

Agricultural Business Management (BS): Biological Sciences Concentration

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

The Bachelor of Science degree in Agricultural Business Management prepares graduates for increasing opportunities to enter managerial positions in ag-related businesses. The academic program combines core courses in agricultural business and economics with courses in science and technology. Students learn to apply the concepts, principles and terminology of business and economics to real-world issues and opportunities.

The concentration in biological sciences combines training in science with business and economics and leads to a Bachelor of Science degree in Agricultural Business Management with a concentration in the Biological Sciences/Business Management (BBM). The concentration 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.

For more information about this program, including contact information, visit our website (<https://cals.ncsu.edu/agricultural-and-resource-economics/students/undergraduate/#undergraduate-offerings>).

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Plan Requirements

Code	Title	Hours	Counts towards
Orientation			
ALS 103	Freshman Transitions and Diversity in Agriculture & Life Sciences	1	
or ALS 303	Transfer Transitions and Diversity in Agriculture & Life Sciences		
Communications & Tech Fluency			
Communications Course:		3	
COM 110	Public Speaking		
COM 112	Interpersonal Communication		
COM 201	Introduction to Persuasion Theory		
COM 211	Argumentation and Advocacy		

Advanced Writing Course:		3
ENG 331	Communication for Engineering and Technology	
ENG 332	Communication for Business and Management	
ENG 333	Communication for Science and Research	
AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed	3
or CSC 200		
Mathematical Sciences		
Select one of the following:		3-4
MA 121	Elements of Calculus	
MA 131	Calculus for Life and Management Sciences A	
MA 141	Calculus I	
Select one of the following:		3-4
MA 114	Introduction to Finite Mathematics with Applications	
MA 231	Calculus for Life and Management Sciences B	
MA 241	Calculus II	
Statistics Course:		3
BUS 350	Economics and Business Statistics	
ST 311	Introduction to Statistics	
ST 350	Economics and Business Statistics	
Natural Sciences		
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
Select one of the following:		4
BIO 183	Introductory Biology: Cellular and Molecular Biology	
PB 200	Plant Life	
PB 250	Plant Biology	
GN 301	Genetics in Human Affairs	3

or GN 311	Principles of Genetics	
Physics Course:		4
PY 131	Conceptual Physics	
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	
PY 211	College Physics I	
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4
Chemistry Course:		4
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	
CH 220	Introductory Organic Chemistry	
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	
Biology Course:		4
AEC 360	Ecology	
MB 351 & MB 352	General Microbiology and General Microbiology Laboratory	
PB 360	Ecology	
PB 400	Plant Diversity and Evolution	
ZO 250	Animal Anatomy and Physiology	
Department Course Requirements		
ARE 201	Introduction to Agricultural & Resource Economics	3
or EC 201	Principles of Microeconomics	
ACC 220	Introduction to Managerial Accounting	3
or ACC 210	Concepts of Financial Reporting	
ARE 304	Agribusiness Management	3
ARE 306	Agricultural Law	3

or ARE 309	Environmental Law & Economic Policy	
Marketing Course:		3
ARE 311	Agricultural Markets	
ARE 312	Agribusiness Marketing	
BUS 360	Marketing Methods	
ARE 321	Agricultural Financial Management	3
or BUS 320	Financial Management	
ARE 301	Intermediate Microeconomics	3
or EC 301	Intermediate Microeconomics	
ARE/EC Elective:		3
ARE 332	Human Resource Management for Agribusiness	
ARE 345	Global Agribusiness Management	
EC 302	Intermediate Macroeconomics	
EC 348	Introduction to International Economics	
EC 431	Labor Economics	
ARE 490	Career Seminar in Agriculture & Resource Economics	1
ARE Electives (p. 3)		3
Restricted Electives		
Restricted Electives (p. 4)		12
GEP Courses		
ENG 101	Academic Writing and Research ¹	4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (Humanities/Social Sciences/Visual and Performing Arts)		3

GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)	5
GEP U.S. Diversity (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/) (verify requirement)	
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)	11
Select courses with enough credits to meet the minimum graduation requirement of 120 total credit hours.	
Total Hours	120

¹ A grade of C- or higher is required.

ARE Electives

Code	Title	Hours	Counts towards
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
ECG 505	Applied Microeconomic Analysis	3
ECG 506	Applied Macroeconomic Analysis	3
ECG 512	Law and Economics	3
ECG 515	Environmental and Resource Policy	3
ECG 528	Options and Derivatives Pricing	3
ECG 530	Topics in Labor Economics	3
ECG 537	Health Economics	3
ECG 540	Economic Development	3
ECG 548	International Economics	3
ECG 561	Applied Econometrics I	3
ECG 562	Applied Econometrics II	3
ECG 563	Applied Microeconomic:	3
ECG 580	Writing in Economics	3
ECG 590	Special Economics Topics	1-6
FIM 528		3

MA 528		3
MBA 528		3
ST 561	Applied Econometrics I	3

Restricted Electives

Code Title Hours Counts towards

Before registering for these courses students should check to make sure they have met the necessary prerequisites and that credit restrictions do not apply: e.g. credit is not allowed for both BIO 105 and BIO 181.

Business/Economics Set

Note: 300-Level BUS courses are restricted to students in the Business minor and 400-level BUS courses are restricted to Business majors.

ACC 210	Concepts of Financial Reporting	3
ACC 220	Introduction to Managerial Accounting	3
ACC 230	Individual Income Taxation	3
ACC 280	Survey of Financial and Managerial Accounting	3
ACC 295	Special Topics in Accounting	1-6
ACC 310	Intermediate Financial Accounting I	3
ACC 311	Intermediate Financial Accounting II	3
ACC 330	An Introduction To Income Taxation	3
ACC 340	Accounting Information Systems	3
ACC 411	Business Valuation	3
ACC 420	Cost Accounting for Effective Management	3
ACC 440	Enterprise Resource Planning Systems	3
ACC 450	Auditing and Assurance Services	3

ACC 451	Internal Auditing	3	ACC 567	Enterprise Resource Planning for Tax	1
ACC 460	Governmental and Nonprofit Accounting	3	ACC 568	Analysis of Unstructured Data in Tax	1
ACC 495	Special Topics in Accounting	1-6	ACC 569	Advanced Visual Analytics in Tax	1
ACC 498	Independent Study in Accounting	1-6	ACC 570	Data Security and Warehousing in Tax	1
ACC 499	Internship in ACC	1-6	ACC 571	Enterprise Resource Planning - Advanced Applications	1
ACC 508	Advanced Commercial Law	3	ACC 588	Special Topics in Accounting	1-6
ACC 510	Advanced Financial Accounting	3	ARE 215	Small Business Accounting	3
ACC 519	Applied Financial Management	3	ARE 260	Marketing and Risk Management in the Pork Industry	1
ACC 520	Advanced Management Accounting	3	ARE 270	Principles of Agribusiness Entrepreneurship	3
ACC 530	Advanced Income Tax	3	ARE 295	Special Topics in Agricultural & Resource Economics (200 Level)	1-6
ACC 533	Accounting and Tax Research	3	ARE 301	Intermediate Microeconomics	3
ACC 540	IT Risks and Controls	3	ARE 303	Farm Management	3
ACC 550	Advanced Auditing	3	ARE 304	Agribusiness Management	3
ACC 560	Tools for Tax Analytics	1	ARE 306	Agricultural Law	3
ACC 561	Database Management in Tax	1	ARE 309	Environmental Law & Economic Policy	3
ACC 562	Forecasting Effective Tax Rates and Scenario Analysis - Introduction	1	ARE 311	Agricultural Markets	3
ACC 563	Forecasting Effective Tax Rates and Scenario Analysis - Advanced Application	1	ARE 312	Agribusiness Marketing	3
ACC 564	Project Management and Process Documentation in Tax	1	ARE 321	Agricultural Financial Management	3
ACC 565	Visual Analytics in Tax	1	ARE 323	Agribusiness Finance	3
ACC 566	Database Management Applications in Tax	1	ARE 332	Human Resource Management for Agribusiness	3
			ARE 336	Introduction to Resource and Environmental Economics	3

ARE 345	Global Agribusiness Management	3	ARE 495	Special Topics in Agricultural and Resource Economics	1-6
ARE 370	Agribusiness New Venture Development	3	ARE 590	Special Topics in ARE	1-99
ARE 395	Special Topics in Agricultural and Resource Economics (300 level)	1-6	BUS 225	Personal Finance	3
ARE 404	Advanced Agribusiness Management	3	BUS 295	Special Topics in Business Management	1-6
ARE 412	Advanced Agribusiness Marketing	3	BUS 320	Financial Management	3
ARE 413	Applied Agribusiness Marketing	3	BUS 340	Information Systems Management	3
ARE 415	Introduction to Commodity Futures Markets	3	BUS 350	Economics and Business Statistics	3
ARE 420	Taxation in Agriculture, Production, and Agribusiness	3	BUS 351	Predictive Analytics for Business	3
ARE 425	Contracts and Organizations in Agriculture	3	BUS 360	Marketing Methods	3
ARE 433	U.S. Agricultural Policy	3	BUS 370	Operations and Supply Chain Management	3
ARE 444	Ethics in Agribusiness	3	BUS 420	Financial Management of Corporations	3
ARE 448	International Agricultural Trade	3	BUS 422	Investments and Portfolio Management	3
ARE 455	Agribusiness Analytics	3	BUS 425	Advanced Personal Financial Management	3
ARE 470	Agribusiness Entrepreneurship Clinical Skills Development	3	BUS 426	International Financial Management	3
ARE 475	Food Policy	3	BUS 428	Financial Analytics	3
ARE 490	Career Seminar in Agriculture & Resource Economics	1	BUS 429	Financial Modeling	3
ARE 492	External Learning Experience	1-6	BUS 440	Database Management	3
ARE 493	Special Problems/ Research Exploration	1-6	BUS 441	Business Data Communications and Networking	3
ARE 494	Agribusiness Study Abroad	1-6	BUS 442	Information Systems Development	3
			BUS 443	Web Development for Business Applications	3
			BUS 444	Systems Analysis and Design	3

BUS 449	Information Technology Capstone	3	BUS 554	Project Management	3
BUS 458	Analytics: From Data to Decisions	3	BUS 571	High Growth Entrepreneurship	3
BUS 459	Business Analytics Practicum	3	BUS 585	Market Research In Textiles	3
BUS 460	Consumer Behavior	3	BUS 590	Special Topics In Business Management	1-6
BUS 461	Channel and Retail Marketing	3	EC 202	Principles of Macroeconomics	3
BUS 462	Marketing Research	3	EC 301	Intermediate Microeconomics	3
BUS 464	International Marketing	3	EC 302	Intermediate Macroeconomics	3
BUS 465	Traditional and Digital Brand Promotion	3	EC 305	A Closer Look at Capitalism	3
BUS 466	Personal Selling	3	EC 336	Introduction to Resource and Environmental Economics	3
BUS 467	Product and Brand Management	3	EC 348	Introduction to International Economics	3
BUS 468	Marketing Strategy	3	EC 351	Econometrics I	3
BUS 469	Digital Marketing Practicum	3	EC 404	Money, Financial Markets, and the Economy	3
BUS 470	Operations Modeling and Analysis	3	EC 410	Public Finance	3
BUS 472	Operations Planning and Control Systems	3	EC 413	Industrial Organization	3
BUS 473	Supply Chain Strategy	3	EC 431	Labor Economics	3
BUS 474	Logistics Management	3	EC 437		3
BUS 475	Purchasing and Supply Management	3	EC 449	International Finance	3
BUS 476	Decision Modeling and Analysis		EC 451	Econometrics II	3
BUS 479	Supply Chain Management Undergraduate Practicum	3	EC 468	Game Theory	3
BUS 495	Special Topics in Business Management	1-6	EC 474	Economics of Financial Institutions and Markets	3
BUS 498	Independent Study in Business Management	1-6	EC 480		3
BUS 501	Strategic Management Foundations	3	EC 490	Research Seminar in Economics	3
			EC 495	Special Topics in Economics	1-6
			EC 498	Independent Study in Economics	1-6
			ECG 512	Law and Economics	3
			FTM 482	Global Brand Management in Textiles and Apparel	3

M 100	Personal and Professional Identity Development	1	MIE 480	Business Policy and Strategy	3
MBA 577	Technology Entrepreneurship and Commercialization II	3	MIE 495	Special Topics in MIE	1-6
MIE 201	Introduction to Business Processes	3	MIE 498	Independent Study in MIE	1-6
MIE 295	Special Topics in MIE	1-6	MSE 577	Technology Entrepreneurship and Commercialization II	3
MIE 305	Legal and Regulatory Environment	3	PRT 406	Sports Law	3
MIE 306	Managing Ethics in Organizations	3	ST 350	Economics and Business Statistics	3
MIE 310	Introduction to Entrepreneurship	3	TTM 585	Market Research In Textiles	3
MIE 330	Human Resource Management	3	Science Set		
MIE 335	Organizational Behavior	3	AEC 360	Ecology	4
MIE 410	Business Opportunity Analysis	3	AEC 380	Water Resources: Global Issues in Ecology, Policy, Management, and Advocacy	3
MIE 411	Managing the Growth Venture	3	AEC 419	Freshwater Ecology	4
MIE 412	Finance and Accounting for Entrepreneurs	3	AEC 420	Introduction to Fisheries Science	3
MIE 413	New Venture Planning	3	AEC 423	Introduction to Fisheries Sciences Laboratory	1
MIE 416	The Legal Dynamics of Entrepreneurship	3	AEC 441	Biology of Fishes	3
MIE 418	Social Entrepreneurship Practicum	3	AEC 442	Biology of Fishes Laboratory	1
MIE 419	Entrepreneurship Practicum	3	AEC 460	Field Ecology and Methods	4
MIE 430	Teamwork in Organizations	3	AEC 509	Ecology and Conservation of Freshwater Invertebrates	3
MIE 432	Labor and Employee Relations	3	AEC 515	Fish Physiology	3
MIE 434	Compensation Systems	3	AEC 519	Freshwater Ecology	4
MIE 435	Leadership and Management	3	AEC 586	Aquaculture	3
MIE 436	Training and Development	3	AEC 587	Aquaculture Laboratory	1
MIE 438	Staffing	3	AEC 761	Conservation and Climate Science	3
MIE 439	Human Resources Practicum	3	AEE 101	Introduction to Career and Technical Education	1

AEE 103	Fundamentals of Agricultural and Extension Education	1	AEE 426	Methods of Teaching Agriculture	3
AEE 208	Agricultural Biotechnology: Issues and Implications	3	AEE 427	Student Teaching in Agriculture	8
AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed	3	AEE 433	Leadership and Management of Volunteers in Agricultural and Extension Education	3
AEE 230	Introduction to Cooperative Extension	3	AEE 435	Professional Presentations in Agricultural Organizations	3
AEE 303	Administration and Supervision of Student Organizations	3	AEE 460	Organizational Leadership Development in Agriculture and Life Sciences	3
AEE 311	Communication Methods and Media	3	AEE 478	Advanced Issues in Extension Education	3
AEE 322	Experiential Learning in Agriculture	3	AEE 490	Seminar in Agricultural and Extension Education	1
AEE 323	Leadership Development in Agriculture and Life Sciences	3	AEE 491	Seminar in Agricultural Education	1
AEE 325	Planning and Delivering Non-Formal Education	3	AEE 492	External Learning Experience in Agricultural and Extension Education	1-6
AEE 326	Teaching Diverse Learners in AED	3	AEE 493	Special Problems in Agriculture and Extension Education	1-6
AEE 327	Conducting Summer Programs in Agricultural Education	1	AEE 495	Special Topics in Agricultural and Extension Education	1-3
AEE 350	Personal Leadership Development in Agriculture and Life Sciences	3	AEE 500	Agricultural Education, Schools and Society	3
AEE 360	Developing Team Leadership in Agriculture and Life Sciences	3	AEE 501	Foundations Of Agricultural and Extension Education	3
AEE 423	Practicum in Agricultural Extension/ Industry	8	AEE 503	Youth Program Management	3
AEE 424	Planning Agricultural Educational Programs	3	AEE 505	Trends and Issues in Agricultural and Extension Education	3

AEE 507	Comparative Agricultural and Extension Education	3	AEE 579	Research Design in Agricultural and Extension Education	3
AEE 521	Program Planning in Agricultural and Extension Education	3	AEE 595	Special Topics in Agricultural and Extension Education	1-6
AEE 522	Occupational Experience in Agriculture	3	ALS 103	Freshman Transitions and Diversity in Agriculture & Life Sciences	
AEE 523	Adult Education in Agriculture	3	ALS 303	Transfer Transitions and Diversity in Agriculture & Life Sciences	1
AEE 524	Coordinating the High School Agricultural Education Program	3	ANS 105	Introduction to Companion Animal Science	3
AEE 526	Information Technologies in Agricultural and Extension Education	3	ANS 110	Introduction to Equine Science	3
AEE 529	Curriculum Development in Agricultural and Extension Education	3	ANS 150	Introduction to Animal Science	3
AEE 533	Leadership and Management of Volunteers in Agricultural and Extension Education	3	ANS 151	Introduction to Animal Science Lab	1
AEE 535	Teaching Agriculture in Secondary Schools	3	ANS 201	Techniques of Animal Care	2
AEE 545	Methods of Change in Agricultural and Human Sciences		ANS 205	Physiology of Domestic Animals	3
AEE 560	Organizational Behavior and Administrative Leadership in Agricultural & Human Science	3	ANS 206	Anatomy of Domestic Animals Lab	1
AEE 577	Evaluation in Agricultural and Extension Education	3	ANS 208	Agricultural Biotechnology: Issues and Implications	3
AEE 578	Scientific Inquiry in Agricultural and Extension Education	3	ANS 215	Agricultural Genetics	3
			ANS 220	Reproductive Physiology	3
			ANS 221	Reproductive Physiology Lab	1
			ANS 225	Principles of Animal Nutrition	3
			ANS 230	Animal Nutrition	3
			ANS 231	Animal Nutrition Lab	1
			ANS 240	Livestock Merchandising	3
			ANS 240A	Livestock Merchandising	3
			ANS 260	Basic Swine Science	2

ANS 261	Swine Health and Biosecurity	1	ANS 403	Swine Management	3
ANS 262	Swine Breeding and Gestation Management	1	ANS 404	Dairy Cattle Management	3
ANS 263	Farrowing Management	1	ANS 408	Small Ruminant Management	3
ANS 264	Swine Nursery and Finishing Management	1	ANS 410	Equine Breeding Farm Management	3
ANS 265	Contemporary Issues in the Swine Industry	1	ANS 411	Management of Growing and Performance Horses	3
ANS 266	Swine Environment Management	1	ANS 415	Comparative Nutrition	3
ANS 267	Swine Manure and Nutrient Management	1	ANS 425	Feed Manufacturing Technology	3
ANS 268	Employee Management for the Swine Industry	1	ANS 440	Animal Genetic Improvement	3
ANS 269	Internship in the Swine Industry	1	ANS 452	Comparative Reproductive Physiology and Biotechnology	3
ANS 270	Pork Export Markets from a Swine Production Perspective	1	ANS 453	Physiology and Genetics of Growth and Development	3
ANS 271	Swine Nutrition	1	ANS 454	Lactation, Milk and Nutrition	3
ANS 281	Professional Development of PreVeterinary Track Students	1	ANS 480	Judging Team	1
ANS 290	Professional Development for Animal Science Careers	2	ANS 492	Professional Internship Experience in the Animal Sciences	1-3
ANS 303	Principles of Equine Evaluation	2	ANS 493	Research Experience in the Animal Sciences	1-3
ANS 304	Dairy Cattle Evaluation	2	ANS 494	Teaching Experience in the Animal Sciences	1-3
ANS 309	Livestock Evaluation	3	ANS 495	Special Topics in Animal Science	1-3
ANS 322	Muscle Foods and Eggs	3	ANS 515	Comparative Nutrition	3
ANS 324	Milk and Dairy Products	3	ANS 525	Feed Manufacturing Technology	3
ANS 330	Laboratory Animal Science	3	ANS 530	Advanced Applied Animal Reproduction	3
ANS 395	Animal Science Study Abroad	1-6	ANS 531	Advanced Applied Animal Reproduction Lab	1
ANS 400	Companion Animal Management	3	ANS 540	Animal Genetic Improvement	3
ANS 402	Beef Cattle Management	3	ANS 550	Applied Ruminant Nutrition	3

ANS 552	Comparative Reproductive Physiology and Biotechnology	3	BAE 361	Analytical Methods in Engineering Design	3
ANS 553	Physiology and Genetics of Growth and Development	3	BAE 371	Fundamentals of Hydrology for Engineers	3
ANS 554	Lactation, Milk and Nutrition	3	BAE 376	Watershed Assessment and Water Quality Protection	3
ANS 561	Equine Nutrition	3	BAE 401	Sensors and Controls	3
ANS 571	Regulation of Metabolism	3	BAE 425	Industrial Microbiology and Bioprocessing	3
ANS 575	Current Topics in Genomics and Proteomics in Animal Science	3	BAE 435	Precision Agriculture Technology	3
ANS 590	Topical Problems in Animal Science	1-3	BAE 451	Engineering Design I	2
BAE 100	Introduction to Biological and Agricultural Engineering and Technology	1	BAE 452	Engineering Design II	2
BAE 200	Computer Methods in Biological Engineering	2	BAE 462	Machinery Design and Applications	3
BAE 202	Introduction to Biological and Agricultural Engineering Methods	4	BAE 472	Irrigation and Drainage	3
BAE 203	Introduction to AutoCAD Civil 3D for Environmental & Ecological Engineers	2	BAE 473	Introduction to Hydrologic and Water Quality Modeling	3
BAE 204	Introduction to Environmental and Ecological Engineering	2	BAE 474	Principles and Applications of Ecological Engineering	3
BAE 302	Transport Phenomena	3	BAE 478	Agricultural Waste Management	3
BAE 305	Biological Engineering Circuits	4	BAE 481	Structures & Environment	3
BAE 321	Bioprocessing Engineering Fundamentals	3	BAE 488	Postharvest Engineering	3
BAE 322	Introduction to Food Process Engineering	3	BAE 492	External Learning Experience	1-6
BAE 325	Introductory Geomatics	3	BAE 493	Special Problems in Biological and Agricultural Engineering	1-6
			BAE 495	Special Topics in Biological and Agricultural Engineering	1-3
			BAE 501	Sensors and Controls	3
			BAE 502	Instrumentation for Hydrologic Applications	3

BAE 525	Industrial Microbiology and Bioprocessing	3	BAE 590	Special Problems	1-6
BAE 528	Biomass to Renewable Energy Processes	3	BAE 591	Master's Research Methods I	1
BAE 535	Precision Agriculture Technology	3	BAE 592	Master's Research Methods II	1
BAE 536	GIS Applications in Precision Agriculture	1	BAE 593	Introduction to Research Communications	
BAE 560		3	BBS 325	Introduction to Brewing Science and Technology	3
BAE 561	Agricultural Air Quality	3	BBS 426	Upstream Biomanufacturing Laboratory	2
BAE 572	Irrigation and Drainage	3	BBS 526	Upstream Biomanufacturing Laboratory	2
BAE 573	Introduction to Hydrologic and Water Quality Modeling	3	BCH 101	Introduction to Microbiology and Biochemistry Laboratory Practices	3
BAE 574	DRAINMOD: Theory and Application	3	BCH 571	Regulation of Metabolism	3
BAE 575	Design of Structural Stormwater Best Management Practices	3	BEC 220	Introduction to Drug Development and Careers in Biomanufacturing	1
BAE 576	Watershed Monitoring and Assessment	3	BEC 330	Principles and Applications of Bioseparations	2
BAE 577	Wetlands Design and Restoration	3	BEC 363	Foundations of Recombinant Microorganisms for Biomanufacturing	2
BAE 578	Agricultural Waste Management	3	BEC 426	Upstream Biomanufacturing Laboratory	2
BAE 580	Introduction to Land and Water Engineering	3	BEC 436	Introduction to Downstream Process Development	2
BAE 581	Open Channel Hydraulics for Natural Systems	3	BEC 440	Expression Systems in Biomanufacturing 1	3
BAE 582	Risk and Failure Assessment of Stream Restoration Structures	1	BEC 441	Expression Systems in Biomanufacturing II	3
BAE 583	Stream Corridor 3 Es: Ecohydraulics, Engineering and Ethics	3	BEC 462	Fundamentals of Bio-Nanotechnology	3
BAE 584	Introduction to Fluvial Geomorphology	3			
BAE 585		1			

BEC 463	Fermentation of Recombinant Microorganisms	2	BEC 577	Advanced Biomanufacturing and Biocatalysis	3
BEC 475	Global Regulatory Affairs for Medical Products	3	BEC 580	cGMP Fermentation Operations	2
BEC 480	cGMP Fermentation Operations	2	BEC 583	Tissue Engineering Technologies	2
BEC 483	Tissue Engineering Technologies	2	BEC 585	cGMP Downstream Operations	2
BEC 485	cGMP Downstream Operations	2	BEC 590	Industry Practicum in Biomanufacturing	3
BEC 488	Animal Cell Culture Engineering	2	BEC 595	Special Topics in Biomanufacturing	1-6
BEC 495	Special Topics in Biomanufacturing	1-4	BIO 140	Survey of Animal Diversity	3
BEC 497	Biomanufacturing Research Projects	1-3	BIO 141	Animal Diversity Laboratory	1
BEC 515	Biopharmaceutical Product Characterization Techniques	2	BIO 165	Introduction to Environmental Research	5
BEC 526	Upstream Biomanufacturing Laboratory	2	BIO 183	Introductory Biology: Cellular and Molecular Biology	4
BEC 532	Foundations of Downstream Processing and Formulation	2	BIO 227	Understanding Structural Diversity through Biological Illustration	3
BEC 536	Introduction to Downstream Process Development	2	BIO 230	The Science of Studying Dinosaurs	3
BEC 540	Expression Systems in Biomanufacturing I	3	BIO 240	Principles of Human Anatomy & Physiology (A): Nervous, Skeletal, Muscular, & Digestive Systems	4
BEC 541	Expression Systems in Biomanufacturing II	3	BIO 245	Principles of Human Anatomy & Physiology (B): Endocrine, Cardiovascular, Respiratory & Renal Systems	4
BEC 562	Fundamentals of Bio-Nanotechnology	3	BIO 267	Research in the Life Sciences I: Research Skills	3
BEC 563	Fermentation of Recombinant Microorganisms	2	BIO 269	Research in the Life Sciences II: Guided Research	3
BEC 575	Global Regulatory Affairs for Medical Products	3			

BIO 310	Quantitative Approaches to Biological Problems	3	BIO 499	Honors Project Part 2	3
BIO 315	General Parasitology	3	BIO 518	Experience and the Brain	3
BIO 325	Paleontological Field Methods	4	BIO 560	Population Ecology	3
BIO 330	Evolutionary Biology	3	BIO 570	Evolutionary Ecology	3
BIO 361	Developmental Biology	3	BIO 572	Proteomics	3
BIO 370	Developmental Anatomy of the Vertebrates	3	BIO 588	Neurobiology	3
BIO 375	Developmental Anatomy Laboratory	2	BIO 592	Topical Problems	1-3
BIO 405	Functional Histology	3	BIT 210	Phage Hunters	3
BIO 414	Cell Biology	3	BIT 211	Phage Genomics	2
BIO 416	Cancer Cell Biology	3	BIT 463	Fermentation of Recombinant Microorganisms	2
BIO 418	Cell Biology Research Lab	2	BIT 466	Animal Cell Culture Techniques	2
BIO 424	Endocrinology	3	BIT 476	Applied Bioinformatics	2
BIO 432	Evolutionary Medicine	3	BIT 481	Plant Tissue Culture and Transformation	2
BIO 434	Hormones and Behavior	3	BIT 563	Fermentation of Recombinant Microorganisms	2
BIO 440	The Human Animal: An Evolutionary Perspective	3	BIT 566	Animal Cell Culture Techniques	2
BIO 444	The Biology of Love and Sex	3	BIT 572	Proteomics	3
BIO 481	Senior Capstone Project	1	BMA 560	Population Ecology	3
BIO 482	Capstone Course in Molecular, Cellular, and Developmental Biology	3	BME 483	Tissue Engineering Technologies	2
BIO 483	Capstone Course in Integrative Physiology and Neurobiology	3	BME 583	Tissue Engineering Technologies	2
BIO 484	Capstone Course in Human Biology	3	BSC 295	Special Topics in Biological Sciences	1-6
BIO 485	Capstone Course in Ecology, Evolution, and Conservation Biology	3	BSC 492	Professional Experience	1-3
BIO 488	Neurobiology	3	BSC 493	Research Experience	1-3
BIO 498	Honors Project Part I	3	BSC 495	Special Topics in Biological Sciences	1-6
			CE 435	Engineering Geology	3
			CE 479	Air Quality	3
			CE 581	Fluid Mechanics in Natural Environments	3
			CH 100	Chemistry and Society	4

CH 101	Chemistry - A Molecular Science	3	CH 227	Organic Chemistry II for Students in Chemical Sciences	3
CH 102	General Chemistry Laboratory	1	CH 228	Organic Chemistry Laboratory II for Students in Chemical Sciences	1
CH 103	General Chemistry I for Students in Chemical Sciences	3	CH 230	Computational Chemistry Lab I	1
CH 104	General Chemistry Laboratory I for Students in Chemical Sciences	1	CH 232	Computational Chemistry Lab II	1
CH 111	Preparatory Chemistry	3	CH 295	Special Topics in Chemistry	1-3
CH 201	Chemistry - A Quantitative Science	3	CH 315	Quantitative Analysis	3
CH 202	Quantitative Chemistry Laboratory	1	CH 316	Quantitative Analysis Laboratory	1
CH 203	General Chemistry II for Students in Chemical Sciences	3	CH 331	Introductory Physical Chemistry	4
CH 204	General Chemistry Laboratory II for Students in Chemical Sciences	1	CH 335	Principles of Green Chemistry	4
CH 220	Introductory Organic Chemistry	3	CH 345	Chemistry and War	3
CH 221	Organic Chemistry I	3	CH 401	Systematic Inorganic Chemistry I	3
CH 222	Organic Chemistry I Lab	1	CH 403	Systematic Inorganic Chemistry II	3
CH 223	Organic Chemistry II	3	CH 415	Analytical Chemistry II	3
CH 224	Organic Chemistry II Lab	1	CH 431	Physical Chemistry I	3
CH 225	Organic Chemistry I for Students in Chemical Sciences	3	CH 433	Physical Chemistry II	3
CH 226	Organic Chemistry Laboratory I for Students in Chemical Sciences	1	CH 435	Introduction to Quantum Chemistry	3
			CH 437	Physical Chemistry for Engineers	4
			CH 441	Forensic Chemistry	3
			CH 442	Advanced Synthetic Techniques	4
			CH 444	Advanced Synthetic Techniques II	4
			CH 452	Advanced Measurement Techniques I	4

CH 454	Advanced Measurement Techniques II	4	CS 312	Grassland Management for Natural Resources Conservation	3
CH 463	Molecular Origins of Life	3	CS 400	Turf Cultural Systems	3
CH 495	Special Topics in Chemistry	1-4	CS 410	Community Food Systems	3
CH 499	Undergraduate Research in Chemistry	1-3	CS 411	Crop Ecology	3
CH 563	Molecular Origins of Life	3	CS 413	Plant Breeding	2
CH 572	Proteomics	3	CS 414	Weed Science	4
CHE 462	Fundamentals of Bio-Nanotechnology	3	CS 415	Integrated Pest Management	3
CHE 463	Fermentation of Recombinant Microorganisms	2	CS 418	Introduction to Regulatory Science in Agriculture	3
CHE 488	Animal Cell Culture Engineering	2	CS 424	Seed Physiology	3
CHE 562	Fundamentals of Bio-Nanotechnology	3	CS 430	Advanced Agroecology	4
CHE 563	Fermentation of Recombinant Microorganisms	2	CS 465	Turf Management Systems and Environmental Quality	3
CHE 577	Advanced Biomanufacturing and Biocatalysis	3	CS 470	Advanced Turfgrass Pest Management	2
CS 200	Introduction to Turfgrass Management	4	CS 480	Sustainable Food Production (capstone)	1
CS 210	Lawns and Sports Turf	3	CS 502	Plant Disease: Methods & Diagnosis	2
CS 211	Plant Genetics	3	CS 518	Introduction to Regulatory Science in Agriculture	
CS 213	Crop Science	3	CS 524	Seed Physiology	3
CS 214	Crop Science Laboratory	1	CS 541	Plant Breeding Methods	3
CS 216	Southern Row Crop Production - Cotton, Peanuts, and Tobacco	3	CS 565	Turf Management Systems and Environmental Quality	3
CS 218	Southern Row Crop Production - Corn, Small Grains and Soybeans	3	CS 590	Special Topics	1-6
CS 224	Seeds, Biotechnology and Societies	3	CS 591	Special Problems	1-6
CS 230	Introduction to Agroecology	3	CSSC 290	Professional Development in Crop & Soil Sciences	1
			CS 490	Senior Seminar in Crop Science and Soil Science	1

CSSC 492	Professional Internship Experience in Crop and Soil Sciences	1-3	ENT 502	Insect Diversity	4
CSSC 493	Research Experience in Crop and Soil Sciences	1-3	ENT 503	Insect Morphology and Physiology	3
CSSC 495	Special Topics in Crop and Soil Sciences	1-6	ENT 504	Professional Development for Agriculture and the Life Sciences	2
ECE 488	Systems Biology Modeling of Plant Regulation		ENT 506	Principles of Genetic Pest Management	3
ECE 489	Solid State Solar and Thermal Energy Harvesting	3	ENT 509	Biology of Aquatic Insects	3
ECE 588	Systems Biology Modeling of Plant Regulation		ENT 510	Writing Proposals in Agriculture, Biology, and Ecology	2
ECE 589	Solid State Solar and Thermal Energy Harvesting	3	ENT 520	Insect Behavior	3
ECI 424	Student Teaching in Modern Foreign Languages	12	ENT 526	Organic Agriculture: Principles and Practices	3
ENT 201	Insects and People	3	ENT 550	Fundamentals of Arthropod Management	3
ENT 203	An Introduction to the Honey Bee and Beekeeping	3	ENT 560	Techniques in Molecular Ecology and Evolution	3
ENT 207	Insects and Human Disease	3	ENT 582	Medical and Veterinary Entomology	3
ENT 212	Basic Entomology	1	ENT 591	Special Topics In Entomology	1-6
ENT 305	Introduction to Forensic Entomology	3	ES 100	Introduction to Environmental Sciences	3
ENT 401	Honey Bee Biology and Management	3	ES 111	Applications of Environmental Sciences	1
ENT 402	Forest Entomology	3	ES 113	Earth from Space	3
ENT 425	General Entomology	3	ES 150	Water and the Environment	3
ENT 470	Advanced Turfgrass Pest Management	2	ES 200	Climate Change and Sustainability	3
ENT 492	External Learning Experience	1-6	ES 295	Special Topics in Environmental Science	1-4
ENT 493	Special Problems in Entomology	1-6	ES 300	Energy and Environment	3
ENT 495	Special Topics in Entomology	1-3	ES 400	Analysis of Environmental Issues	3

ES 449	Human Dimensions of Natural Resources in Australia/New Zealand		ET 294	Independent Study in Environmental Technology & Management	1-6
ES 450	Sustaining Natural Resources in Australia/New Zealand		ET 295	Special Topics in Environmental Technology & Management	1-6
ES 495	Special Topics in Environmental Science	1-6	ET 301	Environmental Technology Laboratory III	1
ES 496	Environmental Science Internship	1-3	ET 302	Environmental Technology Laboratory IV	1
ES 497	Professional Development in Environmental Science	1-3	ET 303	Laboratory Safety Systems and Management	1
ES 498	Research in Environmental Science	1-3	ET 310	Environmental Monitoring and Analysis	3
ES 499	Thesis in Environmental Science	3	ET 320	Fundamentals of Air Pollution	3
ET 105	Introduction to Environmental Regulations	1	ET 330	Environmental Technology Practicum	3
ET 120	Introduction to Renewable Energy Technologies and Assessments	3	ET 401	Environmental Technology Laboratory V	1
ET 201	Environmental Technology Laboratory I	1	ET 455	Adaptive Management and Governance	3
ET 202	Environmental Technology Laboratory II	1	ET 460	Practice of Environmental Technology	3
ET 203	Pollution Prevention	1	ET 493	Independent Study in Environmental Technology & Management	1-6
ET 220	Solar Photovoltaics Assessment	3	ET 494	Independent Study in Environmental Technology & Management	1-6
ET 255	Hydro, Wind, and Bioenergy Assessment	3	ET 495	Special Topics in Environmental Technology & Management	1-6
ET 262	Renewable Energy Adoption: Barriers and Incentives	3	FM 425	Feed Manufacturing Technology	3
ET 293	Independent Study in Environmental Technology & Management	1-6	FM 426	Feed Manufacturing Technology Laboratory	1
			FM 525	Feed Manufacturing Technology	3

FM 580	Feed and Ingredient Quality Assurance	3	FOR 353	GIS and Remote Sensing for Environmental Analysis and Assessment	3
FOR 150	Critical Thinking and Data Analysis	2	FOR 374	Forest Measurement, Modeling, and Inventory	3
FOR 172	Forest System Mapping and Mensuration I	2	FOR 402	Forest Entomology	3
FOR 204	Silviculture	2	FOR 405	Forest Management	4
FOR 248	Forest History, Technology and Society	3	FOR 406	Forest Inventory, Analysis and Planning	4
FOR 250	Professional Development II: Communications in Natural Resources	1	FOR 408	Hardwood Management	3
FOR 252	Introduction to Forest Science	3	FOR 411	Forest Tree Genetics and Biology	3
FOR 260	Forest Ecology	4	FOR 414	World Forestry	3
FOR 261	Forest Communities	2	FOR 415	World Forestry Study Tour	1
FOR 264	Forest Wildlife	1	FOR 420	Watershed and Wetlands Hydrology	4
FOR 265	Fire Management	1	FOR 422	Consulting Forestry	3
FOR 273	Forest System Mapping and Mensuration II	3	FOR 430	Forest Health and Protection	3
FOR 293	Independent Study in Forest Management	1-6	FOR 434	Forest Operations and Analysis	3
FOR 294	Independent Study in Forest Management	1-6	FOR 472	Forest Soils	4
FOR 295	Special Topics in Forestry	1-6	FOR 491	Special Topics in Forestry and Related Natural Resources	1-4
FOR 303	Silvics and Forest Tree Physiology	3	FOR 493	Independent Study in Forest Management	1-6
FOR 304	Theory of Silviculture	4	FOR 494	Independent Study in Forest Management	1-6
FOR 318	Forest Pathology	3	FOR 501	Dendrology	3
FOR 319	Forest Economics	3	FOR 502	Forest Measurements	1
FOR 330	North Carolina Forests	3	FOR 503	Tree Physiology	1
FOR 334	Operations Research Applications in Natural Resources	1	FOR 504	The Practice of Silviculture	3
FOR 339	Dendrology	4	FOR 505	Forest Management	4
FOR 350	Professional Development III: Ethical Dilemmas in Natural Resource Management	1	FOR 506	Silviculture Laboratory	1
			FOR 507	Silviculture Mini Course	1

FOR 508	Hardwood Management	3	FS 290	Careers in Food and Bioprocessing Sciences	1
FOR 509	Forest Resource Policy	1	FS 295	Special Topics in Food Science	1-4
FOR 510	Introduction to GPS	1	FS 301	Introduction to Human Nutrition	3
FOR 513	Silviculture for Intensively Managed Plantations	3	FS 322	Muscle Foods and Eggs	3
FOR 514	Woodland Stewardship	3	FS 324	Milk and Dairy Products	3
FOR 519	Forest Economics	3	FS 325	Introduction to Brewing Science and Technology	3
FOR 520	Watershed and Wetlands Hydrology	4	FS 330	Science of Food Preparation	3
FOR 522	Consulting Forestry	3	FS 352	Introduction to Microbiological Food Safety Hazards	3
FOR 531	Wildland Fire Science	3	FS 354	Food Sanitation	3
FOR 532	Wildland Firefighter	3	FS 401	Advanced Nutrition and Metabolism	3
FOR 534	Forest Operations and Analysis	3	FS 402	Chemistry of Food and Bioprocessed Materials	4
FOR 540	Advanced Dendrology	3	FS 403	Analytical Techniques in Food & Bioprocessing Science	4
FOR 561	Forest Communities of the Southeastern Coastal Plain	1	FS 405	Food Microbiology	3
FOR 562	Forest Communities of the Southern Appalachians	1	FS 406	Food Microbiology Lab	1
FOR 565	Plant Community Ecology	4	FS 416	Quality Control in Food and Bioprocessing	3
FOR 574	Forest Mensuration and Modeling	3	FS 421	Food Preservation	3
FOR 575	Advanced Terrestrial Ecosystem Ecology	3	FS 426	Upstream Biomanufacturing Laboratory	2
FOR 583	Tropical Forestry	3	FS 435	Food Safety Management Systems	3
FOR 595	Special Topics	1-6	FS 453	Food Laws and Regulations	3
FS 201	Introduction to Food Science	3	FS 462	Postharvest Physiology	3
FS 231	Principles of Food and Bioprocess Engineering	4			
FS 250	Basics of Food Safety & Quality	3			

FS 471	Professionalism & Project Preparation in Food & Bioprocessing Science	1	FS 554	Lactation, Milk, and Nutrition	3
FS 475	Problems and Design in Food and Bioprocessing Science	3	FS 555	Exercise Nutrition	3
FS 481	Research Experience in Food and Bioprocessing Sciences	3	FS 557	Nutraceuticals and Functional Foods	3
FS 492	Professional Internship Experience in Food Science	1-6	FS 562	Postharvest Physiology	3
FS 493	Research Experience in Food Science	1-6	FS 567	Sensory Analysis of Foods	3
FS 495	Special Topics in Food Science	1-3	FS 580	Professional Development and Ethics in Food Safety	1
FS 501	Advanced Nutrition and Metabolism	3	FS 591	Special Problems In Food Science	1-6
FS 502	Chemistry of Food and Bioprocessed Materials	4	FS 592	Special Research Projects in Food Science	1-6
FS 505	Food Microbiology	3	FSA 520	Pre-Harvest Food Safety	3
FS 506	Food Microbiology Lab	1	FSA 530	Post-Harvest Food Safety	3
FS 516	Quality Control in Food and Bioprocessing		FSA 540	Food Safety and Public Health	3
FS 520	Pre-Harvest Food Safety	3	FSA 580	Professional Development and Ethics in Food Safety	1
FS 521	Food Preservation	3	FW 221	Conservation of Natural Resources	3
FS 522	Food Packaging	3	FW 293	Independent Study in Fisheries, Wildlife, and Conservation Biology	1-6
FS 526	Upstream Biomanufacturing Laboratory	2	FW 294	Independent Study in Fisheries, Wildlife, and Conservation Biology	1-6
FS 530	Post-Harvest Food Safety	3	FW 311	Piedmont Wildlife Ecology and Management	3
FS 535	Food Safety Management Systems	3	FW 312	Fisheries Techniques and Management	1
FS 540	Food Safety and Public Health	3	FW 313	Mountain Wildlife Ecology and Management	1
FS 550	Food Industry Study Tour	2	FW 314	Coastal Ecology and Management	1
FS 553	Food Laws and Regulations	3	FW 333	Conservation Biology in Practice	3

FW 353	Wildlife Management	3	FW 553	Principles of Wildlife Science	3
FW 373	Vertebrate Natural History	3	FW 560	International Wildlife Management and Conservation	3
FW 403	Urban Wildlife Management	3	FW 565	African Ecology and Conservation	4
FW 404	Wildlife Habitat Management	3	FW 586	Aquaculture	3
FW 405	Tropical Wildlife Ecology	3	FW 587	Aquaculture Laboratory	1
FW 411	Human Dimensions of Wildlife and Fisheries	3	FW 595	Special Topics in Fisheries and Wildlife Sciences	1-6
FW 415	Professional Development in Fisheries, Wildlife, and Conservation Biology	1	GES 506	Principles of Genetic Pest Management	3
FW 444	Mammalogy	3	GIS 512	Introduction to Environmental Remote Sensing	3
FW 445	Human Dimensions of Conservation Biology in the Bahamas	3	GIS 515	Cartographic Design	2
FW 453	Principles of Wildlife Science	4	GIS 530	Spatial Data Foundations	3
FW 460	International Wildlife Management and Conservation	3	GIS 550	Geospatial Data Structures and Web Services	3
FW 465	African Ecology and Conservation	4	GIS 582	Geospatial Modeling	3
FW 492	External Learning Experience	1-6	GN 301	Genetics in Human Affairs	3
FW 493	Independent Study in Fisheries, Wildlife, and Conservation Biology	1-6	GN 311	Principles of Genetics	4
FW 494	Independent Study in Fisheries, Wildlife, and Conservation Biology	1-6	GN 312	Elementary Genetics Laboratory	1
FW 495	Special Topics in Fisheries and Wildlife Science	1-3	GN 421	Molecular Genetics	3
FW 511	Human Dimensions of Wildlife and Fisheries	3	GN 423	Population, Quantitative and Evolutionary Genetics	3
FW 515	Fish Physiology	3	GN 425	Advanced Genetics Laboratory	2
FW 544	Mammalogy	3	GN 427	Introductory Bioinformatics	3
			GN 428	Introduction to Machine Learning in Biology	3
			GN 434	Genes and Development	3
			GN 441	Human and Biomedical Genetics	3
			GN 451	Genome Science	3

GN 453	Personal Genomics	3	HS 301	Plant Propagation	4
GN 456	Epigenetics, Development, and Disease	3	HS 302	Gardening with Herbaceous Perennials	3
GN 461	Advanced Bioinformatics	3	HS 303	Ornamental Plant Identification I	3
GN 490	Genetics Colloquium	1	HS 304	Ornamental Plant Identification II	3
GN 496	Genetics Research Experience	3	HS 357	Landscape Grading and Drainage	4
GN 497	Genetics Teaching Experience	3	HS 400	Residential Landscaping	6
GN 521	Molecular Genetics	3	HS 410	Community Food Systems	3
GN 541	Human and Biomedical Genetics	3	HS 411	Nursery Management	3
HS 131	Fruit & Vegetable Production	3	HS 416	Planting Design	4
HS 144	Weeds & Diseases of Ornamentals	3	HS 418	Digital Media Graphic for Landscape Designers	3
HS 200	Home Horticulture	3	HS 420	Green Infrastructure	3
HS 201	The World of Horticulture: Principles and Practices	3	HS 421	Temperate-Zone Tree Fruits: Physiology and Culture	3
HS 202	Home Plant Identification	3	HS 422	Small Fruit Production	3
HS 203	Home Plant Propagation	3	HS 423	Viticulture	3
HS 204	Home Landscape Maintenance	3	HS 428	Service-Learning in Urban Agriculture Systems	1
HS 205	Home Food Production	3	HS 431	Vegetable Production	4
HS 215	Agricultural Genetics	3	HS 432	Introduction to Permaculture	3
HS 242	Introduction to Small Scale Landscape Design	3	HS 433	Public Garden Administration	3
HS 250	Home Landscape Design: Creating Garden Spaces	3	HS 440	Greenhouse Management	3
HS 252	Landscape Graphic Communication	2	HS 442	Floriculture Crop Production	3
HS 272	Landscape Design/Build	6	HS 451	Plant Nutrition	3
HS 280	Hands-On-Horticulture	3	HS 462	Postharvest Physiology	3
HS 290	Horticulture: Careers and Opportunities	1	HS 471	Landscape Ecosystem Management	4
			HS 475	Horticulture Entrepreneurship	3

HS 476	Crop Physiology and Production in Controlled Environments	3	IDS 303	Humans and the Environment	3
HS 480	Sustainable Food Production (capstone)	1	MA 315	Mathematics Methods in Atmospheric Sciences	4
HS 491	Sustainable Agriculture Entrepreneurship Study Abroad	3	MA 555	Introduction to Manifold Theory	3
HS 492	Horticulture Internship	1-3	MB 101	Introduction to Microbiology and Biochemistry Laboratory Practices	3
HS 493	Research Experience in Horticultural Science	1-3	MB 103	Introductory Topics in Microbiology	1
HS 494	Teaching Experience in Horticultural Science	1-3	MB 180	Introduction to Microbial Bioprocessing	3
HS 495	Experimental Courses in Horticultural Science	1-6	MB 200	The Fourth Horseman: Plagues that Changed the World	3
HS 502	Plant Disease: Methods & Diagnosis	2	MB 210	Phage Hunters	3
HS 516	Planting Design	4	MB 211	Phage Genomics	2
HS 520	Green Infrastructure	3	MB 351	General Microbiology	3
HS 521	Temperate-Zone Tree Fruits: Physiology and Culture	3	MB 352	General Microbiology Laboratory	1
HS 523	Viticulture	3	MB 354	Inquiry-Guided Microbiology Lab	1
HS 532	Introduction to Permaculture	3	MB 360	Scientific Inquiry in Microbiology: At the Bench	3
HS 533	Public Garden Administration	3	MB 405	Food Microbiology	3
HS 541	Plant Breeding Methods	3	MB 406	Food Microbiology Lab	1
HS 550	Environmental Nursery Production	3	MB 411	Medical Microbiology	3
HS 551	Plant Nutrition	3	MB 412	Medical Microbiology Laboratory	1
HS 562	Postharvest Physiology	3	MB 414	Microbial Metabolic Regulation	3
HS 576	Crop Physiology and Production in Controlled Environments	3	MB 420	Fundamentals of Microbial Cell Biotransformation	2
HS 583	Advanced Floral Crop Production and Handling	3	MB 435	Bacterial Pathogenesis	3
HS 590	Special Problems in Horticultural Science	1-6	MB 441	Immunology	3
			MB 451	Microbial Diversity	3
			MB 452	Microbial Diversity Lab	2

MB 455	Microbial Biotechnology	3	MEA 211	Geology II Laboratory	1
MB 461	Molecular Virology	3	MEA 215	Introduction to Atmospheric Sciences	4
MB 470	Emerging and Re-emerging Infectious Diseases	3	MEA 217	Introduction to Computing in the Geosciences	3
MB 480	Current Issues in Microbiology	1	MEA 220	Marine Biology	3
MB 492	External Learning Experience	1-6	MEA 240	The Planets of Our Solar System	3
MB 501	Biology of Plant Pathogens	3	MEA 250	Introduction to Coastal Environments	3
MB 505	Food Microbiology	3	MEA 251	Introduction to Coastal Environments Laboratory	1
MB 506	Food Microbiology Lab	1	MEA 252	Biology of Marine Mammals	3
MB 520	Fundamentals of Microbial Cell Biotransformations	2	MEA 300	Environmental Geology	4
MB 532	Soil Microbiology	4	MEA 312	Atmospheric Thermodynamics	4
MB 535	Bacterial Pathogenesis	3	MEA 315	Mathematics Methods in Atmospheric Sciences	4
MB 555	Microbial Biotechnology	3	MEA 320	Fundamentals of Air Pollution	3
MB 575	Introduction to Mycology	4	MEA 321	Fundamentals of Air Quality and Climate Change	3
MB 585	Industry Case Studies in Microbial Biotechnology	3	MEA 323	Geochemistry of Natural Waters	3
MB 590	Topical Problems	1-3	MEA 350	Marine Conservation Biology	3
MEA 100	Earth System Science: Exploring the Connections	4	MEA 369	Life on Earth: Principles of Paleontology	
MEA 101	Geology I: Physical	3	MEA 409	Watershed Forensics	3
MEA 110	Geology I Laboratory	1	MEA 410	Introduction to Mineralogy and Petrology	4
MEA 130	Introduction to Weather and Climate	3	MEA 411	Marine Sediment Transport	3
MEA 135	Introduction to Weather and Climate Laboratory	1	MEA 412	Atmospheric Physics	3
MEA 150	Environmental Issues in Water Resources	4	MEA 415	Climate Dynamics	3
MEA 200	Introduction to Oceanography	3	MEA 421	Atmospheric Dynamics I	3
MEA 202	Geology II: Historical	3	MEA 422	Atmospheric Dynamics II	3
MEA 210	Oceanography Lab	1			

MEA 425	Introduction to Atmospheric Chemistry	3	MEA 473	Principles of Chemical Oceanography	3
MEA 440	Igneous and Metamorphic Petrology	4	MEA 476	Worldwide River and Delta Systems: Their Evolution and Human Impacts	3
MEA 443	Synoptic Weather Analysis and Forecasting	4	MEA 479	Air Quality	3
MEA 444	Mesoscale Analysis and Forecasting	4	MEA 481	Geomorphology: Earth's Dynamic Surface	3
MEA 449	Principles of Biological Oceanography	3	MEA 485	Introduction to Hydrogeology	3
MEA 450	Introductory Sedimentology and Stratigraphy	4	MEA 488	Meteorology for Media	3
MEA 451	Structural Geology	4	MEA 493	Special Topics in MEAS	1-6
MEA 454	Marine Physical-Biological Interactions	3	MEA 495	Junior Seminar in the Marine, Earth, and Atmospheric Sciences	1
MEA 455	Micrometeorology	3	MEA 498	Internship in MEAS	1-6
MEA 458	Introduction to Tropical Meteorology	3	MEA 507	Discipline-based Education Research in the Geosciences	3
MEA 459	Field Investigation of Coastal Processes	5	MEA 510	Air Pollution Meteorology	3
MEA 460	Principles of Physical Oceanography	3	MEA 511	Introduction to Meteorological Remote Sensing	3
MEA 462	Observational Methods and Data Analysis in Marine Physics	3	MEA 514	Advanced Physical Meteorology	3
MEA 463	Fluid Physics	3	MEA 515	Climate Dynamics	3
MEA 464	Ocean Circulation Systems	3	MEA 517	Fundamentals of Climate Change Science	3
MEA 465	Geologic Field Camp	4	MEA 518	Adaptation to Climate Change	3
MEA 466	Preparatory Course for Field Camp	1	MEA 519	Barriers to Climate Change Literacy	3
MEA 467	Marine Meteorology	3	MEA 525	Introduction to Atmospheric Chemistry	3
MEA 469	Ecology of coastal Resources	3	MEA 540	Principles of Physical Oceanography	3
MEA 470	Introduction to Geophysics	3	MEA 549	Principles of Biological Oceanography	3
MEA 471	Exploration and Engineering Geophysics	3	MEA 553	Estuarine Biogeochemistry	3

MEA 554	Marine Physical-Biological Interactions	3	NR 293	Independent Study in Natural Resources	1-6
MEA 562	Marine Sediment Transport	3	NR 294	Independent Study in Natural Resources	1-6
MEA 570	Geological Oceanography	3	NR 295	Special Topics in Natural Resources	1-3
MEA 573	Principles of Chemical Oceanography	3	NR 300	Natural Resource Measurements	4
MEA 574	Advanced Igneous Petrology	3	NR 301	Practicum for Professional Development I	1
MEA 577	Electron Microprobe Analysis of Geologic Material	2	NR 303	Humans and the Environment	3
MEA 579	Principles of Air Quality Engineering	3	NR 350	International Sustainable Resource Use	4
MEA 580	Air Quality Modeling and Forecasting	4	NR 360	Internship Experience	3
MEA 581	Fluid Mechanics in Natural Environments	3	NR 400	Natural Resource Management	4
MEA 582	Geospatial Modeling	3	NR 406	Conservation of Biological Diversity	3
MEA 585	Physical Hydrogeology	3	NR 420	Watershed and Wetlands Hydrology	4
MEA 591	Special Topics in Marine Science	1-6	NR 421	Wetland Science and Management	3
MEA 592	Special Topics in Earth Sciences	1-6	NR 460	Renewable Natural Resource Management and Policy	3
MEA 593	Special Topics in Atmospheric Science	1-6	NR 484	Environmental Impact Assessment	4
MEA 599	Regional Geology of North America	1-6	NR 491	Special Topics in Forestry and Related Natural Resources	1-4
MSE 489	Solid State Solar and Thermal Energy Harvesting	3	NR 493	Independent Study in Natural Resources	1-6
MSE 589	Solid State Solar and Thermal Energy Harvesting	3	NR 500	Natural Resource Management	4
NE 528	Introduction to Plasma Physics and Fusion Energy	3	NR 494	Independent Study in Natural Resources	
NE 529	Plasma Physics and Fusion Energy II	3	NR 510	Military Land Sustainability	3
NR 219	Natural Resource Markets	3	NR 511	Managing Natural Resources in an Arena of Conflict	3
			NR 512	Land Use Policy & Management	3

NR 520	Watershed and Wetlands Hydrology	4	NTR 492	Professional Internship Experience in Nutrition Science	1-3
NR 521	Wetland Science and Management	3	NTR 493	Research Experience in Nutrition Science	1-3
NR 548	Historical Environments	3	NTR 495	Special Topics in Nutrition	1-6
NR 554	Introduction to Data Analysis in Natural Resources	3	NTR 500	Principles of Human Nutrition	3
NR 560	Renewable Natural Resource Management and Policy	3	NTR 501	Advanced Nutrition and Metabolism	3
NR 571	Current Issues in Natural Resource Policy	3	NTR 510	Maternal and Infant Nutrition	3
NR 595	Special Topics in Natural Resources	1-6	NTR 515	Comparative Nutrition	3
NTR 210	Introduction to Community Food Security	3	NTR 521	Life Cycle Nutrition	3
NTR 220	Food and Culture	3	NTR 525	Feed Manufacturing Technology	3
NTR 301	Introduction to Human Nutrition	3	NTR 550	Applied Ruminant Nutrition	3
NTR 302	Introduction to Nutrition Research, Communication, and Careers	3	NTR 554	Lactation, Milk, and Nutrition	3
NTR 320	Nutrition Education	3	NTR 555	Exercise Nutrition	3
NTR 330	Public Health Nutrition	3	NTR 557	Nutraceuticals and Functional Foods	3
NTR 401	Advanced Nutrition and Metabolism	3	NTR 561	Equine Nutrition	3
NTR 410	Maternal and Infant Nutrition	3	NTR 594	Special Topics in Nutrition	1-6
NTR 415	Comparative Nutrition	3	PB 103	Perspectives on Botany	1
NTR 419	Human Nutrition and Chronic Disease	3	PB 200	Plant Life	4
NTR 420	Applied Nutrition Education	3	PB 205	Our Green World	3
NTR 421	Life Cycle Nutrition	3	PB 208	Agricultural Biotechnology: Issues and Implications	3
NTR 425	Feed Manufacturing Technology	3	PB 213	Plants and Civilization	3
NTR 454	Lactation, Milk and Nutrition	3	PB 215	Medicinal Plants	3
NTR 490	Senior Capstone Experience in Nutrition	4	PB 219	Plants in Folklore, Myth, and religion	3
			PB 220	Local Flora	3
			PB 250	Plant Biology	4
			PB 277	Space Biology	3
			PB 295	Special Topics in Botany	1-4
			PB 321	Introduction to Whole Plant Physiology	3
			PB 325	Culinary Botany	3

PB 345	Economic Botany	3	PHY 552	Comparative Reproductive Physiology and Biotechnology	3
PB 346	Economic Botany Lab	1	PO 201	Poultry Science and Production	3
PB 360	Ecology	4	PO 201A	Poultry Science and Production	3
PB 400	Plant Diversity and Evolution	4	PO 202	Poultry Science and Production Laboratory	1
PB 403	Systematic Botany	4	PO 202A	Poultry Science and Production Laboratory	1
PB 413	Plant Anatomy	2	PO 212	Poultry and People	3
PB 421	Plant Physiology	3	PO 215	Applied Avian and Aquaculture Nutrition	3
PB 445	Paleobotany	4	PO 290	Poultry Seminar	1
PB 464	Rare Plants of North Carolina	3	PO 322	Muscle Foods and Eggs	3
PB 480	Introduction to Plant Biotechnology	3	PO 340	Live Poultry and Poultry Product Evaluation, Grading, and Inspection	3
PB 481	Plant Tissue Culture and Transformation	2	PO 404	Avian Anatomy and Physiology	4
PB 488	Systems Biology Modeling of Plant Regulation		PO 406	Physiological Aspects of Poultry Management	3
PB 492	External Learning Experience	1-6	PO 407	Physiological Aspects of Poultry Management Laboratory	1
PB 493	Plant Biology Supervised Undergraduate Research Experience	1-6	PO 410	Production and Management of Game Birds in Confinement	3
PB 495	Special Topics in Plant Biology	1-6	PO 411	Agrosecurity	3
PB 501	Biology of Plant Pathogens	3	PO 412	Emerging Topics in Poultry Science	3
PB 503	Systematic Botany	4	PO 415	Comparative Nutrition	3
PB 513	Plant Anatomy	2	PO 421	Commercial Egg Production	3
PB 545	Paleobotany	4	PO 424	Poultry Meat Production	3
PB 559	Plant Water Relations	2	PO 425	Feed Manufacturing Technology	3
PB 564	Rare Plants of North Carolina	3			
PB 570	Plant Functional Ecology	3			
PB 575	Introduction to Mycology	4			
PB 580	Introduction to Plant Biotechnology	3			
PB 595	Special Topics in Plant Biology	1-6			
PHY 452	Comparative Reproductive Physiology and Biotechnology	3			
PHY 524	Comparative Endocrinology	3			

PO 426	Feed Manufacturing Technology Laboratory	1	PP 502	Plant Disease: Methods & Diagnosis	2
PO 433	Poultry Processing and Products	3	PP 575	Introduction to Mycology	4
PO 435	Poultry Incubation & Breeding	4	PRT 449	Human Dimensions of Natural Resources in Australia/New Zealand	3
PO 466	Animal Cell Culture Techniques	2	PRT 450	Sustaining Natural Resources in Australia/New Zealand	3
PO 492	External Learning Experience	1-6	PSE 335	Principles of Green Chemistry	4
PO 493	Special Problems in Poultry Science	1-6	PY 123	Stellar and Galactic Astronomy	3
PO 495	Special Topics in Poultry Science	1-3	PY 124	Solar System Astronomy	3
PO 504	Avian Anatomy and Physiology	4	PY 125	Astronomy Laboratory	1
PO 506	Physiological Aspects of Poultry Management	3	PY 131	Conceptual Physics	4
PO 510	Poultry Product Safety: An On-Farm Model	3	PY 201	University Physics I	4
PO 515	Comparative Nutrition	3	PY 202	University Physics II	4
PO 524	Comparative Endocrinology	3	PY 203	University Physics III	4
PO 525	Feed Manufacturing Technology	3	PY 205	Physics for Engineers and Scientists I	3
PO 533	Poultry Processing and Products	3	PY 206	Physics for Engineers and Scientists I Laboratory	1
PO 566	Animal Cell Culture Techniques	2	PY 208	Physics for Engineers and Scientists II	3
PO 580	Feed and Ingredient Quality Assurance	3	PY 209	Physics for Engineers and Scientists II Laboratory	1
PO 590	Special Problems in Poultry Science	1-6	PY 211	College Physics I	4
PP 144	Weeds & Diseases of Ornamentals	3	PY 212	College Physics II	4
PP 222	Kingdom of Fungi	3	PY 251	Introduction to Scientific Computing	3
PP 318	Forest Pathology	3	PY 252	Instrumental and Data Analysis for Physics	2
PP 470	Advanced Turfgrass Pest Management	2	PY 299	Special Problems in Physics	1-3
PP 501	Biology of Plant Pathogens	3			

PY 301	Introduction to Quantum Mechanics	3	PY 525	Computational Physics	3
PY 328	Stellar and Galactic Astrophysics	3	PY 528	Introduction to Plasma Physics and Fusion Energy	3
PY 341	Relativity, Gravitation and Cosmology	3	PY 529	Plasma Physics and Fusion Energy II	3
PY 401	Quantum Physics I	3	PY 543	Astrophysics	3
PY 402	Quantum Physics II	3	PY 552	Condensed Matter Physics I	3
PY 407	Introduction to Modern Physics	3	PY 570	Polymer Physics	3
PY 411	Mechanics I	3	PY 581	Matter & Interactions for Teachers I	3
PY 412	Mechanics II	3	PY 582	Matter & Interactions for Teachers II	3
PY 413	Thermal Physics	3	PY 589	Solid State Solar and Thermal Energy Harvesting	3
PY 414	Electromagnetism I	3	PY 590	Special Topics In Physics	1-6
PY 415	Electromagnetism II	3	PY 599	Special Topics in Physics	1-6
PY 452	Advanced Physics Laboratory	3	SMT 202	Anatomy and Properties of Renewable Materials	3
PY 489	Solid State Solar and Thermal Energy Harvesting	3	SSC 185	Land and Life	3
PY 495	Special Topics in Physics	1-4	SSC 200	Soil Science	3
PY 499	Independent Research in Physics	1-6	SSC 201	Soil Science Laboratory	1
PY 501	Quantum Physics I	3	SSC 332	Environmental Soil Microbiology	3
PY 502	Quantum Physics II	3	SSC 341	Soil Fertility and Nutrient Management	3
PY 506	Nuclear and Subatomic Physics	3	SSC 342	Soil and Plant Nutrient Analysis	1
PY 507	Elementary Particle Physics	3	SSC 410	Soil Judging for Land Evaluation	1
PY 509	General Relativity	3	SSC 421	Role of Soils in Environmental Management	3
PY 511	Mechanics I	3	SSC 427	Biological Approaches to Sustainable Soil Systems	3
PY 512	Mechanics II	3	SSC 428	Service-Learning in Urban Agriculture Systems	1
PY 514	Electromagnetism I	3			
PY 515	Electromagnetism II	3			
PY 516	Physical Optics	3			
PY 517	Atomic and Molecular Physics	3			
PY 519	Biological Physics	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 455	Soils, Environmental Quality and Global Challenges	3
SSC 461	Soil Physical Properties and Plant Growth	3
SSC 462	Soil-Crop Management Systems	3
SSC 470	Wetland Soils	3
SSC 473	Introduction to Hydrologic and Water Quality Modeling	3
SSC 511	Soil Physics	4
SSC 521	Soil Chemistry	3
SSC 532	Soil Microbiology	4
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 541	Soil Fertility	3
SSC 545	Remote Sensing Applications in Soil Science and Agriculture	3
SSC 551	Soil Morphology, Genesis and Classification	3
SSC 562	Environmental Applications Of Soil Science	3
SSC 570	Wetland Soils	3
SSC 573	Introduction to Hydrologic and Water Quality Modeling	3
SSC 590	Special Problems in Soil Science	1-6
TE 570	Polymer Physics	3
TOX 201	Poisons, People and the Environment	3
TOX 401	Principles of Toxicology	4

TOX 415	Environmental Toxicology and Chemistry	4
TOX 501	Principles of Toxicology	4
TOX 515	Environmental Toxicology	4
TOX 595	Special Topics	1-6
USC 291	Service Learning Program Leader Development I	1
USC 292	Service Learning Program Leader Development II	2
VMP 401	Poultry Diseases	4
VMP 420	Disease of Farm Animals	3
ZO 233	Human-Animal Interactions	3
ZO 250	Animal Anatomy and Physiology	4
ZO 317	Primate Ecology and Evolution	3
ZO 333	Captive Animal Biology	3
ZO 350	Animal Phylogeny and Diversity	4
ZO 402	Invertebrate Biology	4
ZO 410	Introduction to Animal Behavior	3
ZO 486	Capstone Course in Zoology	3
ZO 524		3
ZO 553	Principles Of Wildlife Science	3
ZO 582	Medical and Veterinary Entomology	3

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
ALS 103	Freshman Transitions and Diversity in Agriculture & Life Sciences	1
ARE 201 or EC 201	Introduction to Agricultural & Resource Economics ¹ or Principles of Microeconomics	3
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
ENG 101	Academic Writing and Research	4
Mathematics Requirement (p. 1)		3
Hours		15

Spring Semester

Select one of the following:	4
BIO 183 Introductory Biology: Cellular and Molecular Biology	
PB 200 Plant Life	
PB 250 Plant Biology	
Mathematics Requirement (p. 1)	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)	3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)	3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)	1
Hours	14

Second Year**Fall Semester**

CH 101 Chemistry - A Molecular Science and General Chemistry Laboratory	4
AEE 226 Computer Applications and Information Technology in Agricultural & Extension Ed	3
PY 131 Conceptual Physics	4
or PY 211 or College Physics I	
Communications Requirement (p. 1)	3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)	1
Hours	15

Spring Semester

ACC 220 Introduction to Managerial Accounting	3
or ACC 210 or Concepts of Financial Reporting	
Chemistry Requirement (p. 1)	4
Statistics Requirement (p. 1)	3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)	3
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (Humanities/Social Sciences/Visual and Performing Arts)	3
Hours	16

Third Year**Fall Semester**

ARE 301 Intermediate Microeconomics	3
ARE 306 Agricultural Law	3
or ARE 309 or Environmental Law & Economic Policy	
ARE 490 Career Seminar in Agriculture & Resource Economics	1
Biology Elective Requirement (p. 1)	4
ARE or EC Elective (p. 1)	3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)	2-3
Hours	16

Spring Semester

Marketing Requirement (p. 1)	3
GN 311 Principles of Genetics	4
ARE 304 Agribusiness Management	3
Restricted Elective (p. 4)	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)	3
Hours	16

Fourth Year**Fall Semester**

ARE 321 Agricultural Financial Management	3
or BUS 320 or Financial Management	
ARE/EC Elective (p. 1)	3
Free Elective ²	2
Restricted Elective (p. 4)	3
Restricted Elective (p. 4)	3
Hours	14

Spring Semester

Advanced Writing Requirement (p. 1)	3
Restricted Elective (p. 4)	3
Free Electives ²	8-9
Hours	14
Total Hours	120

¹ A grade of C- or higher is required.

² For Free Elective, select courses with enough credits to meet the minimum graduation requirement of 120 total credit hours.

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.