Horticulture: Plants and People

Spring, 3(2-2) R: Not open to juniors or seniors in the Department of Horticulture.

Horticulture Career Development

Fall, 1(1-0)
Internship preparation and identification of employment opportunities. Career goal establishment, resume construction, correspondence development, personal budgeting, interview skills and strategies.

Pruning and Training Systems in Horticulture

Spring of odd years, 3(2-2) R: Open only to the Applied Plant Science major.

Landscape Plants I

Fall, 3(2-2)
Identification, adaptation, and evaluation of shade trees, narrow-leaved evergreens, shrubs, woody vines, herbs, ornamental grasses, and herbaceous perennials.

Landscape Plants II

Spring, 3(2-2)
Identification, adaptation, and evaluation of flowering trees and shrubs, broad-leaved evergreens, herbaceous vines, ground covers, bulbs, wildflowers, ferns, and aquatic plants.

Landscape Maintenance

Fall, 2(2-2) R: Open only to students in the Institute of Agricultural Technology.
Ornamental plant management. Plant growth and development. Pruning, fertilization, irrigation, weed control, transplanting, development of landscape management specifications; integrated pest management and plant health care programs.

Landscape Maintenance Field Laboratory

Fall, 1(0-2) P: HRT 213 or concurrently R: Open only to students in the Institute of Agricultural Technology.
Landscape maintenance. Site analysis. Pruning woody plants, transplanting by hand and mechanical tree spade, and planting techniques for ornamentals. Herbaceous perennial care, cutting back, dividing. Scouting as a component of integrated pest management and plant health care programs.

Landscape and Turfgrass Business Operations

Spring, 2(3-0) R: Open only to students in the Institute of Agricultural Technology, SA: AT 082 Not open to students with credit in AT 082.
Organizing, marketing, and directing a business enterprise within the turf and landscape industry. Project estimating, bidding, payroll, equipment, and accounting. Offered first ten weeks of semester.

Landscaping Industries Seminar

Fall, 1(0-2) R: Interest or experience in the 'green industries'. R: Open only to students in the Institute of Agricultural Technology, SA: HRT 064 Not open to students with credit in HRT 207 or HRT 064.
Landscape, nursery and related 'green industry' firms. Career opportunities. Horticulture operations, products, services and marketing practices. Personal and professional development.

Landscape Construction

Fall, 3(2-2) R: Open only to students in the Institute of Agricultural Technology, SA: HRT 076 Not open to students with credit in HRT 076.
Construction installation techniques encountered in landscape development. Field installation of patios, retaining walls, ponds, and plant materials. Construction estimating and bidding procedures. Field Trip required.

Landscape Irrigation

Spring, 3(3-3) R: Open only to students with credit in HRT 078.
Design, installation and maintenance of irrigation systems for turfgrass and landscape plants. Design hydraulics, equipment selection, pump stations, water features, water quality and conservation. Offered the first ten weeks of the semester.

Landscape Computer Aided Design

Spring, 2(3-0) R: CSE 101 or CSS 110
Computer Aided Design (CAD) for landscape design. Calculations, take offs, perspective drawings using AutoCAD software. Offered first ten weeks of semester.

Greenhouse Structures and Management

Fall, 3(3-0)
Planning and operation of a commercial greenhouse. Structures, covering, heating, cooling, ventilation, irrigation, fertilization, root media, and pest control. Field Trips required.

Ornamental Grasses

Fall of even years, 3(3-0)
Selection, propagation, production, garden design, and maintenance of ornamental grasses for landscape use. Invasive issues and responsible use of ornamental grasses in the landscape. Class meets first five weeks of semester.

Passive Solar Greenhouses for Protected Cultivation

Fall, 1(1-0)
Season extension and year-round vegetable, herb, flower, and fruit production in unheated, low-cost, passive solar greenhouses. Marketing options, site selection, site preparation, structures, and organic crop management methods. Field trip required.

Organic Transplant Production

Spring, 1(1-0)

Culinary and Medicinal Herbs

Summer, 1(1-0)
245 Specialty Cut Flowers  
Summer. 1(1-0)  

251 Organic Farming Principles and Practices  
Spring. 3(3-0) Interdepartmental with Crop and Soil Sciences. Administered by Horticulture. 
History and principles of organic farming. Farms as ecological systems. Certification process and agencies. Organic matter management, the soil food web, and nutrient availability. Biodiversity, crop rotations, plant competition, ground cover, and plant health. Integrating crops and animals. Organic animal husbandry. Field trip required.

252 Organic Certification and Farm Plans  
Fall. 1(1-0) P: HRT 251 
Organic certification requirements as specified by the USDA National Organic Program and implemented by certifying agencies. Methods of record keeping and farm plans for specialty crop, field crop, perennial fruit, and livestock farms. Organic processing and marketing.

253 Compost Production and Use  
Summer. 1(1-0) 
Process and methods of composting, maturity and quality analysis, and use of compost products at home and farm scale. Field trip required.

254 Organic Produce Direct Marketing  
Fall. 1(1-0)  

255 Organic Produce Wholesale Marketing  
Fall. 1(1-0) 

256 Study a Farm  
Summer. 3(1-2) P: HRT 251 
Field trips to visit Michigan organic farms, farmers' markets, food distributors and retailers to observe farming and marketing methods and learn from farmers. Field trips required.

259A Student Organic Farm Practicum I  
Spring. 3(0-9) R: Open to agricultural technology students. SA: HRT 259 
Intensive organic vegetable, fruit, herb, and flower farming by direct involvement in the weekly activities and operation of the MSU Student Organic Farm. Equipment basics, soil fertility, field cultivation, harvesting, post-harvest handling, summer hoop-houses, and farm stand operations.

259B Student Organic Farm Practicum II  
Summer. 4(0-12) P: HRT 259A R: Open to agricultural technology students. SA: HRT 259 
Intensive organic vegetable, fruit, herb, and flower farming by direct involvement in the weekly activities and operation of the MSU Student Organic Farm. Equipment basics, soil fertility, field cultivation, harvesting, post-harvest handling, summer hoop-houses, and farm stand operations.

259C Student Organic Farm Practicum III  
Spring. 3(0-9) P: HRT 259B R: Open to agricultural technology students. SA: HRT 259 
Intensive organic vegetable, fruit, herb, and flower farming by direct involvement in the weekly activities and operation of the MSU Student Organic Farm. Harvest and post-harvest handling, crop storage, fall hoop-houses, cover crops, crop specialty planting, organic farm plan, crop plan, farm stand, and community-supported agriculture.

260 Independent Study in Horticulture  
Fall, Spring. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to students in the Institute of Agricultural Technology. SA: HRT 075 
A planned learning experience developed by the student in cooperation with a faculty member.

301 Nursery Management  
Fall. 3(2-3) P: (HRT 203 or concurrently) and (HRT 204 or concurrently) SA: HRT 071, HRT 210 
Management and cultural practices of field and container grown nursery operations. Site selection and development, financing, legal restrictions, personnel management, production practices, nutrition, irrigation, weed and pest control, modification of plant growth, storage, shipping, and marketing.

311 Landscape Design and Management Specifications  
Spring. 4(3-2) Interdepartmental with Landscape Architecture. Administered by Horticulture. P: HRT 211 and (HRT 212 or concurrently) 
Landscape design techniques, spatial organization, plant selection, plant and site interaction. Relationship between design, construction and maintenance. Preparation of planting and maintenance specifications.

323 Floriculture Production: Herbaceous Perennials and Annuals  
Spring. 3(2-3) P: HRT 203 and HRT 203L and HRT 204 or concurrently and HRT 221 
Commercial greenhouse and outdoor production of herbaceous perennials, annuals, and other plants typically sold in retail nurseries for outdoor gardens. Plant identification, propagation, production, scheduling, and finishing procedures based on specific plant growth requirements. Plant selection, marketing, and retailing issues.

332 Tree Fruit Production and Management  
Fall. 2(1-3) P: HRT 203 or HRT 251 
Commercial apple, cherry, peach, and pear production. Cultural practices to manipulate growth and development and optimize fruit yields and quality. Field trips required.

334 Current Issues in Viticulture and Enology  
Spring of even years. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open to agricultural technology students and open to students in the Department of Horticulture. 

335 Berry Crop Production and Management  
Fall. 3(3-0) P: HRT 203 or (HRT 251 or concurrently) SA: HRT 440, HRT 442 
Field production of vegetable crops. Marketing systems, direct marketing, vegetable markets, u-pick, restaurants. Crop scheduling and marketing. Field trip required.

341 Vegetable Production and Management  
Spring. 3(2-3) P: HRT 203 or (HRT 251 or concurrently) SA: HRT 440, HRT 442 
Field production of vegetable crops. Marketing systems, direct marketing, vegetable markets, u-pick, restaurants. Crop scheduling and marketing. Field trip required.

342 Turfgrass Physiology  
Spring. 2(3-0) Interdepartmental with Crop and Soil Sciences. Administered by Crop and Soil Sciences. P: (CSS 233) Completion of Tier I writing requirement. RB: PLB 105 SA: CSS 282, CSS 068 Not open to students with credit in CSS 332. 
Physiological principles of turfgrass growth and development. Water relations, light, temperature, respiration, photosynthesis, mineral nutrition, and hormone action. Impact of mowing, cultivation, and traffic on turfgrass growth. Offered first ten weeks of semester.

351 Special Topics  
Fall, Spring. 1 to 2 credits. A student may earn a maximum of 9 credits in all enrollments for this course. Specific topics in horticulture of current interest and importance. Possible field trips. Offered half of semester.

401 Physiology and Management of Herbaceous Plants  
Fall. 3(3-0) P: HRT 361 or PLB 301 R: Not open to freshmen or sophomores. 
Physiological and floral responses of herbaceous plants to light, temperature, nutrients, and gases. Management of these factors for optimum production.

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403 Handling and Storage of Horticultural Crops  
Fall. 3(2-3) P: BS 161 or PLB 105 R: Not open to freshmen or sophomores. SA: HRT 482  
Biological principles involved in quality maintenance of horticultural products. Control of deterioration during harvesting, handling, transport, and storage.

404 Horticulture Management (W)  
Spring. 3(2-2) P: Completion of Tier I writing requirement. RB: (EC 201 or EC 202) and (HRT 203 and HRT 204) or (CSS 370 or FOR 404) R: Open only to seniors in the College of Agriculture and Natural Resources. SA: HRT 488  
Integration of management, economic, marketing, and horticultural production principles to develop personnel, financial, and resource strategies. Horticultural business plan development in a team situation. Effects of business decisions on people and profits.

407 Horticulture Marketing  
Fall. 3(2-2) RB: (HRT 203 and HRT 204) and (EC 201 and EC 202) or (HRT 210 or concurrently) or (HRT 322 or concurrently) or (HRT 323 or concurrently) or (HRT 331 or concurrently) or (HRT 341 or concurrently)  
Demographic and purchase trends of perishable horticultural commodities including landscape and floral crops, and fruits and vegetables. Market segmentation and product targeting, distribution, branding and packaging, and advertising and promotion. Services as a critical component of strategic business planning.

408 Agricultural Services Marketing  
Spring of even years. 1(3-0) P: HRT 203 RB: HRT 407 R: Not open to freshmen. Products and services for horticulture marketing. Marketing agricultural services to a diverse customer base. Class meets first five weeks of semester.

411 Landscape Contract Management  
Fall. 3(2-2) RB: HRT 311  

413 Sustainable Landscape Practices  
Spring of even years. 1(3-0) P: HRT 203 and (HRT 211 or HRT 212)  
Landscaping construction and maintenance to minimize adverse environmental effects. Site protection, restoration, plant selection, bioengineering, green roofs, water issues, and maintenance practices. Class meets last five weeks of semester.

414 Ornamental Conifers  
Fall of odd years. 1(3-0) P: HRT 211 or HRT 212 or FOR 204  
Taxonomy, ecology, and production of important conifers for landscape and Christmas trees. Class meets first five weeks of semester.

415 Natural Landscapes, Native Plants and Landscape Restoration  
Fall. 3(3-0) P: HRT 211 or HRT 212 or BS 162 or LB 144 R: Not open to freshmen.

Natural landscapes, native plants and landscape restoration options for natural and built environments. Planning and design approaches, site engineering, construction practices, and management guidelines. Case studies, regulatory policies, contract services, resources and issues. Field trip required.

417 Sustainable Sites and Environmental Landscape Practices  
Fall. 3(3-0) P: HRT 211 or HRT 212 R: Not open to freshmen.  
Sustainable sites and environmental landscape practices integrated into the built environment. Planning and design approaches, site engineering, construction practices, and management guidelines. Case studies, specifications, certification programs.

419 Landscape Design Practicum  
Fall. Spring, 2 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P: HRT 111 or HRT 311 R: Approval of department; application required. Application of landscape design theory and practice to landscape development projects. Client interaction, site visits and design, plan development, and construction and management specifications. Residential, commercial and public landscape projects.

424 Sustainable Agriculture and Food Systems: Integration and Synthesis  
Fall. 3(3-0) Interdepartmental with Crop and Soil Sciences and Environmental Studies and Agriscience. Administered by Crop and Soil Sciences. P: CSS 124 RB: CSS 101 or CSS 360 or CSS 431 or ENT 479 or HRT 203 or HRT 251 or HRT 341 or EEP 255 or EEP 260 or EAA 434) or (ESA 444 or GEO 410) R: Open to juniors or seniors or graduate students.  

430 Exploring Wines and Vines  
Fall. 3(3-0) RB: Must be 21 years of age. R: Approval of department. Consumer-oriented study of wine history, production methods, climatic influences, cultural impacts, social responsibility, and economic impact of wine industry as part of modern agriculture. Sensory evaluation and its relationship to food pairings. Field trip required.

432 Principles and Practices of Grape Production  
Spring of even years. 3(3-0) P: CEM 141 and CEM 161 and CSE 101 R: Open to agricultural technology students and open to students in the Department of Horticulture.  
Grapevine physiology, structure, and function. Techniques for vineyard establishment. Cultivar and rootstock selection, influence of environmental factors on vine growth, pre-plant site selection and preparation, training and trellising systems, cultural practices for canopy management, and methods of crop control.

441 Plant Breeding and Biotechnology  
Spring of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Forestry. Administered by Crop and Soil Sciences. P: CSS 101  
Plant improvement by genetic manipulation. Genetic variability in plants. Traditional and biotechnological means of creating and disseminating recombinant genotypes and cultivars. Importance of plant breeding to our food system, economy, and environment.

451 Biotechnology Applications for Plant Breeding and Genetics  
Spring. 3(2-2) Interdepartmental with Crop and Soil Sciences and Forestry. Administered by Crop and Soil Sciences. RB: (CSS 350 or ZOL 341) and CSS 441  
Principles, concepts, and techniques of agricultural plant biotechnology. Recombinant DNA technology, plant molecular biology and transformation in relation to plant improvement.

477 Pest Management I: Pesticides in Management Systems  
Fall of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Entomology and Fisheries and Wildlife. Administered by Entomology. RB: (CEM 143 or CEM 251) and (PLP 405 and CSS 402) and (ENT 404 or ENT 470) R: Open to juniors or seniors or graduate students. Chemistry, modes of action, and environmental fate of pesticides. Product development and regulation. Social aspects of pesticide use.

478 Pest Management II: Biological Components of Management Systems (W)  
Spring of even years. 3(2-3) Interdepartmental with Crop and Soil Sciences and Entomology and Forestry and Fisheries and Wildlife. Administered by Entomology. P: (ENT 404 or ENT 470 or PLP 405 or CSS 402) and completion of Tier I writing requirement. Principles of host plant resistance and biological control and their relationship to the design of agrocosystems. Classification of insect biological control agents.

480 Woody Plant Physiology  
Spring. 3(3-0) Interdepartmental with Forestry. Administered by Horticulture. P: BS 162 or PLB 105 R: Not open to freshmen or sophomores.  
Physiology of carbon utilization. Effects of water, temperature, nutrition, and light on apical, vegetative, and reproductive growth of woody plants.

486 Biotechnology in Agriculture: Applications and Ethical Issues  
Fall of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Forestry and Philosophy. Administered by Horticulture. P: BS 161 or PLB 105 RB: CSS 350 or ZOL 341 R: Not open to freshmen or sophomores.  
Current and future roles of biotechnology in agriculture: scientific basis, applications. Environmental, social, and ethical concerns.

490 Independent Study  
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P: HRT 203 and HRT 203L and HRT 204 R: Approval of department; application required. Independent study of horticulture on a field, laboratory, or library research program of special interest to the student.

491 Selected Topics in Horticulture  
Fall. Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P: HRT 203 and HRT 203L and HRT 204 R: Not open to freshmen or sophomores. Selected topics in horticulture of current interest and importance.
492 Undergraduate Research
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 3 credits in all enrollments for this course. P: HRT 203 and HRT 204 R. Approval of department; application required. Mentored field or laboratory research experience.

493 Professional Internship in Horticulture
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. A student may earn a maximum of 6 credits in all enrollments for any or all of these courses: ABM 493, AEE 493, ANR 493, ANS 493, COMP 493, CSS 493, CSS 493, EEP 493, ESA 493, FIM 493, FSC 493, FW 493, HRT 493, PKG 493, PLP 493, and PRR 493. P: HRT 203 and HRT 203L and HRT 204 R: Open only to juniors and seniors in the College of Agriculture and Natural Resources. Approval of department; application required. Professional career-related work experience supervised by a professional horticulturist.

812 Laboratory Research Techniques
Fall, 2(1-3) R: Open to graduate students in the Department of Horticulture. Demonstration and experience using various research techniques.

816 Environmental Design Theory
Fall. 3(3-0) Interdepartmental with Human Environment and Design and Landscape Architecture and Park, Recreation and Tourism Resources. Administered by Landscape Architecture. RB: Undergraduate design degree recommended. Differences between normative theories, scientific theories, models, and constructs. Exploration of normative theories related to thesis or practicum.

817 Environmental Design Studio
Fall, Spring. 3(0-6) Interdepartmental with Human Environment and Design and Landscape Architecture and Park, Recreation and Tourism Resources. Administered by Landscape Architecture. P: (LA 816 and LA 883) RB: Undergraduate design degree. Development of a student-selected environmental design project in a collaborative setting.

819 Advanced Plant Breeding
Fall of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Forestry. Administered by Horticulture. RB: STT 422 and ZOL 341. Genetic expectations resulting from breeding strategies with cross- and self-pollinated crop plants. Germplasm collections, mapping populations, and modifications of reproductive biology useful for crop improvement.

820 Plant Reproductive Biology and Polyploidy
Spring of odd years. 1(3-0) Interdepartmental with Crop and Soil Sciences and Forestry and Plant Biology and Plant Pathology. Administered by Horticulture. RB: Introductory Genetics and Plant Biology. Genetic processes underlying variations in plant reproductive biology and polyploidy. Utilization of these characteristics in plant breeding.

821 Crop Evolution
Spring of odd years. 1 credit. Interdepartmental with Crop and Soil Sciences and Forestry and Plant Biology and Plant Pathology. Administered by Horticulture. RB: Introductory Genetics and Plant Biology. Cultural and biological aspects of the evolution of domestic plants.

822 Historical Geography of Crop Plants

842 Population Genetics, Genealogy and Genomics
Fall. 3(3-0) Interdepartmental with Animal Science and Crop and Soil Sciences and Forestry and Fisheries and Wildlife and Genetics. Administered by Forestry. RB: Pre-calculus, basic genomics. Population genetic processes underlying patterns of molecular genetic variation. Genealogical approaches to the study of genomic diversity, phylogenetic reconstruction, and molecular ecology.

853 Plant Mineral Nutrition
Fall of odd years. 3(3-0) Interdepartmental with Crop and Soil Sciences. Administered by Crop and Soil Sciences. RB: PLB 301 Inorganic ion transport in plant cells and tissues. Physiological responses and adaptation to problem soils. Genetic diversity in nutrient uptake and use by plants. Physiological roles of elemental nutrients in crop growth.

863 Environmental Plant Physiology
Spring of odd years. 3(3-0) Interdepartmental with Plant Biology. Administered by Plant Biology. RB: PLB 301 or PLB 414 or PLB 415 SA: BOT 863 Interaction of plant and environment. Photobiology, thermophysiology, and plant-water relations.

865 Plant Growth and Development
Fall of even years. 3(3-0) Interdepartmental with Plant Biology. Administered by Plant Biology. RB: PLB 415 SA: BOT 866 Genetics and biochemistry of development in higher plants as influenced by genes and environment. Biosynthesis, action and signal transduction of phytohormones and other signaling molecules. Pattern ing, meristem organization and formation of tissues and organs. Genetic mechanisms underlying developmental diversity.

883 Environmental Design Seminar
Fall, Spring. 3(3-0) Interdepartmental with Human Environment and Design and Landscape Architecture and Park, Recreation and Tourism Resources. Administered by Landscape Architecture. RB: Undergraduate design degree. Examination of the breadth of environmental design projects. Literature review of focused projects. Development of practicum or thesis proposals.

890 Independent Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department. Individual study of problems of special interest.

891A Selected Topics in Horticulture
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in the Department of Horticulture. Approval of department. Horticultural science topics of current interest and importance.

891B Selected Topics in Plant Breeding and Genetics
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Crop and Soil Sciences and Forestry. Administered by Horticulture. R: Open only to graduate students in the Plant Breeding and Genetics major or Genetics major. Approval of department. Selected topics in plant breeding.

892 Plant Breeding and Genetics Seminar
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Crop and Soil Sciences and Forestry. Administered by Horticulture. Experience in review, organization, oral presentation, and analysis of research.

894 Horticulture Seminar
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 4 credits in all enrollments for this course. Experience in review, organization, oral presentation and analysis of research.

898 Master's Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department. Master's degree Plan B project.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to graduate students in the Department of Horticulture. Master's thesis research.

941 Quantitative Genetics in Plant Breeding
Spring of even years. 3(2-2) Interdepartmental with Crop and Soil Sciences and Forestry. Administered by Crop and Soil Sciences. RB: CSS 819 and STT 464 Theoretical and genetic basis of statistical analysis of quantitative traits using genetic markers. Computational tools for the study of quantitative traits.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students in the Department of Horticulture. Doctoral dissertation research.