Horticulture

Undergraduate Study

To meet the educational needs of a student population with interests ranging from the biology of plants to landscape design/installation to fruit and vegetable production to golf course construction and management, considerable flexibility is built into the horticulture curriculum. The diversity of interests and need for flexibility are reflected in the impressive array of horticulture courses.

The Department of Horticulture offers six options within the horticulture major:
1. Greenhouse Plant Production
2. Horticultural Food Crop Production and Management
3. Landscape Design, Installation, and Management
4. Public Horticulture
5. Science
6. Turfgrass Management

Graduates possess the technical knowledge and skills to become professional horticulturists. They understand principles of life science, plant growth and development, and are familiar with cultural and management principles for a wide assortment of horticultural crops. They are able to work and communicate effectively with fellow horticultural professionals and other citizens who share an interest in horticulture. Graduates also understand the ethical and environmental dimensions of problems and issues facing horticultural professionals.

A degree in horticulture opens the door to employment opportunities with production nurseries, seed companies, interior landscaping firms, greenhouses, garden centers, conservatories, landscape design/installation firms, public gardens and arboretas, orchards and vineyards, food processing companies, vegetable farms, golf courses, sports fields, sod production companies, and lawn care businesses. Several allied plant-science industries also provide employment opportunities in the areas of sales, management, and communication.

Opportunities exist for careers in research, teaching, extension, and business after obtaining advanced training in graduate school.

Curriculum in Horticulture

Students majoring in horticulture will select an option in which to specialize before reaching junior standing and will fulfill the requirements described below under Options.

A horticulture minor is available. The requirements appear under Horticulture, Courses and Programs.

Total Degree Requirement: 129 credits (cr.)

Only 65 cr. from a two-year institution may apply which may include up to 16 technical cr.; 9 P-NP cr. of free electives; 2.00 minimum GPA

International Perspective: 3 cr.
3 cr. from approved list 3

Total Credits 3

U.S. Diversity: 3 cr.
3 cr. from approved list 3

Total Credits 3

Communications Proficiency (with a grade of C or better)

6 credits of English composition (see approved courses below)
6 credits of speech fundamentals (see approved courses below)

Communication/Library: 13 cr.
ENGL 150 Critical Thinking and Communication 3
ENGL 250 Written, Oral, Visual, and Electronic Composition 3
ENGL 302 Business Communication 3
or ENGL 314 Technical Communication 3
LIB 160 Information Literacy 1
One of the following: 3
SP CM 212 Fundamentals of Public Speaking
AGEDS 311 Presentation and Sales Strategies for Agricultural Audiences
COMST 214 Professional Communication

Total Credits 13

Humanities and Social Sciences: 6 cr.
Approved Humanities course 3
Approved Social Science course 3

Total Credits 6

Ethics: 3 cr.
3 cr. from approved list 3

Total Credits 3

Life Sciences: 6 cr.
BIOL 211 Principles of Biology I 3
Approved Life Sciences course 3

Total Credits 6

Mathematical Sciences: 6 cr.
Select one course from the following: 3
MATH 140 College Algebra
MATH 150 Discrete Mathematics for Business and Social Sciences
MATH 165 Calculus I
MATH 181 Calculus and Mathematical Modeling for the Life Sciences I

AND select one of the following: 3
STAT 101 Principles of Statistics
STAT 104 Introduction to Statistics
STAT 226 Introduction to Business Statistics I
STAT 401 Statistical Methods for Research Workers

Total Credits 6

Physical Sciences: Minimum of 11 cr.
Complete one of the following: 5
CHEM 178 General Chemistry II
& 178L and Laboratory in General Chemistry II
or CHEM 317 General Chemistry III & 317L and Laboratory in General Chemistry III

AND complete one course from the following: 3-4
BBMB 221 Structure and Reactions in Biochemical Processes
CHEM 231 Elementary Organic Chemistry
& 231L and Laboratory in Elementary Organic Chemistry
CHEM 331 Organic Chemistry I & 331L and Laboratory in Organic Chemistry I

AND complete one course from the following: 3-5
AGRON 259 Organic Compounds in Plant and Soils (AND complete one course from the following:)
BBMB 221 Structure and Reactions in Biochemical Processes
CHEM 178 General Chemistry II & 178L and Laboratory in College Chemistry II
CHEM 231 Elementary Organic Chemistry & 231L and Laboratory in Elementary Organic Chemistry
CHEM 331 Organic Chemistry I & 331L and Laboratory in Organic Chemistry I
PHYS 101 Physics for the Nonscientist
PHYS 111 General Physics
PHYS 115 Physics for the Life Sciences

Total Credits 11-14

Biological Sciences: 18 cr.
BIOL 211 Principles of Biology I 3
BIOL 211L Principles of Biology Laboratory I 1

Select fourteen credit hours from the following: 14
AGRON 260 Soils and Environmental Quality
AGRON 316 Crop Structure-Function Relationships
AGRON 317 Principles of Weed Science
AGRON 354 Soils and Plant Growth
AGRON 354L Soils and Plant Growth Laboratory
BIOL 312 Ecology
BIOL 313 Principles of Genetics
& 313L and Genetics Laboratory
or GEN 320 Genetics, Agriculture and Biotechnology
BiOL 314 Principles of Molecular Cell Biology
BiOL 330 Principles of Plant Physiology
BiOL 355 Plants and People
BiOL 366 Plant Systematics
BiOL 454 Plant Anatomy
BiOL 474 Plant Ecology
ENT 201 Introduction to Insects
ENT 211 Insects and Society
ENT 370 Insect Biology
ENT 375 Plant Protection Using Natural Enemies
ENT 376 Fundamentals of Entomology and Pest Management
For 475 Urban Forestry
P.L.P 391 Practical Plant Health
P.L.P 408 Principles of Plant Pathology

Total Credits 18

Horticultural Sciences: Minimum of 30 cr.
HORT 110 Professional and Educational Development in Horticulture 1
HORT 221 Principles of Horticulture Science 3
HORT 321 Horticulture Physiology 3
HORT 445 Horticulture Management and Administration 2
Select 21 cr. hours from courses within selected option. 21

Total Credits Minimum of 30

Soil Sciences: 3 cr.
AGRON 154 Fundamentals of Soil Science 3
or AGRON 155 Soils for Horticultural Scientists

Total Credits 3

Electives
No more than 4 cr. of Hort 490 may count toward graduation.

Options

Greenhouse Plant Production

The following core courses must be taken to meet Horticulture requirements:
HORT 240 Trees, Shrubs, and Woody Vines for Landscaping 3
HORT 322 Plant Propagation 3
HORT 330 Herbaceous Ornamental Plants 3
HORT 331X Hydroponic Food Crop Production 3
HORT 332 Greenhouse Operation and Management 4
HORT 434 Fall Greenhouse Crop Production 3
HORT 435 Spring Greenhouse Crop Production 3

Other recommended courses are:
HORT 424 Sustainable and Environmental Horticulture Systems
HORT 442 Nursery Production and Garden Center Management

Required for option:
ACCT 284 Financial Accounting 3

And select 9 cr. hours from the following:
ACCT 215 Legal Environment of Business 9
ACCT 285 Managerial Accounting
ACCT 316 Business Law
AGRON 206 Introduction to Weather and Climate
COM S 103 Computer Applications
ECON 101 Principles of Microeconomics
ECON 102 Principles of Macroeconomics
ECON 230 Farm Business Management
ECON 234 Small Business Management
ECON 334 Entrepreneurship in Agriculture
ENV S 461I Introduction to GIS
MGMT 310 Entrepreneurship and Innovation

Horticultural Food Crop Production and Management

The following courses are required to meet the Horticulture requirement:
HORT 461 Fruit Crop Production and Management 3
HORT 471 Vegetable Production and Management 2
HORT 471L Vegetable Production and Management Lab 1

Other recommended courses:
HORT 276 Understanding Grape and Wine Science
HORT 322 Plant Propagation
Hort 331X Hydroponic Food Crop Production
HORT 332 Greenhouse Operation and Management
HORT 338 Seed Science and Technology
HORT 465A Horticulture Enterprise Management - Planting
HORT 465B Horticulture Enterprise Management: Harvesting
HORT 465C Horticulture Enterprise Management: Marketing
HORT 484 Organic Agricultural Theory and Practice

Landscape Design, Installation, and Management

The following courses are required to meet the Horticulture requirement:
HORT 240 Trees, Shrubs, and Woody Vines for Landscaping 3
HORT 281 Landscape Graphics 2
HORT 330 Herbaceous Ornamental Plants 3
HORT 341 Woody Plant Cultivars: Shade Trees, Ornamental Trees and Woody Shrubs
Public Horticulture

The following courses are required to meet the Horticulture requirement:

- HORT 240: Trees, Shrubs, and Woody Vines for Landscaping (3 credit hours)
- HORT 282: Educating Youth Through Horticulture (3 credit hours)
- HORT 283: Pesticide Application Certification (2 credit hours)
- HORT 322: Plant Propagation (3 credit hours)
- HORT 330: Herbaceous Ornamental Plants (3 credit hours)

Other recommended courses:

- HORT 281: Landscape Graphics
- HORT 332: Greenhouse Operation and Maintenance
- HORT 342: Landscape Plant Installation, Establishment, and Maintenance
- HORT 351: Turfgrass Establishment and Management
- HORT 351L: Turfgrass Establishment and Management Laboratory
- HORT 380: Principles of Garden Composition
- HORT 381: Beginning Garden Composition Studio

And select 12 credit hours from the following:

- ACCT 215: Legal Environment of Business (3 credit hours)
- ACCT 284: Financial Accounting
- ACCT 316: Business Law
- COM S 103: Computer Applications
- ECON 234: Small Business Management
- ECON 334: Entrepreneurship in Agriculture
- MGMT 310: Entrepreneurship and Innovation
- MGMT 313: Feasibility Analysis and Business Planning
- MGMT 370: Management of Organizations
- MGMT 371: Organizational Behavior
- MKT 340: Principles of Marketing
- MKT 343: Personal Sales
- MKT 442: Sales Management
- MKT 447: Consumer Behavior
- TSM 324: Soil and Water Conservation Management

Turfgrass Management

The following courses are required to meet the Horticulture requirement:

- HORT 240: Trees, Shrubs, and Woody Vines for Landscaping (3 credit hours)
- HORT 351: Turfgrass Establishment and Management (3 credit hours)
- HORT 351L: Turfgrass Establishment and Management Laboratory (1 credit hour)
Minors

The Department of Horticulture offers two minors: 1) Horticulture and 2) Landscape Management. Both minors are earned by taking HORT 221 Principles of Horticulture Science plus 12 additional credits with a maximum of 3 credits at the 200-level and a minimum of 9 credits at the 300-level or above.

The Horticulture minor is a broad-based minor that does not focus within a specific area of horticulture. The 12 additional credits for this minor can be selected from the full list of Horticulture courses.

The Landscape Management minor focuses on landscape management including plant selection, landscape installation and management, and turfgrass management. The 12 additional credits for this minor can be selected from the following courses: HORT 240 Trees, Shrubs, and Woody Vines for Landscaping, HORT 281 Landscape Graphics, HORT 330 Herbaceous Ornamental Plants, HORT 341 Woody Plant Cultivars: Shade Trees, Ornamental Trees and Woody Shrubs, HORT 342 Landscape Plant Installation, Establishment, and Maintenance, HORT 351 Turfgrass Establishment and Management or HORT 444 Landscape Construction Management.

Visit our departmental website at www.hort.iastate.edu .

Graduate Study

The graduate major in horticulture leads to the M.S. (thesis and non-thesis option) and Ph.D. Some faculty members of the department serve as major professors for students in interdepartmental graduate majors in plant biology; genetics and genomics; molecular, cellular, and developmental biology; ecology and evolutionary biology; sustainable agriculture; and environmental science.

Graduates possess a broad understanding of horticulture and the allied plant sciences. They are able to communicate effectively with members of the scientific community, industry groups, and other interested citizens. They are experienced in conducting research and communicating the results from that research. They are capable of addressing and solving complex problems that confront the many horticultural, agricultural, and plant science professions. They also understand the ethical, legal, social, and environmental issues associated with modern agricultural/horticultural practices.