stockbridge

Lecture, 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 with discussions on bioactivity of plant extracts. Laboratory practice in seeding, growing, oil extraction, and utilization of these plants. Examinations, project and identification of selected herbs. No prerequisite.

290S – Sustainable Living (Spring)

3 cr, Gerber, 308 Bowditch

Lecture. This course will be offered to anyone wanting to learn how to live more lightly on the planet. Global issues of sustainability will be discussed including energy, food, land, waste, housing, personal health, and community. Discussions will focus on holistic personal decision-making. Includes community service learning requirement.

297B – Medicinal Botany (Fall)

1 cr, Craker/Staff

Lecture. An exploration of plants as botanical remedies and the principles underlying the resurgence of plant materials for medicinal use. Class focuses on scientific evidence in support of traditional herbalism. Discussion topics include medicinal studies and reassessments of botanical medicines that have been discarded by conventional medical practices, but which may be helpful in treating human ailments. Demonstrations of traditional techniques for producing herbal extracts are used to relate botany to medicine. No prerequisites.

297F -- Commercial Floral Design II (Fall)

3 cr, Garrabrants/McDonald, 103 Stockbridge

Lecture, lab. Advanced floral design techniques used to create innovative arrangements, wedding, and funeral designs. Students will design with fresh, silk, and dried flowers. In addition, managing a flower shop will be discussed including marketing, pricing, purchasing, personnel management, and promotional programs. The laboratory will provide the practical experience for the design techniques presented. Term projects, two exams, weekly grading of lab projects. Pre-requisite: PLSOILIN 210.

300 -- Deciduous Orchard Science (Fall, odd years)

3 cr, Greene, 304 Bowditch

Lecture, lab. Principles and practices involved in the establishment and management of deciduous orchards. Prerequisites: PLSOILIN 102 (may be taken concurrently).

305 – Small Fruit Production (Fall, even years)

3 cr, Greene, 304 Bowditch

Lecture, lab. Principles and practices governing the establishment and management of small fruit plantings. Prerequisites: PLSOILIN 102 (may be taken concurrently).

310 -- Principles of Weed Management (Fall)

3 cr, Bhowmik, 10 Stockbridge

Lecture, 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. Text: Fundamentals of Weed Science, 2nd ed., Zimdahyl, R.C.; Academic Press, New York.

315 -- Greenhouse Management (Fall)

4 cr, Boyle, 211 French

Lecture, lab. An introduction to the greenhouse environment and the technology used in production of greenhouse crops. Lab includes greenhouse experiments in seed propagation and 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. Text: Greenhouse Management, Langhans; 3rd ed. Four one-hour exams, take-home problem sets. Prerequisite: BIOLOGY 103 or equivalent (may be taken concurrently).

321 -- Greenhouse Crop Production I (Fall)

3 cr, Han, 204B French

Lecture, lab. Greenhouse culture of seasonal crops, stressing modern concepts of production and management. Prerequisite: BIOLOGY 103 or equivalent and PLSOILIN 315.

325 -- Vegetable Crop Production (Spring)

4 cr, Mangan, 201 French

Lecture, lab. This course focuses on sustainable practices used to produce vegetable crops. This course is for students who want to grow vegetable crops or work in the vegetable industry. Topics include specific practices used for the major vegetable crops grown in New England, water and soil fertility management, season extenders, and crop rotation. Prerequisite: PLSOILIN 102 and 100 or BIOLOGY 101 or 103.

326 -- Insect Biology

3 cr, Lecture. 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. Other 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. Prerequisite: none. **Formerly listed as: ENTOMOL 326.**

327 -- Insect Biology Lab

1 cr, Lab. Designed to demonstrate information covered in the lecture part of the course and to help students learn various entomological techniques (i.e., how to collect, identify, and preserve insects). Lab work with live insects affords students an opportunity to observe various body parts at work and to see what internal structures are present. Several field trips, dissections of several insects, and a collection required. **Formerly listed as: ENTOMOL 327.**

335 -- Greenhouse Crop Production II (Spring)

4 cr, Han, 204-B French

Lecture, lab. Greenhouse culture of spring greenhouse crops. Project, two exams and a final. Prerequisites: PLSOILIN 315 and PLSOILIN 321.

340 – Advanced Turfgrass Management (Spring)

3 cr, Ebdon, 12F Stockbridge

Lecture. Management of environmental stress in turfgrass. Special practices in managing high quality turfgrass areas such as golf courses, athletic fields, and ornamental areas. Prerequisites: PLSOILIN 230 and 275.

342 – Pesticides, Public Policy and the Environment (Fall)

3 cr, Vittum, 316 Ag. Engin.

Lecture. Current issues associated with pesticide use; includes discussion of role of pesticides in agriculture, public health, and other related areas; fate of pesticides in the environment; and public perception of pesticides. Case studies examine benefits and risks of pesticide use; environmental cancer; and role of media and public interest groups in pesticide decisions. Alternatives to current heavy reliance on chemical technology in pest control. Current and pending federal, state, and local legislation. Prerequisite: none. Same as: ENVIRSCI 342. **Formerly listed as: ENTOMOL 342.**

350 -- Crop Science (Spring)

3 cr, Herbert, 207 Bowditch

Lecture, lab. An examination of crop management and farming systems for forage and field crop production. Cultural requirements and physiological responses of crops. Illustrations of concepts, discussions of topics and examination of distinguishing morphological characteristics of selected crop species during laboratory sessions. Quizzes, mid-term, final. Prerequisites: BIOLOGY 103 or PLSOILIN 100 or 102.

360 -- Nursery Management (Spring)

4 cr, Lecture, lab. This is a comprehensive course in nursery crops production, covering administrative and cultural practices used in the production of both field-grown and container-grown ornamental plants. Topics include site selection, organization, inventory control, nutrient management, irrigation, plant growth and development, alternative production systems, overwintering, and pest control with an emphasis on integrated pest management. Weather conditions require that lectures be held during the first half of the semester, with labs conducted in the second half. Prerequisites: PLSOILIN 105. ENVIRDES 335 highly recommended.

365 -- Hydroponics (Spring)

4 cr, Barker, 202 Bowditch

Lecture, lab. Instruction and practice on soilless culture of plants by hydroponics. Topics include plant nutrition, nutrient solutions, media, systems and techniques of hydroponics, and marketing. Two lectures and two laboratories per week. Exam, final exam, lab reports. Prerequisite: PLNTSOIL 105, 120 or consent of instructor. Chemistry recommended.

370 -- Tropical Agriculture (Fall)

3 cr, Herbert, 207 Bowditch

Lecture. 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. WebCT page with crop images and written materials. No pre-requisites.

375 -- Soil and Water Conservation (Fall, even years)

3 cr, Veneman, 19 Stockbridge

Lecture, lab. Soil management related to water and wind erosion control. Environmental aspects of erosion. Cropping, tilling and management effects on erosion and water quality. Landscape and soil sustainability. Principles of soil drainage. Midterm and final exams, term paper, class presentations. Prerequisite: PLSOILIN 105 or equivalent.

380 -- Technical Writing (Fall and Spring)

3 cr, Craker, 12A Stockbridge

Discussion. Satisfies the junior year writing requirement for PLNTSOIL, ENT, AND PLPATH majors, through a series of writing exercises based on the types of written materials commonly used in agricultural sciences. Exercises include developing and writing professional correspondence, resumes, reports, and bibliographies. Work individually and in groups to master sentence and paragraph structure. Oral presentation required. Prerequisite: ENGLWRIT 112 or equivalent.

390A – Pests of Human Habitats

3 cr, Hollingsworth, 201 Ag. Engin.

Lecture and lab. An overview of arthropod, vertebrate and other pests in urban environments. Identification, biology and management of the pests of residences and other structures, vectors of human disease, and other organisms affecting human health and comfort will be covered. Application of integrated pest management principles will be discussed, with an emphasis on the influence of planning and design in the prevention of pest problems. Prerequisite: An introductory entomology course or permission of instructor. **Formerly listed as: ENTOMOL 390A.**

391A – Dialogue on Agricultural Issues (Fall)

1 cr. Gerber, 210 Bowditch/308 Bowditch

A classroom dialogue and web-based course intended to introduce students to controversial agricultural issues; explore diverse perspectives; and develop an individual and community-based understanding of current issues affecting American agriculture. Examples of issues that may be included are: sustainability, alternative economies, organic agriculture, spirituality, genetic engineering, food safety, green revolution, urban farming and others suggested by students. This course will include weekly readings, exploratory dialogue, and reflective writings. Junior, senior, or graduate student standing required. Some knowledge of agriculture is helpful but not required. Mandatory Pass/Fail grading.

397A – Ethnobotany I: The Shaman’s Pharmacy (Spring)

1 cr, Kilham/Craker, 12A Stockbridge

Explores traditional, plant-derived medicines among various world cultures, backed by first-hand knowledge from field research. Learn about beneficial compounds in plants, and about medicinal plant preparation. In The Shaman’s Pharmacy, you will see, touch, smell, and taste herbal potions. You will view extraordinary slides from the Amazon, India, China, and other cultures, and learn about environmental preservation, shamans, medicine men and women, and nature’s bounty of beneficial plants. No prerequisites.

397C -- Community Food Systems (Spring)

3 cr, Staff

Lecture, lab. This class will explore the movement of food from the grower to the consumer. Emphasis will be on how consumers get access to food from emergency and non-emergency sources. Direct marketing, Community-Supported Agriculture, farmers’ markets, and small-scale farming will be discussed. Outside speakers from area community food banks, CSA’s, non-profit organizations, faith communities, soup kitchens, and farmers’ markets will lead discussions on various topics related to food access. Two one-hour lectures and a two-hour lab/discussion. Service Learning Course.

397F – Integrated Pest Mgt for Greenhouse Crops (Spring, first seven weeks)

2 cr, Smith, 203 French

Integrated pest management (IPM) can be defined as the prevention or suppression of pests (insects, mites, diseases, weeds, and algae) by use of multiple management strategies that are eddective, economically feasible, and safe for growers, consumers, and the environment. This course will focus on IPM practices for commercial greenhouse crops. Through weekly reading assignments, emphasis will be placed on major greenhouse pests including identification, life cycles, monitoring and management strategies. Students will participate in greenhouse IPM scouting exercises.

397I - Insect Natural History Field Course (Fall)

1 cr, Van Driesche, 320 Ag. Engin.

Field trips, labs. This course is intended to stimulate interest in insect biology through encounter and observation with live insects in field settings. Students will take a series of field trips to various habitats to find and observe live insects and discuss their biology, ecology and importance.

No prerequisites.

397K – Insect Ecology & Management (Fall)

3 cr, Averill, 204G Fernald.

Lecture. Understanding insect life cycles and the role of insects in natural and managed ecosystems. Introduction to the basic insect orders. Discussion of integrated pest management strategies in horticultural, agriculture, and landscape settings. No prerequisites.

397M - Applied Marketing for the Green Industry (Fall)

3 cr, Barstow, 4 Stockbridge Hall.

Lecture/Discussion. Sustainable marketing introduction for students in the green industries with special attention to turfgrass, horticulture and natural products. Two lectures and one discussion period weekly. Development of marketing plans required. No prerequisites.

397P -- Introduction to Plant Physiology (Fall & Spring)

3 cr, Bernatzky, 204A French

Lecture. Provides background on organic compounds and their functions, the structure and function of cell components, examines the processes of respiration and photosynthesis, the genetic manipulation of plants, water relations and solute transport, and environmental effects on plant development. Prerequisites: PLSOILIN 102 or Biology 103 and CHEM 111 or CHEM 110.

397T – Molecular Systematics Lab (Spring, even years)

3 cr. Normark, 204B Fernald. Understand the diversity and evolutionary history of organisms by analyzing DNA sequences. Learn all the basic lab techniques (such as specimen curation, DNA preparation, PCR, and gel electrophoresis) in this intensive laboratory course. Gain analytical and software skills necessary for using DNA sequencing data to infer phylogenetic trees and explore evolutionary questions. Prerequisites: BIOLOGY 100 and 101. Capacity limited to 10 students.

398G -- Greenhouse Practicum

1 cr, Beauchesne, French Hall Greenhouses

Students will receive individualized instruction from the greenhouse staff. Greenhouse practicum will focus on teaching the following skills: 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).

PLNTSOIL

505 – General Plant Pathology (Fall)

4 cr, Wick, 109 Fernald.

Lecture, lab. Causes, nature, and control of plant diseases. Diagnosis of plant diseases. Mechanisms, biochemistry, and genetics of plant disease induction, development, and control. Prerequisite: course in plant biology. **Formerly listed as: MICROBIO 530.**

510 – Management & Ecology of Plant Diseases (Spring)

3 cr, Cooley, Clark Hall

Lecture. 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. Independent project. Prerequisite: Introductory course in biology. **Formerly listed as: MICROBIO 515.**

515 -- Microbiology of Soil (Spring)

3 cr, Simkins, 12A Stockbridge

Lecture. Microbial processes in the soil and sediment environment. The ecology of the various microbial communities; the 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. Midterms, final. Prerequisites: Basic biology and organic chemistry, or permission of instructor. **Also listed as ENVSCI 515.**

520 -- Crop Physiology (Fall)

3 cr, Herbert, 207 Bowditch

Lecture. Physiology of crop plants, carbon fixation, partitioning, growth and development, competition in crops, environmental factors and yield relationships of crops. Text: Crop Ecology, Loomis, R.S. and D.J. Connor. Prerequisite: PLSOILIN 325 or 350 or consent of instructor.

525 -- Mycology (Fall, even years)

4 cr, Manning, 207 Fernald

Lecture, lab. Biology, ecology, physiology, and taxonomy of fungi. Includes consideration of fungi as causes of diseases in animals, plants, and humans, and their uses in biotechnology applications such as bioremediation. Prerequisites: BIOLOGY 100 & 101. **Formerly listed as: MICROBIO 520.**

530 -- Plant Nutrition (Fall)

4 cr, Barker, 202 Bowditch

Lecture, discussion, lab. The acquisition, translocation, distribution, and function of the essential inorganic elements in plants. Genetic control of plant nutrition and ecological adaptation of plants to nutritional variables. Diagnosis of plant nutritional disorders. Text: Mineral Nutrition in Higher Plants, Marschner. Quizzes, lab reports, problems, final. Optional honors section available. Prerequisite: PLSOIL 100 and 105, CHEM 112 or equivalent courses.

535 -- Diagnostic Plant Pathology (Spring, odd years)

4 cr, Wick, 109 Fernald

Lecture, lab. Methods of diagnosing plant diseases caused by fungi, bacteria, viruses, nematodes, and abiotic agents considered using specimens collected by students. Prerequisite: PLNTSOIL 505. **Formerly listed as: MICROBIO 535.**

540 -- Plant Breeding (Fall)

3 cr, Bernatzky, 204A French

Lecture. Introduction to the principles of plant breeding. Basic breeding methods and the new techniques of genetic engineering, reproductive systems of crop plants, inbreeding depression and hybrid vigor, interspecific hybridization, use of genetic markers for crop improvement, breeding for disease resistance, and conservation of germplasm. Hour exams, project, and final. Prerequisite: BIOL 283 or similar course in introductory genetics.

545 -- Postharvest Physiology (Spring)

4 cr, Han, 204B French

Lecture. The basic biochemical and physiological processes occurring in fruits, vegetables, and flowers after harvest; postharvest treatments to modify these processes. Text: Postharvest: An Introduction to the Physiology and Handling of Fruits and Vegetables, Wills, et al., 4th ed. (1998). Reading of periodicals required. Hour exams, final. Prerequisite: Plant Biology course and CHEM 111, or permission of instructor.

550 -- Plant Growth Regulators in Agriculture (Spring)

3 cr, Greene, 304 Bowditch

Lecture. Lectures focus on the influence that naturally occurring plant hormones have on regulating physiology, growth and development in plants. Also discussed are the uses and potential uses of synthetic plant growth regulators, cultural techniques, and horticultural practices to improve the production of food, fiber, and ornamental plants. Prerequisite: PLNTSOIL 397P

555 – Environmental Stress & Plant Growth (Fall - alternate years)

3 cr, Manning, 207 Fernald

Lecture. Identification and discussion of environmental stress factors that affect growth and success of plants. Emphasis will be placed on woody plants and turfgrass in urban/suburban environments. Criteria will be developed to fit plants to various types of urban sites, depending on site characteristics. Plant response to light, temperature, water, salt and other soil pollutants, soil compaction, and air pollutants will be considered as well as mechanisms of tolerance or avoidance. Lectures plus one field trip. Three written exams, student paper, no final exam. Prerequisites: Introductory plant science course, Plant physiology preferred, or consent of instructor.

560 -- Advanced Weed Science (Spring- odd years)

3 cr, Bhowmik, 10 Stockbridge

Lecture. Ecological concepts in weed management; historical and ecological perspectives. Weed-crop competition and allelopathy; reproductive strategy; seed dormancy, seed production, allocation of resources in perennial weeds. The physiology and biochemistry of herbicides in plants and their relationships with the soil environment. Prerequisite: PLSOILIN 310 or consent of instructor.

565 -- Soil Formation, Classification and Land Use (Spring)

4 cr, Veneman, 19A Stockbridge

Lecture, lab, field trips. Effect of environmental factors on soil formation and land use. Relationship between soil morphology, classification and use interpretations. Application of soils information to on-site sewage disposal, wetland identification and other environmentally significant problem areas. Text: Soil Morphology, Genesis, and Classification, Fanning and Fanning. Hour exams, final, term paper, lab reports, some full day field trips. Prerequisite: Introductory course in chemistry, geology, soil or environmental science; or consent of instructor.

570 – Soil Physics

3 cr. Lecture. Physical properties of soils and how they relate to water and solute movement in hydrologic systems, energy exchange, plant-soil relations, environmental problems, and soil-water management. Text: Introduction to Soil Physics, Hillel. Two hour exams, final. Prerequisites: Introductory course in chemistry, geology, soil or environmental science; or consent of instructor.

572 – Nematology

4 cr, Wick, 109 Fernald

Lecture, lab. Biology and identification of soil nematodes. Parasitism of plants and management practices stressed. Prerequisite: PLNTSOIL 505. **Formerly listed as: MICROBIO 572.**

575 -- Environmental Soil Chemistry (Fall)

4 cr, Xing, 12B Stockbridge

Lecture, lab. The course describes fundamental chemical concepts/processes in soils such as precipitation/dissolution, ion exchange, redox reactions, partitioning and absorption, and solution speciation and nature of soil minerals and organic matter. These concepts and computer models are used to examine some current environmental, agricultural, and engineering problems. The course also addresses how the chemical processes affect fate, transport, and availability, remediation of heavy metals and organic contaminants in soils and other related terrestrial environments. Problem sets, quizzes, midterm, and final. Prerequisites: CHEM 111 & 112, PLNTSOIL 105. **Also listed as ENVIRSCI 575.**

580 -- Soil Fertility (Fall)

3 cr, Cox, 12C Stockbridge

Lecture. 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. Text to be determined. Four hour-exams, final. Prerequisites: PLSOILIN 102 and 105, introductory chemistry.

597A - Phyto/Bioremediation (Fall)

3 cr, Parkash, 202 French

Lecture. This course will cover the 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 a special emphasis on toxic metals will be discussed. Prerequisites: BIOLOGY 100, or 103, or PLSOILIN 397P or equivalent course.

597G – Plant Genetic Engineering (Spring)

3 cr, Parkash, 202 French

Lecture. This course will familiarize students with concepts and current status of plant genetic engineering for crop improvement and health applications, covering with wide range of topics for engineering plants for abiotic and biotic stresses, metabolic engineering for nutrient enhancement, and risk assessment of engineered crops.

597L -- Wetland Delineation (Fall - odd years)

3 cr, Veneman/Tiner, 19 Stockbridge

Lecture, lab. Wetland delineation using vegetation, hydrology and soils. Vegetation identification and herbarium collection, hydric soil identification, wetland hydrology indicators. Text. Various titles, class handouts. One final exam, paper, field projects, class presentation. Prerequisite: knowledge of chemistry.

597O -- Organic Contaminants in Soils, Waters, and Sediments (Fall - even years)

3 cr, Simkins, 12A Stockbridge

Lecture. Transport and fate of manmade compounds in natural and managed environments: abiotic and biotic effects including partitioning, interfaces, concentration, biodegradation and biotransformation. Examination of specific examples of compounds and classes of contaminants in affected environments, such as pesticides and petroleum products in soil and ground water. Prerequisites: basic biology and organic chemistry; knowledge of biochemistry helpful.

597P – Origin & Future of Crops (Spring)

3 cr, Boyle, 211 French

Lecture. This course will review the current knowledge about the origin of the world's crops and examine genetic changes brought about by domestication of wild plants, dispersal from their centers of origin, and plant breeding. Texts: Crops and Man, 2nd edition (1992) by Harlan; and Guns, Germs, and Steel: the Fates of Human Societies (1998) by Diamond. Three hourly exams. Prerequisite: must have taken at least one genetics course or permission of instructor.

597S -- ST -- Agricultural Systems Thinking (Spring - odd years)

3 cr. Gerber, 210 French

Lecture. To provide students with an opportunity to learn and practice holistic systems of thinking to deepen their understanding of complex food and agricultural systems. Prerequisites: none.

597W -- Artificial Wetlands for Wastewater Treatment (Fall)

3 cr, Spokas/Veneman, 19 Stockbridge

Lecture. Aquatic plant selection, sizing, and design techniques. Pollution parameters of primary concern are BOD, suspended solids, nutrients, heavy metals, pathogens, organics. Treatment applications include primary and secondary effluents and sludges; storm water and agricultural runoff; solid and hazardous waste leachates, liquids, industrial wastes. Field trips, weekly homework assignments, student projects. Text: Natural Systems for Waste Management and Treatment, Reed, et al. Hourly and final exams. Prerequisites: college algebra, introductory chemistry, introductory physics, biology; or consent of instructor.

597V – Integrated Turf Management (Spring)

3 cr., Vittum, 316 Ag.Engineering

Lecture. This capstone course will stress concepts of Integrated Pest Management and review stress management and pest management strategies. Each student will develop an IPM plan for a turf setting. Prerequisites: PLSOILIN 107, PLSOILIN 310, PLSOILIN 340, PLNTSOIL 505. Enrollment restricted to Seniors.

597X -- Inorganic Contaminants in Soil, Water, and Sediment (Spring- alternate years)

3 cr, Xing, 12B Stockbridge

Lecture. The course discusses physical, chemical, and biological factors affecting the fate and transport of heavy metals and other inorganic contaminants in soil, water, and sediment. The course also provides an introduction to the heavy metals chemistry, sources, pedogenic and geochemical behavior, and methods used for their analysis. Additionally, remediation technologies, options, and goals are also presented. Short reports, midterm and final, term paper, and class presentation. Prerequisites: CHEM 111 & 112, college algebra, knowledge of transition metal chemistry, or permission from instructor.

ENTOMOL

511 – Insect Behavior (Spring, odd years)

3 cr, Averill, 204G Fernald

Lecture. Specific behaviors of insects analyzed from physiological, ecological, and evolutionary perspectives. Topics include communication, defense, learning, competition, spacing patterns, orientation mechanisms, dispersal and migration, host and mate finding, food selection, feeding, courtship, production of young, and social behavior. Prerequisite: PLSOILIN 326 (formerly ENTOMOL 326) or equivalent, or consent of instructor.

523 – Biological Control (Spring, even years)

3 cr, Van Driesche, 320 Ag. Engin.

Lecture. Ecological principles of pest suppression via conservation, augmentation or introduction of natural enemies of insects, plants, and other pests. Biological control presented as foundation of sustainable agriculture and integrated pest management. Applications discussed for biological control in both production systems (farming, forestry) and for protection of natural ecosystems and rare species from damage caused by invasive, exotic pests. Prerequisite: none

572 – Forest and Shade Tree Entomology (Spring, odd years)

3 cr, Elkinton, 310 Ag. Engin.

Lecture, lab. Ecology, biology and control of insects which attack shade trees, forests and forest products. A brief introduction to insects; attention to the more important forest and shade tree insects.

581 – Integrated Pest Management (Spring, odd years)

4 cr, Van Driesche, 320 Ag. Engin.

Lecture, 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. Prerequisite: PLSOILIN 326 and PLNTSOIL 505, or consent of instructor.

590A – Insect Microbiology

3 cr, Lecture. Introduction to insect microbial interactions; attention to pathogenic microorganisms; including viruses, fungi, bacteria, and protozoa; concentration on the molecular basis of pathogenesis. Prerequisite: none

597A – Insect-Plant Interactions (Fall)

3 cr, Adler, 204C Fernald

Lecture. This course covers the ecology and evolution of insect-plant interactions in basic and applied contexts. Lectures, discussions, and readings will examine insect-plant interactions and the consequences at multiple levels. Prerequisites: suggested that students have taken an introductory ecology class, and a statistics course.