997. Readings in Asian History
Fall, Winter, Spring. 4 credits. May reenroll for a maximum of 40 credits.

998. Directed Reading
Fall, Winter, Spring, Summer. 4 credits. May reenroll for a maximum of 16 credits. Graduate students; approval of department. Supervised individual reading on special topics and fields.

999. Master’s Thesis Research
Fall, Winter, Spring. Variable credit. Approval of department.

0101A. Doctoral Seminar
Fall. 3(3-0) Admission to doctoral program in history.
HST 901A, HST 901B and HST 901C constitute a three-term seminar required of students entering doctoral program. Under guidance of dissertation director and course instructors student will prepare major research paper and submit for criticism by all participants. Grades are given for the three terms at the end of HST 901C.

0101B. Doctoral Seminar
Winter. 3(3-0) HST 901A.
Continuation of HST 901A.

0101C. Doctoral Seminar
Spring. 3(3-0) HST 901B.
Continuation of HST 901B.

999. Doctoral Dissertation Research
Fall, Winter, Spring. Variable credit. Approval of department.

HISTORY OF ART
See Art.

HORTICULTURE

College of Agriculture and Natural Resources

101. Principles of Horticulture
Fall, Spring. 4(3-2) Not open to students with credit in HRT 201.
Principles of horticultural science and horticultural crop production, as related to fruits, vegetables, flowers and landscape plants.

201. Greenhouse Cut Flower Production
Fall. 4(3-2)
Commercial cut flower production including scheduling, cultural conditions, equipment, and management decisions. Laboratory provides live crops for study and discussion.

209. Foliage Plants
Fall. 4(3-2)
Identification, culture, propagation, and utilization of common foliage plants with emphasis on species and cultivars used for interior plantscapes.

211. Ornamental Trees and Narrow-leaved Evergreens
Fall. 4(2-4)
Identification, adaptation and evaluation of trees, deciduous shrubs, narrow-leaved evergreens and woody vines. Emphasis is on the aesthetic and functional uses of trees and shrubs in the landscape.

212. Ornamental Flowering Shrubs and Broad-leaved Evergreens
Spring. 4(2-4) HRT 211 or approval of instructor.
Identification, adaptation and evaluation of trees, deciduous shrubs, broad-leaved evergreens, woody vines and ground covers. Emphasis is on the flowering characteristics and aesthetic and functional uses of plants in the landscape.

221. Commercial Plant Propagation
Winter. 4(3-2) HRT 101.
Principles of plant propagation by seed, cutting, layering, and grafting employed by nurseries; use of growth regulators and environmental treatments in plant propagation.

319. Small Fruit Production
(419.) Winter of odd-numbered years. 3(3-0) HRT 101, BOT 205, BOT 301.
Commercial production culture, utilization and physiology of strawberries, grapes, blueberries and raspberries.

320. Tree Fruit Production
Fall. 4(3-2) HRT 101, Juniors.
Commercial production of principle tree fruit crops of Michigan with emphasis on planting, soil management, fertilization, pruning, thinning, and grafting.

325. Ornamental Plant Management
Spring. 4(3-2) HRT 101, HRT 211, HRT 312.
Transplanting and maintenance of landscape plants subject to stresses of urban environment. Development of annual maintenance specifications. Identification and evaluation of herbaceous annuals, biennials and perennials for landscape.

326. Herbaceous Ornamental Plants
Summer. 4(3-3) HRT 101 or BOT 205 or approval of department.
Identification, evaluation, and utilization of annual, biennial, and herbaceous perennial plants for landscape. Includes bulbs, herbs, grasses, ferns, and cultivated plants.

330. Special Problems
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.
Individual work on a field, laboratory or library research problem of special interest to the student.

331. Selected Topics
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits if different topic is taken. Approval of department.

350. Floral Design
Spring. 2(0-4) Junior majors and approval of department.
Principles of floral design and the care and handling of materials. Creation of consolages, terraria, tropical plants, and home, hospital and novelty arrangements.

402. Principles of Weed Control for Horticultural Crops
Spring. 4(3-2) CEM 143, BOT 301.
Principles underlying weed control practices for horticultural crops. Weed biology and factors involved in biological, cultural, mechanical and chemical control. Collection of 40 weed species required.

406. Principles of Plant Breeding
Winter. 4(3-2) CSS 250. Interdepartmental with and administered by the Department of Crop and Soil Sciences.
Application of genetics and other sciences to breeding and improvement of agronomic and horticultural crops.

410. Fruit Tree Physiology I
Winter of even-numbered years. 4(4-0) Juniors. BOT 301, HRT 101.
Physiological effects of nutrition, moisture, light, temperature and culture as related to tree fruit crops.

412. Fruit Tree Physiology II
Winter of odd-numbered years. 3(3-0) Juniors. HRT 101, BOT 301.
Physiology of flowering and fruit development in woody plants with special reference to chemical and cultural methods of manipulation.

416. Handling and Storage of Horticultural Crops
Winter of even-numbered years. 4(3-2) Juniors.
Biological principles involving physical movement of fresh products from farm to consumer; physiological processes affecting maturity, quality and condition; selection and use of handling, storage, and transport facilities.

417. Controlled Plant Environment
Fall. 3(3-0) HRT 101, BOT 301 or BOT 414.
Control of greenhouse environment and its effect on growth and production of horticultural crops.

418. Controlled Plant Environment Laboratory
Fall. 2(1-2) HRT 417 or concurrently. Experiments in the morphology and physiology of greenhouse crops. Crop production and use of greenhouse equipment.

434. Greenhouse Container-Grown Plant Production
Winter. 4(3-2) HRT 415 or approval of department.
Principles of flower crop physiology; management of container-grown plant production.

435. Commercial Bedding Plant Production
Spring of odd-numbered years. 4(3-2) HRT 417, HRT 438, HRT 434.
Production and marketing of bedding plants. Includes germination, soils, transplanting, environmental factors, production practices, major species, structures, equipment, systems, problems, economics and marketing. One field trip required.

440. Nursery Management
Fall. 3(2-2) Juniors.
Management practices applied to wholesale nursery production and marketing. One all-day field trip to visit nurseries is required.
452. Warm Season Vegetables
Spring, 3(0-0) HRT 101, BOT 301, CSS 301.
Winter season vegetable crops with emphasis on botany, taxonomy, morphology, growth processes, production, harvesting, handling, quality and composition.

453. Warm Season Vegetables Laboratory
Spring, 1(0-2) HRT 452 or concurrently.
Identification of seeds and plants and factors affecting germination, sex expression, permanent flowering, bulb and tuber formation.

456. Cool Season Vegetables
Fall, 3(3-0) HRT 101, BOT 301, CSS 301.
Cool season vegetable crops, with emphasis on botany, taxonomy, morphology, growth processes, production, harvesting, handling, quality and composition.

457. Cool Season Vegetables Laboratory
Fall, 1(0-2) HRT 456 or concurrently.
Mineral nutrition, fertilizer placement and sources, herbicide action, weed competition, plant identification and post-harvest conditions for vegetables.

801. Research Procedures in Plant Science
Winter. 4(3-2) Approval of department. Ordinarily approach to problems of biological research in relation to basic principles of research.

805. Physiology of Horticultural Crops
Winter of even-numbered years. 4(3-2) BOT 415.
Physiology of grafting, senescence, flowering of woody plants, fruiting, senescence, bud and seed dormancy as related to horticultural crops. Emphasis on critical review of literature.

810. Seminar
Fall, Winter. 1(0-1)

814. Plant Breeding and Genetics Seminar
Winter. 1(1-0) May reenroll for a maximum of 2 credits. Approval of department. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. Administered by the Department of Crop and Soil Sciences.

815. Selected Topics in Plant Breeding and Genetics
Fall, Winter, Spring, Summer. 2 to 5 credits. May reenroll for a maximum of 12 credits if different topics are taken. Approval of department. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. Administered by the Department of Crop and Soil Sciences. Selected topics in plant breeding including: host-plant resistance, nutrition and quality, computerized records and data analysis, classical literature and strategies for improving field, horticultural and forestry crops.

816. Special Problems in Plant Breeding and Genetics
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 8 credits. Approval of department. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. Students may conduct research in a laboratory, greenhouse or field-plot on a selected subject or study selected published literature under the supervision of a faculty member.

821. Genetic Concepts in Plant Breeding
Fall, 3(3-0) CSS 250 or ZOL 441. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. Administered by the Department of Crop and Soil Sciences.
Genetic structure of plant populations, gene action, inbreeding, outbreeding, heterosis, linkage and recombination, genetic architecture of traits, genetic distance.

822. Plant Breeding Systems
Winter, 3(3-0) CSS 821, STT 422. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. Breeding systems for improvement of self and cross pollinated and vegetatively propagated crops. The genetic basis for parent selection.

823. Plant Breeding Methods
Spring, 3(3-0) HRT 822, STT 423. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. Administered by the Department of Crop and Soil Sciences. Methods, strategies and practices in organization and operation of plant breeding programs. Emphasis on practical application of classical, modern and futuristic approaches to plant breeding.

825. Post Harvest Physiology
Winter of odd-numbered years. 4(3-2) BOT 416. Biochemical and biophysical changes associated with the maturation, ripening and senescence of harvested horticultural plants.

830. Special Research Problems
Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 12 credits. Approval of department.

831. Selected Topics
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits if different topics are taken. Approval of department.

836. Evolution of Crop Plants
Spring of odd-numbered years, 3(0-0) CSS 821 or approval of department. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. Cultural and biological aspects of evolution under domestication; origin and diversity of cultivated plants.

838. Tissue Culture for Plant Breeding
(840) Winter of even-numbered years. 3(2-2) BOT 414, CSS 821. Interdepartmental with the departments of Crop and Soil Sciences, and Forestry. The application of plant cell, protoplast and tissue culture methodologies and principles to crop improvement.