

# Agroecology & Sustainable Food Systems (BS): Agroecology Research & Production Concentration

The Bachelor of Science in Agroecology and Sustainable Food Systems is offered jointly through the Departments of Crop and Soil Sciences and Horticultural Science. This multidisciplinary major offers students diverse courses, hands-on learning, community engagement opportunities, internships, and research experiences to address the grand challenges of agriculture and food systems. Students can choose from three career path concentrations – Agroecology Research and Production, Community Food Systems, and Urban Horticulture.

The Agroecology Research and Production concentration is for students interested in the deeper science of sustainable agriculture production practices, research, and graduate school opportunities in agriculture, entomology, horticulture, soil sciences and related sciences. Students will have the opportunity to learn from a wide diversity of faculty leading cutting edge sustainable agriculture research, many at the Center for Environmental Farming Systems (CEFS), a national recognized sustainable agriculture research, education and extension facility.

Community Food Systems (<http://catalog.ncsu.edu/undergraduate/agriculture-life-sciences/crop-soil-sciences/agroecology-sustainable-food-systems-bs-community-food-systems-concentration/>) is a broad concentration for students interested in connecting production with issues in the greater food system, such as food security, policy, community education or extension. Students can also participate in social science, agricultural economics, agriculture education research and others with food system with researchers at CEFS and NC State that support this concentration.

The Urban Horticulture (<http://catalog.ncsu.edu/undergraduate/agriculture-life-sciences/horticultural-science/agroecology-sustainable-food-systems-bs-urban-horticulture-concentration/>) concentration integrates horticulture production and agriculture business education for students interested in starting or managing their own sustainable horticultural farm, working with community gardens, and more. There are many focused horticulture classes, research and internship opportunities as well for this concentration.

## Program Highlights:

- Students in our program gain valuable hands-on experience in sustainable and organic production in our hands-on Agroecology Education Farm, a student farm near campus where all the food produced goes back into NC State Dining cafeterias and the food pantry on campus.
- Students interested in Agroecology can also join the Agroecology Student Club at NC State who organize various sustainable agriculture and food system activities each semester.

- As a required part of the curriculum, students will complete either an internship program or research experience to gain practical and professional development experience. Students will have no problems finding an opportunity with the numerous sustainable agriculture researchers and community stakeholders that collaborate with NC State focused in sustainable agriculture and food systems.
- Seniors will complete a Senior Capstone Project through which they draw on both their major courses and their concentration to address a problem or issue that they identify.
- Agroecology and Sustainable Food System students have the opportunity to student abroad with the various global food and sustainable agriculture focused study abroad programs in Ireland, Scotland, England, Mexico and others.

## Contact Person

Undergraduate Programs Office  
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For more information about our program, visit our website (<https://agroecology.wordpress.ncsu.edu/>).

## Plan Requirements

| Code                                      | Title  | Hours |
|---|--|-------|
| <b>Orientation</b>                        |  |       |
| ALS 103<br>or ALS 303                     | First-year Success in Agriculture and Life Sciences<br>Transfer Success in Agriculture and Life Sciences | 1     |
| CSSC 290                                  | Professional Development in Crop & Soil Sciences   | 1     |
| <b>Mathematics &amp; Natural Sciences</b> |  |       |
| MA 121<br>or MA 131                       | Elements of Calculus<br>Calculus for Life and Management Sciences A                                      | 3     |
| ST 311                                    | Introduction to Statistics   | 3     |
| AEC 360<br>or PB 360                      | Ecology<br>Ecology   | 4     |
| BIO 181                                   | Introductory Biology: Ecology, Evolution, and Biodiversity   | 4     |
| BIO 183<br>or PB 200                      | Introductory Biology: Cellular and Molecular Biology<br>Plant Life                                       | 4     |
| CH 101                                    | Chemistry - A Molecular Science  | 3     |
| CH 102                                    | General Chemistry Laboratory   | 1     |
| PY 131                                    | Conceptual Physics   | 4     |
| <b>Advanced Chemistry</b>                 |  |       |
| Select one of the following:              |  | 4     |
| CH 201<br>& CH 202                        | Chemistry - A Quantitative Science<br>and Quantitative Chemistry Laboratory                              |       |
| CH 220<br>& CH 222                        | Introductory Organic Chemistry<br>and Organic Chemistry I Lab  |       |
| <b>Communication/Advanced Writing</b>     |  |       |
| COM 110<br>or COM 112                     | Public Speaking<br>Interpersonal Communication   | 3     |
| Select one of the following:              |  | 3     |
| AEE 311                                   | Communication Methods and Media  |       |

|         |  |
|---------|--|
| ENG 331 | Communication for Engineering and Technology |
| ENG 332 | Communication for Business and Management    |
| ENG 333 | Communication for Science and Research       |

**Major Requirements**

|           |  |   |
|-----------|--|---|
| ARE 201   | Introduction to Agricultural & Resource Economics      | 3 |
| CS 230    | Introduction to Agroecology <sup>1</sup>               | 3 |
| CS 415    | Integrated Pest Management                             | 3 |
| CS 430    | Advanced Agroecology                                   | 4 |
| HS/CS 410 | Community Food Systems                                 | 3 |
| HS/CS 480 | Sustainable Food Production (capstone)                 | 1 |
| SSC 200   | Soil Science <sup>1</sup>                              | 3 |
| SSC 201   | Soil Science Laboratory                                | 1 |
| STS 323   | World Population and Food Prospects                    | 3 |
| SSC 427   | Biological Approaches to Sustainable Soil Systems      | 3 |
| SSC 428   | Soil Management Principles for Sustainable Agriculture | 1 |

**Experiential Learning**

Select one of the following: 3

|          |  |
|----------|--|
| CSSC 492 | Professional Internship Experience in Crop and Soil Sciences       |
| CSSC 493 | Research Experience in Crop and Soil Sciences                      |
| ALS 494  | International Learning Experience in Agriculture and Life Sciences |
| HS 494   | Teaching Experience in Horticultural Science                       |

**Concentration Electives**

|   |   |
|---|---|
| Foundational Elective                             | 3 |
| Agricultural Sciences Electives                   | 6 |
| Advanced Agricultural Sciences Elective           | 9 |
| Socio-Economic and Food System Electives          | 6 |
| Advanced Socio-Economic and Food System Electives | 3 |

**GEP Courses**

|   |  |   |
|---|--|---|
| ENG 101   | Academic Writing and Research <sup>1</sup> | 4 |
| GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )  |  |   |
| GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )               |  | 2 |
| GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )   |  |   |
| GEP Elective ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )  |  | 3 |
| GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> ) (verify requirement)                   |  |   |
| GEP Foundations of American Democracy ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/</a> ) (verify requirement)                            |  |   |
| World Language Proficiency ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/</a> ) (verify requirement) |  |   |

**Free Electives**

|                                |   |
|--------------------------------|---|
| Free Electives (12 Hr S/U Lmt) | 6 |
|--------------------------------|---|

**Total Hours** 120

<sup>2</sup> Students should consult their academic advisors to determine which courses fill this requirement.

**Foundational Electives**

| Code    | Title                              | Hours |
|---------|------------------------------------|-------|
| CS 224  | Seeds, Biotechnology and Societies | 3     |
| ES 200  | Climate Change and Sustainability  | 3     |
| FW 221  | Conservation of Natural Resources  | 3     |
| IDS 203 | Humans and the Environment         | 3     |
| SSC 185 | Land and Life                      | 3     |

**Agricultural Sciences**

| Code    | Title  | Hours |
|---------|--|-------|
| AEC 203 | An Introduction to the Honey Bee and Beekeeping                | 3     |
| CS 213  | Crop Science   | 3     |
| CS 214  | Crop Science Laboratory  | 1     |
| CS 216  | Southern Row Crop Production - Cotton, Peanuts, and Tobacco    | 3     |
| CS 218  | Southern Row Crop Production - Corn, Small Grains and Soybeans | 3     |
| CS 251  | Production of Forage Crops                                     | 3     |
| CS 411  |  | 3     |
| CS 424  | Seed Physiology  | 3     |
| ENT 425 | General Entomology   | 3     |
| PB 215  | Medicinal Plants   | 3     |
| PB 250  | Plant Biology  | 4     |
| PP 315  | Principles of Plant Pathology                                  | 4     |

**Advanced Agricultural Sciences Electives**

| Code    | Title   | Hours |
|---------|---|-------|
| AEC 400 | Applied Ecology   | 3     |
| ANS 215 | Agricultural Genetics                                     | 3     |
| CS 211  | Plant Genetics  | 3     |
| CS 411  |   | 3     |
| ENT 401 | Honey Bee Biology and Management                          | 3     |
| ENT 526 | Organic Agriculture: Principles and Practices             | 3     |
| HS 431  | Vegetable Production                                      | 4     |
| HS 432  | Introduction to Permaculture                              | 3     |
| HS 451  | Plant Nutrition   | 3     |
| HS 462  | Postharvest Physiology                                    | 3     |
| HS 476  | Crop Physiology and Production in Controlled Environments | 3     |
| PB 321  | Introduction to Whole Plant Physiology                    | 3     |
| PB 345  | Economic Botany   | 3     |
| PB 346  | Economic Botany Lab                                       | 1     |
| PB 450  | Plant Ecology   | 3     |
| SSC 332 | Environmental Soil Microbiology                           | 3     |
| SSC 341 | Soil Fertility and Nutrient Management                    | 3     |
| SSC 342 | Soil and Plant Nutrient Analysis                          | 1     |

<sup>1</sup> A grade of C- or higher is required.

|         |  |   |
|---------|--|---|
| SSC 455 | Soils, Environmental Quality and Global Challenges | 3 |
| SSC 461 | Soil Physical Properties and Plant Growth          | 3 |

## Socio-Economic and Food System Electives

| Code       | Title  | Hours |
|------------|--|-------|
| ARE 215    | Small Business Accounting  | 3     |
| ARE 270    | Principles of Agribusiness Entrepreneurship                      | 3     |
| ARE 303    | Farm Management  | 3     |
| ARE 304    | Agribusiness Management  | 3     |
| ARE 306    | Agricultural Law   | 3     |
| ARE 309    | Environmental Law & Economic Policy                              | 3     |
| ARE 311    | Agricultural Markets   | 3     |
| FS 222     | Discover: Conventional, Organic and Genetically Engineered Foods | 3     |
| FS/NTR 301 | Introduction to Human Nutrition                                  | 3     |
| IDS 211    | Eating through American History                                  | 3     |
| NTR 210    | Introduction to Community Food Security                          | 3     |
| NTR 310    | Food Insecurity and Federal Nutrition Programs                   | 3     |
| NTR 330    | Public Health Nutrition  | 3     |

## Advanced Socio-Economic and Food System Electives

| Code    | Title                            | Hours |
|---------|----------------------------------|-------|
| AEC 470 | Urban Ecology                    | 3     |
| ARE 433 | U.S. Agricultural Policy         | 3     |
| ARE 448 | International Agricultural Trade | 3     |
| IDS 303 | Humans and the Environment       | 3     |
| NTR 330 | Public Health Nutrition          | 3     |
| PRT 430 | Tourism, Poverty, and Health     | 3     |
| SOC 311 | Community Relationships          | 3     |
| SOC 342 | International Development        | 3     |
| SOC 350 | Food and Society                 | 3     |

## Semester Sequence

### First Year

| Fall Semester             |   | Hours |
|---------------------------|---|-------|
| ALS 103<br>or ALS 303     | First-year Success in Agriculture and Life Sciences<br>or Transfer Success in Agriculture and Life Sciences | 1     |
| CSSC 290                  | Professional Development in Crop & Soil Sciences  | 1     |
| BIO 181                   | Introductory Biology: Ecology, Evolution, and Biodiversity  | 4     |
| ENG 101                   | Academic Writing and Research   | 4     |
| MA 121<br>or MA 131       | Elements of Calculus<br>or Calculus for Life and Management Sciences A                                      | 3     |
| Foundation Elective (p. ) |   | 3     |
| Hours                     |   | 16    |

### Spring Semester

|   |   |           |
|---|---|-----------|
| BIO 183 or PB 200   | Introductory Biology: Cellular and Molecular Biology<br>or Plant Life | 4         |
| COM 110 or COM 112  | Public Speaking<br>or Interpersonal Communication                     | 3         |
| ST 311  | Introduction to Statistics  | 3         |
| GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )  |   | 3         |
| GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> ) |   | 1         |
| <b>Hours</b>  |   | <b>14</b> |

### Second Year

#### Fall Semester

|   |  |           |
|---|--|-----------|
| CH 101 & CH 102   | Chemistry - A Molecular Science and General Chemistry Laboratory | 4         |
| CS 230  | Introduction to Agroecology                                      | 3         |
| Agricultural Sciences Elective  |  | 3         |
| GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )  |  | 3         |
| GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> ) |  | 1         |
| <b>Hours</b>  |  | <b>14</b> |

#### Spring Semester

|                                |   |           |
|--------------------------------|---|-----------|
| ARE 201                        | Introduction to Agricultural & Resource Economics | 3         |
| AEC/PB 360                     | Ecology   | 4         |
| SSC 200                        | Soil Science                                      | 3         |
| SSC 201                        | Soil Science Laboratory                           | 1         |
| Agricultural Sciences Elective |   | 3         |
| <b>Hours</b>                   |   | <b>14</b> |

### Third Year

#### Fall Semester

|                              |  |           |
|------------------------------|--|-----------|
| SSC 427                      | Biological Approaches to Sustainable Soil Systems                        | 3         |
| SSC 428                      | Soil Management Principles for Sustainable Agriculture                   | 1         |
| CS/HS 410                    | Community Food Systems   | 3         |
| Select one of the following: |  | 4         |
| CH 201 & CH 202              | Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory |           |
| CH 220 & CH 222              | Introductory Organic Chemistry and Organic Chemistry I Lab               |           |
| Select one of the following: |  | 3         |
| AEE 311                      | Communication Methods and Media  |           |
| ENG 331                      | Communication for Engineering and Technology                             |           |
| ENG 332                      | Communication for Business and Management                                |           |
| ENG 333                      | Communication for Science and Research                                   |           |
| <b>Hours</b>                 |  | <b>14</b> |

#### Spring Semester

|        |                      |   |
|--------|----------------------|---|
| CS 430 | Advanced Agroecology | 4 |
|--------|----------------------|---|

|  |                                     |           |
|--|-------------------------------------|-----------|
| STS 323                                  | World Population and Food Prospects | 3         |
| Advanced Agricultural Sciences Elective  |                                     | 3         |
| Advanced Agricultural Sciences Elective  |                                     | 3         |
| Socio-Economic and Food Systems Elective |                                     | 3         |
| <b>Hours</b>                             |                                     | <b>16</b> |

**Fourth Year****Fall Semester**

|   |  |           |
|---|--|-----------|
| CS/HS 480   | Sustainable Food Production (capstone)                             | 1         |
| PY 131  | Conceptual Physics   | 4         |
| Advanced Agricultural Sciences Elective   |  | 3         |
| Socio-Economic and Food Systems Elective  |  | 3         |
| Select one of the following:  |  | 3         |
| CSSC 492  | Professional Internship Experience in Crop and Soil Sciences       |           |
| CSSC 493  | Research Experience in Crop and Soil Sciences                      |           |
| ALS 494   | International Learning Experience in Agriculture and Life Sciences |           |
| GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> ) |  | 3         |
| <b>Hours</b>  |  | <b>17</b> |

**Spring Semester**

|  |                            |            |
|--|----------------------------|------------|
| CS 415   | Integrated Pest Management | 3          |
| GEP Elective ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) |                            | 3          |
| Advanced Socio-Economic and Food Systems Elective  |                            | 3          |
| Free Electives   |                            | 6          |
| <b>Hours</b>   |                            | <b>15</b>  |
| <b>Total Hours</b>   |                            | <b>120</b> |

## Career Opportunities

Interested in the deeper science of sustainable agriculture production, research, and graduate school opportunities in agriculture, entomology, horticulture, soil sciences and related sciences? Then Agroecology Research and Production is for you. Career tracks include:

### Career Titles

- Agriculture and Environmental Science Researcher
- Agriculture Policy and Education Specialist
- Community Garden Director
- Conservationist
- Ecologist
- Environmental Scientist
- Farmer
- Farm Nursery Manager
- Governmental (USDA, NRCS, EPA) Researcher and Educator
- International Agriculture Worker
- Organic Farmer
- Plant Breeder
- Sustainable Agriculture Specialist
- Weed Ecologist

## Learn More About Careers

NCcareers.org (<https://nccareers.org/>)

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)

This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your future career. An NC State email address is required to create an account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.

Careers in Crop and Soil Sciences (<https://cals.ncsu.edu/crop-and-soil-sciences/careers/>)

AgCareers.com (<http://agcareers.com/>)