Agricultural Education (BS): Natural Resources Concentration

To see more about what you will learn in this program, visit the Learning Outcomes website (https://apps.oirp.ncsu.edu/pgas/)!

The Agricultural Education major within the Department of Agricultural and Human Sciences prepares graduates to teach agriculture, serve as FFA advisors, and supervise agricultural experiences (SAE) in public and private schools.

The Natural Resources concentration is one of seven concentrations offered for the Bachelor of Science in Agricultural Education.

- Students interested in Agricultural Education may be eligible to apply for the North Carolina Teaching Fellows Program at NC State.
- Student teachers of agriculture may apply for Ed Scholars through NC State.
- Many alumni pursue careers in middle and high schools, universities and community colleges, county extension offices, and in the agricultural industry

Teacher Licensure

Completion of the B.S. program in Agricultural Education leads to teacher licensure in North Carolina for grades 6-12. Because of North Carolina's reciprocity agreements, graduates also can pursue certification in about 35 states. Download the Teacher Licensure Checklist (https://cals.ncsu.edu/agricultural-and-human-sciences/wp-content/uploads/sites/13/2017/06/Teacher-Licensure-Checklist.pdf) to review the requirements for admissions to teacher education candidacy and help you stay on course.

For more information about this program, including contact information, visit our website (https://cals.ncsu.edu/agricultural-and-human-sciences/undergraduate/#agricultural-education-major).

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Plan Requirements

Code	Title	Hours	Counts towards
Orientation			
AEE 103	Fundamentals of Agricultural and Extension Education	1	
or ALS 103	Freshman Transitions and Diversity in Agriculture & Life Sciences		
or ALS 303	Transfer Transitions and Diversity in Agriculture & Life Sciences		
Writing and Speaking			
COM 110	Public Speaking	3	
Sciences			
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
BIO 183	Introductory Biology: Cellular and Molecular Biology	4	
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4	
Agricultural Education			
AEE 101	Introduction to Career and Technical Education [1]	1	
AEE 206	Introduction to Teaching Agriculture [1]	3	
AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed [1]	3	
AEE 303	Administration and Supervision of Student Organizations [1]	3	
AEE 322	Experiential Learning in Agriculture [1]	3	
AEE 326	Teaching Diverse Learners in AED [1]	3	
AEE 327	Conducting Summer Programs in Agricultural Education	1	
AEE 424	Planning Agricultural Educational Programs [1]	3	
AEE 426	Methods of Teaching Agriculture [1]	3	
AEE 427	Student Teaching in Agriculture [1]	8	
AEE 491	Seminar in Agricultural Education	1	
Other Professional Education			
EDP 304	Educational Psychology [1]	3	

ELP 344	School and Society [1]	3
ED 311	Classroom Assessment Principles and Practices [1]	2
ED 312	Classroom Assessment Principles and Practices Professional Learning Lab [1]	1
Teaching Content Courses		
BAET 201	Shop Processes and Management	3
or TDE 110	Materials & Processes Technology	
ANS 150 & ANS 151	Introduction to Animal Science and Introduction to Animal Science Lab	4
Agriculture Elective (p. 2)		5
Select one of the following Economics Courses:		3
ARE 201	Introduction to Agricultural & Resource Economics	
ARE 201A	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 205	Fundamentals of Economics	
Natural Resources Concentration		
ARE 336	Introduction to Resource and Environmental Economics	3
CS 230	Introduction to Agroecology	3
FOR 252	Introduction to Forest Science	3
FW 221	Conservation of Natural Resources	3
FW 353	Wildlife Management	3
SSC 185	Land and Life	3
SSC 200 & SSC 201	Soil Science and Soil Science Laboratory	4
GEP Courses In The Major		
ENG 101	Academic Writing and Research [1]	4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Mathematical Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-mathematical-sciences/)		6
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/) (verify requirement)		
Free Electives		
Free Electives (12 Hr S/U Lmt) [2]		5
Total Hours		**120**

[1] A grade of C- or higher is required.

[2] Students should consult their academic advisors to determine which courses fill this requirement.

Agriculture Electives

Code	Title	Hours	Counts towards
Agriculture Elective			
ARE 215	Small Business Accounting	3	
ARE 260	Marketing and Risk Management in the Pork Industry	1	
ARE 270	Principles of Agribusiness Entrepreneurship	3	
ARE 295	Special Topics in Agricultural & Resource Economics (200 Level)	1-6	

ARE 301	Intermediate Microeconomics	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
ARE 312	Agribusiness Marketing	3
ARE 321	Agricultural Financial Management	3
ARE 323	Agribusiness Finance	3
ARE 332	Human Resource Management for Agribusiness	3
ARE 336	Introduction to Resource and Environmental Economics	3
ARE 345	Global Agribusiness Management	3
ARE 370	Agribusiness New Venture Development	3
ARE 395	Special Topics in Agricultural and Resource Economics (300 level)	1-6
ARE 404	Advanced Agribusiness Management	3
ARE 412	Advanced Agribusiness Marketing	3
ARE 413	Applied Agribusiness Marketing	3
ARE 415	Introduction to Commodity Futures Markets	3
ARE 420	Taxation in Agriculture, Production, and Agribusiness	3
ARE 425	Contracts and Organizations in Agriculture	3
ARE 433	U.S. Agricultural Policy	3
ARE 444	Ethics in Agribusiness	3
ARE 448	International Agricultural Trade	3
ARE 455	Agribusiness Analytics	3
ARE 470	Agribusiness Entrepreneurship Clinical Skills Development	3
ARE 475	Food Policy	3
ARE 490	Career Seminar in Agriculture & Resource Economics	1
ARE 492	External Learning Experience	1-6
ARE 493	Special Problems/ Research Exploration	1-6
ARE 494	Agribusiness Study Abroad	1-6
ARE 495	Special Topics in Agricultural and Resource Economics	1-6
ARE 590	Special Topics in ARE	1-99
EC 301	Intermediate Microeconomics	3
EC 336	Introduction to Resource and Environmental Economics	3
Group C - Applied Sci & Tech		
AEE 101	Introduction to Career and Technical Education	1
AEE 206	Introduction to Teaching Agriculture	3
AEE 208	Agricultural Biotechnology: Issues and Implications	3
AEE 230	Introduction to Cooperative Extension	3
AEE 303	Administration and Supervision of Student Organizations	3
AEE 311	Communication Methods and Media	3

AEE 322	Experiential Learning in Agriculture	3
AEE 323	Leadership Development in Agriculture and Life Sciences	3
AEE 325	Planning and Delivering Non-Formal Education	3
AEE 326	Teaching Diverse Learners in AED	3
AEE 327	Conducting Summer Programs in Agricultural Education	1
AEE 350	Personal Leadership Development in Agriculture and Life Sciences	3
AEE 360	Developing Team Leadership in Agriculture and Life Sciences	3
AEE 423	Practicum in Agricultural Extension/ Industry	8
AEE 424	Planning Agricultural Educational Programs	3
AEE 426	Methods of Teaching Agriculture	3
AEE 427	Student Teaching in Agriculture	8
AEE 433	Leadership and Management of Volunteers in Agricultural and Extension Education	3
AEE 435	Professional Presentations in Agricultural Organizations	3
AEE 460	Organizational Leadership Development in Agriculture and Life Sciences	3
AEE 478	Advanced Issues in Extension Education	3
AEE 490	Seminar in Agricultural and Extension Education	1
AEE 533	Leadership and Management of Volunteers in Agricultural and Extension Education	3
ALS 110	Academic and Career Skills Seminar	1
ANS 105	Introduction to Companion Animal Science	3
ANS 110	Introduction to Equine Science	3
ANS 150	Introduction to Animal Science	3
ANS 151	Introduction to Animal Science Lab	1
ANS 201	Techniques of Animal Care	2
ANS 208	Agricultural Biotechnology: Issues and Implications	3
ANS 225	Principles of Animal Nutrition	3
ANS 303	Principles of Equine Evaluation	2
ANS 304	Dairy Cattle Evaluation	2
ANS 309	Livestock Evaluation	3
ANS 322	Muscle Foods and Eggs	3
ANS 324	Milk and Dairy Products	3
ANS 400	Companion Animal Management	3
ANS 402	Beef Cattle Management	3
ANS 403	Swine Management	3
ANS 404	Dairy Cattle Management	3
ANS 408	Small Ruminant Management	3
ANS 410	Equine Breeding Farm Management	3

ANS 425	Feed Manufacturing Technology	3
ANS 440	Animal Genetic Improvement	3
ANS 453	Physiology and Genetics of Growth and Development	3
ANS 454	Lactation, Milk and Nutrition	3
ANS 525	Feed Manufacturing Technology	3
ANS 540	Animal Genetic Improvement	3
ANS 553	Physiology and Genetics of Growth and Development	3
ANS 554	Lactation, Milk and Nutrition	3
BAE 100	Introduction to Biological and Agricultural Engineering and Technology	1
BAE 202	Introduction to Biological and Agricultural Engineering Methods	4
BAE 302	Transport Phenomena	3
BAE 322	Introduction to Food Process Engineering	3
BAE 361	Analytical Methods in Engineering Design	3
BAE 371	Fundamentals of Hydrology for Engineers	3
BAE 401	Sensors and Controls	3
BAE 435	Precision Agriculture Technology	3
BAE 451	Engineering Design I	2
BAE 452	Engineering Design II	2
BAE 462	Machinery Design and Applications	3
BAE 472	Irrigation and Drainage	3
BAE 473	Introduction to Hydrologic and Water Quality Modeling	3
BAE 474	Principles and Applications of Ecological Engineering	3
BAE 481	Structures & Environment	3
BAE 501	Sensors and Controls	3
BAE 535	Precision Agriculture Technology	3
BAE 572	Irrigation and Drainage	3
BAE 573	Introduction to Hydrologic and Water Quality Modeling	3
BAET 201	Shop Processes and Management	3
BAET 323	Water Management	3
BAET 332	Management of Animal Environments	4
BAET 333	Processing Agricultural Products	4
BAET 343	Agricultural Electrification	4
BAET 411	Agricultural Machinery and Power Units	4
BAET 432	Agricultural and Environmental Safety and Health	3
BAET 443	Environmental Restoration Implementation	3
BEC 330	Principles and Applications of Bioseparations	2
BEC 436	Introduction to Downstream Process Development	2
BEC 440		3
BEC 536	Introduction to Downstream Process Development	2
BEC 540		3
BME 203		3

BME 207	Biomedical Electronics	4
BME 342		3
BME 385	Bioinstrumentatior	3
BME 412	Biomedical Signal Processing	3
BME 425	Bioelectricity	3
BME 525	Bioelectricity	3
CS 470	Advanced Turfgrass Pest Management	2
ECI 424	Student Teaching in Modern Foreign Languages	12
ENT 470	Advanced Turfgrass Pest Management	2
FM 425	Feed Manufacturing Technology	3
FM 525	Feed Manufacturing Technology	3
FS 322	Muscle Foods and Eggs	3
FS 324	Milk and Dairy Products	3
FS 435	Food Safety Management Systems	3
FS 535	Food Safety Management Systems	3
MSE 203		3
NTR 425	Feed Manufacturing Technology	3
NTR 454	Lactation, Milk and Nutrition	3
NTR 525	Feed Manufacturing Technology	3
PB 208	Agricultural Biotechnology: Issues and Implications	3
PO 322	Muscle Foods and Eggs	3
BME 365	Linear Systems in Biomedical Engineering	3
PO 425	Feed Manufacturing Technology	3
PO 525	Feed Manufacturing Technology	3
PP 470	Advanced Turfgrass Pest Management	2
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 473	Introduction to Hydrologic and Water Quality Modeling	3
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 573	Introduction to Hydrologic and Water Quality Modeling	3
USC 291	Service Learning Program Leader Development I	1
USC 292	Service Learning Program Leader Development II	2
Group C - Applied Sci & Tech		
AEC 420	Introduction to Fisheries Science	3
AEE 206	Introduction to Teaching Agriculture	3
AEE 303	Administration and Supervision of Student Organizations	3
AEE 322	Experiential Learning in Agriculture	3
AEE 327	Conducting Summer Programs in Agricultural Education	1
AEE 424	Planning Agricultural Educational Programs	3
AEE 426	Methods of Teaching Agriculture	3
AEE 427	Student Teaching in Agriculture	8

ANS 322	Muscle Foods and Eggs	3
ANS 324	Milk and Dairy Products	3
ANS 330	Laboratory Animal Science	3
ANS 411	Management of Growing and Performance Horses	3
ANS 425	Feed Manufacturing Technology	3
ANS 525	Feed Manufacturing Technology	3
BAE 325	Introductory Geomatics	3
BAE 425	Industrial Microbiology and Bioprocessing	3
BAE 435	Precision Agriculture Technology	3
BAE 525	Industrial Microbiology and Bioprocessing	3
BAE 535	Precision Agriculture Technology	3
BBS 201	Introduction to Biopharmaceutical Science	3
BBS 301	Process Validation Science	3
BBS 426	Upstream Biomanufacturing Laboratory	2
BBS 526	Upstream Biomanufacturing Laboratory	2
BCH 220	Role of Biotechnology in Society	3
BEC 426	Upstream Biomanufacturing Laboratory	2
BEC 483	Tissue Engineering Technologies	2
BEC 526	Upstream Biomanufacturing Laboratory	2
BEC 583	Tissue Engineering Technologies	2
BME 375	Biomedical Microcontroller Applications	3
BME 444	Orthopaedic Biomechanics	3
BME 451	BME Senior Design: Product Development	3
BME 452	BME Senior Design: Product Implementation and Strategy	3
BME 466	Polymeric Biomaterials Engineering	3
BME 467	Mechanics of Tissues & Implants Requirements	3
BME 483	Tissue Engineering Technologies	2
BME 484	Fundamentals of Tissue Engineering	3
BME 544	Orthopaedic Biomechanics	3
BME 566	Polymeric Biomaterials Engineering	3
BME 583	Tissue Engineering Technologies	2
BME 584	Fundamentals of Tissue Engineering	3
CS 200	Introduction to Turfgrass Management	4
CS 210	Lawns and Sports Turf	3
CS 213	Crop Science	3
CS 216	Southern Row Crop Production - Cotton, Peanuts, and Tobacco	3
CS 218	Southern Row Crop Production - Corn, Small Grains and Soybeans	3
CS 230	Introduction to Agroecology	3
CS 312		3
CS 400	Turf Cultural Systems	3
CS 411	Crop Ecology	3
CS 413	Plant Breeding	2

CS 414	Weed Science	4
CS 415	Integrated Pest Management	3
CS 424	Seed Physiology	3
CS 430	Advanced Agroecology	4
CS 465	Turf Management Systems and Environmental Quality	3
CS 524	Seed Physiology	3
CS 565	Turf Management Systems and Environmental Quality	3
CSSC 490	Senior Seminar in Crop Science and Soil Science	1
ECI 424	Student Teaching in Modern Foreign Languages	12
ENT 203	An Introduction to the Honey Bee and Beekeeping	3
ENT 401	Honey Bee Biology and Management	3
ES 100	Introduction to Environmental Sciences	3
ES 200	Climate Change and Sustainability	3
ES 300	Energy and Environment	3
ES 400	Analysis of Environmental Issues	3
FM 425	Feed Manufacturing Technology	3
FM 460	Feed Mill Operations and Leadership	3
FM 480	Feed Quality Assurance & Formulation	3
FM 490	Feed Science Seminar	1
FM 525	Feed Manufacturing Technology	3
FOR 318	Forest Pathology	3
FOR 420	Watershed and Wetlands Hydrology	4
FOR 472	Forest Soils	4
FOR 520	Watershed and Wetlands Hydrology	4
FS 201	Introduction to Food Science	3
FS 290	Careers in Food and Bioprocessing Sciences	1
FS 322	Muscle Foods and Eggs	3
FS 324	Milk and Dairy Products	3
FS 330	Science of Food Preparation	3
FS 352	Introduction to Microbiological Food Safety Hazards	3
FS 354	Food Sanitation	3
FS 416	Quality Control in Food and Bioprocessing	3
FS 421	Food Preservation	3
FS 426	Upstream Biomanufacturing Laboratory	2
FS 435	Food Safety Management Systems	3
FS 453	Food Laws and Regulations	3
FS 462	Postharvest Physiology	3
FS 475	Problems and Design in Food and Bioprocessing Science	3
FS 516	Quality Control in Food and Bioprocessing	3
FS 521	Food Preservation	3
FS 526	Upstream Biomanufacturing Laboratory	2
FS 535	Food Safety Management Systems	3
FS 553	Food Laws and Regulations	3
FS 562	Postharvest Physiology	3
FW 221	Conservation of Natural Resources	3

FW 311	Piedmont Wildlife Ecology and Management	3
FW 312	Fisheries Techniques and Management	1
FW 313	Mountain Wildlife Ecology and Management	1
FW 314	Coastal Ecology and Management	1
FW 353	Wildlife Management	3
FW 403	Urban Wildlife Management	3
FW 411	Human Dimensions of Wildlife and Fisheries	3
FW 453	Principles of Wildlife Science	4
FW 460	International Wildlife Management and Conservation	3
FW 465	African Ecology and Conservation	4
FW 511	Human Dimensions of Wildlife and Fisheries	3
FW 560	International Wildlife Management and Conservation	3
FW 565	African Ecology and Conservation	4
GPH 201	Fundamentals of Global Public Health	3
HS 432	Introduction to Permaculture	3
HS 462	Postharvest Physiology	3
HS 532	Introduction to Permaculture	3
HS 562	Postharvest Physiology	3
IDS 303	Humans and the Environment	3
NR 303	Humans and the Environment	3
NR 350	International Sustainable Resource Use	4
NR 406	Conservation of Biological Diversity	3
NR 420	Watershed and Wetlands Hydrology	4
NR 460	Renewable Natural Resource Management and Policy	3
NR 520	Watershed and Wetlands Hydrology	4
NR 560	Renewable Natural Resource Management and Policy	3
NTR 425	Feed Manufacturing Technology	3
NTR 525	Feed Manufacturing Technology	3
PO 322	Muscle Foods and Eggs	3
PO 424	Poultry Meat Production	3
PO 425	Feed Manufacturing Technology	3
PO 435	Poultry Incubation & Breeding	4
PO 525	Feed Manufacturing Technology	3
PP 318	Forest Pathology	3
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 462	Soil-Crop Management Systems	3
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
TE 466	Polymeric Biomaterials Engineering	3
TE 467	Mechanics of Tissues & Implants Requirements	3
TE 566	Polymeric Biomaterials Engineering	3
VMP 401	Poultry Diseases	4

VMP 420	Disease of Farm Animals	3

Semester Sequence

This is a sample.

First Year		
Fall Semester		**Hours**
AEE 101	Introduction to Career and Technical Education [1]	1
AEE 103	Fundamentals of Agricultural and Extension Education [2]	1
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
COM 110	Public Speaking	3
ENG 101	Academic Writing and Research	4
GEP Mathematical Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-mathematical-sciences/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
	Hours	**17**
Spring Semester		
AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed [1]	3
ANS 150 & ANS 151	Introduction to Animal Science and Introduction to Animal Science Lab	4
BIO 183	Introductory Biology: Cellular and Molecular Biology	4
GEP Mathematical Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-mathematical-sciences/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
	Hours	**15**
Second Year		
Fall Semester		
AEE 206	Introduction to Teaching Agriculture [1]	3
CS 230	Introduction to Agroecology	3
BAET 201 or TDE 110	Shop Processes and Management or Materials & Processes Technology	3
FW 221	Conservation of Natural Resources	3
Economics Elective (p. 1)		3
	Hours	**15**
Spring Semester		
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4
FOR 252	Introduction to Forest Science	3
SSC 185	Land and Life	3
GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
	Hours	**13**
Third Year		
Fall Semester		
AEE 322	Experiential Learning in Agriculture [1]	3
ARE 336	Introduction to Resource and Environmental Economics	3
EDP 304	Educational Psychology [1]	3
SSC 200 & SSC 201	Soil Science and Soil Science Laboratory	4
Agriculture Elective (p. 2)		5
	Hours	**18**
Spring Semester		
AEE 303	Administration and Supervision of Student Organizations [1]	3
AEE 326	Teaching Diverse Learners in AED [1]	3
ED 311	Classroom Assessment Principles and Practices [1]	2
ED 312	Classroom Assessment Principles and Practices Professional Learning Lab [1]	1
ELP 344	School and Society [1]	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
	Hours	**15**
Fourth Year		
Fall Semester		
AEE 327	Conducting Summer Programs in Agricultural Education	1
AEE 426	Methods of Teaching Agriculture [1]	3
FW 353	Wildlife Management	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
Free Electives [3]		5
	Hours	**15**
Spring Semester		
AEE 424	Planning Agricultural Educational Programs [1]	3
AEE 427	Student Teaching in Agriculture [1]	8
AEE 491	Seminar in Agricultural Education	1
	Hours	**12**
	Total Hours	**120**

1. A minimum grade of C- is required for graduation. A minimum grade of C is required for teacher licensure.
2. Incoming freshmen complete AEE 103 Fundamentals of Agricultural and Extension Education. Transfer students may complete ALS 103 Freshman Transitions and Diversity in Agriculture & Life Sciences or ALS 303 Transfer Transitions and Diversity in Agriculture & Life Sciences.
3. Total hours of free electives vary in order to allow the minimum hours required for the degree to equal 120 credit hrs.