

# MAJOR IN HORTICULTURE, HORTICULTURAL SCIENCE CONCENTRATION

Horticultural Science graduates conduct research to discover new information about plant growth, development, and environmental response. This research can lead to new plant varieties and production methods. The curriculum consists of a solid foundation in the basic natural sciences as well as in agricultural sciences and prepares students for technical and scientific careers in laboratory, greenhouse, or field research. Exceptional students participate in individual research projects coordinated by professors. Graduates in this area often continue their education.

## Learning Objectives

Upon successful completion of this concentration, students will be able to:

1. Describe fundamental principles of plant structure, growth, development, and reproduction as they relate to horticultural crops.
2. Apply principles of soil science, water management, and plant nutrition to optimize plant health and productivity in various horticultural systems.
3. Explain proper propagation methods (e.g., seed, cuttings, grafting, tissue culture) and production techniques used in greenhouse, nursery, and field settings.
4. Utilize modern tools, equipment, and technologies (e.g., precision agriculture, automation, controlled environment agriculture) to improve horticultural efficiency and sustainability.
5. Collect, analyze, and interpret horticultural data to make informed decisions related to plant growth, production systems, and pest management.

## Requirements Effective Spring 2026

### Freshman

|                                                                                                                                                                                                                                                                              |                                                | AUCC | Credits |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------|---------|
| BZ 120                                                                                                                                                                                                                                                                       | Principles of Plant Biology (GT-SC1)           | 3A   | 4       |
| CHEM 111                                                                                                                                                                                                                                                                     | General Chemistry I (GT-SC2)                   | 3A   | 4       |
| CHEM 112                                                                                                                                                                                                                                                                     | General Chemistry Lab I (GT-SC1)               | 3A   | 1       |
| CHEM 113                                                                                                                                                                                                                                                                     | General Chemistry II                           |      | 3       |
| CHEM 114                                                                                                                                                                                                                                                                     | General Chemistry Lab II                       |      | 1       |
| CO 150                                                                                                                                                                                                                                                                       | College Composition (GT-CO2)                   | 1A   | 3       |
| HORT 100                                                                                                                                                                                                                                                                     | Horticultural Science                          | 3A   | 4       |
| HORT 192/LAND 192                                                                                                                                                                                                                                                            | Orientation to Horticulture/Landscape Arch     |      | 1       |
| MATH 124 <sup>1</sup>                                                                                                                                                                                                                                                        | Logarithmic and Exponential Functions (GT-MA1) | 1B   | 1       |
| MATH 125 <sup>1</sup>                                                                                                                                                                                                                                                        | Numerical Trigonometry (GT-MA1)                | 1B   | 1       |
| MATH 126                                                                                                                                                                                                                                                                     | Analytic Trigonometry (GT-MA1)                 | 1B   | 1       |
| 1C ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc</a> )                                                                         |                                                | 1C   | 3       |
| Social and Behavioral Sciences ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences</a> ) |                                                | 3C   | 3       |

### Total Credits

30

### Sophomore

|                                                                                                                                                                                                                                                                 |                                              |    |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----|-----|
| HORT 260                                                                                                                                                                                                                                                        | Plant Propagation                            |    | 4   |
| PH 121                                                                                                                                                                                                                                                          | General Physics I (GT-SC1)                   | 3A | 5   |
| PH 122                                                                                                                                                                                                                                                          | General Physics II (GT-SC1)                  | 3A | 5   |
| SPCM 200                                                                                                                                                                                                                                                        | Public Speaking                              |    | 3   |
| Select one course from the following:                                                                                                                                                                                                                           |                                              |    | 3-4 |
| BUS 150                                                                                                                                                                                                                                                         | Business Computing Concepts and Applications |    |     |
| CS 110                                                                                                                                                                                                                                                          | Personal Computing                           |    |     |
| Advanced Writing ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing</a> )                      |                                              | 2  | 3   |
| Arts and Humanities ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> )                     |                                              | 3B | 3   |
| Historical Perspectives ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives</a> ) |                                              | 3D | 3   |

### Total Credits

29-30

**Junior**

|                                                                                                                                                                                                                                |                                               |    |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----|-----------|
| BZ 440                                                                                                                                                                                                                         | Plant Physiology                              |    | 3         |
| MATH 155                                                                                                                                                                                                                       | Calculus for Biological Scientists I (GT-MA1) | 1B | 4         |
| SOCR 240                                                                                                                                                                                                                       | Introductory Soil Science                     |    | 4         |
| SOCR 330                                                                                                                                                                                                                       | Principles of Genetics                        |    | 3         |
| STAT 301                                                                                                                                                                                                                       | Introduction to Applied Statistical Methods   |    | 3         |
| Select one group from the following:                                                                                                                                                                                           |                                               |    | 5-8       |
| Group A:                                                                                                                                                                                                                       |                                               |    |           |
| CHEM 245                                                                                                                                                                                                                       | Fundamentals of Organic Chemistry             |    |           |
| CHEM 246                                                                                                                                                                                                                       | Fundamentals of Organic Chemistry Laboratory  |    |           |
| Group B:                                                                                                                                                                                                                       |                                               |    |           |
| CHEM 341                                                                                                                                                                                                                       | Modern Organic Chemistry I                    |    |           |
| CHEM 343                                                                                                                                                                                                                       | Modern Organic Chemistry II                   |    |           |
| CHEM 344                                                                                                                                                                                                                       | Modern Organic Chemistry Laboratory           |    |           |
| HORT XXX <sup>2</sup>                                                                                                                                                                                                          |                                               |    | 5         |
| Arts and Humanities ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/</a> 3B #arts-humanities) |                                               |    | 3         |
| Elective                                                                                                                                                                                                                       |                                               |    | 0-3       |
| <b>Total Credits</b>                                                                                                                                                                                                           |                                               |    | <b>33</b> |

**Senior**

|                               |                                             |       |              |
|-------------------------------|---------------------------------------------|-------|--------------|
| AB 420                        | Horticultural Entomology                    |       | 2            |
| BC 351                        | Principles of Biochemistry                  |       | 4            |
| BSPM 361                      | Elements of Plant Pathology                 |       | 3            |
| HORT 310                      | Greenhouse Management                       | 4B    | 4            |
| HORT 454                      | Horticulture Crop Production and Management | 4A,4C | 2            |
| HORT 476                      | Environmental Plant Stress Physiology       |       | 3            |
| HORT 495                      | Independent Study                           |       | 2            |
| HORT XXX <sup>2</sup>         |                                             |       | 6            |
| Elective <sup>2</sup>         |                                             |       | 1-2          |
| <b>Total Credits</b>          |                                             |       | <b>27-28</b> |
| <b>Program Total Credits:</b> |                                             |       | <b>120</b>   |

<sup>1</sup> The equivalent to MATH 117 and MATH 118, if needed, may be taken using elective credits.

<sup>2</sup> Students must select at least 12 credits of upper division (300- to 400-level) horticulture elective and/or free elective courses to bring the

program total of upper division credits to a minimum of 42. Select enough elective credits to bring the program total to 120 credits.

## Major Completion Map

**Freshman**

| Semester 1            |                                                | Critical | Recommended | AUCC | Credits   |
|-----------------------|------------------------------------------------|----------|-------------|------|-----------|
| BZ 120                | Principles of Plant Biology (GT-SC1)           |          |             | 3A   | 4         |
| CHEM 111              | General Chemistry I (GT-SC2)                   | X        |             | 3A   | 4         |
| CHEM 112              | General Chemistry Lab I (GT-SC1)               | X        |             | 3A   | 1         |
| CO 150                | College Composition (GT-CO2)                   |          |             | 1A   | 3         |
| HORT 192/<br>LAND 192 | Orientation to Horticulture/Landscape Arch     |          |             |      | 1         |
| MATH 124              | Logarithmic and Exponential Functions (GT-MA1) |          |             | 1B   | 1         |
| MATH 125              | Numerical Trigonometry (GT-MA1)                |          |             | 1B   | 1         |
| <b>Total Credits</b>  |                                                |          |             |      | <b>15</b> |
| Semester 2            |                                                | Critical | Recommended | AUCC | Credits   |
| CHEM 113              | General Chemistry II                           |          |             |      | 3         |

|                                                                |                                                                                                                                                                                                                                               |   |    |   |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|---|
| CHEM 114                                                       | General Chemistry Lab II                                                                                                                                                                                                                      |   |    | 1 |
| HORT 100                                                       | Horticultural Science                                                                                                                                                                                                                         |   | 3A | 4 |
| MATH 126                                                       | Analytic Trigonometry (GT-MA1)                                                                                                                                                                                                                |   | 1B | 1 |
| 1C                                                             | ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc</a> )                                             |   | 1C | 3 |
| Social and Behavioral Sciences                                 | ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences</a> ) |   | 3C | 3 |
| CO 150 and AUCC 1B must be completed by the end of Semester 2. |                                                                                                                                                                                                                                               | X |    |   |

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**Total Credits** **15**

**Sophomore**

| Semester 3                                         |                                                                                                                                                                                                                         | Critical | Recommended | AUCC | Credits |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|---------|
| PH 121                                             | General Physics I (GT-SC1)                                                                                                                                                                                              | X        |             | 3A   | 5       |
| SPCM 200                                           | Public Speaking                                                                                                                                                                                                         |          |             |      | 3       |
| Select one course from the following:              |                                                                                                                                                                                                                         |          |             |      | 3-4     |
| BUS 150                                            | Business Computing Concepts and Applications                                                                                                                                                                            |          |             |      |         |
| CS 110                                             | Personal Computing                                                                                                                                                                                                      |          |             |      |         |
| Arts and Humanities                                | ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> ) |          |             | 3B   | 3       |
| BZ 120 must be completed by the end of Semester 3. |                                                                                                                                                                                                                         | X        |             |      |         |

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**Total Credits** **14-15**

| Semester 4                                           |                                                                                                                                                                                                                                         | Critical | Recommended | AUCC | Credits |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|---------|
| HORT 260                                             | Plant Propagation                                                                                                                                                                                                                       |          |             |      | 4       |
| PH 122                                               | General Physics II (GT-SC1)                                                                                                                                                                                                             |          |             | 3A   | 5       |
| Advanced Writing                                     | ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing</a> )               |          |             | 2    | 3       |
| Historical Perspectives                              | ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives</a> ) |          |             | 3D   | 3       |
| CHEM 113 must be completed by the end of Semester 4. |                                                                                                                                                                                                                                         | X        |             |      |         |

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**Total Credits** **15**

**Junior**

| Semester 5                           |                                                                                                                                                                                                                         | Critical | Recommended | AUCC | Credits |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------|------|---------|
| MATH 155                             | Calculus for Biological Scientists I (GT-MA1)                                                                                                                                                                           | X        |             | 1B   | 4       |
| SOCR 330                             | Principles of Genetics                                                                                                                                                                                                  |          |             |      | 3       |
| Select one group from the following: |                                                                                                                                                                                                                         |          |             |      | 5-6     |
| Group A:                             |                                                                                                                                                                                                                         |          |             |      |         |
| CHEM 245                             | Fundamentals of Organic Chemistry                                                                                                                                                                                       |          |             |      |         |
| CHEM 246                             | Fundamentals of Organic Chemistry Laboratory                                                                                                                                                                            |          |             |      |         |
| Group B:                             |                                                                                                                                                                                                                         |          |             |      |         |
| CHEM 341                             | Modern Organic Chemistry I                                                                                                                                                                                              |          |             |      |         |
| CHEM 343                             | Modern Organic Chemistry II                                                                                                                                                                                             |          |             |      |         |
| Arts and Humanities                  | ( <a href="https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> ) |          |             | 3B   | 3       |
| Elective                             |                                                                                                                                                                                                                         |          |             |      | 0-1     |

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**Total Credits** **16**

| Semester 6                                       |                                             | Critical | Recommended | AUCC | Credits |
|--------------------------------------------------|---------------------------------------------|----------|-------------|------|---------|
| BZ 440                                           | Plant Physiology                            |          |             |      | 3       |
| SOCR 240                                         | Introductory Soil Science                   |          |             |      | 4       |
| STAT 301                                         | Introduction to Applied Statistical Methods |          |             |      | 3       |
| If Group B taken Semester 5, take the following: |                                             |          |             |      | 0-2     |
| CHEM 344                                         | Modern Organic Chemistry Laboratory         |          |             |      |         |
| HORT XXX                                         |                                             |          |             |      | 5       |
| Elective                                         |                                             |          |             |      | 0-2     |

CHEM 245 and CHEM 341 must be completed by the end of Semester 6. X

|                                                                                                      |                                             |                 |                    |             |                |
|------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------|--------------------|-------------|----------------|
| <b>Total Credits</b>                                                                                 |                                             |                 |                    |             | <b>17</b>      |
| <b>Senior</b>                                                                                        |                                             |                 |                    |             |                |
| <b>Semester 7</b>                                                                                    |                                             | <b>Critical</b> | <b>Recommended</b> | <b>AUCC</b> | <b>Credits</b> |
| AB 420                                                                                               | Horticultural Entomology                    |                 |                    |             | 2              |
| BC 351                                                                                               | Principles of Biochemistry                  |                 |                    |             | 4              |
| HORT 310                                                                                             | Greenhouse Management                       |                 |                    | 4B          | 4              |
| HORT 495                                                                                             | Independent Study                           |                 |                    |             | 2              |
| HORT XXX                                                                                             |                                             |                 |                    |             | 2              |
| <b>Total Credits</b>                                                                                 |                                             |                 |                    |             | <b>14</b>      |
| <b>Semester 8</b>                                                                                    |                                             | <b>Critical</b> | <b>Recommended</b> | <b>AUCC</b> | <b>Credits</b> |
| BSPM 361                                                                                             | Elements of Plant Pathology                 | X               |                    |             | 3              |
| HORT 454                                                                                             | Horticulture Crop Production and Management | X               |                    | 4A,4C       | 2              |
| HORT 476                                                                                             | Environmental Plant Stress Physiology       | X               |                    |             | 3              |
| HORT XXX                                                                                             |                                             | X               |                    |             | 4              |
| Elective                                                                                             |                                             | X               |                    |             | 1-2            |
| The benchmark courses for the 8th semester are the remaining courses in the entire program of study. |                                             | X               |                    |             |                |
| <b>Total Credits</b>                                                                                 |                                             |                 |                    |             | <b>13-14</b>   |
| <b>Program Total Credits:</b>                                                                        |                                             |                 |                    |             | <b>120</b>     |