

# Plant Biology (BS)

The Bachelor of Science degree in Plant Biology provides classroom, laboratory, and field experience in the fundamental areas of the plant sciences. Undergraduates majoring in Plant Biology select major courses that are tailored to their interests within the discipline and are required to have a supervised research or internship experience. Majors, as pre-professionals in the plant sciences, are prepared for advanced study in plant biology and other biological fields, as well as in the applied plant sciences, such as horticulture, crop science, plant pathology, natural resource management, and conservation.

Students can choose to pursue a general major with courses in different areas of Plant Biology, or can specialize their study in one of the following areas: Ethnobotany, Plant Physiology and Molecular Biology, and Plant Systematics and Ecology. The Bachelor of Science in Plant Biology with a double major in another life science or applied plant science is possible, as is a double major in a humanities and social sciences discipline.

## Accelerated Graduate Training Opportunities

Advanced, academically qualified undergraduate students have the opportunity to participate in the Accelerated Bachelor's/Master's (ABM) program in Plant Biology, which allows students to earn both the BS in Plant Biology and the non-thesis Master of Plant Biology (MR) (<https://cals.ncsu.edu/plant-and-microbial-biology/students/graduate/mr-plant-biology/>) degrees within five years. Students interested in the ABM should contact the Plant Biology Undergraduate Program Director for additional information.

For more information about the BS in Plant Biology, visit our program website (<https://cals.ncsu.edu/plant-and-microbial-biology/students/undergraduate/>).

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## Plan Requirements

Code	Title	Hours
<b>Orientation</b>		
ALS 103	First-year Success in Agriculture and Life Sciences	1
or ALS 303	Transfer Success in Agriculture and Life Sciences	
or LSC 103	Exploring Opportunities in the Life Sciences	
or PB 103	Perspectives on Botany	
<b>Communication</b>		
Communication Elective (p. 2)		3
<b>Mathematics &amp; Sciences</b>		
Select one of the following:		3
MA 121	Elements of Calculus	
MA 131	Calculus for Life and Management Sciences A	
MA 141	Calculus I	
ST 101	Statistics by Example	3

or ST 311	Introduction to Statistics	
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory <sup>1</sup>	4
Select one of the following:		4
CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab	
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	
PY 131 or PY 211	Conceptual Physics College Physics I	4
GN 311	Principles of Genetics	4
<b>Major Requirements</b>		
LSC 101	Critical and Creative Thinking in the Life Sciences <sup>1</sup>	2
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity <sup>1</sup>	4
BIO 183	Introductory Biology: Cellular and Molecular Biology <sup>1</sup>	4
PB 250	Plant Biology <sup>1</sup>	4
Select one of the following:		3
ALS 498	Honors Research or Teaching I	
PB 492	External Learning Experience	
PB 493	Plant Biology Supervised Undergraduate Research Experience	
PB 495	Special Topics in Plant Biology	
PB Electives 300-Level+ (p. 2) <sup>1</sup>		6
PB Electives (p. 2) <sup>1</sup>		6
PB Elective Lab Credit Co-Requisites (verify requirement) (p. 3) <sup>1</sup>		
Applied Plant Science Elective (p. ) <sup>1</sup>		3
<b>Restricted Electives</b>		
CALS Elective Groups A, B, & C (p. )		24
<b>GEP Courses</b>		
ENG 101	Academic Writing and Research <sup>1</sup>	4
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )		6
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )		6
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		2
GEP US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</a> )		3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )		3
GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> ) (verify requirement)		
GEP Foundations of American Democracy ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/</a> ) (verify requirement)		
World Language Proficiency ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/</a> ) (verify requirement)		
<b>Free Electives</b>		

Free Electives (12 Hr S/U Lmt) <sup>2</sup>	14
<b>Total Hours</b>	<b>120</b>

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

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

## Communication Elective

Code	Title	Hours
COM 110	Public Speaking	3
COM 211	Argumentation and Advocacy	3
ENG 316	Introduction to News and Article Writing	3
ENG 323	Writing in Rhetorical Traditions	3
ENG 331	Communication for Engineering and Technology	3
ENG 332	Communication for Business and Management	3
ENG 333	Communication for Science and Research	3

## PB Electives 300-Level+

Code	Title	Hours
AEC 360	Ecology	4
BIO 414	Cell Biology	3
BIT 481	Plant Tissue Culture and Transformation	2
ECE 488	Systems Biology Modeling of Plant Regulation	3
ECE 588	Systems Biology Modeling of Plant Regulation	3
FOR 565	Plant Community Ecology	4
MB 501	Biology of Plant Pathogens	3
MB 575	Introduction to Mycology	4
PB 321	Introduction to Whole Plant Physiology	3
PB 325	Culinary Botany	3
PB 345	Economic Botany	3
PB 346	Economic Botany 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 488	Systems Biology Modeling of Plant Regulation	3
PB 501	Biology of Plant Pathogens	3
PB 503	Systematic Botany	4
PB 513	Plant Anatomy	2
PB 545	Paleobotany	4
PB 559	Plant Water Relations	2
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 588	Systems Biology Modeling of Plant Regulation	3
PB 595	Special Topics in Plant Biology	1-6

PP 501	Biology of Plant Pathogens	3
PP 575	Introduction to Mycology	4

## PB Electives

Code	Title	Hours
<b>PB Electives</b>		
PB 213	Plants and Civilization	3
PB 215	Medicinal Plants	3
PB 219	Plants in Folklore, Myth, and religion	3
PB 220	Local Flora	3
PB 277	Space Biology	3
PP 222	Kingdom of Fungi	3
<b>PB Electives 300-Level+</b>		
AEC 360	Ecology	4
BIO 414	Cell Biology	3
BIT 481	Plant Tissue Culture and Transformation	2
ECE 488	Systems Biology Modeling of Plant Regulation	3
ECE 588	Systems Biology Modeling of Plant Regulation	3
FOR 565	Plant Community Ecology	4
MB 501	Biology of Plant Pathogens	3
MB 575	Introduction to Mycology	4
PB 321	Introduction to Whole Plant Physiology	3
PB 325	Culinary Botany	3
PB 345	Economic Botany	3
PB 346	Economic Botany 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 488	Systems Biology Modeling of Plant Regulation	3
PB 501	Biology of Plant Pathogens	3
PB 503	Systematic Botany	4
PB 513	Plant Anatomy	2
PB 545	Paleobotany	4
PB 559	Plant Water Relations	2
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 588	Systems Biology Modeling of Plant Regulation	3
PB 595	Special Topics in Plant Biology	1-6
PP 501	Biology of Plant Pathogens	3
PP 575	Introduction to Mycology	4

**PB Elective Lab Credit Co-Requisites**

Code	Title	Hours
AEC 360	Ecology	4
BIT 481	Plant Tissue Culture and Transformation	2
FOR 565	Plant Community Ecology	4
PB 220	Local Flora	3
PB 346	Economic Botany Lab	1
PB 360	Ecology	4
PB 400	Plant Diversity and Evolution	4
PB 403	Systematic Botany	4
PB 413	Plant Anatomy	2
PB 445	Paleobotany	4
PB 481	Plant Tissue Culture and Transformation	2
PB 503	Systematic Botany	4
PB 513	Plant Anatomy	2
PB 545	Paleobotany	4

**Applied Plant Science Elective**

Code	Title	Hours
CS 312		3
CS 411		3
CS 413	Plant Breeding	2
CS 414	Weed Science	4
CS 415	Integrated Pest Management	3
CS 424	Seed Physiology	3
CS 430	Advanced Agroecology	4
CS 524	Seed Physiology	3
FOR 303	Silvics and Forest Tree Physiology	3
FOR 318	Forest Pathology	3
FOR 339		4
FOR 411	Forest Genetics	3
FS 462	Postharvest Physiology	3
FS 562	Postharvest Physiology	3
HS 301	Plant Propagation	4
HS 411	Nursery Management	3
HS 421	Temperate-Zone Tree Fruits: Physiology and Culture	3
HS 422	Small Fruit Production	3
HS 431	Vegetable Production	4
HS 432	Introduction to Permaculture	3
HS 440	Greenhouse Management	3
HS 451	Plant Nutrition	3
HS 462	Postharvest Physiology	3
HS 521	Temperate-Zone Tree Fruits: Physiology and Culture	3
HS 532	Introduction to Permaculture	3
HS 551	Plant Nutrition	3
HS 562	Postharvest Physiology	3
MB 501	Biology of Plant Pathogens	3
PB 501	Biology of Plant Pathogens	3
PP 315	Principles of Plant Pathology	4
PP 318	Forest Pathology	3

PP 501	Biology of Plant Pathogens	3
PP 540		2

**CALS Elective Groups A, B, & C**

Code	Title	Hours
<b>Group A - Biological Sciences</b>		
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
ANS 515	Comparative 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
BCH 101	Introduction to Microbiology and Biochemistry Laboratory Practices	3
BCH 220	Role of Biotechnology in Society	3
BCH 351	General Biochemistry	3
BCH 451	Principles of Biochemistry	4
BCH 452	Introductory Biochemistry Laboratory	2
BCH 453	Biochemistry of Gene Expression	3
BCH 454	Advanced Biochemistry Laboratory	4
BCH 455	Proteins and Molecular Mechanisms	3
BCH 553	Biochemistry of Gene Expression	3
BCH 555	Proteins and Molecular Mechanisms	3
BEC 463	Fermentation of Recombinant Microorganisms	2
BEC 563	Fermentation of Recombinant Microorganisms	2
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
BIO 267	Research in the Life Sciences I: Research Skills	3
BIO 414	Cell Biology	3
BIO 434	Hormones and Behavior	3
BIO 440	The Human Animal: An Evolutionary Perspective	3

BIT 410	Manipulation of Recombinant DNA	4	NTR 501	Advanced Nutrition and Metabolism	3
BIT 462		2	NTR 515	Comparative Nutrition	3
BIT 463	Fermentation of Recombinant Microorganisms	2	PB 103	Perspectives on Botany	1
BIT 464	Protein Purification	2	PB 200	Plant Life	4
BIT 466	Animal Cell Culture Techniques	2	PB 205	Our Green World	3
BIT 467	PCR and DNA Fingerprinting	2	PB 208	Agricultural Biotechnology: Issues and Implications	3
BIT 468		2	PB 213	Plants and Civilization	3
BIT 476	Applied Bioinformatics	2	PB 215	Medicinal Plants	3
BIT 481	Plant Tissue Culture and Transformation	2	PB 219	Plants in Folklore, Myth, and religion	3
BIT 501	Ethical Issues in Biotechnology	1	PB 220	Local Flora	3
BIT 562		2	PB 250	Plant Biology	4
BIT 563	Fermentation of Recombinant Microorganisms	2	PB 277	Space Biology	3
BIT 564	Protein Purification	2	PB 321	Introduction to Whole Plant Physiology	3
BIT 566	Animal Cell Culture Techniques	2	PB 360	Ecology	4
BIT 567	PCR and DNA Fingerprinting	2	PB 400	Plant Diversity and Evolution	4
BIT 568		2	PB 403	Systematic Botany	4
CHE 463	Fermentation of Recombinant Microorganisms	2	PB 413	Plant Anatomy	2
CHE 563	Fermentation of Recombinant Microorganisms	2	PB 421	Plant Physiology	3
ENT 201	Insects and People	3	PB 445	Paleobotany	4
ENT 207	Insects and Human Disease	3	PB 464	Rare Plants of North Carolina	3
ENT 402	Forest Entomology	3	PB 480	Introduction to Plant Biotechnology	3
ENT 425	General Entomology	3	PB 481	Plant Tissue Culture and Transformation	2
FOR 402	Forest Entomology	3	PB 503	Systematic Botany	4
FS 231	Principles of Food and Bioprocess Engineering	4	PB 513	Plant Anatomy	2
FS 301	Introduction to Human Nutrition	3	PB 545	Paleobotany	4
FS 401	Advanced Nutrition and Metabolism	3	PB 564	Rare Plants of North Carolina	3
FS 402	Chemistry of Food and Bioprocessed Materials	4	PB 580	Introduction to Plant Biotechnology	3
FS 403	Analytical Techniques in Food & Bioprocessing Science	4	PHY 452		3
FS 405	Food Microbiology	3	PHY 552	Comparative Reproductive Physiology and Biotechnology	3
FS 406	Food Microbiology Lab	1	PO 415	Comparative Nutrition	3
FS 501	Advanced Nutrition and Metabolism	3	PO 466	Animal Cell Culture Techniques	2
FS 502	Chemistry of Food and Bioprocessed Materials	4	PO 515	Comparative Nutrition	3
FS 505	Food Microbiology	3	PO 566	Animal Cell Culture Techniques	2
FS 506	Food Microbiology Lab	1	PP 150	Introduction to Plant Molecular Biology	3
FW 313	Mountain Wildlife Ecology and Management	1	PP 222	Kingdom of Fungi	3
FW 353	Wildlife Management	3	<b>11PB 2147</b>		
FW 403	Urban Wildlife Management	3	AEC 419	Freshwater Ecology	4
FW 404	Wildlife Habitat Management	3	AEC 420	Introduction to Fisheries Science	3
FW 453	Principles of Wildlife Science	4	AEC 423	Introduction to Fisheries Sciences Laboratory	1
HS 215	Agricultural Genetics	3	AEC 441	Biology of Fishes	3
MB 101	Introduction to Microbiology and Biochemistry Laboratory Practices	3	AEC 442	Biology of Fishes Laboratory	1
MB 405	Food Microbiology	3	AEC 460	Field Ecology and Methods	4
MB 406	Food Microbiology Lab	1	AEC 519	Freshwater Ecology	4
MB 505	Food Microbiology	3	ANS 515	Comparative Nutrition	3
MB 506	Food Microbiology Lab	1	BEC 463	Fermentation of Recombinant Microorganisms	2
NTR 301	Introduction to Human Nutrition	3	BEC 563	Fermentation of Recombinant Microorganisms	2
NTR 401	Advanced Nutrition and Metabolism	3	BIO 140		3
NTR 415	Comparative Nutrition	3	BIO 141		1
NTR 419	Human Nutrition and Chronic Disease	3	BIO 227	Understanding Structural Diversity through Biological Illustration	3
NTR 454	Lactation, Milk and Nutrition	3	BIO 315	General Parasitology	3

BIO 330	Evolutionary Biology	3	MB 352	General Microbiology Laboratory	1
BIO 361	Developmental Biology	3	MB 354	Inquiry-Guided Microbiology Lab	1
BIO 370	Developmental Anatomy of the Vertebrates	3	MB 405	Food Microbiology	3
BIO 375	Developmental Anatomy Laboratory	2	MB 406	Food Microbiology Lab	1
BIO 405	Functional Histology	3	MB 411	Medical Microbiology	3
BIO 414	Cell Biology	3	MB 412	Medical Microbiology Laboratory	1
BIO 424	Endocrinology	3	MB 414	Microbial Metabolic Regulation	3
BIO 482	Capstone Course in Molecular, Cellular, and Developmental Biology	3	MB 420	Fundamentals of Microbial Cell Biotransformations	2
BIO 483	Capstone Course in Integrative Physiology and Neurobiology	3	MB 441	Immunology	3
BIO 484	Capstone Course in Human Biology	3	MB 451	Microbial Diversity	3
BIO 485	Capstone Course in Ecology, Evolution, and Conservation Biology	3	MB 452	Microbial Diversity Lab	2
BIO 488	Neurobiology	3	MB 455	Microbial Biotechnology	3
BIO 588	Neurobiology	3	MB 461	Molecular Virology	3
BIT 210	Phage Hunters	3	MB 480	Current Issues in Microbiology	1
BIT 211	Phage Genomics	2	MB 505	Food Microbiology	3
BIT 463	Fermentation of Recombinant Microorganisms	2	MB 506	Food Microbiology Lab	1
BIT 563	Fermentation of Recombinant Microorganisms	2	MB 520	Fundamentals of Microbial Cell Biotransformations	2
BME 301	Human Physiology : Electrical Analysis	3	MEA 200	Introduction to Oceanography	3
BME 302	Human Physiology: Mechanical Analysis	4	MEA 210	Oceanography Lab	1
CHE 463	Fermentation of Recombinant Microorganisms	2	MEA 220	Marine Biology	3
CHE 563	Fermentation of Recombinant Microorganisms	2	MEA 250	Introduction to Coastal Environments	3
CS 211	Plant Genetics	3	MEA 251	Introduction to Coastal Environments Laboratory	1
ENT 425	General Entomology	3	MEA 369	Life on Earth: Principles of Paleontology	3
FS 301	Introduction to Human Nutrition	3	NTR 301	Introduction to Human Nutrition	3
FS 405	Food Microbiology	3	NTR 415	Comparative Nutrition	3
FS 406	Food Microbiology Lab	1	NTR 419	Human Nutrition and Chronic Disease	3
FS 505	Food Microbiology	3	NTR 420		3
FS 506	Food Microbiology Lab	1	NTR 421		3
FW 353	Wildlife Management	3	NTR 490	Senior Capstone Experience in Nutrition	4
GN 301	Genetics in Human Affairs	3	NTR 515	Comparative Nutrition	3
GN 311	Principles of Genetics	4	NTR 521		3
GN 312	Elementary Genetics Laboratory	1	PO 404	Avian Anatomy and Physiology	4
GN 421	Molecular Genetics	3	PO 415	Comparative Nutrition	3
GN 423	Population, Quantitative and Evolutionary Genetics	3	PO 504	Avian Anatomy and Physiology	4
GN 425	Advanced Genetics Laboratory	2	PO 515	Comparative Nutrition	3
GN 434	Genes and Development	3	SSC 200	Soil Science	3
GN 441	Human and Biomedical Genetics	3	SSC 201	Soil Science Laboratory	1
GN 451	Genome Science	3	SSC 332	Environmental Soil Microbiology	3
GN 490	Genetics Colloquium	1	SSC 470	Wetland Soils	3
GN 521	Molecular Genetics	3	SSC 570	Wetland Soils	3
GN 541	Human and Biomedical Genetics	3	ZO 233	Human-Animal Interactions	3
HS 215	Agricultural Genetics	3	ZO 250	Animal Anatomy and Physiology	4
HS 451	Plant Nutrition	3	ZO 317	Primate Ecology and Evolution	3
HS 551	Plant Nutrition	3	ZO 333	Captive Animal Biology	3
MB 180	Introduction to Microbial Bioprocessing	3	ZO 350	Animal Phylogeny and Diversity	4
MB 200	The Fourth Horseman: Plagues that Changed the World	3	ZO 402	Invertebrate Biology	4
MB 210	Phage Hunters	3	ZO 410	Introduction to Animal Behavior	3
MB 211	Phage Genomics	2	ZO 486	Capstone Course in Zoology	3
MB 351	General Microbiology	3	<b>11PB 2147</b>		
			ANS 225	Principles of Animal Nutrition	3
			BIT 100	Current Topics in Biotechnology	4
			BIT 465	Real-time PCR Techniques	2

BIT 471	RNA Interference and Model Organisms	2	CSC 246	Concepts and Facilities of Operating Systems for Computer Scientists	3
BIT 473	Protein Interactions	2	CSC 251	Python Applications	1
BIT 474	Plant Genetic Engineering	2	CSC 255		1
BIT 565	Real-time PCR Techniques	2	CSC 281	Foundations of Interactive Game Design	3
BIT 571	RNA Interference and Model Organisms	2	CSC 295	Special Topics in Computer Science	1-3
BIT 573	Protein Interactions	2	CSC 302	Introduction to Numerical Methods	3
BIT 574	Plant Genetic Engineering	2	CSC 316	Data Structures and Algorithms	3
ENT 305	Introduction to Forensic Entomology	3	CSC 326	Software Engineering	4
<b>11PB 2147</b>			CSC 333	Automata, Grammars, and Computability	3
AEE 226	Computer Applications and Information Technology in Agricultural & Extension Ed	3	CSC 342	Applied Web-based Client-Server Computing	3
BAE 200	Computer Methods in Biological Engineering	2	CSC 379	Ethics in Computing	1
BMA 573	Mathematical Modeling of Physical and Biological Processes I	3	CSC 401	Data and Computer Communications Networks	3
BMA 574	Mathematical Modeling of Physical and Biological Processes II	3	CSC 402	Networking Projects	3
BUS 340	Information Systems Management	3	CSC 405	Computer Security	3
BUS 350	Economics and Business Statistics	3	CSC 406	Architecture Of Parallel Computers	3
CE 435	Engineering Geology	3	CSC 411	Introduction to Artificial Intelligence	3
CE 479	Air Quality	3	CSC 412	Compiler Construction	3
CE 581	Fluid Mechanics in Natural Environments	3	CSC 415	Software Security	3
CH 230	Computational Chemistry Lab I	1	CSC 416	Introduction to Combinatorics	3
CH 232	Computational Chemistry Lab II	1	CSC 417	Theory of Programming Languages	3
CH 315	Quantitative Analysis	3	CSC 422	Automated Learning and Data Analysis	3
CH 316	Quantitative Analysis Laboratory	1	CSC 427	Introduction to Numerical Analysis I	3
CH 331	Introductory Physical Chemistry	4	CSC 428	Introduction to Numerical Analysis II	3
CH 401	Systematic Inorganic Chemistry I	3	CSC 431	File Organization and Processing	3
CH 403	Systematic Inorganic Chemistry II	3	CSC 440	Database Management Systems	3
CH 415	Analytical Chemistry II	3	CSC 442	Introduction to Data Science	3
CH 431	Physical Chemistry I	3	CSC 450	Web Services	3
CH 433	Physical Chemistry II	3	CSC 453	Introduction to Internet of Things (IoT) Systems	3
CH 435	Introduction to Quantum Chemistry	3	CSC 454	Human-Computer Interaction	3
CH 437	Physical Chemistry for Engineers	4	CSC 455	Social Computing and Decentralized Artificial Intelligence	3
CH 441	Forensic Chemistry	3	CSC 456	Computer Architecture and Multiprocessors	3
CH 442	Advanced Synthetic Techniques	4	CSC 461	Computer Graphics	3
CH 444	Advanced Synthetic Techniques II	4	CSC 462	Advanced Computer Graphics Projects	3
CH 452	Advanced Measurement Techniques I	4	CSC 467	Introduction to Quantum Algorithms	3
CH 454	Advanced Measurement Techniques II	4	CSC 474	Network Security	3
CH 463	Molecular Origins of Life	3	CSC 481	Game Engine Foundations	3
CH 563	Molecular Origins of Life	3	CSC 482	Advanced Computer Game Projects	3
CSC 110	Computer Science Principles - The Beauty and Joy of Computing	3	CSC 484	Building Game AI	3
CSC 111	Introduction to Computing: Python	3	CSC 492	Senior Design Project	3
CSC 112	Introduction to Computing-FORTRAN	3	CSC 495		1-6
CSC 113	Introduction to Computing - MATLAB	3	CSC 499	Independent Research in Computer Science	1-6
CSC 116	Introduction to Computing - Java	3	CSC 501	Operating Systems Principles	3
CSC 200		3	CSC 503	Computational Applied Logic	3
CSC 216	Software Development Fundamentals	3	CSC 505	Design and Analysis Of Algorithms	3
CSC 217	Software Development Fundamentals Lab	1	CSC 506	Architecture Of Parallel Computers	3
CSC 226	Discrete Mathematics	3	CSC 510	Software Engineering	3
CSC 230	C and Software Tools	3	CSC 512	Compiler Construction	3
CSC 236	Computer Organization and Assembly Language for Computer Scientists	3	CSC 513	Electronic Commerce Technology	3
			CSC 515	Software Security	3
			CSC 517	Object-Oriented Design and Development	3

CSC 519	DevOps: Modern Software Engineering Practices	3	ISE 505	Linear Programming	3
CSC 520	Artificial Intelligence I	3	ISE 546	Management Decision and Control Systems	3
CSC 522	Automated Learning and Data Analysis	3	LOG 201	Logic	3
CSC 530	Computational Methods for Molecular Biology	3	LOG 335	Symbolic Logic	3
CSC 533	Privacy in the Digital Age	3	MA 105	Mathematics of Finance	3
CSC 540	Database Management Concepts and Systems	3	MA 205		3
CSC 541	Advanced Data Structures	3	MA 225	Foundations of Advanced Mathematics	3
CSC 546	Management Decision and Control Systems	3	MA 242	Calculus III	4
CSC 547	Cloud Computing Technology	3	MA 302	Numerical Applications to Differential Equations	1
CSC 548	Parallel Systems	3	MA 303	Linear Analysis	3
CSC 554	Human-Computer Interaction	3	MA 305	Introductory Linear Algebra and Matrices	3
CSC 555	Social Computing and Decentralized Artificial Intelligence	3	MA 315	Mathematics Methods in Atmospheric Sciences	4
CSC 561	Principles of Computer Graphics	3	MA 325	Introduction to Applied Mathematics	3
CSC 562	Introduction to Game Engine Design	3	MA 331	Differential Equations for the Life Sciences	3
CSC 563	Visual Interfaces for Mobile Devices	3	MA 335	Symbolic Logic	3
CSC 565	Graph Theory	3	MA 341	Applied Differential Equations I	3
CSC 568	Enterprise Storage Architecture	3	MA 351	Introduction to Discrete Mathematical Models	3
CSC 570	Computer Networks	3	MA 401	Applied Differential Equations II	3
CSC 573	Internet Protocols	3	MA 402	Mathematics of Scientific Computing	3
CSC 574	Computer and Network Security	3	MA 403	Introduction to Modern Algebra	3
CSC 575	Introduction to Wireless Networking	3	MA 405	Introduction to Linear Algebra	3
CSC 576	Networking Services: QoS, Signaling, Processes	3	MA 407	Introduction to Modern Algebra for Mathematics Majors	3
CSC 577	Switched Network Management	3	MA 408	Foundations of Euclidean Geometry	3
CSC 579	Introduction to Computer Performance Modeling	3	MA 410	Theory of Numbers	3
CSC 580	Numerical Analysis I	3	MA 412	Long-Term Actuarial Models	3
CSC 582	Computer Models of Interactive Narrative	3	MA 413	Short-Term Actuarial Models	3
CSC 583	Introduction to Parallel Computing	3	MA 416	Introduction to Combinatorics	3
CSC 584	Building Game AI	3	MA 421	Introduction to Probability	3
CSC 591	Special Topics In Computer Science	1-6	MA 425	Mathematical Analysis I	3
E 531	Dynamic Systems and Multivariable Control I	3	MA 426	Mathematical Analysis II	3
ECE 406	Architecture Of Parallel Computers	3	MA 427	Introduction to Numerical Analysis I	3
ECE 460		3	MA 428	Introduction to Numerical Analysis II	3
ECE 506	Architecture Of Parallel Computers	3	MA 430	Mathematical Models in the Physical Sciences	3
ECE 514	Random Processes	3	MA 432	Mathematical Models in Life Sciences	3
ECE 517	Object-Oriented Design and Development	3	MA 437	Applications of Algebra	3
ECE 547	Cloud Computing Technology	3	MA 440		3
ECE 560		3	MA 444	Problem Solving Strategies for Competitions	1
ECE 570	Computer Networks	3	MA 450	Methods of Applied Mathematics I	3
ECE 573	Internet Protocols	3	MA 451	Methods of Applied Mathematics II	3
ECE 574	Computer and Network Security	3	MA 491	Reading in Honors Mathematics	1-6
ECE 575	Introduction to Wireless Networking	3	MA 493	Special Topics in Mathematics	1-6
ECE 576	Networking Services: QoS, Signaling, Processes	3	MA 494	Major Paper in Mathematics	1
ECE 577	Switched Network Management	3	MA 499	Independent Research in Mathematics	1-6
ECE 579	Introduction to Computer Performance Modeling	3	MA 501	Advanced Mathematics for Engineers and Scientists I	3
ECG 528	Options and Derivatives Pricing	3	MA 502	Advanced Mathematics for Engineers and Scientists II	3
ET 320	Fundamentals of Air Pollution	3	MA 504	Introduction to Mathematical Programming	3
FIM 528	Options and Derivatives Pricing	3	MA 505	Linear Programming	3
FIM 548	Monte Carlo Methods for Financial Math	3	MA 507	Survey of Real Analysis	3
FIM 549	Financial Risk Analysis	3	MA 508	Survey of Geometry	3
GIS 582	Geospatial Modeling	3	MA 509	Survey of Abstract Algebra	3
ISE 441	Introduction to Simulation	3			

MA 510	Selected Topics In Mathematics For Secondary Teachers	1-6	MEA 323	Geochemistry of Natural Waters	3
MA 511	Advanced Calculus I	3	MEA 409	Watershed Forensics	3
MA 512	Introduction to Analysis	3	MEA 410	Introduction to Mineralogy	4
MA 513	Introduction To Complex Variables	3	MEA 411	Marine Sediment Transport	3
MA 515	Analysis I	3	MEA 412	Atmospheric Physics	3
MA 518	Geometry of Curves and Surfaces	3	MEA 415	Climate Dynamics	3
MA 520	Linear Algebra	3	MEA 421	Atmospheric Dynamics I	3
MA 521	Abstract Algebra I	3	MEA 422	Atmospheric Dynamics II	3
MA 522	Computer Algebra	3	MEA 425	Introduction to Atmospheric Chemistry	3
MA 523	Linear Transformations and Matrix Theory	3	MEA 440	Igneous and Metamorphic Petrology	4
MA 524	Combinatorics I	3	MEA 443	Synoptic Weather Analysis and Forecasting	4
MA 526	Mathematical Analysis II	3	MEA 444	Mesoscale Analysis and Forecasting	4
MA 528	Options and Derivatives Pricing	3	MEA 449	Principles of Biological Oceanography	3
MA 531	Dynamic Systems and Multivariable Control I	3	MEA 450	Introductory Sedimentology and Stratigraphy	4
MA 532	Ordinary Differential Equations I	3	MEA 451	Structural Geology	4
MA 534	Introduction To Partial Differential Equations	3	MEA 454	Marine Physical-Biological Interactions	3
MA 537	Nonlinear Dynamics and Chaos	3	MEA 455	Micrometeorology	3
MA 540	Uncertainty Quantification for Physical and Biological Models	3	MEA 458	Introduction to Tropical Meteorology	3
MA 544	Computer Experiments In Mathematical Probability	3	MEA 459	Field Investigation of Coastal Processes	5
MA 546	Probability and Stochastic Processes I	3	MEA 460	Principles of Physical Oceanography	3
MA 547	Stochastic Calculus for Finance	3	MEA 462	Observational Methods and Data Analysis in Marine Physics	3
MA 548	Monte Carlo Methods for Financial Math	3	MEA 463	Fluid Physics	3
MA 549	Financial Risk Analysis	3	MEA 464	Ocean Circulation Systems	3
MA 551	Introduction to Topology	3	MEA 465	Geologic Field Camp	4
MA 555	Introduction to Manifold Theory	3	MEA 466	Preparatory Course for Field Camp	1
MA 561	Set Theory and Foundations Of Mathematics	3	MEA 467	Marine Meteorology	3
MA 565	Graph Theory	3	MEA 469	Ecology of Coastal Resources	3
MA 573	Mathematical Modeling of Physical and Biological Processes I	3	MEA 470	Introduction to Geophysics	3
MA 574	Mathematical Modeling of Physical and Biological Processes II	3	MEA 471	Exploration and Engineering Geophysics	3
MA 580	Numerical Analysis I	3	MEA 473	Principles of Chemical Oceanography	3
MA 583	Introduction to Parallel Computing	3	MEA 476	Worldwide River and Delta Systems: Their Evolution and Human Impacts	3
MA 584	Numerical Solution of Partial Differential Equations--Finite Difference Methods	3	MEA 479	Air Quality	3
MA 587	Numerical Solution of Partial Differential Equations--Finite Element Method	3	MEA 481	Geomorphology: Earth's Dynamic Surface	3
MA 591	Special Topics	1-6	MEA 485	Introduction to Hydrogeology	3
MBA 528	Options and Derivatives Pricing	3	MEA 488	Meteorology for Media	3
MEA 100	Earth System Science: Exploring the Connections	4	MEA 493	Special Topics in MEAS	1-6
MEA 101	Geology I: Physical	3	MEA 495	Junior Seminar in the Marine, Earth, and Atmospheric Sciences	1
MEA 110	Geology I Laboratory	1	MEA 498	Internship in MEAS	1-6
MEA 130	Introduction to Weather and Climate	3	MEA 507	Discipline-based Education Research in the Geosciences	3
MEA 135	Introduction to Weather and Climate Laboratory	1	MEA 510	Air Pollution Meteorology	3
MEA 202	Geology II: Historical	3	MEA 511	Introduction to Meteorological Remote Sensing	3
MEA 211	Geology II Laboratory	1	MEA 514	Advanced Physical Meteorology	3
MEA 300	Environmental Geology	4	MEA 515	Climate Dynamics	3
MEA 312	Atmospheric Thermodynamics	4	MEA 517	Fundamentals of Climate Change Science	3
MEA 315	Mathematics Methods in Atmospheric Sciences	4	MEA 518	Adaptation to Climate Change	3
MEA 320	Fundamentals of Air Pollution	3	MEA 519	Barriers to Climate Change Literacy	3
MEA 321	Fundamentals of Air Quality and Climate Change	3	MEA 525	Introduction to Atmospheric Chemistry	3
			MEA 540	Principles of Physical Oceanography	3
			MEA 549	Principles of Biological Oceanography	3

MEA 553	Estuarine Biogeochemistry	3	NE 528	Introduction to Plasma Physics and Fusion Energy	3
MEA 554	Marine Physical-Biological Interactions	3	NE 529	Plasma Physics and Fusion Energy II	3
MEA 562	Marine Sediment Transport	3	PSY 240	Introduction to Behavioral Research I	3
MEA 570	Geological Oceanography	3	PSY 241	Introduction to Behavioral Research I Lab	1
MEA 573	Principles of Chemical Oceanography	3	PSY 242	Introduction to Behavioral Research II	3
MEA 574	Advanced Igneous Petrology	3	PSY 243	Introduction to Behavioral Research II Lab	2
MEA 577	Electron Microprobe Analysis of Geologic Material	2	PY 123	Stellar and Galactic Astronomy	3
MEA 579	Principles of Air Quality Engineering	3	PY 124	Solar System Astronomy	3
MEA 580	Air Quality Modeling and Forecasting	4	PY 125	Astronomy Laboratory	1
MEA 581	Fluid Mechanics in Natural Environments	3	PY 131	Conceptual Physics	4
MEA 582	Geospatial Modeling	3	PY 203	University Physics III	4
MEA 585	Physical Hydrogeology	3	PY 301	Introduction to Quantum Mechanics	3
MEA 591	Special Topics in Marine Science	1-6	PY 328	Stellar and Galactic Astrophysics	3
MEA 592	Special Topics in Earth Sciences	1-6	PY 341	Relativity, Gravitation and Cosmology	3
MEA 593	Special Topics in Atmospheric Science	1-6	PY 401	Quantum Physics I	3
MEA 599	Regional Geology of North America	1-6	PY 402	Quantum Physics II	3
OR 504	Introduction to Mathematical Programming	3	PY 407	Introduction to Modern Physics	3
OR 505	Linear Programming	3	PY 411	Mechanics I	3
OR 531	Dynamic Systems and Multivariable Control I	3	PY 412	Mechanics II	3
OR 565	Graph Theory	3	PY 413	Thermal Physics	3
OR 579	Introduction to Computer Performance Modeling	3	PY 414	Electromagnetism I	3
PSY 240	Introduction to Behavioral Research I	3	PY 415	Electromagnetism II	3
PSY 241	Introduction to Behavioral Research I Lab	1	PY 452	Advanced Physics Laboratory	3
PSY 242	Introduction to Behavioral Research II	3	PY 489	Solid State Solar and Thermal Energy Harvesting	3
PSY 243	Introduction to Behavioral Research II Lab	2	PY 495	Special Topics in Physics	1-4
PY 414	Electromagnetism I	3	PY 499	Independent Research in Physics	1-6
PY 415	Electromagnetism II	3	PY 501	Quantum Physics I	3
PY 514	Electromagnetism I	3	PY 502	Quantum Physics II	3
PY 515	Electromagnetism II	3	PY 506	Nuclear and Subatomic Physics	3
ST 350	Economics and Business Statistics	3	PY 507	Elementary Particle Physics	3
ST 412	Long-Term Actuarial Models	3	PY 509	General Relativity	3
ST 413	Short-Term Actuarial Models	3	PY 511	Mechanics I	3
ST 442	Introduction to Data Science	3	PY 512	Mechanics II	3
ST 546	Probability and Stochastic Processes I	3	PY 514	Electromagnetism I	3
<b>11PB 2147</b>			PY 515	Electromagnetism II	3
BME 201	Computer Methods in Biomedical Engineering	3	PY 516	Physical Optics	3
CSC 442	Introduction to Data Science	3	PY 517	Atomic and Molecular Physics	3
EC 351	Econometrics I	3	PY 519	Biological Physics	3
ECE 489	Solid State Solar and Thermal Energy Harvesting	3	PY 525	Computational Physics	3
ECE 589	Solid State Solar and Thermal Energy Harvesting	3	PY 528	Introduction to Plasma Physics and Fusion Energy	3
ECG 561	Applied Econometrics I	3	PY 529	Plasma Physics and Fusion Energy II	3
EMS 519	Teaching and Learning of Statistical Thinking	3	PY 543	Astrophysics	3
GPH 404	Epidemiology and Statistics in Global Public Health	3	PY 552	Condensed Matter Physics I	3
MA 412	Long-Term Actuarial Models	3	PY 570	Polymer Physics	3
MA 413	Short-Term Actuarial Models	3	PY 581	Matter & Interactions for Teachers I	3
MA 546	Probability and Stochastic Processes I	3	PY 582	Matter & Interactions for Teachers II	3
MA 555	Introduction to Manifold Theory	3	PY 589	Solid State Solar and Thermal Energy Harvesting	3
MEA 150	Environmental Issues in Water Resources	4	PY 590	Special Topics In Physics	1-6
MEA 463	Fluid Physics	3	PY 599	Special Topics in Physics	1-6
MSE 489	Solid State Solar and Thermal Energy Harvesting	3	SSC 200	Soil Science	3
MSE 589	Solid State Solar and Thermal Energy Harvesting	3	SSC 201	Soil Science Laboratory	1
			ST 311	Introduction to Statistics	3

ST 312	Introduction to Statistics II	3	ST 535	Statistical Methods for Quality and Productivity Improvement	3
ST 370	Probability and Statistics for Engineers	3	ST 537	Applied Multivariate and Longitudinal Data Analysis	3
ST 371	Introduction to Probability and Distribution Theory	3	ST 540	Applied Bayesian Analysis	3
ST 372	Introduction to Statistical Inference and Regression	3	ST 542	Statistical Practice	3
ST 380		3	ST 544	Applied Categorical Data Analysis	3
ST 401	Experiences in Data Analysis	4	ST 546	Probability and Stochastic Processes I	3
ST 404	Epidemiology and Statistics in Global Public Health	3	ST 555	Statistical Programming I	3
ST 405	Applied Nonparametric Statistics	3	ST 556	Statistical Programming II	3
ST 412	Long-Term Actuarial Models	3	ST 557	Using Technology to Teach and Learn with Data	3
ST 413	Short-Term Actuarial Models	3	ST 558	Data Science for Statisticians	3
ST 421	Introduction to Mathematical Statistics I	3	ST 561	Applied Econometrics I	3
ST 422	Introduction to Mathematical Statistics II	3	ST 562	Data Mining with SAS Enterprise Miner	3
ST 430	Introduction to Regression Analysis	3	ST 563	Introduction to Statistical Learning	3
ST 431	Introduction to Experimental Design	3	ST 590	Special Topics	1-6
ST 432	Introduction to Survey Sampling	3	TE 570	Polymer Physics	3
ST 433	Applied Spatial Statistics	3	<b>11PB 2147</b>		
ST 434	Applied Time Series	3	ACC 210	Concepts of Financial Reporting	3
ST 435	Statistical Methods for Quality and Productivity Improvement	3	ACC 220	Introduction to Managerial Accounting	3
ST 437	Applied Multivariate and Longitudinal Data Analysis	3	ACC 280	Survey of Financial and Managerial Accounting	3
ST 440	Applied Bayesian Analysis	3	ACC 310	Intermediate Financial Accounting I	3
ST 442	Introduction to Data Science	3	ACC 311	Intermediate Financial Accounting II	3
ST 445	Introduction to Statistical Computing and Data Management	3	ACC 330	An Introduction To Income Taxation	3
ST 446	Intermediate SAS Programming with Applications	3	ACC 340	Accounting Information Systems	3
ST 491	Statistics in Practice	3	ACC 411	Business Valuation	3
ST 495	Special Topics in Statistics	1-6	ACC 420	Cost Accounting for Effective Management	3
ST 497	Professional Experience in Statistics	1-3	ACC 440	Enterprise Resource Planning Systems: Implementation, Risk, and Analytics	3
ST 498	Independent Study In Statistics	1-6	ACC 450	Auditing and Assurance Services	3
ST 499	Research Experience in Statistics	1-3	ACC 451	Internal Auditing	3
ST 501	Fundamentals of Statistical Inference I	3	ACC 460	Governmental and Nonprofit Accounting	3
ST 502	Fundamentals of Statistical Inference II	3	ARE 215	Small Business Accounting	3
ST 503	Fundamentals of Linear Models and Regression	3	ARE 301	Intermediate Microeconomics	3
ST 505	Applied Nonparametric Statistics	3	ARE 303	Farm Management	3
ST 506		3	ARE 304	Agribusiness Management	3
ST 507	Statistics For the Behavioral Sciences I	3	ARE 306	Agricultural Law	3
ST 508		3	ARE 309	Environmental Law & Economic Policy	3
ST 511	Statistical Methods For Researchers I	3	ARE 311	Agricultural Markets	3
ST 512	Statistical Methods For Researchers II	3	ARE 312	Agribusiness Marketing	3
ST 513	Statistics for Management and Social Sciences I	3	ARE 321	Agricultural Financial Management	3
ST 514	Statistics For Management and Social Sciences II	3	ARE 336	Introduction to Resource and Environmental Economics	3
ST 515	Experimental Statistics for Engineers I	3	ARE 345	Global Agribusiness Management	3
ST 516	Experimental Statistics For Engineers II	3	ARE 404	Advanced Agribusiness Management	3
ST 517	Applied Statistical Methods I	3	ARE 413	Applied Agribusiness Marketing	3
ST 519	Teaching and Learning of Statistical Thinking	3	ARE 433	U.S. Agricultural Policy	3
ST 520	Statistical Principles of Clinical Trials	3	ARE 490	Career Seminar in Agriculture & Resource Economics	1
ST 524		3	BUS 225	Personal Finance	3
ST 533	Applied Spatial Statistics	3	BUS 320	Financial Management	3
ST 534	Applied Time Series	3	BUS 340	Information Systems Management	3
			BUS 360	Marketing Methods	3

BUS 370	Operations and Supply Chain Management	3	EC 302	Intermediate Macroeconomics	3
BUS 420	Financial Management of Corporations	3	EC 305	A Closer Look at Capitalism	3
BUS 422	Investments and Portfolio Management	3	EC 336	Introduction to Resource and Environmental Economics	3
BUS 425	Advanced Personal Financial Management	3	EC 348	Introduction to International Economics	3
BUS 426	International Financial Management	3	EC 351	Econometrics I	3
BUS 440	Database Management	3	EC 404	Money, Financial Markets, and the Economy	3
BUS 441	Business Data Communications and Networking	3	EC 410	Public Finance	3
BUS 442	Information Systems Development	3	EC 413	Industrial Organization	3
BUS 443	Web Development for Business Applications	3	EC 431	Labor Economics	3
BUS 444	Systems Analysis and Design	3	EC 437	Health Economics	3
BUS 461	Channel and Retail Marketing	3	EC 449	International Finance	3
BUS 462	Marketing Research	3	EC 451	Econometrics II	3
BUS 464	International Marketing	3	EC 474	Economics of Financial Institutions and Markets	3
BUS 465	Traditional and Digital Brand Promotion	3	EC 480		3
BUS 466	Personal Selling	3	EC 490	Research Seminar in Economics	3
BUS 467	Product and Brand Management	3	FTM 482	Global Brand Management in Textiles and Apparel	3
BUS 468	Marketing Strategy	3	MIE 412	Finance and Accounting for Entrepreneurs	3
BUS 469	Digital Marketing Practicum	3	MIE 413	New Venture Planning	3
BUS 470	Operations Modeling and Analysis	3	MIE 419	Entrepreneurship Practicum	3
BUS 472	Operations Planning and Control Systems	3	PRT 406	Sports Law	3
BUS 473	Supply Chain Strategy	3	<b>11PB 2147</b>		
BUS 475	Purchasing and Supply Management	3	AEE 101	Introduction to Career and Technical Education	1
BUS 479	Supply Chain Management Undergraduate Practicum	3	AEE 208	Agricultural Biotechnology: Issues and Implications	3
EC 301	Intermediate Microeconomics	3	AEE 230	Introduction to Cooperative Extension	3
EC 336	Introduction to Resource and Environmental Economics	3	AEE 303	Administration and Supervision of Student Organizations	3
FTM 482	Global Brand Management in Textiles and Apparel	3	AEE 311	Communication Methods and Media	3
M 100	Personal and Professional Identity Development	1	AEE 322	Experiential Learning in Agriculture	3
MIE 201	Introduction to Business	3	AEE 323	Leadership Development in Agriculture and Life Sciences	3
MIE 305	Legal and Regulatory Environment	3	AEE 325	Planning and Delivering Non-Formal Education	3
MIE 330	Managing People	3	AEE 326	Teaching Diverse Learners in AED	3
MIE 335	Organizational Behavior	3	AEE 327	Conducting Summer Programs in Agricultural Education	1
MIE 432	Employee Relations	3	AEE 350	Personal Leadership Development in Agriculture and Life Sciences	3
MIE 434	Rewards and Relationship Management	3	AEE 360	Developing Team Leadership in Agriculture and Life Sciences	3
MIE 435	Leading in a Changing World	3	AEE 423	Practicum in Agricultural Extension/Industry	8
MIE 436	Consultative Skills	3	AEE 424	Planning Agricultural Educational Programs	3
MIE 438	Talent Management	3	AEE 426	Methods of Teaching Agriculture	3
MIE 480	Business Policy and Strategy	3	AEE 427	Student Teaching in Agriculture	8
PRT 406	Sports Law	3	AEE 433	Leadership and Management of Volunteers in Agricultural and Extension Education	3
<b>11PB 2147</b>			AEE 435	Professional Presentations in Agricultural Organizations	3
ACC 220	Introduction to Managerial Accounting	3	AEE 460	Organizational Leadership Development in Agriculture and Life Sciences	3
ACC 280	Survey of Financial and Managerial Accounting	3	AEE 478	Advanced Issues in Extension Education	3
ARE 301	Intermediate Microeconomics	3	AEE 490	Seminar in Agricultural and Extension Education	1
ARE 332	Human Resource Management for Agribusiness	3	AEE 533	Leadership and Management of Volunteers in Agricultural and Extension Education	3
ARE 336	Introduction to Resource and Environmental Economics	3	BAET 201	Shop Processes and Management	3
ARE 412	Advanced Agribusiness Marketing	3			
BUS 340	Information Systems Management	3			
BUS 449	Information Technology Practicum	3			
BUS 474	Logistics Management	3			
EC 202	Principles of Macroeconomics	3			
EC 301	Intermediate Microeconomics	3			

BAET 323	Water Management	3	BAE 474	Principles and Applications of Ecological Engineering	3
BAET 332	Management of Animal Environments	4	BAE 481	Structures & Environment	3
BAET 333	Processing Agricultural Products	3	BAE 501	Sensors and Controls	3
BAET 343	Agricultural Electrification	4	BAE 535	Precision Agriculture Technology	3
BAET 411	Agricultural Machinery and Power Units	4	BAE 572	Irrigation and Drainage	3
BAET 432	Agricultural and Environmental Safety and Health	3	BAE 573	Introduction to Hydrologic and Water Quality Modeling	3
BAET 443	Environmental Restoration Implementation	3	BEC 330	Principles and Applications of Bioseparations	2
ALS 110	Academic and Career Skills Seminar	1	BEC 436	Introduction to Downstream Process Development	2
ANS 105	Introduction to Companion Animal Science	3	BEC 440		3
ANS 110	Introduction to Equine Science	3	BEC 536	Introduction to Downstream Process Development	2
ANS 150	Introduction to Animal Science	3	BEC 540		3
ANS 151	Introduction to Animal Science Lab	1	BME 203		3
ANS 201	Techniques of Animal Care	2	BME 207	Biomedical Electronics	4
ANS 208	Agricultural Biotechnology: Issues and Implications	3	BME 342		3
ANS 225	Principles of Animal Nutrition	3	BME 365	Linear Systems in Biomedical Engineering	3
ANS 303	Principles of Equine Evaluation	2	BME 385	Bioinstrumentation	3
ANS 304	Dairy Cattle Evaluation	2	BME 412	Biomedical Signal Processing	3
ANS 309	Livestock Evaluation	3	BME 425	Bioelectricity	3
ANS 322	Muscle Foods and Eggs	3	BME 525	Bioelectricity	3
ANS 324	Milk and Dairy Products	3	CS 470	Advanced Turfgrass Pest Management	2
ANS 400	Companion Animal Management	3	ECI 424	Student Teaching in Modern Foreign Languages	12
ANS 402	Beef Cattle Management	3	ENT 470	Advanced Turfgrass Pest Management	2
ANS 403	Swine Management	3	FM 425	Feed Manufacturing Technology	3
ANS 404	Dairy Cattle Management	3	FM 525	Feed Manufacturing Technology	3
ANS 408	Small Ruminant Management	3	FS 322	Muscle Foods and Eggs	3
ANS 410	Equine Breeding Farm Management	3	FS 324	Milk and Dairy Products	3
ANS 425	Feed Manufacturing Technology	3	FS 435	Food Safety Management Systems	3
ANS 440	Animal Genetic Improvement	3	FS 535	Food Safety Management Systems	3
ANS 453	Physiology and Genetics of Growth and Development	3	MSE 203		3
ANS 454	Lactation, Milk and Nutrition	3	NTR 425	Feed Manufacturing Technology	3
ANS 525	Feed Manufacturing Technology	3	NTR 454	Lactation, Milk and Nutrition	3
ANS 540	Animal Genetic Improvement	3	NTR 525	Feed Manufacturing Technology	3
ANS 553	Physiology and Genetics of Growth and Development	3	PB 208	Agricultural Biotechnology: Issues and Implications	3
ANS 554	Lactation, Milk and Nutrition	3	PO 322	Muscle Foods and Eggs	3
BAE 100	Introduction to Biological and Agricultural Engineering and Technology	1	PO 425	Feed Manufacturing Technology	3
BAE 202	Introduction to Biological and Agricultural Engineering Methods	4	PO 525	Feed Manufacturing Technology	3
BAE 302	Transport Phenomena	3	PP 470	Advanced Turfgrass Pest Management	2
BAE 322	Introduction to Food Process Engineering	3	SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
BAE 361	Analytical Methods in Engineering Design	3	SSC 473	Introduction to Hydrologic and Water Quality Modeling	3
BAE 371	Fundamentals of Hydrology for Engineers	3	SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
BAE 401	Sensors and Controls	3	SSC 573	Introduction to Hydrologic and Water Quality Modeling	3
BAE 435	Precision Agriculture Technology	3	USC 291	Service Learning Program Leader Development I	1
BAE 451	Engineering Design I	2	USC 292	Service Learning Program Leader Development II	2
BAE 452	Engineering Design II	2	<b>11PB 2147</b>		
BAE 462	Machinery Design and Applications	3	AEC 420	Introduction to Fisheries Science	3
BAE 472	Irrigation and Drainage	3	AEE 206	Introduction to Teaching Agriculture	3
BAE 473	Introduction to Hydrologic and Water Quality Modeling	3			

AEE 303	Administration and Supervision of Student Organizations	3	CS 414	Weed Science	4
AEE 322	Experiential Learning in Agriculture	3	CS 415	Integrated Pest Management	3
AEE 327	Conducting Summer Programs in Agricultural Education	1	CS 424	Seed Physiology	3
AEE 424	Planning Agricultural Educational Programs	3	CS 430	Advanced Agroecology	4
AEE 426	Methods of Teaching Agriculture	3	CS 465	Turf Management Systems and Environmental Quality	3
AEE 427	Student Teaching in Agriculture	8	CS 524	Seed Physiology	3
ANS 322	Muscle Foods and Eggs	3	CS 565	Turf Management Systems and Environmental Quality	3
ANS 324	Milk and Dairy Products	3	CSSC 490	Senior Seminar in Crop Science and Soil Science	1
ANS 330	Laboratory Animal Science	3	ECI 424	Student Teaching in Modern Foreign Languages	12
ANS 411	Management of Growing and Performance Horses	3	ENT 203	An Introduction to the Honey Bee and Beekeeping	3
ANS 425	Feed Manufacturing Technology	3	ENT 401	Honey Bee Biology and Management	3
ANS 525	Feed Manufacturing Technology	3	ES 100	Introduction to Environmental Sciences	3
BAE 325	Introductory Geomatics	3	ES 200	Climate Change and Sustainability	3
BAE 425	Industrial Microbiology and Bioprocessing	3	ES 300	Energy and Environment	3
BAE 435	Precision Agriculture Technology	3	ES 400	Analysis of Environmental Issues	3
BAE 525	Industrial Microbiology and Bioprocessing	3	FM 425	Feed Manufacturing Technology	3
BAE 535	Precision Agriculture Technology	3	FM 460	Feed Mill Operations and Leadership	3
BBS 201	Introduction to Biopharmaceutical Science	3	FM 480	Feed Quality Assurance & Formulation	3
BBS 301	Process Validation Science	3	FM 490	Feed Science Seminar	1
BBS 426	Upstream Biomanufacturing Laboratory	2	FM 525	Feed Manufacturing Technology	3
BBS 526	Upstream Biomanufacturing Laboratory	2	FOR 318	Forest Pathology	3
BCH 220	Role of Biotechnology in Society	3	FOR 420	Watershed and Wetlands Hydrology	4
BEC 426	Upstream Biomanufacturing Laboratory	2	FOR 472	Forest Soils	4
BEC 483		2	FOR 520	Watershed and Wetlands Hydrology	4
BEC 526	Upstream Biomanufacturing Laboratory	2	FS 201	Introduction to Food Science	3
BEC 583		2	FS 290	Careers in Food and Bioprocessing Sciences	1
BME 375	Biomedical Microcontroller Applications	3	FS 322	Muscle Foods and Eggs	3
BME 444	Orthopaedic Biomechanics	3	FS 324	Milk and Dairy Products	3
BME 451	BME Senior Design: Product Development	3	FS 330	Science of Food Preparation	3
BME 452	BME Senior Design: Product Implementation and Strategy	3	FS 352	Introduction to Microbiological Food Safety Hazards	3
BME 466	Polymeric Biomaterials Engineering	3	FS 354	Food Sanitation	3
BME 467	Mechanics of Tissues & Implants Requirements	3	FS 416	Quality Control in Food and Bioprocessing	3
BME 483	Tissue Engineering Technologies	2	FS 421	Food Preservation	3
BME 484	Fundamentals of Tissue Engineering	3	FS 426	Upstream Biomanufacturing Laboratory	2
BME 544	Orthopaedic Biomechanics	3	FS 435	Food Safety Management Systems	3
BME 566	Polymeric Biomaterials Engineering	3	FS 453	Food Laws and Regulations	3
BME 583	Tissue Engineering Technologies	2	FS 462	Postharvest Physiology	3
BME 584	Fundamentals of Tissue Engineering	3	FS 475	Problems and Design in Food and Bioprocessing Science	3
CS 200	Introduction to Turfgrass Management	4	FS 516	Quality Control in Food and Bioprocessing	3
CS 210	Lawns and Sports Turf	3	FS 521	Food Preservation	3
CS 213	Crop Science	3	FS 526	Upstream Biomanufacturing Laboratory	2
CS 216	Southern Row Crop Production - Cotton, Peanuts, and Tobacco	3	FS 535	Food Safety Management Systems	3
CS 218	Southern Row Crop Production - Corn, Small Grains and Soybeans	3	FS 553	Food Laws and Regulations	3
CS 230	Introduction to Agroecology	3	FS 562	Postharvest Physiology	3
CS 312		3	FW 221	Conservation of Natural Resources	3
CS 400	Turf Cultural Systems	3	FW 311	Piedmont Wildlife Ecology and Management	3
CS 411		3	FW 312	Fisheries Techniques and Management	1
CS 413	Plant Breeding	2	FW 313	Mountain Wildlife Ecology and Management	1
			FW 314	Coastal Ecology and Management	1

FW 353	Wildlife Management	3	BME 204		3
FW 403	Urban Wildlife Management	3	BME 217	Biomedical Electronics Laboratory	1
FW 411	Human Dimensions of Wildlife and Fisheries	3	BME 298	Biomedical Engineering Design and Manufacturing I	2
FW 453	Principles of Wildlife Science	4	BME 398	Biomedical Engineering Design and Manufacturing II	2
FW 460	International Wildlife Management and Conservation	3	CS 470	Advanced Turfgrass Pest Management	2
FW 465	African Ecology and Conservation	4	CSSC 490	Senior Seminar in Crop Science and Soil Science	1
FW 511	Human Dimensions of Wildlife and Fisheries	3	ENT 470	Advanced Turfgrass Pest Management	2
FW 560	International Wildlife Management and Conservation	3	FM 425	Feed Manufacturing Technology	3
FW 565	African Ecology and Conservation	4	FM 525	Feed Manufacturing Technology	3
GPH 201		3	FOR 318	Forest Pathology	3
HS 432	Introduction to Permaculture	3	FOR 420	Watershed and Wetlands Hydrology	4
HS 462	Postharvest Physiology	3	FOR 472	Forest Soils	4
HS 532	Introduction to Permaculture	3	FOR 520	Watershed and Wetlands Hydrology	4
HS 562	Postharvest Physiology	3	FS 322	Muscle Foods and Eggs	3
IDS 303	Humans and the Environment	3	FS 435	Food Safety Management Systems	3
NR 303	Humans and the Environment	3	FS 462	Postharvest Physiology	3
NR 350	International Sustainable Resource Use	4	FS 535	Food Safety Management Systems	3
NR 406	Conservation of Biological Diversity	3	FS 562	Postharvest Physiology	3
NR 420	Watershed and Wetlands Hydrology	4	FW 221	Conservation of Natural Resources	3
NR 460	Renewable Natural Resource Management and Policy	3	FW 404	Wildlife Habitat Management	3
NR 520	Watershed and Wetlands Hydrology	4	FW 460	International Wildlife Management and Conservation	3
NR 560	Renewable Natural Resource Management and Policy	3	FW 560	International Wildlife Management and Conservation	3
NTR 425	Feed Manufacturing Technology	3	HS 200	Home Horticulture	3
NTR 525	Feed Manufacturing Technology	3	HS 201	The World of Horticulture: Principles and Practices	3
PO 322	Muscle Foods and Eggs	3	HS 203	Home Plant Propagation	3
PO 424	Poultry Meat Production	3	HS 242	Landscape Design Introduction	3
PO 425	Feed Manufacturing Technology	3	HS 250	Home Landscape Design: Creating Garden Spaces	3
PO 435	Poultry Incubation & Breeding	4	HS 252	Landscape Design Graphic Communication	2
PO 525	Feed Manufacturing Technology	3	HS 272	Landscape Design/Build	6
PP 318	Forest Pathology	3	HS 290	Horticulture: Careers and Opportunities	1
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3	HS 301	Plant Propagation	4
SSC 462	Soil-Crop Management Systems	3	HS 302	Gardening with Herbaceous Perennials	3
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3	HS 303	Ornamental Plant Identification I	3
TE 466	Polymeric Biomaterials Engineering	3	HS 304	Ornamental Plant Identification II	3
TE 467	Mechanics of Tissues & Implants Requirements	3	HS 357	Landscape Design Grading and Drainage	4
TE 566	Polymeric Biomaterials Engineering	3	HS 400	Residential Landscaping	6
VMP 401	Poultry Diseases	4	HS 411	Nursery Management	3
VMP 420	Disease of Farm Animals	3	HS 416	Landscape Planting Design	4
<b>11PB 2147</b>			HS 421	Temperate-Zone Tree Fruits: Physiology and Culture	3
AEC 419	Freshwater Ecology	4	HS 422	Small Fruit Production	3
AEC 423	Introduction to Fisheries Sciences Laboratory	1	HS 423		3
AEC 519	Freshwater Ecology	4	HS 431	Vegetable Production	4
ANS 322	Muscle Foods and Eggs	3	HS 440	Greenhouse Management	3
ANS 425/525	Feed Manufacturing Technology	3	HS 442	Floriculture Crop Production	3
BAET 323	Water Management	3	HS 462	Postharvest Physiology	3
BIO 227	Understanding Structural Diversity through Biological Illustration	3	HS 471	Landscape Ecosystem Management	4
			HS 516	Landscape Planting Design	4

HS 521	Temperate-Zone Tree Fruits: Physiology and Culture	3
HS 523		3
HS 562	Postharvest Physiology	3
IDS 303	Humans and the Environment	3
NR 300	Natural Resource Measurements	4
NR 303	Humans and the Environment	3
NR 400	Natural Resource Management	4
NR 420	Watershed and Wetlands Hydrology	4
NR 421	Wetland Science and Management	3
NR 460	Renewable Natural Resource Management and Policy	3
NR 484	Environmental Impact Assessment	4
NR 500	Natural Resource Management	4
NR 520	Watershed and Wetlands Hydrology	4
NR 521	Wetland Science and Management	3
NR 560	Renewable Natural Resource Management and Policy	3
NTR 420		3
NTR 425	Feed Manufacturing Technology	3
NTR 525	Feed Manufacturing Technology	3
PO 201	Poultry Science and Production	3
PO 201A	Poultry Science and Production	3
PO 202	Poultry Science and Production Laboratory	1
PO 202A	Poultry Science and Production Laboratory	1
PO 290	Exploring Opportunities in Poultry Science	1
PO 322	Muscle Foods and Eggs	3
PO 340	Live Poultry and Poultry Product Evaluation, Grading, and Inspection	3
PO 410	Production and Management of Game Birds in Confinement	3
PO 411	Agrosecurity	3
PO 421	Commercial Egg Production	3
PO 425	Feed Manufacturing Technology	3
PO 433	Poultry Processing and Products	3
PO 525	Feed Manufacturing Technology	3
PO 533	Poultry Processing and Products	3
PP 315	Principles of Plant Pathology	4
PP 318	Forest Pathology	3
PP 470	Advanced Turfgrass Pest Management	2
SSC 185	Land and Life	3
SSC 341	Soil Fertility and Nutrient Management	3
SSC 342	Soil and Plant Nutrient Analysis	1
SSC 421		3
SSC 440	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 442	Soil and Environmental Biogeochemistry	3
SSC 452	Soil Classification	4
SSC 461	Soil Physical Properties and Plant Growth	3
SSC 462	Soil-Crop Management Systems	3
SSC 470	Wetland Soils	3
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3

SSC 570	Wetland Soils	3
TOX 201	Poisons, People and the Environment	3
TOX 401	Principles of Toxicology	4
TOX 415	Ecotoxicology	4
TOX 501	Principles of Toxicology	4

## Semester Sequence

This is a sample.

### First Year

Fall Semester	Hours
Select one of the following: <sup>1</sup>	2
LSC 101 Critical and Creative Thinking in the Life Sciences	
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	
PB 103 Perspectives on Botany or LSC 103 or Exploring Opportunities in the Life Sciences	1
BIO 181 Introductory Biology: Ecology, Evolution, and Biodiversity <sup>1</sup>	4
CH 101 Chemistry - A Molecular Science	3
CH 102 General Chemistry Laboratory	1
Select one of the following: <sup>2</sup>	3
MA 121 Elements of Calculus	
MA 131 Calculus for Life and Management Sciences A	
MA 141 Calculus I	
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	1
<b>Hours</b>	<b>15</b>

### Spring Semester

BIO 183 Introductory Biology: Cellular and Molecular Biology <sup>1</sup>	4
Select one of the following:	4
CH 220 Introductory Organic Chemistry & CH 222 and Organic Chemistry I Lab	
CH 221 Organic Chemistry I & CH 222 and Organic Chemistry I Lab	
ENG 101 Academic Writing and Research	4
Restricted Elective (p. )	3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	1
<b>Hours</b>	<b>16</b>

### Second Year

Fall Semester	Hours
PB 250 Plant Biology <sup>1</sup>	4
ST 101 Statistics by Example <sup>3</sup> or ST 311 or Introduction to Statistics	3
Restricted Elective (p. )	4

GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3
<b>Hours</b>	<b>14</b>
<b>Spring Semester</b>	
GN 311 Principles of Genetics	4
PB Elective (p. 2) <sup>4,5</sup>	3
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	3
Restricted Elective (p. )	3
Free Elective	3
<b>Hours</b>	<b>16</b>
<b>Third Year</b>	
<b>Fall Semester</b>	
PB Elective (p. 2) <sup>4,5</sup>	3
PY 131 Conceptual Physics <sup>6</sup> or PY 211 or College Physics I	4
Restricted Electives (p. )	5
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3
<b>Hours</b>	<b>15</b>
<b>Spring Semester</b>	
Advanced Communication Elective (p. 1)	3
PB Elective 300-level or higher (p. 2) <sup>4,5</sup>	3
Applied Plant Science Elective (p. )	3
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	3
Free Elective	3
<b>Hours</b>	<b>15</b>
<b>Fourth Year</b>	
<b>Fall Semester</b>	
Select one of the following:	3
PB 492 External Learning Experience	
PB 493 Plant Biology Supervised Undergraduate Research Experience	
PB 495 Special Topics in Plant Biology	
ALS 498 Honors Research or Teaching I	
PB Elective 300-level or higher (p. 2) <sup>4,5</sup>	3
Restricted Elective (p. )	3
Free Elective	3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	3
<b>Hours</b>	<b>15</b>
<b>Spring Semester</b>	
Restricted Electives (p. )	6
GEP US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</a> )	3
Free Electives	5
<b>Hours</b>	<b>14</b>
<b>Total Hours</b>	<b>120</b>

<sup>1</sup> Students Entering NC State through the Life Sciences First Year (LSFY) Program must take LSC 101 Critical and Creative Thinking in the Life Sciences

- <sup>2</sup> Credit is not allowed for more than one of MA 121 Elements of Calculus, MA 131 Calculus for Life and Management Sciences A, and MA 141 Calculus I
- <sup>3</sup> Credit is not allowed for both ST 101 Statistics by Example and ST 311 Introduction to Statistics. Students interested in research are strongly encouraged to take both ST 311 Introduction to Statistics and ST 312 Introduction to Statistics II
- <sup>4</sup> A minimum of four Plant Biology elective courses are required and must total 12 credit hours. At least two of these courses must be at the 300-level or higher and must total 6 credit hours. A minimum GPA of 2.00 is required across all PB coursework.
- <sup>5</sup> At least one course PB Elective course must have a laboratory or be a laboratory or field-based course.
- <sup>6</sup> Students interested in pursuing graduate and professional training should take PY 211 College Physics I to meet the PY requirement followed by PY 212 College Physics II as a Restricted Elective.

## Career Opportunities

The undergraduate degree is an excellent pre-professional degree in the plant sciences. Graduates are employed as researchers in academic, government, or industrial labs, as field botanists and conservationists in state and natural parks, and as employees of environmental education, or public service organizations. Many majors continue with graduate studies in a plant science discipline, after which they are qualified for teaching positions in community colleges, prominent colleges and universities, for research positions in major federal and state government laboratories, and in private industry. Research technician positions in many life science areas in governmental and industrial laboratories are also career possibilities. The field of plant biotechnology provides additional opportunities with several graduates seeking employment in the biotechnology industry including companies in nearby Research Triangle Park. Graduates are also well qualified for professional training in the health professions.

## Career Titles

- Agricultural Sciences Professor
- Aquaculture Specialist
- Biologist
- Biology Professor
- Botanist
- Elementary School Teacher
- Environmental Disease Analyst
- Environmental Planner
- Environmental Research Analyst
- Environmental Science Professor
- Farm and Ranch Manager
- Farm Management Advisor
- Food & Drug Inspector
- Food Science Technicians
- Food Technologist
- Forest and Conservation Technician
- Forester
- Forestry and Conservation Science Professor
- Geneticist
- Greenhouse and Nursery Manager
- Healthcare Social Workers

- High School Teacher
- Horticulturist
- Irrigation Engineer
- Landscape Contractor
- Marine and Aquatic Biologist
- Middle School Teacher
- Newspaper/Magazines Writer
- Outdoor Education Teacher
- Park Naturalist
- Photographer
- Public Health Service Officer
- Sales Representative (Agricultural Products)
- Scientific Photographer
- Soil Conservationist
- Soil Scientist
- Technical & Scientific Publications Editor
- Technical Publications Writer
- Winemaker / Vintner

## Learn More About Careers

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

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

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

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

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

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

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

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

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

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

American Society of Plant Biologists (<https://jobs.plantae.org/>)

Botanical Society of America (<https://cms.botany.org/home/careers-jobs/careers-in-botany.html>)