

# Agricultural Education (BS): Agricultural Engineering Technology Concentration

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 Agricultural Engineering Technology 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 BS 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, visit our website (<https://cals.ncsu.edu/agricultural-and-human-sciences/undergraduate/#agricultural-education-major>).

## Contact

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## Plan Requirements

Code	Title	Hours
<b>Orientation</b>		
AEE 103	Fundamentals of Agricultural and Extension Education	1
or ALS 103	First-year Success in Agriculture and Life Sciences	
or ALS 303	Transfer Success in Agriculture and Life Sciences	
<b>Communication</b>		

COM 110	Public Speaking	3
<b>Sciences</b>		
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4
MA 107	Precalculus I	3
or MA 111	Precalculus Algebra and Trigonometry	
Select one of the following Physics I courses:		4
PY 201	University Physics I	
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	
PY 211	College Physics I	
<b>Agricultural Education</b>		
AEE 101	Introduction to Career and Technical Education <sup>1</sup>	1
AEE 206	Introduction to Teaching Agriculture <sup>1</sup>	3
AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed <sup>1</sup>	3
AEE 303	Administration and Supervision of Student Organizations <sup>1</sup>	3
AEE 322	Experiential Learning in Agriculture <sup>1</sup>	3
AEE 326	Teaching Diverse Learners in AED <sup>1</sup>	3
AEE 327	Conducting Summer Programs in Agricultural Education	1
AEE 424	Planning Agricultural Educational Programs <sup>1</sup>	3
AEE 426	Methods of Teaching Agriculture <sup>1</sup>	3
AEE 427	Student Teaching in Agriculture <sup>1</sup>	8
AEE 491	Seminar in Agricultural Education	1
<b>Teaching Content Courses</b>		
Plant Science Elective (p. 2)		3
ANS 150 & ANS 151	Introduction to Animal Science and Introduction to Animal Science Lab	4
SSC 200 & SSC 201	Soil Science and Soil Science Laboratory	4
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	
<b>Professional Education</b>		
ELP 344	School and Society <sup>1</sup>	3
EDP 304	Educational Psychology <sup>1</sup>	3
ED 311	Classroom Assessment Principles and Practices <sup>1</sup>	2
ED 312	Classroom Assessment Principles and Practices Professional Learning Lab <sup>1</sup>	1
<b>Agricultural Engineering Technology Concentration Electives</b>		
BAET 201	Shop Processes and Management	3
BAET 411	Agricultural Machinery and Power Units	4
BAE 325	Introductory Geomatics	3
BAET 332	Management of Animal Environments	4
BAET 343	Agricultural Electrification	4
BAET 432	Agricultural and Environmental Safety and Health	3
Agricultural Elective (p. 4)		2

**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> )		6
GEP Mathematical Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-mathematical-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-mathematical-sciences/</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> )		2
GEP US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</a> )		3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )		5
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)		
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)		
<b>Total Hours</b>		<b>120</b>

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

**Plant Science Electives**

Code	Title	Hours
AEC 423	Introduction to Fisheries Sciences Laboratory	1
ALS 103	First-year Success in Agriculture and Life Sciences	1
ALS 303	Transfer Success in Agriculture and Life Sciences	1
ANS 215	Agricultural Genetics	3
CS 200	Introduction to Turfgrass Management	4
CS 210	Lawns and Sports Turf	3
CS 211	Plant Genetics	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 224	Seeds, Biotechnology and Societies	3
CS 230	Introduction to Agroecology	3
CS 312		3
CS 400	Turf Cultural Systems	3
CS 410	Community Food Systems	3
CS 411		3
CS 413	Plant Breeding	2
CS 414	Weed Science	4
CS 415	Integrated Pest Management	3
CS 418	Introduction to Regulatory Science in Agriculture	3
CS 424	Seed Physiology	3
CS 430	Advanced Agroecology	4
CS 465	Turf Management Systems and Environmental Quality	3
CS 470	Advanced Turfgrass Pest Management	2
CS 480	Sustainable Food Production (capstone)	1

CS 502	Plant Disease: Methods & Diagnosis	2
CS 518	Introduction to Regulatory Science in Agriculture	3
CS 524	Seed Physiology	3
CS 541	Plant Breeding Methods	3
CS 565	Turf Management Systems and Environmental Quality	3
CS 590	Special Topics	1-6
CS 591		1-6
CSSC 290	Professional Development in Crop & Soil Sciences	1
CSSC 490	Senior Seminar in Crop Science and Soil Science	1
CSSC 492	Professional Internship Experience in Crop and Soil Sciences	1-3
CSSC 493	Research Experience in Crop and Soil Sciences	1-3
CSSC 495	Special Topics in Crop and Soil Sciences	1-6
ENT 402	Forest Entomology	3
ENT 470	Advanced Turfgrass Pest Management	2
FOR 150	Critical Thinking and Data Analysis	2
FOR 172	Forest System Mapping and Mensuration I	2
FOR 204	Silviculture	2
FOR 248	Forest History, Technology and Society	3
FOR 250	Professional Development II: Communications in Natural Resources	1
FOR 252	Introduction to Forest Science	3
FOR 260	Forest Ecology	4
FOR 261	Forest Communities	2
FOR 264	Forest Wildlife	1
FOR 265	Fire Management	1
FOR 273	Forest System Mapping and Mensuration II	3
FOR 293	Independent Study in Forest Management	1-6
FOR 294	Independent Study in Forest Management	1-6
FOR 295	Special Topics in Forestry	1-6
FOR 303	Silvics and Forest Tree Physiology	3
FOR 304	Theory of Silviculture	4
FOR 318	Forest Pathology	3
FOR 319	Forest Economics	3
FOR 330	North Carolina Forests	3
FOR 334	Operations Research Applications in Natural Resources	1
FOR 339		4
FOR 350	Professional Development III: Ethical Dilemmas in Natural Resource Management	1
FOR 353	GIS and Remote Sensing for Environmental Analysis and Assessment	3
FOR 374	Forest Measurement, Modeling, and Inventory	3
FOR 402	Forest Entomology	3
FOR 405	Forest Management	4
FOR 406	Forest Inventory, Analysis and Planning	4
FOR 408	Hardwood Management: Natural Forest Silviculture	3
FOR 411	Forest Genetics	3
FOR 414	World Forestry	3
FOR 415	World Forestry Study Tour	1
FOR 420	Watershed and Wetlands Hydrology	4

FOR 422	Consulting Forestry	3	HS 252	Landscape Design Graphic Communication	2
FOR 430	Forest Health and Protection	3	HS 272	Landscape Design/Build	6
FOR 434	Forest Operations and Analysis	3	HS 280	Hands-On-Horticulture	3
FOR 472	Forest Soils	4	HS 290	Horticulture: Careers and Opportunities	1
FOR 491	Special Topics in Forestry and Related Natural Resources	1-4	HS 301	Plant Propagation	4
FOR 493	Independent Study in Forest Management	1-6	HS 302	Gardening with Herbaceous Perennials	3
FOR 494	Independent Study in Forest Management	1-6	HS 303	Ornamental Plant Identification I	3
FOR 501	Dendrology	3	HS 304	Ornamental Plant Identification II	3
FOR 502	Forest Measurements	1	HS 357	Landscape Design Grading and Drainage	4
FOR 503	Silvics and Forest Tree Physiology	1	HS 400	Residential Landscaping	6
FOR 504	The Practice of Silviculture	3	HS 410	Community Food Systems	3
FOR 505	Forest Management	4	HS 411	Nursery Management	3
FOR 506	Silviculture Laboratory	1	HS 416	Landscape Planting Design	4
FOR 507	Silviculture Mini Course	1	HS 418	Landscape Design Digital Media Graphics	3
FOR 508	Hardwood Management: Natural Forest Silviculture	3	HS 420	Green Infrastructure	3
FOR 509	Forest Resource Policy	1	HS 421	Temperate-Zone Tree Fruits: Physiology and Culture	3
FOR 510	Introduction to GPS	1	HS 422	Small Fruit Production	3
FOR 513	Silviculture for Intensively Managed Plantations	3	HS 423		3
FOR 514	Woodland Stewardship	3	HS 428	Soil Management Principles for Sustainable Agriculture	1
FOR 519	Forest Economics	3	HS 431	Vegetable Production	4
FOR 520	Watershed and Wetlands Hydrology	4	HS 432	Introduction to Permaculture	3
FOR 522	Consulting Forestry	3	HS 433	Public Garden Administration	3
FOR 531	Wildland Fire Science	3	HS 440	Greenhouse Management	3
FOR 532	Wildland Firefighter	3	HS 442	Floriculture Crop Production	3
FOR 534	Forest Operations and Analysis	3	HS 451	Plant Nutrition	3
FOR 540	Advanced Dendrology	3	HS 462	Postharvest Physiology	3
FOR 561	Forest Communities of the Southeastern Coastal Plain	1	HS 471	Landscape Ecosystem Management	4
FOR 562	Forest Communities of the Southern Appalachians	1	HS 475		3
FOR 565	Plant Community Ecology	4	HS 476	Crop Physiology and Production in Controlled Environments	3
FOR 574		3	HS 480	Sustainable Food Production (capstone)	1
FOR 575	Advanced Terrestrial Ecosystem Ecology	3	HS 491	Sustainable Agriculture Entrepreneurship Study Abroad	3
FOR 583	Tropical Forestry	3	HS 492	Horticulture Internship	1-3
FOR 595	Special Topics	1-6	HS 493	Research Experience in Horticultural Science	1-3
FS 462	Postharvest Physiology	3	HS 494	Teaching Experience in Horticultural Science	1-3
FS 562	Postharvest Physiology	3	HS 495	Experimental Courses in Horticultural Science	1-6
FW 221	Conservation of Natural Resources	3	HS 502	Plant Disease: Methods & Diagnosis	2
FW 404	Wildlife Habitat Management	3	HS 516	Landscape Planting Design	4
GIS 512	Introduction to Environmental Remote Sensing	3	HS 520	Green Infrastructure	3
HS 131	Fruit & Vegetable Production	3	HS 521	Temperate-Zone Tree Fruits: Physiology and Culture	3
HS 144	Weeds & Diseases of Ornamentals	3	HS 523		3
HS 200	Home Horticulture	3	HS 532	Introduction to Permaculture	3
HS 201	The World of Horticulture: Principles and Practices	3	HS 533	Public Garden Administration	3
HS 202	Home Plant Identification	3	HS 541	Plant Breeding Methods	3
HS 203	Home Plant Propagation	3	HS 550	Environmental Nursery Production	3
HS 204	Home Landscape Maintenance	3	HS 551	Plant Nutrition	3
HS 205	Home Food Production	3	HS 562	Postharvest Physiology	3
HS 215	Agricultural Genetics	3	HS 576	Crop Physiology and Production in Controlled Environments	3
HS 242	Landscape Design Introduction	3			
HS 250	Home Landscape Design: Creating Garden Spaces	3			

HS 583		3
HS 590	Special Problems in Horticultural Science	1-6
NR 420	Watershed and Wetlands Hydrology	4
NR 460	Renewable Natural Resource Management and Policy	3
NR 491	Special Topics in Forestry and Related Natural Resources	1-4
NR 520	Watershed and Wetlands Hydrology	4
NR 560	Renewable Natural Resource Management and Policy	3
PP 144	Weeds & Diseases of Ornamentals	3
PP 318	Forest Pathology	3
PP 470	Advanced Turfgrass Pest Management	2
PP 502	Plant Disease: Methods & Diagnosis	2
SMT 202	Anatomy and Properties of Renewable Materials	3
SSC 428	Soil Management Principles for Sustainable Agriculture	1
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

## Agriculture Electives

Code	Title	Hours
<b>Agriculture Elective</b>		
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	BAET 332	Management of Animal Environments	4
ANS 150	Introduction to Animal Science	3	BAET 333	Processing Agricultural Products	4
ANS 151	Introduction to Animal Science Lab	1	BAET 343	Agricultural Electrification	4
ANS 201	Techniques of Animal Care	2	BAET 411	Agricultural Machinery and Power Units	4
ANS 208	Agricultural Biotechnology: Issues and Implications	3	BAET 432	Agricultural and Environmental Safety and Health	3
ANS 225	Principles of Animal Nutrition	3	BAET 443	Environmental Restoration Implementation	3
ANS 303	Principles of Equine Evaluation	2	BEC 330	Principles and Applications of Bioseparations	2
ANS 304	Dairy Cattle Evaluation	2	BEC 436	Introduction to Downstream Process Development	2
ANS 309	Livestock Evaluation	3	BEC 440		3
ANS 322	Muscle Foods and Eggs	3	BEC 536	Introduction to Downstream Process Development	2
ANS 324	Milk and Dairy Products	3	BEC 540		3
ANS 400	Companion Animal Management	3	BME 203		3
ANS 402	Beef Cattle Management	3	BME 207	Biomedical Electronics	4
ANS 403	Swine Management	3	BME 342		3
ANS 404	Dairy Cattle Management	3	BME 385	Bioinstrumentation	3
ANS 408	Small Ruminant Management	3	BME 412	Biomedical Signal Processing	3
ANS 410	Equine Breeding Farm Management	3	BME 425	Bioelectricity	3
ANS 425	Feed Manufacturing Technology	3	BME 525	Bioelectricity	3
ANS 440	Animal Genetic Improvement	3	CS 470	Advanced Turfgrass Pest Management	2
ANS 453	Physiology and Genetics of Growth and Development	3	ECI 424	Student Teaching in Modern Foreign Languages	12
ANS 454	Lactation, Milk and Nutrition	3	ENT 470	Advanced Turfgrass Pest Management	2
ANS 525	Feed Manufacturing Technology	3	FM 425	Feed Manufacturing Technology	3
ANS 540	Animal Genetic Improvement	3	FM 525	Feed Manufacturing Technology	3
ANS 553	Physiology and Genetics of Growth and Development	3	FS 322	Muscle Foods and Eggs	3
ANS 554	Lactation, Milk and Nutrition	3	FS 324	Milk and Dairy Products	3
BAE 100	Introduction to Biological and Agricultural Engineering and Technology	1	FS 435	Food Safety Management Systems	3
BAE 202	Introduction to Biological and Agricultural Engineering Methods	4	FS 535	Food Safety Management Systems	3
BAE 302	Transport Phenomena	3	MSE 203		3
BAE 322	Introduction to Food Process Engineering	3	NTR 425	Feed Manufacturing Technology	3
BAE 361	Analytical Methods in Engineering Design	3	NTR 454	Lactation, Milk and Nutrition	3
BAE 371	Fundamentals of Hydrology for Engineers	3	NTR 525	Feed Manufacturing Technology	3
BAE 401	Sensors and Controls	3	PB 208	Agricultural Biotechnology: Issues and Implications	3
BAE 435	Precision Agriculture Technology	3	PO 322	Muscle Foods and Eggs	3
BAE 451	Engineering Design I	2	PO 425	Feed Manufacturing Technology	3
BAE 452	Engineering Design II	2	PO 525	Feed Manufacturing Technology	3
BAE 462	Machinery Design and Applications	3	PP 470	Advanced Turfgrass Pest Management	2
BAE 472	Irrigation and Drainage	3	SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
BAE 473	Introduction to Hydrologic and Water Quality Modeling	3	SSC 473	Introduction to Hydrologic and Water Quality Modeling	3
BAE 474	Principles and Applications of Ecological Engineering	3	SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
BAE 481	Structures & Environment	3	SSC 573	Introduction to Hydrologic and Water Quality Modeling	3
BAE 501	Sensors and Controls	3	USC 291	Service Learning Program Leader Development I	1
BAE 535	Precision Agriculture Technology	3	USC 292	Service Learning Program Leader Development II	2
BAE 572	Irrigation and Drainage	3	<b>Group C - Applied Sci &amp; Tech</b>		
BAE 573	Introduction to Hydrologic and Water Quality Modeling	3	AEC 420	Introduction to Fisheries Science	3
BAET 201	Shop Processes and Management	3	AEE 206	Introduction to Teaching Agriculture	3
BAET 323	Water Management	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	CS 424	Seed Physiology	3
AEE 424	Planning Agricultural Educational Programs	3	CS 430	Advanced Agroecology	4
AEE 426	Methods of Teaching Agriculture	3	CS 465	Turf Management Systems and Environmental Quality	3
AEE 427	Student Teaching in Agriculture	8	CS 524	Seed Physiology	3
ANS 322	Muscle Foods and Eggs	3	CS 565	Turf Management Systems and Environmental Quality	3
ANS 324	Milk and Dairy Products	3	CSSC 490	Senior Seminar in Crop Science and Soil Science	1
ANS 330	Laboratory Animal Science	3	ECI 424	Student Teaching in Modern Foreign Languages	12
ANS 411	Management of Growing and Performance Horses	3	ENT 203	An Introduction to the Honey Bee and Beekeeping	3
ANS 425	Feed Manufacturing Technology	3	ENT 401	Honey Bee Biology and Management	3
ANS 525	Feed Manufacturing Technology	3	ES 100	Introduction to Environmental Sciences	3
BAE 325	Introductory Geomatics	3	ES 200	Climate Change and Sustainability	3
BAE 425	Industrial Microbiology and Bioprocessing	3	ES 300	Energy and Environment	3
BAE 435	Precision Agriculture Technology	3	ES 400	Analysis of Environmental Issues	3
BAE 525	Industrial Microbiology and Bioprocessing	3	FM 425	Feed Manufacturing Technology	3
BAE 535	Precision Agriculture Technology	3	FM 460	Feed Mill Operations and Leadership	3
BBS 201	Introduction to Biopharmaceutical Science	3	FM 480	Feed Quality Assurance & Formulation	3
BBS 301	Process Validation Science	3	FM 490	Feed Science Seminar	1
BBS 426	Upstream Biomanufacturing Laboratory	2	FM 525	Feed Manufacturing Technology	3
BBS 526	Upstream Biomanufacturing Laboratory	2	FOR 318	Forest Pathology	3
BCH 220	Role of Biotechnology in Society	3	FOR 420	Watershed and Wetlands Hydrology	4
BEC 426	Upstream Biomanufacturing Laboratory	2	FOR 472	Forest Soils	4
BEC 483		2	FOR 520	Watershed and Wetlands Hydrology	4
BEC 526	Upstream Biomanufacturing Laboratory	2	FS 201	Introduction to Food Science	3
BEC 583		2	FS 290	Careers in Food and Bioprocessing Sciences	1
BME 444	Orthopaedic Biomechanics	3	FS 322	Muscle Foods and Eggs	3
BME 375	Biomedical Microcontroller Applications	3	FS 324	Milk and Dairy Products	3
BME 365	Linear Systems in Biomedical Engineering	3	FS 330	Science of Food Preparation	3
BME 451	BME Senior Design: Product Development	3	FS 352	Introduction to Microbiological Food Safety Hazards	3
BME 452	BME Senior Design: Product Implementation and Strategy	3	FS 354	Food Sanitation	3
BME 466	Polymeric Biomaterials Engineering	3	FS 416	Quality Control in Food and Bioprocessing	3
BME 467	Mechanics of Tissues & Implants Requirements	3	FS 421	Food Preservation	3
BME 483	Tissue Engineering Technologies	2	FS 426	Upstream Biomanufacturing Laboratory	2
BME 484	Fundamentals of Tissue Engineering	3	FS 435	Food Safety Management Systems	3
BME 544	Orthopaedic Biomechanics	3	FS 453	Food Laws and Regulations	3
BME 566	Polymeric Biomaterials Engineering	3	FS 462	Postharvest Physiology	3
BME 583	Tissue Engineering Technologies	2	FS 475	Problems and Design in Food and Bioprocessing Science	3
BME 584	Fundamentals of Tissue Engineering	3	FS 516	Quality Control in Food and Bioprocessing	3
CS 200	Introduction to Turfgrass Management	4	FS 521	Food Preservation	3
CS 210	Lawns and Sports Turf	3	FS 526	Upstream Biomanufacturing Laboratory	2
CS 213	Crop Science	3	FS 535	Food Safety Management Systems	3
CS 216	Southern Row Crop Production - Cotton, Peanuts, and Tobacco	3	FS 553	Food Laws and Regulations	3
CS 218	Southern Row Crop Production - Corn, Small Grains and Soybeans	3	FS 562	Postharvest Physiology	3
CS 230	Introduction to Agroecology	3	FW 221	Conservation of Natural Resources	3
CS 312		3	FW 311	Piedmont Wildlife Ecology and Management	3
CS 400	Turf Cultural Systems	3	FW 312	Fisheries Techniques and Management	1
CS 411		3	FW 313	Mountain Wildlife Ecology and Management	1
CS 413	Plant Breeding	2	FW 314	Coastal Ecology and Management	1
CS 414	Weed Science	4	FW 353	Wildlife Management	3
CS 415	Integrated Pest Management	3	FW 403	Urban Wildlife Management	3

FW 411	Human Dimensions of Wildlife and Fisheries	3	BME 298	Biomedical Engineering Design and Manufacturing I	2
FW 453	Principles of Wildlife Science	4			
FW 460	International Wildlife Management and Conservation	3	BME 398	Biomedical Engineering Design and Manufacturing II	2
FW 465	African Ecology and Conservation	4	CS 470	Advanced Turfgrass Pest Management	2
FW 511	Human Dimensions of Wildlife and Fisheries	3	CSSC 490	Senior Seminar in Crop Science and Soil Science	1
FW 560	International Wildlife Management and Conservation	3	ENT 470	Advanced Turfgrass Pest Management	2
FW 565	African Ecology and Conservation	4	FM 425	Feed Manufacturing Technology	3
GPH 201		3	FM 525	Feed Manufacturing Technology	3
HS 432	Introduction to Permaculture	3	FOR 318	Forest Pathology	3
HS 462	Postharvest Physiology	3	FOR 420	Watershed and Wetlands Hydrology	4
HS 532	Introduction to Permaculture	3	FOR 472	Forest Soils	4
HS 562	Postharvest Physiology	3	FOR 520	Watershed and Wetlands Hydrology	4
IDS 303	Humans and the Environment	3	FS 322	Muscle Foods and Eggs	3
NR 303	Humans and the Environment	3	FS 435	Food Safety Management Systems	3
NR 350	International Sustainable Resource Use	4	FS 462	Postharvest Physiology	3
NR 406	Conservation of Biological Diversity	3	FS 535	Food Safety Management Systems	3
NR 420	Watershed and Wetlands Hydrology	4	FS 562	Postharvest Physiology	3
NR 460	Renewable Natural Resource Management and Policy	3	FW 221	Conservation of Natural Resources	3
NR 520	Watershed and Wetlands Hydrology	4	FW 404	Wildlife Habitat Management	3
NR 560	Renewable Natural Resource Management and Policy	3	FW 460	International Wildlife Management and Conservation	3
NTR 425	Feed Manufacturing Technology	3	FW 560	International Wildlife Management and Conservation	3
NTR 525	Feed Manufacturing Technology	3	HS 200	Home Horticulture	3
PO 322	Muscle Foods and Eggs	3	HS 201	The World of Horticulture: Principles and Practices	3
PO 424	Poultry Meat Production	3	HS 203	Home Plant Propagation	3
PO 425	Feed Manufacturing Technology	3	HS 242	Landscape Design Introduction	3
PO 435	Poultry Incubation & Breeding	4	HS 250	Home Landscape Design: Creating Garden Spaces	3
PO 525	Feed Manufacturing Technology	3	HS 252	Landscape Design Graphic Communication	2
PP 318	Forest Pathology	3	HS 272	Landscape Design/Build	6
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3	HS 290	Horticulture: Careers and Opportunities	1
SSC 462	Soil-Crop Management Systems	3	HS 301	Plant Propagation	4
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3	HS 302	Gardening with Herbaceous Perennials	3
TE 466	Polymeric Biomaterials Engineering	3	HS 303	Ornamental Plant Identification I	3
TE 467	Mechanics of Tissues & Implants Requirements	3	HS 304	Ornamental Plant Identification II	3
VMP 401	Poultry Diseases	4	HS 357	Landscape Design Grading and Drainage	4
VMP 420	Disease of Farm Animals	3	HS 400	Residential Landscaping	6
<b>Group C - Applied Sci &amp; Tech</b>			HS 411	Nursery Management	3
AEC 419	Freshwater Ecology	4	HS 416	Landscape Planting Design	4
AEC 423	Introduction to Fisheries Sciences Laboratory	1	HS 421	Temperate-Zone Tree Fruits: Physiology and Culture	3
AEC 519	Freshwater Ecology	4	HS 422	Small Fruit Production	3
BAET 323	Water Management	3	HS 423		3
ANS 322	Muscle Foods and Eggs	3	HS 431	Vegetable Production	4
ANS 425	Feed Manufacturing Technology	3	HS 440	Greenhouse Management	3
ANS 525	Feed Manufacturing Technology	3	HS 442	Floriculture Crop Production	3
BIO 227	Understanding Structural Diversity through Biological Illustration	3	HS 462	Postharvest Physiology	3
BME 204		3	HS 471	Landscape Ecosystem Management	4
BME 217	Biomedical Electronics Laboratory	1	HS 516	Landscape Planting Design	4
			HS 521	Temperate-Zone Tree Fruits: Physiology and Culture	3

HS 523		3
HS 562	Postharvest Physiology	3
IDS 303	Humans and the Environment	3
NR 300	Natural Resource Measurements	4
NR 303	Humans and the Environment	3
NR 400	Natural Resource Management	4
NR 420	Watershed and Wetlands Hydrology	4
NR 421	Wetland Science and Management	3
NR 460	Renewable Natural Resource Management and Policy	3
NR 484	Environmental Impact Assessment	4
NR 500	Natural Resource Management	4
NR 520	Watershed and Wetlands Hydrology	4
NR 521	Wetland Science and Management	3
NR 560	Renewable Natural Resource Management and Policy	3
NTR 420		3
NTR 425	Feed Manufacturing Technology	3
NTR 525	Feed Manufacturing Technology	3
PO 201	Poultry Science and Production	3
PO 201A	Poultry Science and Production	3
PO 202A	Poultry Science and Production Laboratory	1
PO 290	Exploring Opportunities in Poultry Science	1
PO 322	Muscle Foods and Eggs	3
PO 340	Live Poultry and Poultry Product Evaluation, Grading, and Inspection	3
PO 410	Production and Management of Game Birds in Confinement	3
PO 411	Agrosecurity	3
PO 421	Commercial Egg Production	3
PO 425	Feed Manufacturing Technology	3
PO 433	Poultry Processing and Products	3
PO 525	Feed Manufacturing Technology	3
PO 533	Poultry Processing and Products	3
PP 315	Principles of Plant Pathology	4
PP 318	Forest Pathology	3
PP 470	Advanced Turfgrass Pest Management	2
SSC 185	Land and Life	3
SSC 342	Soil and Plant Nutrient Analysis	1
SSC 421		3
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 442	Soil and Environmental Biogeochemistry	3
SSC 452	Soil Classification	4
SSC 461	Soil Physical Properties and Plant Growth	3
SSC 462	Soil-Crop Management Systems	3
SSC 470	Wetland Soils	3
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 570	Wetland Soils	3
TOX 201	Poisons, People and the Environment	3
TOX 401	Principles of Toxicology	4

TOX 415	Ecotoxicology	4
TOX 501	Principles of Toxicology	4

## Semester Sequence

This is a sample.

### First Year

Fall Semester		Hours
AEE 101	Introduction to Career and Technical Education <sup>1</sup>	1
AEE 103	Fundamentals of Agricultural and Extension Education <sup>2</sup>	1
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
COM 110	Public Speaking	3
ENG 101	Academic Writing and Research	4
MA 107	Precalculus I	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>17</b>

### Spring Semester

AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed <sup>1</sup>	3
ANS 150 & ANS 151	Introduction to Animal Science and Introduction to Animal Science Lab	4
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4
GEP Mathematical Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-mathematical-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-mathematical-sciences/</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>15</b>

### Second Year

#### Fall Semester

AEE 206	Introduction to Teaching Agriculture <sup>1</sup>	3
BAET 201	Shop Processes and Management	3
PY 211	College Physics I	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> )		3

**Hours** **13**

#### Spring Semester

Agriculture Elective (p. 4)		2
SSC 200 & SSC 201	Soil Science and Soil Science Laboratory	4
Economics Elective (p. 1)		3
Plant Science Elective (p. 2)		3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )		3

**Hours** **15**



### Third Year

#### Fall Semester

AEE 322	Experiential Learning in Agriculture <sup>1</sup>	3
BAE 325	Introductory Geomatics	3
BAET 343	Agricultural Electrification	4
EDP 304	Educational Psychology <sup>1</sup>	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
<b>Hours</b>		<b>16</b>

#### Spring Semester

AEE 303	Administration and Supervision of Student Organizations <sup>1</sup>	3
AEE 326	Teaching Diverse Learners in AED <sup>1</sup>	3
BAET 332	Management of Animal Environments	4
BAET 411	Agricultural Machinery and Power Units	4
ED 311	Classroom Assessment Principles and Practices <sup>1</sup>	2
ED 312	Classroom Assessment Principles and Practices Professional Learning Lab <sup>1</sup>	1
<b>Hours</b>		<b>17</b>

### Fourth Year

#### Fall Semester

AEE 327	Conducting Summer Programs in Agricultural Education	1
AEE 426	Methods of Teaching Agriculture <sup>1</sup>	3
BAET 432	Agricultural and Environmental Safety and Health	3
ELP 344	School and Society <sup>1</sup>	3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )		2
Agriculture Elective (p. 4)		3
<b>Hours</b>		<b>15</b>

#### Spring Semester

AEE 424	Planning Agricultural Educational Programs <sup>1</sup>	3
AEE 427	Student Teaching in Agriculture <sup>1</sup>	8
AEE 491	Seminar in Agricultural Education	1
<b>Hours</b>		<b>12</b>
<b>Total Hours</b>		<b>120</b>

<sup>1</sup> A minimum grade of C- is required for graduation. A minimum grade of C is required for teacher licensure.

<sup>2</sup> Incoming freshmen complete AEE 103 Fundamentals of Agricultural and Extension Education. Transfer students may complete ALS 103 First-year Success in Agriculture and Life Sciences or ALS 303 Transfer Success in Agriculture and Life Sciences.

## Career Opportunities

The Agricultural Business Management Program prepares graduates for careers in management, marketing, sales, finance, supply chain, entrepreneurship, and related fields. The program has sufficient flexibility to provide more extensive course work in science and math for those students desiring to prepare for advanced graduate study. The concentration in biological sciences prepares graduates for management,

marketing, and sales careers in fields such as biotechnology, pharmaceuticals, health care, environmental protection, and food processing. Graduates specializing in agribusiness entrepreneurship are trained in value creation and prepared to address the strong demand in agtech, biotech, and foodtech.

## Career Titles

- Agricultural Inspector
- Agricultural Technician
- Aquaculture Specialist
- Bank and Branch Managers
- Buyer
- Farm and Ranch Manager
- Farm Management Advisor
- Farm Product Buyer
- Farm Products Purchasing Agent
- Farmers and Ranchers
- Financial Analyst
- Food & Drug Inspector
- Greenhouse and Nursery Manager
- Insurance Agent
- Loan Officer
- Market Research Analyst
- Purchasing Manager
- Real Estate Broker
- Sales Representative (Agricultural Products)
- Winemaker / Vintner

## 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.

Agricultural and Applied Economics Association (<https://www.aaea.org/employmenttopps/>)

AgCareers.com (<https://www.agcareers.com/newsletters/AgCareers.com-Electronic-Internship-Flyer.htm>)

National Agri-Marketing Association (<https://www.nama.org/>)