

Animal Science (BS): Industry Concentration

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

The degree of Bachelor of Science in Animal Science may be obtained by selecting one of three concentrations offered by the Department of Animal Science in the College of Agriculture and Life Sciences: Veterinary Bioscience, Science, and Industry.

The Industry concentration is designed for students who are more interested in the business or production aspects of animal science. It offers flexibility in completing Animal Science courses with business, marketing, economics, and applied science coursework. There are many opportunities to gain undergraduate research experience with an Animal Science faculty member, to participate in one of the animal-related clubs, and to engage globally by participating in one of our Animal Science Study Abroad experiences.

Accelerated Graduate Opportunities

Advanced undergraduates have the opportunity to complete the **Accelerated Bachelor's/Master's degrees**, which allows students to earn both the BS and the Master's of Animal Science degrees within five years. See listing of graduate degrees offered in the Graduate School (<https://grad.ncsu.edu/>). The **Accelerated BS/DVM** for Animal Science Majors (3+1 Advising Guide) is a pathway for students admitted early to a College of Veterinary Medicine to complete the BS in Animal Science degree by transferring back 12 credits after one year in vet school.

For more information about our program, visit our website (<https://cals.ncsu.edu/animal-science/students/undergraduate/#bachelor-of-science>).

Contact

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Plan Requirements

Use of animals and animal specimens is critical to our educational program. To obtain full credit for Animal Science courses, students are required to participate in laboratory procedures involving animals and animal specimens. All activities with live animals are IACUC (Institutional Animal Care and Use Committee) approved. Many lectures also incorporate animals or animal specimens into the course.

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		
Communication			
Select one of the following:		3	
COM 110	Public Speaking		
COM 112	Interpersonal Communication		
COM 211	Argumentation and Advocacy		
Mathematical & Natural Sciences			
MA 107	Precalculus I ¹	3	
ST 311	Introduction to Statistics	3	
or ST 350	Economics and Business Statistics		
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
BIO 183	Introductory Biology: Cellular and Molecular Biology	4	
CH 101	Chemistry - A Molecular Science ¹	3	
CH 102	General Chemistry Laboratory	1	
ANS 215	Agricultural Genetics	3	
or GN 311	Principles of Genetics		
Major Requirements			
ANS 150	Introduction to Animal Science ¹	3	
ANS 151	Introduction to Animal Science Lab	1	
ANS 205	Physiology of Domestic Animals	3	
ANS 206	Anatomy of Domestic Animals Lab	1	
ANS 220 & ANS 221	Reproductive Physiology and Reproductive Physiology Lab	4	

ANS 230 & ANS 231	Animal Nutrition and Animal Nutrition Lab	4
Select two of the following Animal Management courses:		6
ANS 400	Companion Animal Management	
ANS 402	Beef Cattle Management	
ANS 403	Swine Management	
ANS 404	Dairy Cattle Management	
ANS 408	Small Ruminant Management	
ANS 410	Equine Breeding Farm Management	
ANS 411	Management of Growing and Performance Horses	
Animal Science Discipline Elective (p. 3)		3
Animal Science Electives (p. 4)		5
Select one of the following Economics Courses:		3
ARE 201	Introduction to Agricultural & Resource Economics	
ARE 201A	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 202	Principles of Macroeconomics	
EC 205	Fundamentals of Economics	
Industry Option Requirements		
Select one of the following:		3
MA 114	Introduction to Finite Mathematics with Applications	
MA 121	Elements of Calculus	
MA 131	Calculus for Life and Management Sciences A	
Select one of the following:		4

CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	
CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab	
PY 131	Conceptual Physics	4
or PY 211	College Physics I	
Select one of the following BUS Management or Marketing Elective Courses:		3
ARE 303	Farm Management	
ARE 304	Agribusiness Management	
ARE 311	Agricultural Markets	
ARE 312	Agribusiness Marketing	
Economics or BUS Electives (p. 6)		6
GEP Courses		
ENG 101	Academic Writing and Research ¹	4
GEP Humanities (http:// catalog.ncsu.edu/undergraduate/ gep-category-requirements/gep- humanities/) ³		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/) ³		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)

CALS Group A, B, or C

CALS Group A, B, or C (p. 6) 11

Courses for the Minor in Agricultural Business Management fulfill this requirement.

Free Electives

Free Electives (12 Hr S/U Lmt)^{2,3} 8

Total Hours 120

- ¹ A grade of C- or higher is required.
- ² Students should consult their academic advisors to determine which courses fill this requirement.
- ³ Students are encouraged to take an Ethics course as part of their Humanities, Additional Breadth, Interdisciplinary Perspectives, or Free electives.

Animal Science Discipline Elective

Code	Title	Hours	Counts towards
ANS 415	Comparative Nutrition	3	
ANS 425	Feed Manufacturing Technology	3	
ANS 440	Animal Genetic Improvement	3	
ANS 452	Comparative Reproductive Physiology and Biotechnology	3	
ANS 453	Physiology and Genetics of Growth and Development	3	
ANS 454	Lactation, Milk and Nutrition	3	
ANS 515	Comparative Nutrition	3	
ANS 525	Feed Manufacturing Technology	3	
ANS 530	Advanced Applied Animal Reproduction	3	
ANS 531	Advanced Applied Animal Reproduction Lab	1	

ANS 540	Animal Genetic Improvement	3
ANS 550	Applied Ruminant Nutrition	3
ANS 552	Comparative Reproductive Physiology and Biotechnology	3
ANS 553	Physiology and Genetics of Growth and Development	3
ANS 554	Lactation, Milk and Nutrition	3
ANS 561	Equine Nutrition	3
ANS 571	Regulation of Metabolism	3
ANS 575	Current Topics in Genomics and Proteomics in Animal Science	3
ANS 590	Topical Problems in Animal Science	1-3
BCH 571	Regulation of Metabolism	3
FM 425	Feed Manufacturing Technology	3
FM 525	Feed Manufacturing Technology	3
NTR 415	Comparative Nutrition	3
NTR 419	Human Nutrition and Chronic Disease	3
NTR 425	Feed Manufacturing Technology	3
NTR 454	Lactation, Milk and Nutrition	3
NTR 515	Comparative Nutrition	3
NTR 525	Feed Manufacturing Technology	3
NTR 550	Applied Ruminant Nutrition	3
NTR 561	Equine Nutrition	3
PHY 452	Comparative Reproductive Physiology and Biotechnology	3
PHY 552	Comparative Reproductive Physiology and Biotechnology	3

PO 415	Comparative Nutrition	3
PO 425	Feed Manufacturing Technology	3
PO 515	Comparative Nutrition	3
PO 525	Feed Manufacturing Technology	3
VMP 420	Disease of Farm Animals	3

Animal Science Electives

Code	Title	Hours	Counts towards
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Animal Science Electives

VMP 420	Disease of Farm Animals	3
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Any ANS Courses Not Planned

AEE 208	Agricultural Biotechnology: Issues and Implications	3
ANS 105	Introduction to Companion Animal Science	3
ANS 110	Introduction to Equine Science	3
ANS 150	Introduction to Animal Science	3
ANS 151	Introduction to Animal Science Lab	1
ANS 201	Techniques of Animal Care	2
ANS 205	Physiology of Domestic Animals	3
ANS 206	Anatomy of Domestic Animals Lab	1
ANS 208	Agricultural Biotechnology: Issues and Implications	3
ANS 215	Agricultural Genetics	3
ANS 220	Reproductive Physiology	3
ANS 221	Reproductive Physiology Lab	1
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 262	Swine Breeding and Gestation Management	1
ANS 263	Farrowing Management	1
ANS 264	Swine Nursery and Finishing Management	1
ANS 265	Contemporary Issues in the Swine Industry	1
ANS 266	Swine Environment Management	1
ANS 267	Swine Manure and Nutrient Management	1
ANS 268	Employee Management for the Swine Industry	1
ANS 269	Internship in the Swine Industry	1
ANS 270	Pork Export Markets from a Swine Production Perspective	1
ANS 271	Swine Nutrition	1
ANS 281	Professional Development of PreVeterinary Track Students	1
ANS 290	Professional Development for Animal Science Careers	2
ANS 303	Principles of Equine Evaluation	2
ANS 304	Dairy Cattle Evaluation	2
ANS 309	Livestock Evaluation	3
ANS 322	Muscle Foods and Eggs	3
ANS 324	Milk and Dairy Products	3
ANS 330	Laboratory Animal Science	3
ANS 395	Animal Science Study Abroad	1-6

ANS 400	Companion Animal Management	3	ANS 553	Physiology and Genetics of Growth and Development	3
ANS 402	Beef Cattle Management	3	ANS 554	Lactation, Milk and Nutrition	3
ANS 403	Swine Management	3	ANS 561	Equine Nutrition	3
ANS 404	Dairy Cattle Management	3	ANS 571	Regulation of Metabolism	3
ANS 408	Small Ruminant Management	3	ANS 575	Current Topics in Genomics and Proteomics in Animal Science	3
ANS 410	Equine Breeding Farm Management	3	ANS 590	Topical Problems in Animal Science	1-3
ANS 411	Management of Growing and Performance Horses	3	BCH 571	Regulation of Metabolism	3
ANS 415	Comparative Nutrition	3	FM 425	Feed Manufacturing Technology	3
ANS 425	Feed Manufacturing Technology	3	FM 525	Feed Manufacturing Technology	3
ANS 440	Animal Genetic Improvement	3	FS 322	Muscle Foods and Eggs	3
ANS 452	Comparative Reproductive Physiology and Biotechnology	3	FS 324	Milk and Dairy Products	3
ANS 453	Physiology and Genetics of Growth and Development	3	FS 435	Food Safety Management Systems	3
ANS 454	Lactation, Milk and Nutrition	3	FS 535	Food Safety Management Systems	3
ANS 495	Special Topics in Animal Science	1-3	HS 215	Agricultural Genetics	3
ANS 515	Comparative Nutrition	3	NTR 415	Comparative Nutrition	3
ANS 525	Feed Manufacturing Technology	3	NTR 419	Human Nutrition and Chronic Disease	3
ANS 530	Advanced Applied Animal Reproduction	3	NTR 425	Feed Manufacturing Technology	3
ANS 531	Advanced Applied Animal Reproduction Lab	1	NTR 454	Lactation, Milk and Nutrition	3
ANS 540	Animal Genetic Improvement	3	NTR 515	Comparative Nutrition	3
ANS 550	Applied Ruminant Nutrition	3	NTR 525	Feed Manufacturing Technology	3
ANS 552	Comparative Reproductive Physiology and Biotechnology	3	NTR 550	Applied Ruminant Nutrition	3
			NTR 561	Equine Nutrition	3
			PB 208	Agricultural Biotechnology: Issues and Implications	3

PHY 452	Comparative Reproductive Physiology and Biotechnology	3
PHY 552	Comparative Reproductive Physiology and Biotechnology	3
PO 322	Muscle Foods and Eggs	3
PO 415	Comparative Nutrition	3
PO 425	Feed Manufacturing Technology	3
PO 515	Comparative Nutrition	3
PO 525	Feed Manufacturing Technology	3

Economics or BUS Electives

Code	Title	Hours	Counts towards
ACC 220	Introduction to Managerial Accounting	3	
ACC 280	Survey of Financial and Managerial Accounting	3	
ARE 215	Small Business Accounting	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 332	Human Resource Management for Agribusiness	3	
BUS 320	Financial Management	3	
BUS 360	Marketing Methods	3	
MIE 310	Introduction to Entrepreneurship	3	

MIE 330	Human Resource Management	3
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CALS Group A, B, or C

Code	Title	Hours	Counts towards
Group A - Biological Sciences			
AEC 360	Ecology	4	
AEC 420	Introduction to Fisheries Science	3	
AEC 423	Introduction to Fisheries Sciences Laboratory	1	
AEE 208	Agricultural Biotechnology: Issues and Implications	3	
ANS 105	Introduction to Companion Animal Science	3	
ANS 110	Introduction to Equine Science	3	
ANS 150	Introduction to Animal Science	3	
ANS 151	Introduction to Animal Science Lab	1	
ANS 205	Physiology of Domestic Animals	3	
ANS 206	Anatomy of Domestic Animals Lab	1	
ANS 208	Agricultural Biotechnology: Issues and Implications	3	
ANS 215	Agricultural Genetics	3	
ANS 220	Reproductive Physiology	3	
ANS 221	Reproductive Physiology Lab	1	
ANS 230	Animal Nutrition	3	
ANS 231	Animal Nutrition Lab	1	
ANS 415	Comparative Nutrition	3	
ANS 452	Comparative Reproductive Physiology and Biotechnology	3	
ANS 453	Physiology and Genetics of Growth and Development	3	

ANS 454	Lactation, Milk and Nutrition	3	BIO 440	The Human Animal: An Evolutionary Perspective	3
ANS 515	Comparative Nutrition	3	BIT 410	Manipulation of Recombinant DNA	4
ANS 552	Comparative Reproductive Physiology and Biotechnology	3	BIT 462	Gene Expression Analysis: Microarrays	2
ANS 553	Physiology and Genetics of Growth and Development	3	BIT 463	Fermentation of Recombinant Microorganisms	2
ANS 554	Lactation, Milk and Nutrition	3	BIT 464	Protein Purification	2
BCH 101	Introduction to Microbiology and Biochemistry Laboratory Practices	3	BIT 466	Animal Cell Culture Techniques	2
BCH 220	Role of Biotechnology in Society	3	BIT 467	PCR and DNA Fingerprinting	2
BCH 351	General Biochemistry		BIT 468	Genome Mapping	2
BCH 451	Principles of Biochemistry	4	BIT 476	Applied Bioinformatics	2
BCH 452	Introductory Biochemistry Laboratory	2	BIT 481	Plant Tissue Culture and Transformation	2
BCH 453	Biochemistry of Gene Expression	3	BIT 501	Ethical Issues in Biotechnology	1
BCH 454	Advanced Biochemistry Laboratory	4	BIT 562	Gene Expression Analysis: Microarrays	2
BCH 455	Proteins and Molecular Mechanisms	3	BIT 563	Fermentation of Recombinant Microorganisms	2
BCH 553	Biochemistry of Gene Expression	3	BIT 564	Protein Purification	2
BCH 555	Proteins and Molecular Mechanisms	3	BIT 566	Animal Cell Culture Techniques	2
BEC 463	Fermentation of Recombinant Microorganisms	2	BIT 567	PCR and DNA Fingerprinting	2
BEC 563	Fermentation of Recombinant Microorganisms	2	BIT 568	Genome Mapping	2
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	CHE 463	Fermentation of Recombinant Microorganisms	2
BIO 267	Research in the Life Sciences I: Research Skills	3	CHE 563	Fermentation of Recombinant Microorganisms	2
BIO 414	Cell Biology	3	ENT 201	Insects and People	3
BIO 434	Hormones and Behavior	3	ENT 207	Insects and Human Disease	3
			ENT 402	Forest Entomology	3
			ENT 425	General Entomology	3

FOR 402	Forest Entomology	3	MB 505	Food Microbiology	3
FS 231	Principles of Food and Bioprocess Engineering	4	MB 506	Food Microbiology Lab	1
FS 301	Introduction to Human Nutrition	3	NTR 301	Introduction to Human Nutrition	3
FS 401	Advanced Nutrition and Metabolism	3	NTR 401	Advanced Nutrition and Metabolism	3
FS 402	Chemistry of Food and Bioprocessed Materials	4	NTR 415	Comparative Nutrition	3
FS 403	Analytical Techniques in Food & Bioprocessing Science	4	NTR 419	Human Nutrition and Chronic Disease	3
FS 405	Food Microbiology	3	NTR 454	Lactation, Milk and Nutrition	3
FS 406	Food Microbiology Lab	1	NTR 501	Advanced Nutrition and Metabolism	3
FS 501	Advanced Nutrition and Metabolism	3	NTR 515	Comparative Nutrition	3
FS 502	Chemistry of Food and Bioprocessed Materials	4	PB 103	Perspectives on Botany	1
FS 505	Food Microbiology	3	PB 200	Plant Life	4
FS 506	Food Microbiology Lab	1	PB 205	Our Green World	3
FW 313	Mountain Wildlife Ecology and Management	1	PB 208	Agricultural Biotechnology: Issues and Implications	3
FW 353	Wildlife Management	3	PB 213	Plants and Civilization	3
FW 403	Urban Wildlife Management	3	PB 215	Medicinal Plants	3
FW 404	Wildlife Habitat Management	3	PB 219	Plants in Folklore, Myth, and religion	3
FW 453	Principles of Wildlife Science	4	PB 220	Local Flora	3
HS 215	Agricultural Genetics	3	PB 250	Plant Biology	4
MB 101	Introduction to Microbiology and Biochemistry Laboratory Practices	3	PB 277	Space Biology	3
MB 405	Food Microbiology	3	PB 321	Introduction to Whole Plant Physiology	3
MB 406	Food Microbiology Lab	1	PB 360	Ecology	4
			PB 400	Plant Diversity and Evolution	4
			PB 403	Systematic Botany	4
			PB 413	Plant Anatomy	2
			PB 421	Plant Physiology	3
			PB 445	Paleobotany	4
			PB 464	Rare Plants of North Carolina	3
			PB 480	Introduction to Plant Biotechnology	3

PB 481	Plant Tissue Culture and Transformation	2
PB 503	Systematic Botany	4
PB 513	Plant Anatomy	2
PB 545	Paleobotany	4
PB 564	Rare Plants of North Carolina	3
PB 580	Introduction to Plant Biotechnology	3
PHY 452	Comparative Reproductive Physiology and Biotechnology	3
PHY 552	Comparative Reproductive Physiology and Biotechnology	3
PO 415	Comparative Nutrition	3
PO 466	Animal Cell Culture Techniques	2
PO 515	Comparative Nutrition	3
PO 566	Animal Cell Culture Techniques	2
PP 150	Introduction to Plant Molecular Biology	3
PP 222	Kingdom of Fungi	3
Group A - Biological Sciences		
AEC 419	Freshwater Ecology	4
AEC 420	Introduction to Fisheries Science	3
AEC 423	Introduction to Fisheries Sciences Laboratory	1
AEC 441	Biology of Fishes	3
AEC 442	Biology of Fishes Laboratory	1
AEC 460	Field Ecology and Methods	4
AEC 519	Freshwater Ecology	4
ANS 215	Agricultural Genetics	3
ANS 415	Comparative Nutrition	3
ANS 515	Comparative Nutrition	3

BEC 463	Fermentation of Recombinant Microorganisms	2
BEC 563	Fermentation of Recombinant Microorganisms	2
BIO 140	Survey of Animal Diversity	3
BIO 141	Animal Diversity Laboratory	1
BIO 227	Understanding Structural Diversity through Biological Illustration	3
BIO 315	General Parasitology	3
BIO 330	Evolutionary Biology	3
BIO 361	Developmental Biology	3
BIO 370	Developmental Anatomy of the Vertebrates	3
BIO 375	Developmental Anatomy Laboratory	2
BIO 405	Functional Histology	3
BIO 414	Cell Biology	3
BIO 424	Endocrinology	3
BIO 482	Capstone Course in Molecular, Cellular, and Developmental Biology	3
BIO 483	Capstone Course in Integrative Physiology and Neurobiology	3
BIO 484	Capstone Course in Human Biology	3
BIO 485	Capstone Course in Ecology, Evolution, and Conservation Biology	3
BIO 488	Neurobiology	3
BIO 588	Neurobiology	3
BIT 210	Phage Hunters	3
BIT 211	Phage Genomics	2
BIT 463	Fermentation of Recombinant Microorganisms	2
BIT 563	Fermentation of Recombinant Microorganisms	2

BME 301	Human Physiology : Electrical Analysis		GN 541	Human and Biomedical Genetics	3
BME 302	Human Physiology: Mechanical Analysis		HS 215	Agricultural Genetics	3
CHE 463	Fermentation of Recombinant Microorganisms	2	HS 451	Plant Nutrition	3
CHE 563	Fermentation of Recombinant Microorganisms	2	HS 551	Plant Nutrition	3
CS 211	Plant Genetics	3	MB 180	Introduction to Microbial Bioprocessing	3
ENT 425	General Entomology	3	MB 200	The Fourth Horseman: Plagues that Changed the World	3
FS 301	Introduction to Human Nutrition	3	MB 210	Phage Hunters	3
FS 405	Food Microbiology	3	MB 211	Phage Genomics	2
FS 406	Food Microbiology Lab	1	MB 351	General Microbiology	3
FS 505	Food Microbiology	3	MB 352	General Microbiology Laboratory	1
FS 506	Food Microbiology Lab	1	MB 354	Inquiry-Guided Microbiology Lab	1
FW 353	Wildlife Management	3	MB 405	Food Microbiology	3
GN 301	Genetics in Human Affairs	3	MB 406	Food Microbiology Lab	1
GN 311	Principles of Genetics	4	MB 411	Medical Microbiology	3
GN 312	Elementary Genetics Laboratory	1	MB 412	Medical Microbiology Laboratory	1
GN 421	Molecular Genetics	3	MB 414	Microbial Metabolic Regulation	3
GN 423	Population, Quantitative and Evolutionary Genetics	3	MB 420	Fundamentals of Microbial Cell Biotransformations	2
GN 425	Advanced Genetics Laboratory	2	MB 441	Immunology	3
GN 434	Genes and Development	3	MB 451	Microbial Diversity	3
GN 441	Human and Biomedical Genetics	3	MB 452	Microbial Diversity Lab	2
GN 451	Genome Science	3	MB 455	Microbial Biotechnology	3
GN 490	Genetics Colloquium	1	MB 461	Molecular Virology	3
GN 521	Molecular Genetics	3	MB 480	Current Issues in Microbiology	1
			MB 505	Food Microbiology	3
			MB 506	Food Microbiology Lab	1
			MB 520	Fundamentals of Microbial Cell Biotransformations	2

MEA 200	Introduction to Oceanography	3
MEA 210	Oceanography Lab	1
MEA 220	Marine Biology	3
MEA 250	Introduction to Coastal Environments	3
MEA 251	Introduction to Coastal Environments Laboratory	1
MEA 369	Life on Earth: Principles of Paleontology	
NTR 301	Introduction to Human Nutrition	3
NTR 415	Comparative Nutrition	3
NTR 419	Human Nutrition and Chronic Disease	3
NTR 420	Applied Nutrition Education	3
NTR 421	Life Cycle Nutrition	3
NTR 490	Senior Capstone Experience in Nutrition	4
NTR 515	Comparative Nutrition	3
NTR 521	Life Cycle Nutrition	3
PO 404	Avian Anatomy and Physiology	4
PO 415	Comparative Nutrition	3
PO 504	Avian Anatomy and Physiology	4
PO 515	Comparative Nutrition	3
SSC 200	Soil Science	3
SSC 201	Soil Science Laboratory	1
SSC 332	Environmental Soil Microbiology	3
SSC 470	Wetland Soils	3
SSC 570	Wetland Soils	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

Group A - Biological Sciences

BIT 100	Current Topics in Biotechnology	4
BIT 465	Real-time PCR Techniques	2
BIT 471	RNA Interference and Model Organisms	2
BIT 473	Protein Interactions	2
BIT 474	Plant Genetic Engineering	2
BIT 565	Real-time PCR Techniques	2
BIT 571	RNA Interference and Model Organisms	2
BIT 573	Protein Interactions	2
BIT 574	Plant Genetic Engineering	2
ENT 305	Introduction to Forensic Entomology	3

Group A - Physical Sciences

AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed	3
BAE 200	Computer Methods in Biological Engineering	2
BMA 573	Mathematical Modeling of Physical and Biological Processes I	3
BMA 574	Mathematical Modeling of Physical and Biological Processes II	
BUS 340	Information Systems Management	3

BUS 350	Economics and Business Statistics	3	CSC 110	Computer Science Principles - The Beauty and Joy of Computing	3
CE 435	Engineering Geology	3	CSC 111	Introduction to Computing: Python	3
CE 479	Air Quality	3	CSC 112	Introduction to Computing- FORTRAN	3
CE 581	Fluid Mechanics in Natural Environments	3	CSC 113	Introduction to Computing - MATLAB	3
CH 230	Computational Chemistry Lab I	1	CSC 116	Introduction to Computing - Java	3
CH 232	Computational Chemistry Lab II	1	CSC 200		3
CH 315	Quantitative Analysis	3	CSC 216	Software Development Fundamentals	
CH 316	Quantitative Analysis Laboratory	1	CSC 217	Software Development Fundamentals Lab	
CH 331	Introductory Physical Chemistry	4	CSC 226	Discrete Mathematics for Computer Scientists	3
CH 401	Systematic Inorganic Chemistry I	3	CSC 230	C and Software Tools	3
CH 403	Systematic Inorganic Chemistry II	3	CSC 236	Computer Organization and Assembly Language for Computer Scientists	3
CH 415	Analytical Chemistry II	3	CSC 246	Concepts and Facilities of Operating Systems for Computer Scientists	3
CH 431	Physical Chemistry I	3	CSC 251	Web Page Development	1
CH 433	Physical Chemistry II	3	CSC 255	String Processing Languages	1
CH 435	Introduction to Quantum Chemistry	3	CSC 281	Foundations of Interactive Game Design	3
CH 437	Physical Chemistry for Engineers	4	CSC 295	Special Topics in Computer Science	1-3
CH 441	Forensic Chemistry	3	CSC 302	Introduction to Numerical Methods	3
CH 442	Advanced Synthetic Techniques	4	CSC 316	Data Structures and Algorithms	3
CH 444	Advanced Synthetic Techniques II	4			
CH 452	Advanced Measurement Techniques I	4			
CH 454	Advanced Measurement Techniques II	4			
CH 463	Molecular Origins of Life	3			
CH 563	Molecular Origins of Life	3			

CSC 326	Software Engineering	4	CSC 455	Social Computing and Decentralized Artificial Intelligence	3
CSC 333	Automata, Grammars, and Computability	3	CSC 456	Computer Architecture and Multiprocessors	3
CSC 342	Applied Web-based Client-Server Computing	3	CSC 461	Computer Graphics	3
CSC 379	Ethics in Computing	1	CSC 462	Advanced Computer Graphics Projects	3
CSC 401	Data and Computer Communications Networks	3	CSC 467	Multimedia Technology	3
CSC 402	Networking Projects	3	CSC 474	Network Security	3
CSC 405	Computer Security	3	CSC 481	Game Engine Foundations	3
CSC 406	Architecture Of Parallel Computers	3	CSC 482	Advanced Computer Game Projects	3
CSC 411	Introduction to Artificial Intelligence	3	CSC 484	Building Game AI	3
CSC 412	Compiler Construction	3	CSC 492	Senior Design Project	3
CSC 415	Software Security	3	CSC 495	Special Topics in Computer Science	1-6
CSC 416	Introduction to Combinatorics	3	CSC 499	Independent Research in Computer Science	1-6
CSC 417	Theory of Programming Languages	3	CSC 501	Operating Systems Principles	3
CSC 422	Automated Learning and Data Analysis	3	CSC 503	Computational Applied Logic	3
CSC 427	Introduction to Numerical Analysis I	3	CSC 505	Design and Analysis Of Algorithms	3
CSC 428	Introduction to Numerical Analysis II	3	CSC 506	Architecture Of Parallel Computers	3
CSC 431	File Organization and Processing	3	CSC 510	Software Engineering	3
CSC 440	Database Management Systems	3	CSC 512	Compiler Construction	3
CSC 442	Introduction to Data Science	3	CSC 513	Electronic Commerce Technology	3
CSC 450	Web Services	3	CSC 515	Software Security	3
CSC 453	Introduction to Internet of Things (IoT) Systems	3	CSC 517	Object-Oriented Design and Development	3
CSC 454	Human-Computer Interaction	3	CSC 519	DevOps: Modern Software Engineering Practices	3

CSC 520	Artificial Intelligence I	3	CSC 579	Introduction to Computer Performance Modeling	3
CSC 522	Automated Learning and Data Analysis	3	CSC 580	Numerical Analysis I	3
CSC 530	Computational Methods for Molecular Biology	3	CSC 582	Computer Models of Interactive Narrative	3
CSC 533	Privacy in the Digital Age		CSC 583	Introduction to Parallel Computing	3
CSC 540	Database Management concepts and Systems	3	CSC 584	Building Game AI	3
CSC 541	Advanced Data Structures	3	CSC 591	Special Topics In Computer Science	1-6
CSC 546	Management Decision and Control Systems	3	E 531	Dynamic Systems and Multivariable Control I	3
CSC 547	Cloud Computing Technology	3	ECE 406	Architecture Of Parallel Computers	3
CSC 548	Parallel Systems	3	ECE 460	Embedded System Architectures	3
CSC 554	Human-Computer Interaction	3	ECE 506	Architecture Of Parallel Computers	3
CSC 555	Social Computing and Decentralized Artificial Intelligence	3	ECE 514	Random Processes	3
CSC 561	Principles of Computer Graphics	3	ECE 517	Object-Oriented Design and Development	3
CSC 562	Introduction to Game Engine Design	3	ECE 547	Cloud Computing Technology	3
CSC 563	Visual Interfaces for Mobile Devices	3	ECE 560	Embedded System Architectures	3
CSC 565	Graph Theory	3	ECE 570	Computer Networks	3
CSC 568	Enterprise Storage Architecture	3	ECE 573	Internet Protocols	3
CSC 570	Computer Networks	3	ECE 574	Computer and Network Security	3
CSC 573	Internet Protocols	3	ECE 575	Introduction to Wireless Networking	3
CSC 574	Computer and Network Security	3	ECE 576	Networking Services: QoS, Signaling, Processes	3
CSC 575	Introduction to Wireless Networking	3	ECE 577	Switched Network Management	3
CSC 576	Networking Services: QoS, Signaling, Processes	3	ECE 579	Introduction to Computer Performance Modeling	3
CSC 577	Switched Network Management	3			

ECG 528	Options and Derivatives Pricing	3	MA 401	Applied Differential Equations II	3
ET 320	Fundamentals of Air Pollution	3	MA 402	Mathematics of Scientific Computing	3
FIM 528		3	MA 403	Introduction to Modern Algebra	3
FIM 548	Monte Carlo Methods for Financial Math	3	MA 405	Introduction to Linear Algebra	3
FIM 549	Financial Risk Analysis	3	MA 407	Introduction to Modern Algebra for Mathematics Majors	3
GIS 582	Geospatial Modeling	3	MA 408	Foundations of Euclidean Geometry	3
ISE 441	Introduction to Simulation	3	MA 410	Theory of Numbers	3
ISE 505	Linear Programming	3	MA 412	Long-Term Actuarial Models	3
ISE 546	Management Decision and Control Systems	3	MA 413	Short-Term Actuarial Models	3
LOG 201	Logic	3	MA 416	Introduction to Combinatorics	3
LOG 335	Symbolic Logic	3	MA 421	Introduction to Probability	3
MA 105	Mathematics of Finance	3	MA 425	Mathematical Analysis I	3
MA 205	Elements of Matrix Computations	3	MA 426	Mathematical Analysis II	3
MA 225	Foundations of Advanced Mathematics	3	MA 427	Introduction to Numerical Analysis I	3
MA 242	Calculus III	4	MA 428	Introduction to Numerical Analysis II	3
MA 302	Numerical Applications to Differential Equations	1	MA 430	Mathematical Models in the Physical Sciences	3
MA 303	Linear Analysis	3	MA 432	Mathematical Models in Life Sciences	3
MA 305	Introductory Linear Algebra and Matrices	3	MA 437	Applications of Algebra	3
MA 315	Mathematics Methods in Atmospheric Sciences	4	MA 440	Game Theory	3
MA 325	Introduction to Applied Mathematics	3	MA 444	Problem Solving Strategies for Competitions	1
MA 331	Differential Equations for the Life Sciences	3	MA 450	Methods of Applied Mathematics I	3
MA 335	Symbolic Logic	3	MA 451	Methods of Applied Mathematics II	3
MA 341	Applied Differential Equations I	3			
MA 351	Introduction to Discrete Mathematical Models	3			

MA 491	Reading in Honors Mathematics	1-6	MA 528		3
MA 493	Special Topics in Mathematics	1-6	MA 531	Dynamic Systems and Multivariable Control I	3
MA 494	Major Paper in Math	1	MA 532	Ordinary Differential Equations I	3
MA 499	Independent Research in Mathematics	1-6	MA 534	Introduction To Partial Differential Equations	3
MA 501	Advanced Mathematics for Engineers and Scientists I	3	MA 537	Nonlinear Dynamics and Chaos	3
MA 502	Advanced Mathematics for Engineers and Scientists II	3	MA 540	Uncertainty Quantification for Physical and Biological Models	3
MA 504	Introduction to Mathematical Programming	3	MA 544	Computer Experiments In Mathematical Probability	3
MA 505	Linear Programming	3	MA 546	Probability and Stochastic Processes I	3
MA 507	Survey of Real Analysis	3	MA 547	Stochastic Calculus for Finance	3
MA 508	Survey of Geometry	3	MA 548	Monte Carlo Methods for Financial Math	3
MA 509	Survey of Abstract Algebra	3	MA 549	Financial Risk Analysis	3
MA 510	Selected Topics In Mathematics For Secondary Teachers	1-6	MA 551	Introduction to Topology	3
MA 511	Introduction to Advanced Calculus	3	MA 555	Introduction to Manifold Theory	3
MA 512	Advanced Calculus	3	MA 561	Set Theory and Foundations Of Mathematics	3
MA 513	Introduction To Complex Variables	3	MA 565	Graph Theory	3
MA 515	Analysis I	3	MA 573	Mathematical Modeling of Physical and Biological Processes I	3
MA 518	Geometry of Curves and Surfaces	3	MA 574	Mathematical Modeling of Physical and Biological Processes II	3
MA 520	Linear Algebra	3	MA 580		3
MA 521	Abstract Algebra I	3	MA 583	Introduction to Parallel Computing	3
MA 522	Computer Algebra	3			
MA 523	Linear Transformations and Matrix Theory	3			
MA 524	Combinatorics I	3			
MA 526	Mathematical Analysis II	3			

MA 584	Numerical Solution of Partial Differential Equations--Finite Difference Methods	3	MEA 421	Atmospheric Dynamics I	3
MA 587	Numerical Solution of Partial Differential Equations--Finite Element Method	3	MEA 422	Atmospheric Dynamics II	3
MA 591	Special Topics	1-6	MEA 425	Introduction to Atmospheric Chemistry	3
MBA 528		3	MEA 440	Igneous and Metamorphic Petrology	4
MEA 100	Earth System Science: Exploring the Connections	4	MEA 443	Synoptic Weather Analysis and Forecasting	4
MEA 101	Geology I: Physical	3	MEA 444	Mesoscale Analysis and Forecasting	4
MEA 110	Geology I Laboratory	1	MEA 449	Principles of Biological Oceanography	3
MEA 130	Introduction to Weather and Climate	3	MEA 450	Introductory Sedimentology and Stratigraphy	4
MEA 135	Introduction to Weather and Climate Laboratory	1	MEA 451	Structural Geology	4
MEA 202	Geology II: Historical	3	MEA 454	Marine Physical-Biological Interactions	3
MEA 211	Geology II Laboratory	1	MEA 455	Micrometeorology	3
MEA 300	Environmental Geology	4	MEA 458	Introduction to Tropical Meteorology	3
MEA 312	Atmospheric Thermodynamics	4	MEA 459	Field Investigation of Coastal Processes	5
MEA 315	Mathematics Methods in Atmospheric Sciences	4	MEA 460	Principles of Physical Oceanography	3
MEA 320	Fundamentals of Air Pollution	3	MEA 462	Observational Methods and Data Analysis in Marine Physics	3
MEA 321	Fundamentals of Air Quality and Climate Change	3	MEA 463	Fluid Physics	3
MEA 323	Geochemistry of Natural Waters	3	MEA 464	Ocean Circulation Systems	3
MEA 409	Watershed Forensics	3	MEA 465	Geologic Field Camp	4
MEA 410	Introduction to Mineralogy and Petrology	4	MEA 466	Preparatory Course for Field Camp	1
MEA 411	Marine Sediment Transport	3	MEA 467	Marine Meteorology	3
MEA 412	Atmospheric Physics	3	MEA 469	Ecology of coastal Resources	3
MEA 415	Climate Dynamics	3	MEA 470	Introduction to Geophysics	3

MEA 471	Exploration and Engineering Geophysics	3	MEA 549	Principles of Biological Oceanography	3
MEA 473	Principles of Chemical Oceanography	3	MEA 553	Estuarine Biogeochemistry	3
MEA 476	Worldwide River and Delta Systems: Their Evolution and Human Impacts	3	MEA 554	Marine Physical-Biological Interactions	3
MEA 479	Air Quality	3	MEA 562	Marine Sediment Transport	3
MEA 481	Geomorphology: Earth's Dynamic Surface	3	MEA 570	Geological Oceanography	3
MEA 485	Introduction to Hydrogeology	3	MEA 573	Principles of Chemical Oceanography	3
MEA 488	Meteorology for Media	3	MEA 574	Advanced Igneous Petrology	3
MEA 493	Special Topics in MEAS	1-6	MEA 577	Electron Microprobe Analysis of Geologic Material	2
MEA 495	Junior Seminar in the Marine, Earth, and Atmospheric Sciences	1	MEA 579	Principles of Air Quality Engineering	3
MEA 498	Internship in MEAS	1-6	MEA 580	Air Quality Modeling and Forecasting	4
MEA 507	Discipline-based Education Research in the Geosciences	3	MEA 581	Fluid Mechanics in Natural Environments	3
MEA 510	Air Pollution Meteorology	3	MEA 582	Geospatial Modeling	3
MEA 511	Introduction to Meteorological Remote Sensing	3	MEA 585	Physical Hydrogeology	3
MEA 514	Advanced Physical Meteorology	3	MEA 591	Special Topics in Marine Science	1-6
MEA 515	Climate Dynamics	3	MEA 592	Special Topics in Earth Sciences	1-6
MEA 517	Fundamentals of Climate Change Science	3	MEA 593	Special Topics in Atmospheric Science	1-6
MEA 518	Adaptation to Climate Change	3	MEA 599	Regional Geology of North America	1-6
MEA 519	Barriers to Climate Change Literacy	3	OR 504	Introduction to Mathematical Programming	3
MEA 525	Introduction to Atmospheric Chemistry	3	OR 505	Linear Programming	3
MEA 540	Principles of Physical Oceanography	3	OR 531	Dynamic Systems and Multivariable Control I	3
			OR 565	Graph Theory	3

OR 579	Introduction to Computer Performance Modeling	3
PSY 240	Introduction to Behavioral Research I	3
PSY 241	Introduction to Behavioral Research I Lab	1
PSY 242	Introduction to Behavioral Research II	3
PSY 243	Introduction to Behavioral Research II Lab	2
PY 414	Electromagnetism I	3
PY 415	Electromagnetism II	3
PY 514	Electromagnetism I	3
PY 515	Electromagnetism II	3
ST 350	Economics and Business Statistics	3
ST 412	Long-Term Actuarial Models	3
ST 413	Short-Term Actuarial Models	3
ST 442	Introduction to Data Science	3
ST 546	Probability and Stochastic Processes I	3
Group A - Physical Sciences		
BME 201	Computer Methods in Biomedical Engineering	3
CSC 442	Introduction to Data Science	3
EC 351	Econometrics I	3
ECE 489	Solid State Solar and Thermal Energy Harvesting	3
ECE 589	Solid State Solar and Thermal Energy Harvesting	3
ECG 561	Applied Econometrics I	3
EMS 519	Teaching and Learning of Statistical Thinking	3

GPH 404	Epidemiology and Statistics in Global Public Health	3
MA 412	Long-Term Actuarial Models	3
MA 413	Short-Term Actuarial Models	3
MA 546	Probability and Stochastic Processes I	3
MA 555	Introduction to Manifold Theory	3
MEA 150	Environmental Issues in Water Resources	4
MEA 463	Fluid Physics	3
MSE 489	Solid State Solar and Thermal Energy Harvesting	3
MSE 589	Solid State Solar and Thermal Energy Harvesting	3
NE 528	Introduction to Plasma Physics and Fusion Energy	3
NE 529	Plasma Physics and Fusion Energy II	3
PSY 240	Introduction to Behavioral Research I	3
PSY 241	Introduction to Behavioral Research I Lab	1
PSY 242	Introduction to Behavioral Research II	3
PSY 243	Introduction to Behavioral Research II Lab	2
PY 123	Stellar and Galactic Astronomy	3
PY 124	Solar System Astronomy	3
PY 125	Astronomy Laboratory	1
PY 131	Conceptual Physics	4
PY 203	University Physics III	4
PY 301	Introduction to Quantum Mechanics	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	SSC 200	Soil Science	3
PY 489	Solid State Solar and Thermal Energy Harvesting	3	SSC 201	Soil Science Laboratory	1
PY 495	Special Topics in Physics	1-4	ST 311	Introduction to Statistics	3
PY 499	Independent Research in Physics	1-6	ST 312	Introduction to Statistics II	3
PY 501	Quantum Physics I	3	ST 370	Probability and Statistics for Engineers	3
PY 502	Quantum Physics II	3	ST 371	Introduction to Probability and Distribution Theory	3
PY 506	Nuclear and Subatomic Physics	3	ST 372	Introduction to Statistical Inference and Regression	3
PY 507	Elementary Particle Physics	3	ST 380	Probability and Statistics for the Physical Sciences	3
PY 509	General Relativity	3	ST 401	Experiences in Data Analysis	4
PY 511	Mechanics I	3	ST 404	Epidemiology and Statistics in Global Public Health	3
PY 512	Mechanics II	3	ST 405	Applied Nonparametric Statistics	3
PY 514	Electromagnetism I	3	ST 412	Long-Term Actuarial Models	3
PY 515	Electromagnetism II	3			
PY 516	Physical Optics	3			
PY 517	Atomic and Molecular Physics	3			
PY 519	Biological Physics	3			
PY 525	Computational Physics	3			

ST 413	Short-Term Actuarial Models	3	ST 502	Fundamentals of Statistical Inference II	3
ST 421	Introduction to Mathematical Statistics I	3	ST 503	Fundamentals of Linear Models and Regression	3
ST 422	Introduction to Mathematical Statistics II	3	ST 505	Applied Nonparametric Statistics	3
ST 430	Introduction to Regression Analysis	3	ST 506	Sampling Animal Populations	3
ST 431	Introduction to Experimental Design	3	ST 507	Statistics For the Behavioral Sciences I	3
ST 432	Introduction to Survey Sampling	3	ST 508	Statistics For the Behavioral Sciences II	3
ST 433	Applied Spatial Statistics	3	ST 511	Statistical Methods For Researchers I	3
ST 434	Applied Time Series	3	ST 512	Statistical Methods For Researchers II	3
ST 435	Statistical Methods for Quality and Productivity Improvement	3	ST 513	Statistics for Management and Social Sciences I	3
ST 437	Applied Multivariate and Longitudinal Data Analysis	3	ST 514	Statistics For Management and Social Sciences II	3
ST 440	Applied Bayesian Analysis	3	ST 515	Experimental Statistics for Engineers I	3
ST 442	Introduction to Data Science	3	ST 516	Experimental Statistics For Engineers II	3
ST 445	Introduction to Statistical Computing and Data Management	3	ST 517	Applied Statistical Methods I	3
ST 446	Intermediate SAS Programming with Applications	3	ST 519	Teaching and Learning of Statistical Thinking	3
ST 491	Statistics in Practice	3	ST 520	Statistical Principles of Clinical Trials	3
ST 495	Special Topics in Statistics	1-6	ST 524	Statistics In Plant Science	3
ST 497	Professional Experience in Statistics		ST 533	Applied Spatial Statistics	3
ST 498	Independent Study In Statistics	1-6	ST 534	Applied Time Series	3
ST 499	Research Experience in Statistics		ST 535	Statistical Methods for Quality and Productivity Improvement	3
ST 501	Fundamentals of Statistical Inference I	3			

ST 537	Applied Multivariate and Longitudinal Data Analysis	3	ACC 311	Intermediate Financial Accounting II	3
ST 540	Applied Bayesian Analysis	3	ACC 330	An Introduction To Income Taxation	3
ST 542	Statistical Practice	3	ACC 340	Accounting Information Systems	3
ST 544	Applied Categorical Data Analysis	3	ACC 411	Business Valuation	3
ST 546	Probability and Stochastic Processes I	3	ACC 420	Cost Accounting for Effective Management	3
ST 555	Statistical Programming I	3	ACC 440	Enterprise Resource Planning Systems	3
ST 556	Statistical Programming II	3	ACC 450	Auditing and Assurance Services	3
ST 557	Using Technology to Teach Statistics	3	ACC 451	Internal Auditing	3
ST 558	Data Science for Statisticians	3	ACC 460	Governmental and Nonprofit Accounting	3
ST 561	Applied Econometrics I	3	ARE 215	Small Business Accounting	3
ST 562	Data Mining with SAS Enterprise Miner	3	ARE 301	Intermediate Microeconomics	3
ST 563	Introduction to Statistical Learning	3	ARE 303	Farm Management	3
ST 590	Special Topics	1-6	ARE 304	Agribusiness Management	3
ST 701	Statistical Theory I	3	ARE 306	Agricultural Law	3
ST 702	Statistical Theory II	3	ARE 309	Environmental Law & Economic Policy	3
ST 705	Linear Models and Variance Components	3	ARE 311	Agricultural Markets	3
TE 570	Polymer Physics	3	ARE 312	Agribusiness Marketing	3
Group B - Economics & Business			ARE 321	Agricultural Financial Management	3
ACC 200	Introduction to Managerial Accounting	3	ARE 336	Introduction to Resource and Environmental Economics	3
ACC 210	Concepts of Financial Reporting	3	ARE 345	Global Agribusiness Management	3
ACC 220	Introduction to Managerial Accounting	3	ARE 404	Advanced Agribusiness Management	3
ACC 280	Survey of Financial and Managerial Accounting	3	ARE 413	Applied Agribusiness Marketing	3
ACC 310	Intermediate Financial Accounting I	3			

ARE 433	U.S. Agricultural Policy	3	BUS 468	Marketing Strategy	3
ARE 490	Career Seminar in Agriculture & Resource Economics	1	BUS 469	Digital Marketing Practicum	3
BUS 225	Personal Finance	3	BUS 470	Operations Modeling and Analysis	3
BUS 320	Financial Management	3	BUS 472	Operations Planning and Control Systems	3
BUS 340	Information Systems Management	3	BUS 473	Supply Chain Strategy	3
BUS 360	Marketing Methods	3	BUS 475	Purchasing and Supply Management	3
BUS 370	Operations and Supply Chain Management	3	BUS 479	Supply Chain Management Undergraduate Practicum	3
BUS 420	Financial Management of Corporations	3	EC 301	Intermediate Microeconomics	3
BUS 422	Investments and Portfolio Management	3	EC 336	Introduction to Resource and Environmental Economics	3
BUS 425	Advanced Personal Financial Management	3	FTM 482	Global Brand Management in Textiles and Apparel	3
BUS 426	International Financial Management	3	M 100	Personal and Professional Identity Development	1
BUS 440	Database Management	3	MIE 201	Introduction to Business Processes	3
BUS 441	Business Data Communications and Networking	3	MIE 305	Legal and Regulatory Environment	3
BUS 442	Information Systems Development	3	MIE 330	Human Resource Management	3
BUS 443	Web Development for Business Applications	3	MIE 335	Organizational Behavior	3
BUS 444	Systems Analysis and Design	3	MIE 432	Labor and Employee Relations	3
BUS 461	Channel and Retail Marketing	3	MIE 434	Compensation Systems	3
BUS 462	Marketing Research	3	MIE 435	Leadership and Management	3
BUS 464	International Marketing	3	MIE 436	Training and Development	3
BUS 465	Traditional and Digital Brand Promotion	3	MIE 438	Staffing	3
BUS 466	Personal Selling	3	MIE 480	Business Policy and Strategy	3
BUS 467	Product and Brand Management	3	PRT 406	Sports Law	3
Group B - Economics & Business					

ACC 200	Introduction to Managerial Accounting	3	EC 474	Economics of Financial Institutions and Markets	3
ACC 220	Introduction to Managerial Accounting	3	EC 480		3
ACC 280	Survey of Financial and Managerial Accounting	3	EC 490	Research Seminar in Economics	3
ARE 301	Intermediate Microeconomics	3	FTM 482	Global Brand Management in Textiles and Apparel	3
ARE 332	Human Resource Management for Agribusiness	3	MIE 412	Finance and Accounting for Entrepreneurs	3
ARE 336	Introduction to Resource and Environmental Economics	3	MIE 413	New Venture Planning	3
ARE 412	Advanced Agribusiness Marketing	3	MIE 419	Entrepreneurship Practicum	3
BUS 340	Information Systems Management	3	PRT 406	Sports Law	3
BUS 449	Information Technology Capstone	3	Group C - Applied Sci & Tech		
BUS 474	Logistics Management	3	AEE 101	Introduction to Career and Technical Education	1
EC 202	Principles of Macroeconomics	3	AEE 208	Agricultural Biotechnology: Issues and Implications	3
EC 301	Intermediate Microeconomics	3	AEE 230	Introduction to Cooperative Extension	3
EC 302	Intermediate Macroeconomics	3	AEE 303	Administration and Supervision of Student Organizations	3
EC 305	A Closer Look at Capitalism	3	AEE 311	Communication Methods and Media	3
EC 336	Introduction to Resource and Environmental Economics	3	AEE 322	Experiential Learning in Agriculture	3
EC 348	Introduction to International Economics	3	AEE 323	Leadership Development in Agriculture and Life Sciences	3
EC 351	Econometrics I	3	AEE 325	Planning and Delivering Non-Formal Education	3
EC 404	Money, Financial Markets, and the Economy	3	AEE 326	Teaching Diverse Learners in AED	3
EC 410	Public Finance	3	AEE 327	Conducting Summer Programs in Agricultural Education	1
EC 413	Industrial Organization	3			
EC 431	Labor Economics	3			
EC 437		3			
EC 449	International Finance	3			
EC 451	Econometrics II	3			

AEE 350	Personal Leadership Development in Agriculture and Life Sciences	3	BAET 333	Processing Agricultural Products	
AEE 360	Developing Team Leadership in Agriculture and Life Sciences	3	BAET 411	Agricultural Machinery and Power Units	
AEE 423	Practicum in Agricultural Extension/ Industry	8	BAET 432	Agricultural and Environmental Safety and Health	
AEE 424	Planning Agricultural Educational Programs	3	BAET 443	Environmental Restoration Implementation	
AEE 426	Methods of Teaching Agriculture	3	ALS 110	Academic and Career Skills Seminar	1
AEE 427	Student Teaching in Agriculture	8	ANS 105	Introduction to Companion Animal Science	3
AEE 433	Leadership and Management of Volunteers in Agricultural and Extension Education	3	ANS 110	Introduction to Equine Science	3
AEE 435	Professional Presentations in Agricultural Organizations	3	ANS 150	Introduction to Animal Science	3
AEE 460	Organizational Leadership Development in Agriculture and Life Sciences	3	ANS 151	Introduction to Animal Science Lab	1
AEE 478	Advanced Issues in Extension Education	3	ANS 201	Techniques of Animal Care	2
AEE 490	Seminar in Agricultural and Extension Education	1	ANS 208	Agricultural Biotechnology: Issues and Implications	3
AEE 533	Leadership and Management of Volunteers in Agricultural and Extension Education	3	ANS 303	Principles of Equine Evaluation	2
BAET 201	Shop Processes and Management		ANS 304	Dairy Cattle Evaluation	2
BAET 323	Water Management		ANS 309	Livestock Evaluation	3
BAET 332	Management of Animal Environments		ANS 322	Muscle Foods and Eggs	3
			ANS 324	Milk and Dairy Products	3
			ANS 400	Companion Animal Management	3
			ANS 402	Beef Cattle Management	3
			ANS 403	Swine Management	3
			ANS 404	Dairy Cattle Management	3
			ANS 408	Small Ruminant Management	3
			ANS 410	Equine Breeding Farm Management	3

ANS 425	Feed Manufacturing Technology	3	BAE 473	Introduction to Hydrologic and Water Quality Modeling	3
ANS 440	Animal Genetic Improvement	3	BAE 474	Principles and Applications of Ecological Engineering	3
ANS 453	Physiology and Genetics of Growth and Development	3	BAE 481	Structures & Environment	3
ANS 454	Lactation, Milk and Nutrition	3	BAE 501	Sensors and Controls	3
ANS 525	Feed Manufacturing Technology	3	BAE 535	Precision Agriculture Technology	3
ANS 540	Animal Genetic Improvement	3	BAE 572	Irrigation and Drainage	3
ANS 553	Physiology and Genetics of Growth and Development	3	BAE 573	Introduction to Hydrologic and Water Quality Modeling	3
ANS 554	Lactation, Milk and Nutrition	3	BEC 330	Principles and Applications of Bioseparations	2
BAE 100	Introduction to Biological and Agricultural Engineering and Technology	1	BEC 436	Introduction to Downstream Process Development	2
BAE 202	Introduction to Biological and Agricultural Engineering Methods	4	BEC 440	Expression Systems in Biomanufacturing 1	3
BAE 302	Transport Phenomena	3	BEC 536	Introduction to Downstream Process Development	2
BAE 322	Introduction to Food Process Engineering	3	BEC 540	Expression Systems in Biomanufacturing 1	3
BAE 361	Analytical Methods in Engineering Design	3	BME 203	Introduction to the Materials Science of Biomaterials	3
BAE 371	Fundamentals of Hydrology for Engineers	3	BME 207	Biomedical Electronics	4
BAE 401	Sensors and Controls	3	BME 342	Analytical and Experimental Methods for Biomedical Engineers	3
BAE 435	Precision Agriculture Technology	3	BME 412	Biomedical Signal Processing	3
BAE 451	Engineering Design I	2	BME 385	Bioinstrumentation	
BAE 452	Engineering Design II	2	BME 425	Bioelectricity	3
BAE 462	Machinery Design and Applications	3	BME 525	Bioelectricity	3
BAE 472	Irrigation and Drainage	3			

CS 470	Advanced Turfgrass Pest Management	2
ECI 424	Student Teaching in Modern Foreign Languages	12
ENT 470	Advanced Turfgrass Pest Management	2
FM 425	Feed Manufacturing Technology	3
FM 525	Feed Manufacturing Technology	3
FS 322	Muscle Foods and Eggs	3
FS 324	Milk and Dairy Products	3
FS 435	Food Safety Management Systems	3
FS 535	Food Safety Management Systems	3
MSE 203	Introduction to the Materials Science of Biomaterials	3
NTR 425	Feed Manufacturing Technology	3
NTR 454	Lactation, Milk and Nutrition	3
NTR 525	Feed Manufacturing Technology	3
PB 208	Agricultural Biotechnology: Issues and Implications	3
PO 322	Muscle Foods and Eggs	3
PO 425	Feed Manufacturing Technology	3
PO 525	Feed Manufacturing Technology	3
PP 470	Advanced Turfgrass Pest Management	2
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3

SSC 473	Introduction to Hydrologic and Water Quality Modeling	3
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 573	Introduction to Hydrologic and Water Quality Modeling	3
USC 291	Service Learning Program Leader Development I	1
USC 292	Service Learning Program Leader Development II	2
Group C - Applied Sci & Tech		
AEC 420	Introduction to Fisheries Science	3
AEE 206	Introduction to Teaching Agriculture	3
AEE 303	Administration and Supervision of Student Organizations	3
AEE 322	Experiential Learning in Agriculture	3
AEE 327	Conducting Summer Programs in Agricultural Education	1
AEE 424	Planning Agricultural Educational Programs	3
AEE 426	Methods of Teaching Agriculture	3
AEE 427	Student Teaching in Agriculture	8
ANS 322	Muscle Foods and Eggs	3
ANS 324	Milk and Dairy Products	3
ANS 330	Laboratory Animal Science	3
ANS 411	Management of Growing and Performance Horses	3

ANS 425	Feed Manufacturing Technology	3	BME 466	Polymeric Biomaterials Engineering	3
ANS 525	Feed Manufacturing Technology	3	BME 467	Mechanics of Tissues & Implants Requirements	3
BAE 325	Introductory Geomatics	3	BME 483	Tissue Engineering Technologies	2
BAE 425	Industrial Microbiology and Bioprocessing	3	BME 484	Fundamentals of Tissue Engineering	3
BAE 435	Precision Agriculture Technology	3	BME 544	Orthopaedic Biomechanics	3
BAE 525	Industrial Microbiology and Bioprocessing	3	BME 566	Polymeric Biomaterials Engineering	3
BAE 535	Precision Agriculture Technology	3	BME 583	Tissue Engineering Technologies	2
BBS 201	Introduction to Biopharmaceutica Science	3	BME 584	Fundamentals of Tissue Engineering	3
BBS 301	Process Validation Science	3	CS 200	Introduction to Turfgrass Management	4
BBS 426	Upstream Biomanufacturing Laboratory	2	CS 210	Lawns and Sports Turf	3
BBS 526	Upstream Biomanufacturing Laboratory	2	CS 213	Crop Science	3
BCH 220	Role of Biotechnology in Society	3	CS 216	Southern Row Crop Production - Cotton, Peanuts, and Tobacco	3
BEC 426	Upstream Biomanufacturing Laboratory	2	CS 218	Southern Row Crop Production - Corn, Small Grains and Soybeans	3
BEC 483	Tissue Engineering Technologies	2	CS 230	Introduction to Agroecology	3
BEC 526	Upstream Biomanufacturing Laboratory	2	CS 312	Grassland Management for Natural Resources Conservation	3
BEC 583	Tissue Engineering Technologies	2	CS 400	Turf Cultural Systems	3
BME 444	Orthopaedic Biomechanics	3	CS 411	Crop Ecology	3
BME 451	BME Senior Design: Product Development	3	CS 413	Plant Breeding	2
BME 452	BME Senior Design: Product Implementation and Strategy	3	CS 414	Weed Science	4
			CS 415	Integrated Pest Management	3
			CS 424	Seed Physiology	3
			CS 430	Advanced Agroecology	4

CS 465	Turf Management Systems and Environmental Quality	3	FS 290	Careers in Food and Bioprocessing Sciences	1
CS 524	Seed Physiology	3	FS 322	Muscle Foods and Eggs	3
CS 565	Turf Management Systems and Environmental Quality	3	FS 324	Milk and Dairy Products	3
CSSC 490	Senior Seminar in Crop Science and Soil Science	1	FS 330	Science of Food Preparation	3
ECI 424	Student Teaching in Modern Foreign Languages	12	FS 352	Introduction to Microbiological Food Safety Hazards	3
ENT 203	An Introduction to the Honey Bee and Beekeeping	3	FS 354	Food Sanitation	3
ENT 401	Honey Bee Biology and Management	3	FS 416	Quality Control in Food and Bioprocessing	3
ES 100	Introduction to Environmental Sciences	3	FS 421	Food Preservation	3
ES 200	Climate Change and Sustainability	3	FS 426	Upstream Biomanufacturing Laboratory	2
ES 300	Energy and Environment	3	FS 435	Food Safety Management Systems	3
ES 400	Analysis of Environmental Issues	3	FS 453	Food Laws and Regulations	3
FM 425	Feed Manufacturing Technology	3	FS 462	Postharvest Physiology	3
FM 460	Feed Mill Operations and Leadership	3	FS 475	Problems and Design in Food and Bioprocessing Science	3
FM 480	Feed Quality Assurance & Formulation	3	FS 516	Quality Control in Food and Bioprocessing	3
FM 490	Feed Science Seminar	1	FS 521	Food Preservation	3
FM 525	Feed Manufacturing Technology	3	FS 526	Upstream Biomanufacturing Laboratory	2
FOR 318	Forest Pathology	3	FS 535	Food Safety Management Systems	3
FOR 420	Watershed and Wetlands Hydrology	4	FS 553	Food Laws and Regulations	3
FOR 472	Forest Soils	4	FS 562	Postharvest Physiology	3
FOR 520	Watershed and Wetlands Hydrology	4	FW 221	Conservation of Natural Resources	3
FS 201	Introduction to Food Science	3	FW 311	Piedmont Wildlife Ecology and Management	3

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

Group C - Applied Sci & Tech

AEC 419	Freshwater Ecology	4	FOR 520	Watershed and Wetlands Hydrology	4
AEC 423	Introduction to Fisheries Sciences Laboratory	1	FS 322	Muscle Foods and Eggs	3
AEC 519	Freshwater Ecology	4	FS 435	Food Safety Management Systems	3
ANS 322	Muscle Foods and Eggs	3	FS 462	Postharvest Physiology	3
ANS 425	Feed Manufacturing Technology	3	FS 535	Food Safety Management Systems	3
ANS 525	Feed Manufacturing Technology	3	FS 562	Postharvest Physiology	3
BAET 323	Water Management		FW 221	Conservation of Natural Resources	3
BIO 227	Understanding Structural Diversity through Biological Illustration	3	FW 404	Wildlife Habitat Management	3
BME 204	Biomedical Measurements	3	FW 460	International Wildlife Management and Conservation	3
BME 217	Biomedical Electronics Laboratory	1	FW 560	International Wildlife Management and Conservation	3
BME 298	Biomedical Engineering Design and Manufacturing I		HS 200	Home Horticulture	3
BME 398	Biomedical Engineering Design and Manufacturing II	2	HS 201	The World of Horticulture: Principles and Practices	3
CS 470	Advanced Turfgrass Pest Management	2	HS 203	Home Plant Propagation	3
CSSC 490	Senior Seminar in Crop Science and Soil Science	1	HS 242	Introduction to Small Scale Landscape Design	3
ENT 470	Advanced Turfgrass Pest Management	2	HS 250	Home Landscape Design: Creating Garden Spaces	3
FM 425	Feed Manufacturing Technology	3	HS 252	Landscape Graphic Communication	2
FM 525	Feed Manufacturing Technology	3	HS 272	Landscape Design/Build	6
FOR 318	Forest Pathology	3	HS 290	Horticulture: Careers and Opportunities	1
FOR 420	Watershed and Wetlands Hydrology	4	HS 301	Plant Propagation	4
FOR 472	Forest Soils	4	HS 302	Gardening with Herbaceous Perennials	3
			HS 303	Ornamental Plant Identification I	3

HS 304	Ornamental Plant Identification II	3	NR 500	Natural Resource Management	4
HS 357	Landscape Grading and Drainage	4	NR 520	Watershed and Wetlands Hydrology	4
HS 400	Residential Landscaping	6	NR 521	Wetland Science and Management	3
HS 411	Nursery Management	3	NR 560	Renewable Natural Resource Management and Policy	3
HS 416	Planting Design	4	NTR 420	Applied Nutrition Education	3
HS 421	Temperate-Zone Tree Fruits: Physiology and Culture	3	NTR 425	Feed Manufacturing Technology	3
HS 422	Small Fruit Production	3	NTR 525	Feed Manufacturing Technology	3
HS 423	Viticulture	3	PO 201	Poultry Science and Production	3
HS 431	Vegetable Production	4	PO 201A	Poultry Science and Production	3
HS 440	Greenhouse Management	3	PO 202	Poultry Science and Production Laboratory	1
HS 442	Floriculture Crop Production	3	PO 202A	Poultry Science and Production Laboratory	1
HS 462	Postharvest Physiology	3	PO 290	Poultry Seminar	1
HS 471	Landscape Ecosystem Management	4	PO 322	Muscle Foods and Eggs	3
HS 516	Planting Design	4	PO 340	Live Poultry and Poultry Product Evaluation, Grading, and Inspection	3
HS 521	Temperate-Zone Tree Fruits: Physiology and Culture	3	PO 410	Production and Management of Game Birds in Confinement	3
HS 523	Viticulture	3	PO 411	Agrosecurity	3
HS 562	Postharvest Physiology	3	PO 421	Commercial Egg Production	3
IDS 303	Humans and the Environment	3	PO 425	Feed Manufacturing Technology	3
NR 300	Natural Resource Measurements	4	PO 433	Poultry Processing and Products	3
NR 303	Humans and the Environment	3	PO 525	Feed Manufacturing Technology	3
NR 400	Natural Resource Management	4	PO 533	Poultry Processing and Products	3
NR 420	Watershed and Wetlands Hydrology	4	PP 315	Principles of Plant Pathology	4
NR 421	Wetland Science and Management	3			
NR 460	Renewable Natural Resource Management and Policy	3			
NR 484	Environmental Impact Assessment	4			

PP 318	Forest Pathology	3
PP 470	Advanced Turfgrass Pest Management	2
SSC 185	Land and Life	3
SSC 341	Soil Fertility and Nutrient Management	3
SSC 342	Soil and Plant Nutrient Analysis	1
SSC 421	Role of Soils in Environmental Management	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	Environmental Toxicology and Chemistry	4
TOX 501	Principles of Toxicology	4

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
ALS 103	Freshman Transitions and Diversity in Agriculture & Life Sciences	1
ANS 150 & ANS 151	Introduction to Animal Science and Introduction to Animal Science Lab ¹	4
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4

ENG 101	Academic Writing and Research ¹	4
MA 107	Precalculus I ¹	3
Hours		16

Spring Semester

CH 101	Chemistry - A Molecular Science ¹	3
CH 102	General Chemistry Laboratory	1
Animal Science Course (p. 4)		3
Select one of the following:		3
MA 114	Introduction to Finite Mathematics with Applications	
MA 121	Elements of Calculus	
MA 131	Calculus for Life and Management Sciences A	
BIO 183	Introductory Biology: Cellular and Molecular Biology	4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Hours		15

Second Year

Fall Semester

ANS 205 & 205	Physiology of Domestic Animals and Physiology of Domestic Animals	4
ANS 215	Agricultural Genetics	3
Economics Course (p. 1)		3
CH 221 & CH 222 or CH 220	Organic Chemistry I or Introductory Organic Chemistry	4
Communications Course (p. 1)		3
Hours		17

Spring Semester

ANS 220	Reproductive Physiology	3
ANS 221	Reproductive Physiology Lab	1
Business Management or Marketing Elective (p. 1)		3
ST/BUS 350 or ST 311	Economics and Business Statistics or Introduction to Statistics	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

Third Year

Fall Semester

ANS 230 & ANS 231	Animal Nutrition and Animal Nutrition Lab	4
PY 131	Conceptual Physics	4
Business/Economics Elective (p. 6)		3
Free Elective ²		3
Hours		14

Spring Semester

CALs Group A, B, or C Electives (p. 6)		5
Business/Economics Elective (p. 6)		3
Animal Science Course (p. 4)		2

GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)	6
Hours	16
Fourth Year	
Fall Semester	
ANS Animal Management Elective (p. 1)	3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)	5
Free Elective ²	3
CALS Group A, B, or C Elective (p. 6)	3
Hours	14
Spring Semester	
ANS Discipline Course Elective (p. 3)	3
ANS Animal Management Elective (p. 1)	3
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)	3
Free Elective ²	2
CALS Group A,B, or C Elective (p. 6)	3
Hours	14
Total Hours	120

¹ ANS 150 Introduction to Animal Science, MA 107 Precalculus I, ENG 101 Academic Writing and Research, and CH 101 Chemistry - A Molecular Science must be completed with a grade of C-minus or higher, and the student should repeat the course in the semester following the initial attempt if less than a C-minus is earned.

² Students are encouraged to take an Ethics course as part of their Humanities, Additional Breadth, Interdisciplinary Perspectives, or Free electives.

Use of animals and animal specimens is critical to our educational program. To obtain full credit for Animal Science courses, students are required to participate in laboratory procedures involving animals and animal specimens. All activities with live animals are IACUC (Institutional Animal Care and Use Committee) approved. Many lectures also incorporate animals or animal specimens into the course.