# Agricultural Business Management (BS): Biological Sciences Concentration

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

The concentration in biological sciences combines training in science with business and economics and leads to a Bachelor of Science degree in Agricultural Business Management with a concentration in the Biological Sciences/Business Management (BBM). The concentration prepares graduates for management, marketing, and sales careers in fields such as biotechnology, pharmaceuticals, health care, environmental protection, and food processing. Graduates specializing in agribusiness entrepreneurship are trained in value creation and prepared to address the strong demand in agtech, biotech, and foodtech.

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

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## Plan Requirements

| Code | Title | Hours | Counts towards |
|---|---|---|---|
| **Orientation** | | | |
| ALS 103 | Freshman Transitions and Diversity in Agriculture & Life Sciences | 1 | |
| or ALS 303 | Transfer Transitions and Diversity in Agriculture & Life Sciences | | |
| **Communications & Tech Fluency** | | | |
| Communications Course: | | 3 | |
| COM 110 | Public Speaking | | |
| COM 112 | Interpersonal Communication | | |
| COM 201 | Introduction to Persuasion Theory | | |
| COM 211 | Argumentation and Advocacy | | |
| Advanced Writing Course: | | 3 | |
| ENG 331 | Communication for Engineering and Technology | | |
| ENG 332 | Communication for Business and Management | | |
| ENG 333 | Communication for Science and Research | | |
| AEE 226 | Computer Applications and Information Technology in Agricultural & Extension Ed | 3 | |
| or CSC 200 | | | |
| **Mathematical Sciences** | | | |
| Select one of the following: | | 3-4 | |
| MA 121 | Elements of Calculus | | |
| MA 131 | Calculus for Life and Management Sciences A | | |
| MA 141 | Calculus I | | |
| Select one of the following: | | 3-4 | |
| MA 114 | Introduction to Finite Mathematics with Applications | | |
| MA 231 | Calculus for Life and Management Sciences B | | |
| MA 241 | Calculus II | | |
| Statistics Course: | | 3 | |
| BUS 350 | Economics and Business Statistics | | |
| ST 311 | Introduction to Statistics | | |
| ST 350 | Economics and Business Statistics | | |
| **Natural Sciences** | | | |
| BIO 181 | Introductory Biology: Ecology, Evolution, and Biodiversity | 4 | |
| Select one of the following: | | 4 | |
| BIO 183 | Introductory Biology: Cellular and Molecular Biology | | |
| PB 200 | Plant Life | | |
| PB 250 | Plant Biology | | |
| GN 301 | Genetics in Human Affairs | 3 | |
| or GN 311 | Principles of Genetics | | |

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| Physics Course: | | 4 |
| PY 131 | Conceptual Physics | |
| PY 205 & PY 206 | Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory | |
| PY 211 | College Physics I | |
| CH 101 & CH 102 | Chemistry - A Molecular Science and General Chemistry Laboratory | 4 |
| Chemistry Course: | | 4 |
| CH 201 & CH 202 | Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory | |
| CH 220 | Introductory Organic Chemistry | |
| CH 221 & CH 222 | Organic Chemistry I and Organic Chemistry I Lab | |
| Biology Course: | | 4 |
| AEC 360 | Ecology | |
| MB 351 & MB 352 | General Microbiology and General Microbiology Laboratory | |
| PB 360 | Ecology | |
| PB 400 | Plant Diversity and Evolution | |
| ZO 250 | Animal Anatomy and Physiology | |
| **Deptartment Course Requirements** | | |
| ARE 201 | Introduction to Agricultural & Resource Economics | 3 |
| or EC 201 | Principles of Microeconomics | |
| ACC 220 | Introduction to Managerial Accounting | 3 |
| or ACC 210 | Concepts of Financial Reporting | |
| ARE 304 | Agribusiness Management | 3 |
| ARE 306 | Agricultural Law | 3 |
| or ARE 309 | Environmental Law & Economic Policy | |
| Marketing Course: | | 3 |
| ARE 311 | Agricultural Markets | |
| ARE 312 | Agribusiness Marketing | |
| BUS 360 | Marketing Methods | |
| ARE 321 | Agricultural Financial Management | 3 |
| or BUS 320 | Financial Management | |
| ARE 301 | Intermediate Microeconomics | 3 |
| or EC 301 | Intermediate Microeconomics | |
| ARE/EC Elective: | | 3 |
| ARE 332 | Human Resource Management for Agribusiness | |
| ARE 345 | Global Agribusiness Management | |
| EC 302 | Intermediate Macroeconomics | |
| EC 348 | Introduction to International Economics | |
| EC 431 | Labor Economics | |
| ARE 490 | Career Seminar in Agriculture & Resource Economics | 1 |
| ARE Electives (p. 3) | | 3 |
| **Restricted Electives** | | |
| Restricted Electives (p. 4) | | 12 |
| **GEP Courses** | | |
| ENG 101 | Academic Writing and Research [1] | 4 |
| GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) | | 6 |
| GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/) | | 3 |
| GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/) | | 2 |
| GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/) | | 3 |

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| GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/) | 5 |
| GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement) | |
| World Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/) (verify requirement) | |
| **Free Electives** | |
| Free Electives (12 Hr S/U Lmt) | 11 |
| Select courses with enough credits to meet the minimum graduation requirement of 120 total credit hours. | |
| **Total Hours** | **120** |

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

## ARE Electives

| Code | Title | Hours | Counts towards |
|---|---|---|---|
| ARE 215 | Small Business Accounting | 3 | |
| ARE 260 | Marketing and Risk Management in the Pork Industry | 1 | |
| ARE 270 | Principles of Agribusiness Entrepreneurship | 3 | |
| ARE 295 | Special Topics in Agricultural & Resource Economics (200 Level) | 1-6 | |
| ARE 301 | Intermediate Microeconomics | 3 | |
| ARE 303 | Farm Management | 3 | |
| ARE 304 | Agribusiness Management | 3 | |
| ARE 306 | Agricultural Law | 3 | |
| ARE 309 | Environmental Law & Economic Policy | 3 | |
| ARE 311 | Agricultural Markets | 3 | |
| ARE 312 | Agribusiness Marketing | 3 | |
| ARE 321 | Agricultural Financial Management | 3 | |
| ARE 323 | Agribusiness Finance | 3 | |
| ARE 332 | Human Resource Management for Agribusiness | 3 | |
| ARE 336 | Introduction to Resource and Environmental Economics | 3 | |
| ARE 345 | Global Agribusiness Management | 3 | |
| ARE 370 | Agribusiness New Venture Development | 3 | |
| ARE 395 | Special Topics in Agricultural and Resource Economics (300 level) | 1-6 | |
| ARE 404 | Advanced Agribusiness Management | 3 | |
| ARE 412 | Advanced Agribusiness Marketing | 3 | |
| ARE 413 | Applied Agribusiness Marketing | 3 | |
| ARE 415 | Introduction to Commodity Futures Markets | 3 | |
| ARE 420 | Taxation in Agriculture, Production, and Agribusiness | 3 | |
| ARE 425 | Contracts and Organizations in Agriculture | 3 | |
| ARE 433 | U.S. Agricultural Policy | 3 | |
| ARE 444 | Ethics in Agribusiness | 3 | |
| ARE 448 | International Agricultural Trade | 3 | |
| ARE 455 | Agribusiness Analytics | 3 | |
| ARE 470 | Agribusiness Entrepreneurship Clinical Skills Development | 3 | |
| ARE 475 | Food Policy | 3 | |

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|---|---|---|
| ARE 490 | Career Seminar in Agriculture & Resource Economics | 1 |
| ARE 492 | External Learning Experience | 1-6 |
| ARE 493 | Special Problems/ Research Exploration | 1-6 |
| ARE 494 | Agribusiness Study Abroad | 1-6 |
| ARE 495 | Special Topics in Agricultural and Resource Economics | 1-6 |
| ARE 590 | Special Topics in ARE | 1-99 |
| EC 301 | Intermediate Microeconomics | 3 |
| EC 336 | Introduction to Resource and Environmental Economics | 3 |
| ECG 505 | | 3 |
| ECG 506 | | 3 |
| ECG 512 | | 3 |
| ECG 515 | Environmental and Resource Policy | 3 |
| ECG 528 | Options and Derivatives Pricing | 3 |
| ECG 530 | Topics in Labor Economics | 3 |
| ECG 537 | Health Economics | 3 |
| ECG 540 | Economic Development | 3 |
| ECG 548 | International Economics | 3 |
| ECG 561 | Applied Econometrics I | 3 |
| ECG 562 | Applied Econometrics II | 3 |
| ECG 563 | Applied Microeconometrics | 3 |
| ECG 580 | | 3 |
| ECG 590 | Special Economics Topics | 1-6 |
| FIM 528 | Options and Derivatives Pricing | 3 |
| MA 528 | Options and Derivatives Pricing | 3 |
| MBA 528 | Options and Derivatives Pricing | 3 |
| ST 561 | Applied Econometrics I | 3 |

## Restricted Electives

| Code | Title | Hours | Counts towards |
|---|---|---|---|
| Before registering for these courses students should check to make sure they have met the necessary prerequisites and that credit restrictions do not apply: e.g. credit is not allowed for both BIO 105 and BIO 181. | | | |
| **Business/Economics Set** | | | |
| Note: 300-Level BUS courses are restricted to students in the Business minor and 400-level BUS courses are restricted to Business majors. | | | |
| ACC 210 | Concepts of Financial Reporting | 3 | |
| ACC 220 | Introduction to Managerial Accounting | 3 | |
| ACC 230 | Individual Income Taxation | 3 | |
| ACC 280 | Survey of Financial and Managerial Accounting | 3 | |
| ACC 295 | Special Topics in Accounting | 1-6 | |
| ACC 310 | Intermediate Financial Accounting I | 3 | |
| ACC 311 | Intermediate Financial Accounting II | 3 | |
| ACC 330 | An Introduction To Income Taxation | 3 | |
| ACC 340 | Accounting Information Systems | 3 | |
| ACC 411 | Business Valuation | 3 | |
| ACC 420 | Cost Accounting for Effective Management | 3 | |

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| ACC 440 | Enterprise Resource Planning Systems: Implementation, Risk, and Analytics | 3 |
| ACC 450 | Auditing and Assurance Services | 3 |
| ACC 451 | Internal Auditing | 3 |
| ACC 460 | Governmental and Nonprofit Accounting | 3 |
| ACC 495 | Special Topics in Accounting | 1-6 |
| ACC 498 | Independent Study in Accounting | 1-6 |
| ACC 499 | Internship in ACC | 1-6 |
| ACC 508 | Advanced Commercial Law | 3 |
| ACC 510 | Advanced Financial Accounting | 3 |
| ACC 519 | Applied Financial Management | 3 |
| ACC 520 | Advanced Management Accounting | 3 |
| ACC 530 | Advanced Income Tax | 3 |
| ACC 533 | Accounting and Tax Research | 3 |
| ACC 540 | IT Risks and Controls | 3 |
| ACC 550 | Advanced Auditing | 3 |
| ACC 560 | Tools for Tax Analytics | 1 |
| ACC 561 | Database Management in Tax | 1 |
| ACC 562 | Forecasting Effective Tax Rates and Scenario Analysis - Introduction | 1 |
| ACC 563 | Forecasting Effective Tax Rates and Scenario Analysis - Advanced Application | 1 |
| ACC 564 | Project Management and Process Documentation in Tax | 1 |
| ACC 565 | Visual Analytics in Tax | 1 |
| ACC 566 | Database Management Applications in Tax | 1 |
| ACC 567 | | 1 |
| ACC 568 | | 1 |
| ACC 569 | Advanced Visual Analytics in Tax | 1 |
| ACC 570 | Data Security and Warehousing in Tax | 1 |
| ACC 571 | | 1 |
| ACC 588 | Special Topics in Accounting | 1-6 |
| ARE 215 | Small Business Accounting | 3 |
| ARE 260 | Marketing and Risk Management in the Pork Industry | 1 |
| ARE 270 | Principles of Agribusiness Entrepreneurship | 3 |
| ARE 295 | Special Topics in Agricultural & Resource Economics (200 Level) | 1-6 |
| ARE 301 | Intermediate Microeconomics | 3 |
| ARE 303 | Farm Management | 3 |
| ARE 304 | Agribusiness Management | 3 |
| ARE 306 | Agricultural Law | 3 |
| ARE 309 | Environmental Law & Economic Policy | 3 |
| ARE 311 | Agricultural Markets | 3 |
| ARE 312 | Agribusiness Marketing | 3 |
| ARE 321 | Agricultural Financial Management | 3 |
| ARE 323 | Agribusiness Finance | 3 |
| ARE 332 | Human Resource Management for Agribusiness | 3 |

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|---|---|---|
| ARE 336 | Introduction to Resource and Environmental Economics | 3 |
| ARE 345 | Global Agribusiness Management | 3 |
| ARE 370 | Agribusiness New Venture Development | 3 |
| ARE 395 | Special Topics in Agricultural and Resource Economics (300 level) | 1-6 |
| ARE 404 | Advanced Agribusiness Management | 3 |
| ARE 412 | Advanced Agribusiness Marketing | 3 |
| ARE 413 | Applied Agribusiness Marketing | 3 |
| ARE 415 | Introduction to Commodity Futures Markets | 3 |
| ARE 420 | Taxation in Agriculture, Production, and Agribusiness | 3 |
| ARE 425 | Contracts and Organizations in Agriculture | 3 |
| ARE 433 | U.S. Agricultural Policy | 3 |
| ARE 444 | Ethics in Agribusiness | 3 |
| ARE 448 | International Agricultural Trade | 3 |
| ARE 455 | Agribusiness Analytics | 3 |
| ARE 470 | Agribusiness Entrepreneurship Clinical Skills Development | 3 |
| ARE 475 | Food Policy | 3 |
| ARE 490 | Career Seminar in Agriculture & Resource Economics | 1 |
| ARE 492 | External Learning Experience | 1-6 |
| ARE 493 | Special Problems/ Research Exploration | 1-6 |
| ARE 494 | Agribusiness Study Abroad | 1-6 |
| ARE 495 | Special Topics in Agricultural and Resource Economics | 1-6 |
| ARE 590 | Special Topics in ARE | 1-99 |
| BUS 225 | Personal Finance | 3 |
| BUS 295 | Special Topics in Business Management | 1-6 |
| BUS 320 | Financial Management | 3 |
| BUS 340 | Information Systems Management | 3 |
| BUS 350 | Economics and Business Statistics | 3 |
| BUS 351 | Introduction to Business Analytics | 3 |
| BUS 360 | Marketing Methods | 3 |
| BUS 370 | Operations and Supply Chain Management | 3 |
| BUS 420 | Financial Management of Corporations | 3 |
| BUS 422 | Investments and Portfolio Management | 3 |
| BUS 425 | Advanced Personal Financial Management | 3 |
| BUS 426 | International Financial Management | 3 |
| BUS 428 | Financial Analytics | 3 |
| BUS 429 | Financial Modeling | 3 |
| BUS 440 | Database Management | 3 |
| BUS 441 | Business Data Communications and Networking | 3 |
| BUS 442 | Information Systems Development | 3 |
| BUS 443 | Web Development for Business Applications | 3 |

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| BUS 444 | Systems Analysis and Design | 3 |
| BUS 449 | Information Technology Capstone | 3 |
| BUS 458 | Analytics: From Data to Decisions | 3 |
| BUS 459 | Business Analytics Practicum | 3 |
| BUS 460 | Consumer Behavior | 3 |
| BUS 461 | Channel and Retail Marketing | 3 |
| BUS 462 | Marketing Research | 3 |
| BUS 464 | International Marketing | 3 |
| BUS 465 | Traditional and Digital Brand Promotion | 3 |
| BUS 466 | Personal Selling | 3 |
| BUS 467 | Product and Brand Management | 3 |
| BUS 468 | Marketing Strategy | 3 |
| BUS 469 | Digital Marketing Practicum | 3 |
| BUS 470 | Operations Modeling and Analysis | 3 |
| BUS 472 | Operations Planning and Control Systems | 3 |
| BUS 473 | Supply Chain Strategy | 3 |
| BUS 474 | Logistics Management | 3 |
| BUS 475 | Purchasing and Supply Management | 3 |
| BUS 476 | Decision Modeling and Analysis | 3 |
| BUS 479 | Supply Chain Management Undergraduate Practicum | 3 |
| BUS 495 | Special Topics in Business Management | 1-6 |
| BUS 498 | Independent Study in Business Management | 1-6 |
| BUS 501 | Strategic Management Foundations | 3 |
| BUS 554 | Project Management | 3 |
| BUS 571 | High Growth Entrepreneurship | 3 |
| BUS 585 | | 3 |
| BUS 590 | Special Topics In Business Management | 1-6 |
| EC 202 | Principles of Macroeconomics | 3 |
| EC 301 | Intermediate Microeconomics | 3 |
| EC 302 | Intermediate Macroeconomics | 3 |
| EC 305 | A Closer Look at Capitalism | 3 |
| EC 336 | Introduction to Resource and Environmental Economics | 3 |
| EC 348 | Introduction to International Economics | 3 |
| EC 351 | Econometrics I | 3 |
| EC 404 | Money, Financial Markets, and the Economy | 3 |
| EC 410 | Public Finance | 3 |
| EC 413 | Industrial Organization | 3 |
| EC 431 | Labor Economics | 3 |
| EC 437 | | 3 |
| EC 449 | International Finance | 3 |
| EC 451 | Econometrics II | 3 |
| EC 468 | Game Theory | 3 |
| EC 474 | Economics of Financial Institutions and Markets | 3 |
| EC 480 | | 3 |
| EC 490 | Research Seminar in Economics | 3 |
| EC 495 | Special Topics in Economics | 1-6 |
| EC 498 | Independent Study in Economics | 1-6 |
| ECG 512 | | 3 |
| FTM 482 | Global Brand Management in Textiles and Apparel | 3 |

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| M 100 | Personal and Professional Identity Development | 1 |
| MBA 577 | Technology Entrepreneurship and Commercialization II | 3 |
| MIE 201 | Introduction to Business Processes | 3 |
| MIE 295 | Special Topics in MIE | 1-6 |
| MIE 305 | Legal and Regulatory Environment | 3 |
| MIE 306 | Managing Ethics in Organizations | 3 |
| MIE 310 | Introduction to Entrepreneurship | 3 |
| MIE 330 | Human Resource Management | 3 |
| MIE 335 | Organizational Behavior | 3 |
| MIE 410 | Business Opportunity Analysis | 3 |
| MIE 411 | Managing the Growth Venture | 3 |
| MIE 412 | Finance and Accounting for Entrepreneurs | 3 |
| MIE 413 | New Venture Planning | 3 |
| MIE 416 | The Legal Dynamics of Entrepreneurship | 3 |
| MIE 418 | Social Entrepreneurship Practicum | 3 |
| MIE 419 | Entrepreneurship Practicum | 3 |
| MIE 430 | Teamwork in Organizations | 3 |
| MIE 432 | Employee Relations | 3 |
| MIE 434 | Compensation Systems | 3 |
| MIE 435 | Leadership and Management | 3 |
| MIE 436 | Training and Development | 3 |
| MIE 438 | Staffing | 3 |
| MIE 439 | Human Resources Practicum | 3 |
| MIE 480 | Business Policy and Strategy | 3 |
| MIE 495 | Special Topics in MIE | 1-6 |
| MIE 498 | Independent Study in MIE | 1-6 |
| MSE 577 | Technology Entrepreneurship and Commercializatior II | 3 |
| PRT 406 | Sports Law | 3 |
| ST 350 | Economics and Business Statistics | 3 |
| TTM 585 | Market Research In Textiles | 3 |
| **Science Set** | | |
| AEC 360 | Ecology | 4 |
| AEC 380 | Water Resources: Global Issues in Ecology, Policy, Management, and Advocacy | 3 |
| 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 509 | Ecology and Conservation of Freshwater Invertebrates | 3 |
| AEC 515 | Fish Physiology | 3 |
| AEC 519 | Freshwater Ecology | 4 |
| AEC 586 | | 3 |
| AEC 587 | | 1 |
| AEC 761 | Conservation and Climate Science | 3 |
| AEE 101 | Introduction to Career and Technical Education | 1 |
| AEE 103 | Fundamentals of Agricultural and Extension Education | 1 |

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| AEE 208 | Agricultural Biotechnology: Issues and Implications | 3 |
| AEE 226 | Computer Applications and Information Technology in Agricultural & Extension Ed | 3 |
| AEE 230 | Introduction to Cooperative Extension | 3 |
| AEE 303 | Administration and Supervision of Student Organizations | 3 |
| AEE 311 | Communication Methods and Media | 3 |
| AEE 322 | Experiential Learning in Agriculture | 3 |
| AEE 323 | Leadership Development in Agriculture and Life Sciences | 3 |
| AEE 325 | Planning and Delivering Non-Formal Education | 3 |
| AEE 326 | Teaching Diverse Learners in AED | 3 |
| AEE 327 | Conducting Summer Programs in Agricultural Education | 1 |
| AEE 350 | Personal Leadership Development in Agriculture and Life Sciences | 3 |
| AEE 360 | Developing Team Leadership in Agriculture and Life Sciences | 3 |
| AEE 423 | Practicum in Agricultural Extension/ Industry | 8 |
| AEE 424 | Planning Agricultural Educational Programs | 3 |
| AEE 426 | Methods of Teaching Agriculture | 3 |
| AEE 427 | Student Teaching in Agriculture | 8 |
| AEE 433 | Leadership and Management of Volunteers in Agricultural and Extension Education | 3 |
| AEE 435 | Professional Presentations in Agricultural Organizations | 3 |
| AEE 460 | Organizational Leadership Development in Agriculture and Life Sciences | 3 |
| AEE 478 | Advanced Issues in Extension Education | 3 |
| AEE 490 | Seminar in Agricultural and Extension Education | 1 |
| AEE 491 | Seminar in Agricultural Education | 1 |
| AEE 492 | External Learning Experience in Agricultural and Extension Education | 1-6 |
| AEE 493 | Special Problems in Agriculture and Extension Education | 1-6 |
| AEE 495 | Special Topics in Agricultural and Extension Education | 1-3 |
| AEE 500 | Agricultural Education, Schools and Society | 3 |
| AEE 501 | Foundations Of Agricultural and Extension Education | 3 |
| AEE 503 | Youth Program Management | 3 |
| AEE 505 | Trends and Issues in Agricultural Education and Human Sciences | 3 |
| AEE 507 | Comparative Agricultural and Extension Education | 3 |

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| AEE 521 | Program Planning in Agricultural Extension and Human Sciences | 3 |
| AEE 522 | Occupational Experience in Agriculture | 3 |
| AEE 523 | Adult Education in Agriculture | 3 |
| AEE 524 | Coordinating the High School Agricultural Education Program | 3 |
| AEE 526 | Information Technologies in Agricultural and Extension Education | 3 |
| AEE 529 | Curriculum Development in Agricultural and Extension Education | 3 |
| AEE 533 | Leadership and Management of Volunteers in Agricultural and Extension Education | 3 |
| AEE 535 | Teaching Agriculture in Secondary Schools | 3 |
| AEE 545 | Methods of Change in Agricultural and Human Sciences | 3 |
| AEE 560 | Organizational Behavior and Administrative Leadership in Agricultural & Human Science | 3 |
| AEE 577 | Evaluation in Agricultural and Human Sciences | 3 |
| AEE 578 | Scientific Inquiry in Agricultural and Extension Education | 3 |
| AEE 579 | Research Proposal Development in Agricultural Education and Human Sciences | 3 |
| AEE 595 | Special Topics in Agricultural and Extension Education | 1-6 |
| ALS 103 | Freshman Transitions and Diversity in Agriculture & Life Sciences | 1 |
| ALS 303 | Transfer Transitions and Diversity in Agriculture & Life Sciences | 1 |
| ANS 105 | Introduction to Companion Animal Science | 3 |
| ANS 110 | Introduction to Equine Science | 3 |
| ANS 150 | Introduction to Animal Science | 3 |
| ANS 151 | Introduction to Animal Science Lab | 1 |
| ANS 201 | Techniques of Animal Care | 2 |
| ANS 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 225 | Principles of Animal Nutrition | 3 |
| ANS 230 | Animal Nutrition | 3 |
| ANS 231 | Animal Nutrition Lab | 1 |
| ANS 240 | Livestock Merchandising | 3 |
| ANS 240A | Livestock Merchandising | 3 |
| ANS 260 | Basic Swine Science | 2 |
| ANS 261 | Swine Health and Biosecurity | 1 |
| ANS 262 | Swine Breeding and Gestation Management | 1 |

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| 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 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 411 | Management of Growing and Performance Horses | 3 |
| 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 480 | Judging Team | 1 |
| ANS 492 | Professional Internship Experience in the Animal Sciences | 1-3 |
| ANS 493 | Research Experience in the Animal Sciences | 1-3 |
| ANS 494 | Teaching Experience in the Animal Sciences | 1-3 |
| ANS 495 | Special Topics in Animal Science | 1-3 |
| ANS 515 | Comparative Nutrition | 3 |
| ANS 525 | Feed Manufacturing Technology | 3 |
| ANS 530 | | 3 |
| ANS 531 | | 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 |

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| ANS 554 | Lactation, Milk and Nutrition | 3 |
| ANS 561 | Equine Nutrition | 3 |
| ANS 571 | Regulation of Metabolism | 3 |
| ANS 575 | | 3 |
| ANS 590 | Topical Problems in Animal Science | 1-3 |
| BAE 100 | Introduction to Biological and Agricultural Engineering and Technology | 1 |
| BAE 200 | Computer Methods in Biological Engineering | 2 |
| BAE 202 | Introduction to Biological and Agricultural Engineering Methods | 4 |
| BAE 203 | Introduction to AutoCAD Civil 3D for Environmental & Ecological Engineers | 2 |
| BAE 204 | Introduction to Environmental and Ecological Engineering | 2 |
| BAE 302 | Transport Phenomena | 3 |
| BAE 305 | Biological Engineering Circuits | 4 |
| BAE 321 | Bioprocessing Engineering Fundamentals | 3 |
| BAE 322 | Introduction to Food Process Engineering | 3 |
| BAE 325 | Introductory Geomatics | 3 |
| BAE 361 | Analytical Methods in Engineering Design | 3 |
| BAE 371 | Fundamentals of Hydrology for Engineers | 3 |
| BAE 376 | Watershed Assessment and Water Quality Protection | 3 |
| BAE 401 | Sensors and Controls | 3 |
| BAE 425 | Industrial Microbiology and Bioprocessing | 3 |
| BAE 435 | Precision Agriculture Technology | 3 |
| BAE 451 | Engineering Design I | 2 |
| BAE 452 | Engineering Design II | 2 |
| BAE 462 | Machinery Design and Applications | 3 |
| BAE 472 | Irrigation and Drainage | 3 |
| BAE 473 | Introduction to Hydrologic and Water Quality Modeling | 3 |
| BAE 474 | Principles and Applications of Ecological Engineering | 3 |
| BAE 478 | Circular Approach to Manure Management | 3 |
| BAE 481 | Structures & Environment | 3 |
| BAE 488 | Postharvest Engineering | 3 |
| BAE 492 | External Learning Experience | 1-6 |
| BAE 493 | Special Problems in Biological and Agricultural Engineering | 1-6 |
| BAE 495 | Special Topics in Biological and Agricultural Engineering | 1-3 |
| BAE 501 | Sensors and Controls | 3 |
| BAE 502 | Instrumentation for Hydrologic Applications | 3 |
| BAE 525 | Industrial Microbiology and Bioprocessing | 3 |
| BAE 528 | Biomass to Renewable Energy Processes | 3 |
| BAE 535 | Precision Agriculture Technology | 3 |

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| BAE 536 | GIS Applications in Precision Agriculture | 1 |
| BAE 560 | Aerosol Science and Engineering | 3 |
| BAE 561 | Agricultural Air Quality | 3 |
| BAE 572 | Irrigation and Drainage | 3 |
| BAE 573 | Introduction to Hydrologic and Water Quality Modeling | 3 |
| BAE 574 | | 3 |
| BAE 575 | Design of Structural Stormwater Best Management Practices | 3 |
| BAE 576 | | 3 |
| BAE 577 | Wetlands Design and Restoration | 3 |
| BAE 578 | Circular Approach to Manure Management | 3 |
| BAE 580 | Introduction to Land and Water Engineering | 3 |
| BAE 581 | Open Channel Hydraulics for Natural Systems | 3 |
| BAE 582 | Risk and Failure Assessment of Stream Restoration Structures | 1 |
| BAE 583 | Stream Corridor 3 Es: Ecohydraulics, Engineering and Ethics | 3 |
| BAE 584 | Introduction to Fluvial Geomorphology | 3 |
| BAE 585 | | 1 |
| BAE 590 | Special Problems | 1-6 |
| BAE 591 | Master's Research Methods I | 1 |
| BAE 592 | Master's Research Methods II | 1 |
| BAE 593 | Introduction to Research Communications | 1 |
| BBS 325 | Introduction to Brewing Science and Technology | 3 |
| BBS 426 | Upstream Biomanufacturing Laboratory | 2 |
| BBS 526 | Upstream Biomanufacturing Laboratory | 2 |
| BCH 101 | Introduction to Microbiology and Biochemistry Laboratory Practices | 3 |
| BCH 571 | Regulation of Metabolism | 3 |
| BEC 220 | Introduction to Drug Development and Careers in Biomanufacturing | 1 |
| BEC 330 | Principles and Applications of Bioseparations | 2 |
| BEC 363 | | 2 |
| BEC 426 | Upstream Biomanufacturing Laboratory | 2 |
| BEC 436 | Introduction to Downstream Process Development | 2 |
| BEC 440 | | 3 |
| BEC 441 | | 3 |
| BEC 462 | Fundamentals of Bio-Nanotechnology | 3 |
| BEC 463 | Fermentation of Recombinant Microorganisms | 2 |
| BEC 475 | Global Regulatory Affairs for Medical Products | 3 |
| BEC 480 | cGMP Fermentation Operations | 2 |
| BEC 483 | Tissue Engineering Technologies | 2 |
| BEC 485 | cGMP Downstream Operations | 2 |
| BEC 488 | Animal Cell Culture Engineering | 2 |
| BEC 495 | Special Topics in Biomanufacturing | 1-4 |

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| BEC 497 | Biomanufacturing Research Projects | 1-3 |
| BEC 515 | Biopharmaceutical Product Characterization Techniques | 2 |
| BEC 526 | Upstream Biomanufacturing Laboratory | 2 |
| BEC 532 | Foundations of Downstream Processing and Formulation | 2 |
| BEC 536 | Introduction to Downstream Process Development | 2 |
| BEC 540 | | 3 |
| BEC 541 | | 3 |
| BEC 562 | Fundamentals of Bio-Nanotechnology | 3 |
| BEC 563 | Fermentation of Recombinant Microorganisms | 2 |
| BEC 575 | Global Regulatory Affairs for Medical Products | 3 |
| BEC 577 | Advanced Biomanufacturing and Biocatalysis | 3 |
| BEC 580 | cGMP Fermentation Operations | 2 |
| BEC 583 | Tissue Engineering Technologies | 2 |
| BEC 585 | cGMP Downstream Operations | 2 |
| BEC 590 | Industry Practicum in Biomanufacturing | 3 |
| BEC 595 | Special Topics in Biomanufacturing | 1-6 |
| BIO 140 | | 3 |
| BIO 141 | | 1 |
| BIO 165 | | 5 |
| BIO 183 | Introductory Biology: Cellular and Molecular Biology | 4 |
| BIO 227 | Understanding Structural Diversity through Biological Illustration | 3 |
| BIO 230 | The Science of Studying Dinosaurs | 3 |
| BIO 240 | Principles of Human Anatomy & Physiology (A): Nervous, Skeletal, Muscular, & Digestive Systems | 4 |
| BIO 245 | Principles of Human Anatomy & Physiology (B): Endocrine, Cardiovascular, Respiratory & Renal Systems | 4 |
| BIO 267 | Research in the Life Sciences I: Research Skills | 3 |
| BIO 269 | Research in the Life Sciences II: Guided Research | 3 |
| BIO 310 | Quantitative Approaches to Biological Problems | 3 |
| BIO 315 | General Parasitology | 3 |
| BIO 325 | Paleontological Field Methods | 4 |
| 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 416 | Cancer Cell Biology | 3 |
| BIO 418 | Cell Biology Research Lab | 2 |
| BIO 424 | Endocrinology | 3 |
| BIO 432 | Evolutionary Medicine | 3 |

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| BIO 434 | Hormones and Behavior | 3 |
| BIO 440 | The Human Animal: An Evolutionary Perspective | 3 |
| BIO 444 | The Biology of Love and Sex | 3 |
| BIO 481 | Senior Capstone Project | 1 |
| 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 498 | | 3 |
| BIO 499 | | 3 |
| BIO 518 | | 3 |
| BIO 560 | Population Ecology | 3 |
| BIO 570 | Evolutionary Ecology | 3 |
| BIO 572 | Proteomics | 3 |
| BIO 588 | Neurobiology | 3 |
| BIO 592 | Topical Problems | 1-3 |
| BIT 210 | Phage Hunters | 3 |
| BIT 211 | Phage Genomics | 2 |
| BIT 463 | Fermentation of Recombinant Microorganisms | 2 |
| BIT 466 | Animal Cell Culture Techniques | 2 |
| BIT 476 | Applied Bioinformatics | 2 |
| BIT 481 | Plant Tissue Culture and Transformation | 2 |
| BIT 563 | Fermentation of Recombinant Microorganisms | 2 |
| BIT 566 | Animal Cell Culture Techniques | 2 |
| BIT 572 | Proteomics | 3 |
| BMA 560 | Population Ecology | 3 |
| BME 483 | Tissue Engineering Technologies | 2 |
| BME 583 | Tissue Engineering Technologies | 2 |
| BSC 295 | Special Topics in Biological Sciences | 1-6 |
| BSC 492 | Professional Experience | 1-3 |
| BSC 493 | Research Experience | 1-3 |
| BSC 495 | Special Topics in Biological Sciences | 1-6 |
| CE 435 | Engineering Geology | 3 |
| CE 479 | Air Quality | 3 |
| CE 581 | Fluid Mechanics in Natural Environments | 3 |
| CH 100 | Chemistry and Society | 4 |
| CH 101 | Chemistry - A Molecular Science | 3 |
| CH 102 | General Chemistry Laboratory | 1 |
| CH 103 | General Chemistry I for Students in Chemical Sciences | 3 |
| CH 104 | General Chemistry Laboratory I for Students in Chemical Sciences | 1 |
| CH 111 | Preparatory Chemistry | 3 |
| CH 201 | Chemistry - A Quantitative Science | 3 |
| CH 202 | Quantitative Chemistry Laboratory | 1 |
| CH 203 | General Chemistry II for Students in Chemical Sciences | 3 |

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| CH 204 | General Chemistry Laboratory II for Students in Chemical Sciences | 1 |
| CH 220 | Introductory Organic Chemistry | 3 |
| CH 221 | Organic Chemistry I | 3 |
| CH 222 | Organic Chemistry I Lab | 1 |
| CH 223 | Organic Chemistry II | 3 |
| CH 224 | Organic Chemistry II Lab | 1 |
| CH 225 | Organic Chemistry I for Students in Chemical Sciences | 3 |
| CH 226 | Organic Chemistry Laboratory I for Students in Chemical Sciences | 1 |
| CH 227 | Organic Chemistry II for Students in Chemical Sciences | 3 |
| CH 228 | Organic Chemistry Laboratory II for Students in Chemical Sciences | 1 |
| CH 230 | Computational Chemistry Lab I | 1 |
| CH 232 | Computational Chemistry Lab II | 1 |
| CH 295 | Special Topics in Chemistry | 1-3 |
| CH 315 | Quantitative Analysis | 3 |
| CH 316 | Quantitative Analysis Laboratory | 1 |
| CH 331 | Introductory Physical Chemistry | 4 |
| CH 335 | Principles of Green Chemistry | 4 |
| CH 345 | Chemistry and War | 3 |
| CH 401 | Systematic Inorganic Chemistry I | 3 |
| CH 403 | Systematic Inorganic Chemistry II | 3 |
| CH 415 | Analytical Chemistry II | 3 |
| CH 431 | Physical Chemistry I | 3 |
| CH 433 | Physical Chemistry II | 3 |
| CH 435 | Introduction to Quantum Chemistry | 3 |
| CH 437 | Physical Chemistry for Engineers | 4 |
| CH 441 | Forensic Chemistry | 3 |
| CH 442 | Advanced Synthetic Techniques | 4 |
| CH 444 | Advanced Synthetic Techniques II | 4 |
| CH 452 | Advanced Measurement Techniques I | 4 |
| CH 454 | Advanced Measurement Techniques II | 4 |
| CH 463 | Molecular Origins of Life | 3 |
| CH 495 | Special Topics in Chemistry | 1-4 |
| CH 499 | Undergraduate Research in Chemistry | 1-3 |
| CH 563 | Molecular Origins of Life | 3 |
| CH 572 | Proteomics | 3 |
| CHE 462 | Fundamentals of Bio-Nanotechnology | 3 |
| CHE 463 | Fermentation of Recombinant Microorganisms | 2 |
| CHE 488 | Animal Cell Culture Engineering | 2 |
| CHE 562 | Fundamentals of Bio-Nanotechnology | 3 |
| CHE 563 | Fermentation of Recombinant Microorganisms | 2 |

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| CHE 577 | Advanced Biomanufacturing and Biocatalysis | 3 |
| CS 200 | Introduction to Turfgrass Management | 4 |
| CS 210 | Lawns and Sports Turf | 3 |
| CS 211 | Plant Genetics | 3 |
| CS 213 | Crop Science | 3 |
| CS 214 | Crop Science Laboratory | 1 |
| CS 216 | Southern Row Crop Production - Cotton, Peanuts, and Tobacco | 3 |
| CS 218 | Southern Row Crop Production - Corn, Small Grains and Soybeans | 3 |
| CS 224 | Seeds, Biotechnology and Societies | 3 |
| CS 230 | Introduction to Agroecology | 3 |
| CS 312 | | 3 |
| CS 400 | Turf Cultural Systems | 3 |
| CS 410 | Community Food Systems | 3 |
| CS 411 | Crop Ecology | 3 |
| CS 413 | Plant Breeding | 2 |
| CS 414 | Weed Science | 4 |
| CS 415 | Integrated Pest Management | 3 |
| CS 418 | Introduction to Regulatory Science in Agriculture | 3 |
| CS 424 | Seed Physiology | 3 |
| CS 430 | Advanced Agroecology | 4 |
| CS 465 | Turf Management Systems and Environmental Quality | 3 |
| CS 470 | Advanced Turfgrass Pest Management | 2 |
| CS 480 | Sustainable Food Production (capstone) | 1 |
| CS 502 | Plant Disease: Methods & Diagnosis | 2 |
| CS 518 | Introduction to Regulatory Science in Agriculture | 3 |
| CS 524 | Seed Physiology | 3 |
| CS 541 | Plant Breeding Methods | 3 |
| CS 565 | Turf Management Systems and Environmental Quality | 3 |
| CS 590 | Special Topics | 1-6 |
| CS 591 | | 1-6 |
| CSSC 290 | Professional Development in Crop & Soil Sciences | 1 |
| CSSC 490 | Senior Seminar in Crop Science and Soil Science | 1 |
| CSSC 492 | Professional Internship Experience in Crop and Soil Sciences | 1-3 |
| CSSC 493 | Research Experience in Crop and Soil Sciences | 1-3 |
| CSSC 495 | Special Topics in Crop and Soil Sciences | 1-6 |
| ECE 488 | Systems Biology Modeling of Plant Regulation | 3 |
| ECE 489 | Solid State Solar and Thermal Energy Harvesting | 3 |
| ECE 588 | Systems Biology Modeling of Plant Regulation | 3 |
| ECE 589 | Solid State Solar and Thermal Energy Harvesting | 3 |
| ECI 424 | Student Teaching in Modern Foreign Languages | 12 |
| ENT 201 | Insects and People | 3 |
| ENT 203 | An Introduction to the Honey Bee and Beekeeping | 3 |
| ENT 207 | Insects and Human Disease | 3 |

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| ENT 212 | Basic Entomology | 1 |
| ENT 305 | Introduction to Forensic Entomology | 3 |
| ENT 401 | Honey Bee Biology and Management | 3 |
| ENT 402 | Forest Entomology | 3 |
| ENT 425 | General Entomology | 3 |
| ENT 470 | Advanced Turfgrass Pest Management | 2 |
| ENT 492 | External Learning Experience | 1-6 |
| ENT 493 | Special Problems in Entomology | 1-6 |
| ENT 495 | Special Topics in Entomology | 1-3 |
| ENT 502 | Insect Diversity | 4 |
| ENT 503 | Insect Morphology and Physiology | 3 |
| ENT 504 | Professional Development for Agriculture and the Life Sciences | 2 |
| ENT 506 | Principles of Genetic Pest Management | 3 |
| ENT 509 | Ecology and Conservation of Freshwater Invertebrates | 3 |
| ENT 510 | Writing Proposals in Agriculture, Biology, and Ecology | 2 |
| ENT 520 | Insect Behavior | 3 |
| ENT 526 | Organic Agriculture: Principles and Practices | 3 |
| ENT 550 | Fundamentals of Arthropod Management | 3 |
| ENT 560 | | 3 |
| ENT 582 | Medical and Veterinary Entomology | 3 |
| ENT 591 | Special Topics In Entomology | 1-6 |
| ES 100 | Introduction to Environmental Sciences | 3 |
| ES 111 | Applications of Environmental Sciences | 1 |
| ES 113 | Earth from Space | 3 |
| ES 150 | Water and the Environment | 3 |
| ES 200 | Climate Change and Sustainability | 3 |
| ES 295 | Special Topics in Environmental Science | 1-4 |
| ES 300 | Energy and Environment | 3 |
| ES 400 | Analysis of Environmental Issues | 3 |
| ES 449 | Human Dimensions of Natural Resources in Australia/New Zealand | 3 |
| ES 450 | Sustaining Natural Resources in Australia/New Zealand | 3 |
| ES 495 | Special Topics in Environmental Science | 1-6 |
| ES 496 | Environmental Science Internship | 1-3 |
| ES 497 | Professional Development in Environmental Science | 1-3 |
| ES 498 | Research in Environmental Science | 1-3 |
| ES 499 | Thesis in Environmental Science | 3 |
| ET 105 | Introduction to Environmental Regulations | 1 |
| ET 120 | Introduction to Renewable Energy Technologies and Assessments | 3 |
| ET 201 | Environmental Technology Laboratory I | 1 |
| ET 202 | Environmental Technology Laboratory II | 1 |

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| ET 203 | Pollution Prevention | 1 |
| ET 220 | Solar Photovoltaics Assessment | 3 |
| ET 255 | Hydro, Wind, and Bioenergy Assessment | 3 |
| ET 262 | Renewable Energy Adoption: Barriers and Incentives | 3 |
| ET 293 | Independent Study in Environmental Technology & Management | 1-6 |
| ET 294 | Independent Study in Environmental Technology & Management | 1-6 |
| ET 295 | Special Topics in Environmental Technology & Management | 1-6 |
| ET 301 | Environmental Technology Laboratory III | 1 |
| ET 302 | Environmental Technology Laboratory IV | 1 |
| ET 303 | Laboratory Safety Systems and Management | 1 |
| ET 310 | Environmental Monitoring and Analysis | 3 |
| ET 320 | Fundamentals of Air Pollution | 3 |
| ET 330 | Environmental Technology Practicum | 3 |
| ET 401 | Environmental Technology Laboratory V | 1 |
| ET 455 | Adaptive Management and Governance | 3 |
| ET 460 | Practice of Environmental Technology | 3 |
| ET 493 | Independent Study in Environmental Technology & Management | 1-6 |
| ET 494 | Independent Study in Environmental Technology & Management | 1-6 |
| ET 495 | Special Topics in Environmental Technology & Management | 1-6 |
| FM 425 | Feed Manufacturing Technology | 3 |
| FM 426 | Feed Manufacturing Technology Laboratory | 1 |
| FM 525 | Feed Manufacturing Technology | 3 |
| FM 580 | Feed and Ingrdient Quality Assurance | 3 |
| FOR 150 | Critical Thinking and Data Analysis | 2 |
| FOR 172 | Forest System Mapping and Mensuration I | 2 |
| FOR 204 | Silviculture | 2 |
| FOR 248 | Forest History, Technology and Society | 3 |
| FOR 250 | Professional Development II: Communications in Natural Resources | 1 |
| FOR 252 | Introduction to Forest Science | 3 |
| FOR 260 | Forest Ecology | 4 |
| FOR 261 | Forest Communities | 2 |
| FOR 264 | Forest Wildlife | 1 |
| FOR 265 | Fire Management | 1 |
| FOR 273 | Forest System Mapping and Mensuration II | 3 |
| FOR 293 | Independent Study in Forest Management | 1-6 |
| FOR 294 | Independent Study in Forest Management | 1-6 |
| FOR 295 | Special Topics in Forestry | 1-6 |
| FOR 303 | Silvics and Forest Tree Physiology | 3 |
| FOR 304 | Theory of Silviculture | 4 |
| FOR 318 | Forest Pathology | 3 |

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| FOR 319 | Forest Economics | 3 |
| FOR 330 | North Carolina Forests | 3 |
| FOR 334 | Operations Research Applications in Natural Resources | 1 |
| FOR 339 | | 4 |
| FOR 350 | Professional Development III: Ethical Dilemmas in Natural Resource Management | 1 |
| FOR 353 | GIS and Remote Sensing for Environmental Analysis and Assessment | 3 |
| FOR 374 | Forest Measurement, Modeling, and Inventory | 3 |
| FOR 402 | Forest Entomology | 3 |
| FOR 405 | Forest Management | 4 |
| FOR 406 | Forest Inventory, Analysis and Planning | 4 |
| FOR 408 | Applied Forest Ecology: Natural Forest Silviculture | 3 |
| FOR 411 | Forest Tree Genetics and Biology | 3 |
| FOR 414 | World Forestry | 3 |
| FOR 415 | World Forestry Study Tour | 1 |
| FOR 420 | Watershed and Wetlands Hydrology | 4 |
| FOR 422 | Consulting Forestry | 3 |
| FOR 430 | Forest Health and Protection | 3 |
| FOR 434 | Forest Operations and Analysis | 3 |
| FOR 472 | Forest Soils | 4 |
| FOR 491 | Special Topics in Forestry and Related Natural Resources | 1-4 |
| FOR 493 | Independent Study in Forest Management | 1-6 |
| FOR 494 | Independent Study in Forest Management | 1-6 |
| FOR 501 | Dendrology | 3 |
| FOR 502 | Forest Measurements | 1 |
| FOR 503 | | 1 |
| FOR 504 | The Practice of Silviculture | 3 |
| FOR 505 | Forest Management | 4 |
| FOR 506 | Silviculture Laboratory | 1 |
| FOR 507 | Silviculture Mini Course | 1 |
| FOR 508 | Applied Forest Ecology: Natural Forest Silviculture | 3 |
| FOR 509 | Forest Resource Policy | 1 |
| FOR 510 | Introduction to GPS | 1 |
| FOR 513 | Silviculture for Intensively Managed Plantations | 3 |
| FOR 514 | Woodland Stewardship | 3 |
| FOR 519 | Forest Economics | 3 |
| FOR 520 | Watershed and Wetlands Hydrology | 4 |
| FOR 522 | Consulting Forestry | 3 |
| FOR 531 | Wildland Fire Science | 3 |
| FOR 532 | Wildland Firefighter | 3 |
| FOR 534 | Forest Operations and Analysis | 3 |
| FOR 540 | Advanced Dendrology | 3 |
| FOR 561 | Forest Communities of the Southeastern Coastal Plain | 1 |
| FOR 562 | Forest Communities of the Southern Appalachians | 1 |

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| FOR 565 | Plant Community Ecology | 4 |
| FOR 574 | Forest Mensuration and Modeling | 3 |
| FOR 575 | Advanced Terrestrial Ecosystem Ecology | 3 |
| FOR 583 | Tropical Forestry | 3 |
| FOR 595 | Special Topics | 1-6 |
| FS 201 | Introduction to Food Science | 3 |
| FS 231 | Principles of Food and Bioprocess Engineering | 4 |
| FS 250 | Basics of Food Safety & Quality | 3 |
| FS 290 | Careers in Food and Bioprocessing Sciences | 1 |
| FS 295 | Special Topics in Food Science | 1-4 |
| FS 301 | Introduction to Human Nutrition | 3 |
| FS 322 | Muscle Foods and Eggs | 3 |
| FS 324 | Milk and Dairy Products | 3 |
| FS 325 | Introduction to Brewing Science and Technology | 3 |
| FS 330 | Science of Food Preparation | 3 |
| FS 352 | Introduction to Microbiological Food Safety Hazards | 3 |
| FS 354 | Food Sanitation | 3 |
| FS 401 | Advanced Nutrition and Metabolism | 3 |
| FS 402 | Chemistry of Food and Bioprocessed Materials | 4 |
| FS 403 | Analytical Techniques in Food & Bioprocessing Science | 4 |
| FS 405 | Food Microbiology | 3 |
| FS 406 | Food Microbiology Lab | 1 |
| FS 416 | Quality Control in Food and Bioprocessing | 3 |
| FS 421 | Food Preservation | 3 |
| FS 426 | Upstream Biomanufacturing Laboratory | 2 |
| FS 435 | Food Safety Management Systems | 3 |
| FS 453 | Food Laws and Regulations | 3 |
| FS 462 | Postharvest Physiology | 3 |
| FS 471 | Professionalism & Project Preparation in Food & Bioprocessing Science | 1 |
| FS 475 | Problems and Design in Food and Bioprocessing Science | 3 |
| FS 481 | Research Experience in Food and Bioprocessing Sciences | 3 |
| FS 492 | Professional Internship Experience in Food Science | 1-6 |
| FS 493 | Research Experience in Food Science | 1-6 |
| FS 495 | Special Topics in Food Science | 1-3 |
| FS 501 | Advanced Nutrition and Metabolism | 3 |
| FS 502 | Chemistry of Food and Bioprocessed Materials | 4 |
| FS 505 | Food Microbiology | 3 |
| FS 506 | Food Microbiology Lab | 1 |
| FS 516 | Quality Control in Food and Bioprocessing | 3 |
| FS 520 | Pre-Harvest Food Safety | 3 |
| FS 521 | Food Preservation | 3 |

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| FS 522 | Food Packaging | 3 |
| FS 526 | Upstream Biomanufacturing Laboratory | 2 |
| FS 530 | Post-Harvest Food Safety | 3 |
| FS 535 | Food Safety Management Systems | 3 |
| FS 540 | Food Safety and Public Health | 3 |
| FS 550 | Food Industry Study Tour | 2 |
| FS 553 | Food Laws and Regulations | 3 |
| FS 554 | Lactation, Milk, and Nutrition | 3 |
| FS 555 | Exercise Nutrition | 3 |
| FS 557 | Nutraceuticals and Functional Foods | 3 |
| FS 562 | Postharvest Physiology | 3 |
| FS 567 | Sensory Analysis of Foods | 3 |
| FS 580 | Professional Development and Ethics in Food Safety | 1 |
| FS 591 | Special Problems In Food Science | 1-6 |
| FS 592 | Special Research Projects in Food Science | 1-6 |
| FSA 520 | Pre-Harvest Food Safety | 3 |
| FSA 530 | Post-Harvest Food Safety | 3 |
| FSA 540 | Food Safety and Public Health | 3 |
| FSA 580 | Professional Development and Ethics in Food Safety | 1 |
| FW 221 | Conservation of Natural Resources | 3 |
| FW 293 | Independent Study in Fisheries, Wildlife, and Conservation Biology | 1-6 |
| FW 294 | Independent Study in Fisheries, Wildlife, and Conservation Biology | 1-6 |
| FW 311 | Piedmont Wildlife Ecology and Management | 3 |
| FW 312 | Fisheries Techniques and Management | 1 |
| FW 313 | Mountain Wildlife Ecology and Management | 1 |
| FW 314 | Coastal Ecology and Management | 1 |
| FW 333 | Conservation Biology in Practice | 3 |
| FW 353 | Wildlife Management | 3 |
| FW 373 | Vertebrate Natural History | 3 |
| FW 403 | Urban Wildlife Management | 3 |
| FW 404 | Wildlife Habitat Management | 3 |
| FW 405 | Tropical Wildlife Ecology | 3 |
| FW 411 | Human Dimensions of Wildlife and Fisheries | 3 |
| FW 415 | Professional Development in Fisheries, Wildlife, and Conservation Biology | 1 |
| FW 444 | Mammalogy | 3 |
| FW 445 | Human Dimensions of Conservation Biology in the Bahamas | 3 |
| FW 453 | Principles of Wildlife Science | 4 |
| FW 460 | International Wildlife Management and Conservation | 3 |
| FW 465 | African Ecology and Conservation | 4 |
| FW 492 | External Learning Experience | 1-6 |

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| FW 493 | Independent Study in Fisheries, Wildlife, and Conservation Biology | 1-6 |
| FW 494 | Independent Study in Fisheries, Wildlife, and Conservation Biology | 1-6 |
| FW 495 | Special Topics in Fisheries and Wildlife Science | 1-3 |
| FW 511 | Human Dimensions of Wildlife and Fisheries | 3 |
| FW 515 | Fish Physiology | 3 |
| FW 544 | Mammalogy | 3 |
| FW 553 | Principles of Wildlife Science | 3 |
| FW 560 | International Wildlife Management and Conservation | 3 |
| FW 565 | African Ecology and Conservation | 4 |
| FW 586 | | 3 |
| FW 587 | | 1 |
| FW 595 | Special Topics in Fisheries and Wildlife Sciences | 1-6 |
| GES 506 | Principles of Genetic Pest Management | 3 |
| GIS 512 | Introduction to Environmental Remote Sensing | 3 |
| GIS 515 | Cartographic Design | 2 |
| GIS 530 | Spatial Data Foundations | 3 |
| GIS 550 | Geospatial Data Structures and Web Services | 3 |
| GIS 582 | Geospatial Modeling | 3 |
| GN 301 | Genetics in Human Affairs | 3 |
| GN 311 | Principles of Genetics | 4 |
| GN 312 | Elementary Genetics Laboratory | 1 |
| GN 421 | Molecular Genetics | 3 |
| GN 423 | Population, Quantitative and Evolutionary Genetics | 3 |
| GN 425 | Advanced Genetics Laboratory | 2 |
| GN 427 | Introductory Bioinformatics | 3 |
| GN 428 | Introduction to Machine Learning in Biology | 3 |
| GN 434 | Genes and Development | 3 |
| GN 441 | Human and Biomedical Genetics | 3 |
| GN 451 | Genome Science | 3 |
| GN 453 | Personal Genomics | 3 |
| GN 456 | Epigenetics, Development, and Disease | 3 |
| GN 461 | Advanced Bioinformatics | 3 |
| GN 490 | Genetics Colloquium | 1 |
| GN 496 | Genetics Research Experience | 3 |
| GN 497 | Genetics Teaching Experience | 3 |
| GN 521 | Molecular Genetics | 3 |
| GN 541 | Human and Biomedical Genetics | 3 |
| HS 131 | Fruit & Vegetable Production | 3 |
| HS 144 | Weeds & Diseases of Ornamentals | 3 |
| HS 200 | Home Horticulture | 3 |
| HS 201 | The World of Horticulture: Principles and Practices | 3 |
| HS 202 | Home Plant Identification | 3 |
| HS 203 | Home Plant Propagation | 3 |
| HS 204 | Home Landscape Maintenance | 3 |
| HS 205 | Home Food Production | 3 |

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| HS 215 | Agricultural Genetics | 3 |
| HS 242 | Introduction to Small Scale Landscape Design | 3 |
| HS 250 | Home Landscape Design: Creating Garden Spaces | 3 |
| HS 252 | Landscape Graphic Communication | 2 |
| HS 272 | Landscape Design/Build | 6 |
| HS 280 | Hands-On-Horticulture | 3 |
| HS 290 | Horticulture: Careers and Opportunities | 1 |
| HS 301 | Plant Propagation | 4 |
| HS 302 | Gardening with Herbaceous Perennials | 3 |
| HS 303 | Ornamental Plant Identification I | 3 |
| HS 304 | Ornamental Plant Identification II | 3 |
| HS 357 | Landscape Grading and Drainage | 4 |
| HS 400 | Residential Landscaping | 6 |
| HS 410 | Community Food Systems | 3 |
| HS 411 | Nursery Management | 3 |
| HS 416 | Planting Design | 4 |
| HS 418 | Digital Media Graphic for Landscape Designers | 3 |
| HS 420 | Green Infrastructure | 3 |
| HS 421 | Temperate-Zone Tree Fruits: Physiology and Culture | 3 |
| HS 422 | Small Fruit Production | 3 |
| HS 423 | | 3 |
| HS 428 | Soil Management Principles for Sustainable Agriculture | 1 |
| HS 431 | Vegetable Production | 4 |
| HS 432 | Introduction to Permaculture | 3 |
| HS 433 | Public Garden Administration | 3 |
| HS 440 | Greenhouse Management | 3 |
| HS 442 | Floriculture Crop Production | 3 |
| HS 451 | Plant Nutrition | 3 |
| HS 462 | Postharvest Physiology | 3 |
| HS 471 | Landscape Ecosystem Management | 4 |
| HS 475 | | 3 |
| HS 476 | Crop Physiology and Production in Controlled Environments | 3 |
| HS 480 | Sustainable Food Production (capstone) | 1 |
| HS 491 | Sustainable Agriculture Entrepreneurship Study Abroad | 3 |
| HS 492 | Horticulture Internship | 1-3 |
| HS 493 | Research Experience in Horticultural Science | 1-3 |
| HS 494 | Teaching Experience in Horticultural Science | 1-3 |
| HS 495 | Experimental Courses in Horticultural Science | 1-6 |
| HS 502 | Plant Disease: Methods & Diagnosis | 2 |
| HS 516 | Planting Design | 4 |
| HS 520 | Green Infrastructure | 3 |
| HS 521 | Temperate-Zone Tree Fruits: Physiology and Culture | 3 |
| HS 523 | | 3 |
| HS 532 | Introduction to Permaculture | 3 |
| HS 533 | Public Garden Administration | 3 |
| HS 541 | Plant Breeding Methods | 3 |

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| HS 550 | Environmental Nursery Production | 3 |
| HS 551 | Plant Nutrition | 3 |
| HS 562 | Postharvest Physiology | 3 |
| HS 576 | Crop Physiology and Production in Controlled Environments | 3 |
| HS 583 | | 3 |
| HS 590 | Special Problems in Horticultural Science | 1-6 |
| IDS 303 | Humans and the Environment | 3 |
| MA 315 | Mathematics Methods in Atmospheric Sciences | 4 |
| MA 555 | Introduction to Manifold Theory | 3 |
| MB 101 | Introduction to Microbiology and Biochemistry Laboratory Practices | 3 |
| MB 103 | Introductory Topics in Microbiology | 1 |
| MB 180 | Introduction to Microbial Bioprocessing | 3 |
| MB 200 | The Fourth Horseman: Plagues that Changed the World | 3 |
| MB 210 | Phage Hunters | 3 |
| MB 211 | Phage Genomics | 2 |
| MB 351 | General Microbiology | 3 |
| MB 352 | General Microbiology Laboratory | 1 |
| MB 354 | Inquiry-Guided Microbiology Lab | 1 |
| MB 360 | Scientific Inquiry in Microbiology: At the Bench | 3 |
| MB 405 | Food Microbiology | 3 |
| MB 406 | Food Microbiology Lab | 1 |
| MB 411 | Medical Microbiology | 3 |
| MB 412 | Medical Microbiology Laboratory | 1 |
| MB 414 | Microbial Metabolic Regulation | 3 |
| MB 420 | Fundamentals of Microbial Cell Biotransformations | 2 |
| MB 435 | Bacterial Pathogenesis | 3 |
| MB 441 | Immunology | 3 |
| MB 451 | Microbial Diversity | 3 |
| MB 452 | Microbial Diversity Lab | 2 |
| MB 455 | Microbial Biotechnology | 3 |
| MB 461 | Molecular Virology | 3 |
| MB 470 | Emerging and Re-emerging Infectious Diseases | 3 |
| MB 480 | Current Issues in Microbiology | 1 |
| MB 492 | External Learning Experience | 1-6 |
| MB 501 | Biology of Plant Pathogens | 3 |
| MB 505 | Food Microbiology | 3 |
| MB 506 | Food Microbiology Lab | 1 |
| MB 520 | Fundamentals of Microbial Cell Biotransformations | 2 |
| MB 532 | Soil Microbiology | 4 |
| MB 535 | Bacterial Pathogenesis | 3 |
| MB 555 | Microbial Biotechnology | 3 |
| MB 575 | Introduction to Mycology | 4 |
| MB 585 | Industry Case Studies in Microbial Biotechnology | 3 |
| MB 590 | Topical Problems | 1-3 |
| MEA 100 | Earth System Science: Exploring the Connections | 4 |
| MEA 101 | Geology I: Physical | 3 |
| MEA 110 | Geology I Laboratory | 1 |

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| MEA 130 | Introduction to Weather and Climate | 3 |
| MEA 135 | Introduction to Weather and Climate Laboratory | 1 |
| MEA 150 | Environmental Issues in Water Resources | 4 |
| MEA 200 | Introduction to Oceanography | 3 |
| MEA 202 | Geology II: Historical | 3 |
| MEA 210 | Oceanography Lab | 1 |
| MEA 211 | Geology II Laboratory | 1 |
| MEA 215 | Introduction to Atmospheric Sciences | 4 |
| MEA 217 | Introduction to Computing in the Geosciences | 3 |
| MEA 220 | Marine Biology | 3 |
| MEA 240 | The Planets of Our Solar System | 3 |
| MEA 250 | Introduction to Coastal Environments | 3 |
| MEA 251 | Introduction to Coastal Environments Laboratory | 1 |
| MEA 252 | Biology of Marine Mammals | 3 |
| MEA 300 | Environmental Geology | 4 |
| MEA 312 | Atmospheric Thermodynamics | 4 |
| MEA 315 | Mathematics Methods in Atmospheric Sciences | 4 |
| MEA 320 | Fundamentals of Air Pollution | 3 |
| MEA 321 | Fundamentals of Air Quality and Climate Change | 3 |
| MEA 323 | Geochemistry of Natural Waters | 3 |
| MEA 350 | Marine Conservation Biology | 3 |
| MEA 369 | Life on Earth: Principles of Paleontology | 3 |
| MEA 409 | Watershed Forensics | 3 |
| MEA 410 | Introduction to Mineralogy | 4 |
| MEA 411 | Marine Sediment Transport | 3 |
| MEA 412 | Atmospheric Physics | 3 |
| MEA 415 | Climate Dynamics | 3 |
| MEA 421 | Atmospheric Dynamics I | 3 |
| MEA 422 | Atmospheric Dynamics II | 3 |
| MEA 425 | Introduction to Atmospheric Chemistry | 3 |
| MEA 440 | Igneous and Metamorphic Petrology | 4 |
| MEA 443 | Synoptic Weather Analysis and Forecasting | 4 |
| MEA 444 | Mesoscale Analysis and Forecasting | 4 |
| MEA 449 | Principles of Biological Oceanography | 3 |
| MEA 450 | Introductory Sedimentology and Stratigraphy | 4 |
| MEA 451 | Structural Geology | 4 |
| MEA 454 | Marine Physical-Biological Interactions | 3 |
| MEA 455 | Micrometeorology | 3 |
| MEA 458 | Introduction to Tropical Meteorology | 3 |
| MEA 459 | Field Investigation of Coastal Processes | 5 |
| MEA 460 | Principles of Physical Oceanography | 3 |
| MEA 462 | Observational Methods and Data Analysis in Marine Physics | 3 |
| MEA 463 | Fluid Physics | 3 |
| MEA 464 | Ocean Circulation Systems | 3 |
| MEA 465 | Geologic Field Camp | 4 |

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| MEA 466 | Preparatory Course for Field Camp | 1 |
| MEA 467 | Marine Meteorology | 3 |
| MEA 469 | Ecology of Coastal Resources | 3 |
| MEA 470 | Introduction to Geophysics | 3 |
| MEA 471 | Exploration and Engineering Geophysics | 3 |
| MEA 473 | Principles of Chemical Oceanography | 3 |
| MEA 476 | Worldwide River and Delta Systems: Their Evolution and Human Impacts | 3 |
| MEA 479 | Air Quality | 3 |
| MEA 481 | Geomorphology: Earth's Dynamic Surface | 3 |
| MEA 485 | Introduction to Hydrogeology | 3 |
| MEA 488 | Meteorology for Media | 3 |
| MEA 493 | Special Topics in MEAS | 1-6 |
| MEA 495 | Junior Seminar in the Marine, Earth, and Atmospheric Sciences | 1 |
| MEA 498 | Internship in MEAS | 1-6 |
| MEA 507 | Discipline-based Education Research in the Geosciences | 3 |
| MEA 510 | Air Pollution Meteorology | 3 |
| MEA 511 | Introduction to Meteorological Remote Sensing | 3 |
| MEA 514 | Advanced Physical Meteorology | 3 |
| MEA 515 | Climate Dynamics | 3 |
| MEA 517 | Fundamentals of Climate Change Science | 3 |
| MEA 518 | Adaptation to Climate Change | 3 |
| MEA 519 | Barriers to Climate Change Literacy | 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 |
| MEA 554 | Marine Physical-Biological Interactions | 3 |
| MEA 562 | Marine Sediment Transport | 3 |
| MEA 570 | Geological Oceanography | 3 |
| MEA 573 | Principles of Chemical Oceanography | 3 |
| MEA 574 | Advanced Igneous Petrology | 3 |
| MEA 577 | Electron Microprobe Analysis of Geologic Material | 2 |
| MEA 579 | Principles of Air Quality Engineering | 3 |
| MEA 580 | Air Quality Modeling and Forecasting | 4 |
| MEA 581 | Fluid Mechanics in Natural Environments | 3 |
| MEA 582 | Geospatial Modeling | 3 |
| MEA 585 | Physical Hydrogeology | 3 |
| MEA 591 | Special Topics in Marine Science | 1-6 |
| MEA 592 | Special Topics in Earth Sciences | 1-6 |
| MEA 593 | Special Topics in Atmospheric Science | 1-6 |
| MEA 599 | Regional Geology of North America | 1-6 |
| MSE 489 | Solid State Solar and Thermal Energy Harvesting | 3 |

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| 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 |
| NR 219 | Natural Resource Markets | 3 |
| NR 293 | Independent Study in Natural Resources | 1-6 |
| NR 294 | Independent Study in Natural Resources | 1-6 |
| NR 295 | Special Topics in Natural Resources | 1-3 |
| NR 300 | Natural Resource Measurements | 4 |
| NR 301 | Practicum for Professional Development I | 1 |
| NR 303 | Humans and the Environment | 3 |
| NR 350 | International Sustainable Resource Use | 4 |
| NR 360 | Internship Experience | 3 |
| NR 400 | Natural Resource Management | 4 |
| NR 406 | Conservation of Biological Diversity | 3 |
| 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 491 | Special Topics in Forestry and Related Natural Resources | 1-4 |
| NR 493 | Independent Study in Natural Resources | 1-6 |
| NR 500 | Natural Resource Management | 4 |
| NR 494 | Independent Study in Natural Resources | 1-6 |
| NR 510 | Military Land Sustainability | 3 |
| NR 511 | Managing Natural Resources in an Arena of Conflict | 3 |
| NR 512 | Land Use Policy & Management | 3 |
| NR 520 | Watershed and Wetlands Hydrology | 4 |
| NR 521 | Wetland Science and Management | 3 |
| NR 548 | Historical Environments | 3 |
| NR 554 | Introduction to Data Analysis in Natural Resources | 3 |
| NR 560 | Renewable Natural Resource Management and Policy | 3 |
| NR 571 | Current Issues in Natural Resource Policy | 3 |
| NR 595 | Special Topics in Natural Resources | 1-6 |
| NTR 210 | Introduction to Community Food Security | 3 |
| NTR 220 | Food and Culture | 3 |
| NTR 301 | Introduction to Human Nutrition | 3 |
| NTR 302 | Introduction to Nutrition Research, Communication, and Careers | 3 |
| NTR 320 | | 3 |
| NTR 330 | Public Health Nutrition | 3 |
| NTR 401 | Advanced Nutrition and Metabolism | 3 |
| NTR 410 | Maternal and Infant Nutrition | 3 |
| NTR 415 | Comparative Nutrition | 3 |
| NTR 419 | Human Nutrition and Chronic Disease | 3 |
| NTR 420 | | 3 |

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| NTR 421 | | 3 |
| NTR 425 | Feed Manufacturing Technology | 3 |
| NTR 454 | Lactation, Milk and Nutrition | 3 |
| NTR 490 | Senior Capstone Experience in Nutrition | 4 |
| NTR 492 | Professional Internship Experience in Nutrition Science | 1-3 |
| NTR 493 | Research Experience in Nutrition Science | 1-3 |
| NTR 495 | Special Topics in Nutrition | 1-6 |
| NTR 500 | Principles of Human Nutrition | 3 |
| NTR 501 | Advanced Nutrition and Metabolism | 3 |
| NTR 510 | Maternal and Infant Nutrition | 3 |
| NTR 515 | Comparative Nutrition | 3 |
| NTR 521 | | 3 |
| NTR 525 | Feed Manufacturing Technology | 3 |
| NTR 550 | Applied Ruminant Nutrition | 3 |
| NTR 554 | Lactation, Milk, and Nutrition | 3 |
| NTR 555 | Exercise Nutrition | 3 |
| NTR 557 | Nutraceuticals and Functional Foods | 3 |
| NTR 561 | Equine Nutrition | 3 |
| NTR 594 | Special Topics in Nutrition | 1-6 |
| PB 103 | Perspectives on Botany | 1 |
| PB 200 | Plant Life | 4 |
| PB 205 | Our Green World | 3 |
| PB 208 | Agricultural Biotechnology: Issues and Implications | 3 |
| 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 250 | Plant Biology | 4 |
| PB 277 | Space Biology | 3 |
| PB 295 | Special Topics in Botany | 1-4 |
| PB 321 | Introduction to Whole Plant Physiology | 3 |
| PB 325 | Culinary Botany | 3 |
| PB 345 | Economic Botany | 3 |
| 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 492 | External Learning Experience | 1-6 |
| PB 493 | Plant Biology Supervised Undergraduate Research Experience | 1-6 |
| PB 495 | Special Topics in Plant Biology | 1-6 |
| 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 |

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| PB 595 | Special Topics in Plant Biology | 1-6 |
| PHY 452 | | 3 |
| PHY 524 | Comparative Endocrinology | 3 |
| PHY 552 | | 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 212 | Poultry and People | 3 |
| PO 215 | Applied Avian and Aquaculture Nutrition | 3 |
| 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 404 | Avian Anatomy and Physiology | 4 |
| PO 406 | Physiological Aspects of Poultry Management | 3 |
| PO 407 | Physiological Aspects of Poultry Management Laboratory | 1 |
| PO 410 | Production and Management of Game Birds in Confinement | 3 |
| PO 411 | Agrosecurity | 3 |
| PO 412 | Emerging Topics in Poultry Science | 3 |
| PO 415 | Comparative Nutrition | 3 |
| PO 421 | Commercial Egg Production | 3 |
| PO 424 | Poultry Meat Production | 3 |
| PO 425 | Feed Manufacturing Technology | 3 |
| PO 426 | Feed Manufacturing Technology Laboratory | 1 |
| PO 433 | Poultry Processing and Products | 3 |
| PO 435 | Poultry Incubation & Breeding | 4 |
| PO 466 | Animal Cell Culture Techniques | 2 |
| PO 492 | External Learning Experience | 1-6 |
| PO 493 | Special Problems in Poultry Science | 1-6 |
| PO 495 | Special Topics in Poultry Science | 1-3 |
| PO 504 | Avian Anatomy and Physiology | 4 |
| PO 506 | Physiological Aspects of Poultry Management | 3 |
| PO 510 | Poultry Product Safety | 3 |
| PO 515 | Comparative Nutrition | 3 |
| PO 524 | Comparative Endocrinology | 3 |
| PO 525 | Feed Manufacturing Technology | 3 |
| PO 533 | Poultry Processing and Products | 3 |
| PO 566 | Animal Cell Culture Techniques | 2 |
| PO 580 | Feed and Ingrdient Quality Assurance | 3 |
| PO 590 | Special Problems in Poultry Science | 1-6 |
| PP 144 | Weeds & Diseases of Ornamentals | 3 |
| PP 222 | Kingdom of Fungi | 3 |
| PP 318 | Forest Pathology | 3 |
| PP 470 | Advanced Turfgrass Pest Management | 2 |

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| PP 501 | Biology of Plant Pathogens | 3 |
| PP 502 | Plant Disease: Methods & Diagnosis | 2 |
| PP 575 | Introduction to Mycology | 4 |
| PRT 449 | Human Dimensions of Natural Resources in Australia/New Zealand | 3 |
| PRT 450 | Sustaining Natural Resources in Australia/New Zealand | 3 |
| PSE 335 | Principles of Green Chemistry | 4 |
| PY 123 | Stellar and Galactic Astronomy | 3 |
| PY 124 | Solar System Astronomy | 3 |
| PY 125 | Astronomy Laboratory | 1 |
| PY 131 | Conceptual Physics | 4 |
| PY 201 | University Physics I | 4 |
| PY 202 | University Physics II | 4 |
| PY 203 | University Physics III | 4 |
| PY 205 | Physics for Engineers and Scientists I | 3 |
| PY 206 | Physics for Engineers and Scientists I Laboratory | 1 |
| PY 208 | Physics for Engineers and Scientists II | 3 |
| PY 209 | Physics for Engineers and Scientists II Laboratory | 1 |
| PY 211 | College Physics I | 4 |
| PY 212 | College Physics II | 4 |
| PY 251 | Introduction to Scientific Computing | 3 |
| PY 252 | Instrumental and Data Analysis for Physics | 2 |
| PY 299 | Special Problems in Physics | 1-3 |
| PY 301 | Introduction to Quantum Mechanics | 3 |
| PY 328 | Stellar and Galactic Astrophysics | 3 |
| PY 341 | Relativity, Gravitation and Cosmology | 3 |
| PY 401 | Quantum Physics I | 3 |
| PY 402 | Quantum Physics II | 3 |
| PY 407 | Introduction to Modern Physics | 3 |
| PY 411 | Mechanics I | 3 |
| PY 412 | Mechanics II | 3 |
| PY 413 | Thermal Physics | 3 |
| PY 414 | Electromagnetism I | 3 |
| PY 415 | Electromagnetism II | 3 |
| PY 452 | Advanced Physics Laboratory | 3 |
| PY 489 | Solid State Solar and Thermal Energy Harvesting | 3 |
| PY 495 | Special Topics in Physics | 1-4 |
| PY 499 | Independent Research in Physics | 1-6 |
| PY 501 | Quantum Physics I | 3 |
| PY 502 | Quantum Physics II | 3 |
| PY 506 | Nuclear and Subatomic Physics | 3 |
| PY 507 | Elementary Particle Physics | 3 |
| PY 509 | General Relativity | 3 |
| PY 511 | Mechanics I | 3 |
| PY 512 | Mechanics II | 3 |
| PY 514 | Electromagnetism I | 3 |
| PY 515 | Electromagnetism II | 3 |
| PY 516 | Physical Optics | 3 |
| PY 517 | Atomic and Molecular Physics | 3 |

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| PY 519 | Biological Physics | 3 |
| PY 525 | Computational Physics | 3 |
| PY 528 | Introduction to Plasma Physics and Fusion Energy | 3 |
| PY 529 | Plasma Physics and Fusion Energy II | 3 |
| PY 543 | Astrophysics | 3 |
| PY 552 | Condensed Matter Physics I | 3 |
| PY 570 | Polymer Physics | 3 |
| PY 581 | Matter & Interactions for Teachers I | 3 |
| PY 582 | Matter & Interactions for Teachers II | 3 |
| PY 589 | Solid State Solar and Thermal Energy Harvesting | 3 |
| PY 590 | Special Topics In Physics | 1-6 |
| PY 599 | Special Topics in Physics | 1-6 |
| SMT 202 | Anatomy and Properties of Renewable Materials | 3 |
| SSC 185 | Land and Life | 3 |
| SSC 200 | Soil Science | 3 |
| SSC 201 | Soil Science Laboratory | 1 |
| SSC 332 | Environmental Soil Microbiology | 3 |
| SSC 341 | Soil Fertility and Nutrient Management | 3 |
| SSC 342 | Soil and Plant Nutrient Analysis | 1 |
| SSC 410 | Soil Judging for Land Evaluation | 1 |
| SSC 421 | | 3 |
| SSC 427 | Biological Approaches to Sustainable Soil Systems | 3 |
| SSC 428 | Soil Management Principles for Sustainable Agriculture | 1 |
| SSC 440 | Geographic Information Systems (GIS) in Soil Science and Agriculture | 3 |
| SSC 442 | Soil and Environmental Biogeochemistry | 3 |
| SSC 452 | Soil Classification | 4 |
| SSC 455 | Soils, Environmental Quality and Global Challenges | 3 |
| SSC 461 | Soil Physical Properties and Plant Growth | 3 |
| SSC 462 | Soil-Crop Management Systems | 3 |
| SSC 470 | Wetland Soils | 3 |
| SSC 473 | Introduction to Hydrologic and Water Quality Modeling | 3 |
| SSC 511 | Soil Physics | 4 |
| SSC 521 | Soil Chemistry | 3 |
| SSC 532 | Soil Microbiology | 4 |
| SSC 540 | Geographic Information Systems (GIS) in Soil Science and Agriculture | 3 |
| SSC 541 | Soil Fertility | 3 |
| SSC 545 | Remote Sensing Applications in Soil Science and Agriculture | 3 |
| SSC 551 | Soil Morphology, Genesis and Classification | 3 |
| SSC 562 | Environmental Applications Of Soil Science | 3 |
| SSC 570 | Wetland Soils | 3 |
| SSC 573 | Introduction to Hydrologic and Water Quality Modeling | 3 |
| SSC 590 | Special Problems in Soil Science | 1-6 |
| TE 570 | Polymer Physics | 3 |
| TOX 201 | Poisons, People and the Environment | 3 |
| TOX 401 | Principles of Toxicology | 4 |
| TOX 415 | Ecotoxicology | 4 |

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

## Semester Sequence

This is a sample.

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| **First Year** | | |
| **Fall Semester** | | **Hours** |
| ALS 103 | Freshman Transitions and Diversity in Agriculture & Life Sciences | 1 |
| ARE 201<br>or EC 201 | Introduction to Agricultural & Resource Economics [1]<br>or Principles of Microeconomics | 3 |
| BIO 181 | Introductory Biology: Ecology, Evolution, and Biodiversity | 4 |
| ENG 101 | Academic Writing and Research | 4 |
| Mathematics Requirement (p. 1) | | 3 |
| | **Hours** | **15** |
| **Spring Semester** | | |
| Select one of the following: | | 4 |
| BIO 183 | Introductory Biology: Cellular and Molecular Biology | |
| PB 200 | Plant Life | |
| PB 250 | Plant Biology | |
| Mathematics Requirement (p. 1) | | 3 |
| GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) | | 3 |
| GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/) | | 3 |
| GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/) | | 1 |
| | **Hours** | **14** |
| **Second Year** | | |
| **Fall Semester** | | |
| CH 101<br>& CH 102 | Chemistry - A Molecular Science<br>and General Chemistry Laboratory | 4 |
| AEE 226 | Computer Applications and Information Technology in Agricultural & Extension Ed | 3 |
| PY 131<br>or PY 211 | Conceptual Physics<br>or College Physics I | 4 |
| Communications Requirement (p. 1) | | 3 |
| GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/) | | 1 |
| | **Hours** | **15** |
| **Spring Semester** | | |
| ACC 220<br>or ACC 210 | Introduction to Managerial Accounting<br>or Concepts of Financial Reporting | 3 |
| Chemistry Requirement (p. 1) | | 4 |
| Statistics Requirement (p. 1) | | 3 |
| GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/) | | 3 |
| GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/) | | 3 |
| | **Hours** | **16** |
| **Third Year** | | |
| **Fall Semester** | | |
| ARE 301 | Intermediate Microeconomics | 3 |
| ARE 306<br>or ARE 309 | Agricultural Law<br>or Environmental Law & Economic Policy | 3 |
| ARE 490 | Career Seminar in Agriculture & Resource Economics | 1 |
| Biology Elective Requirement (p. 1) | | 4 |
| ARE or EC Elective (p. 1) | | 3 |
| GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/) | | 2-3 |
| | **Hours** | **16** |
| **Spring Semester** | | |
| Marketing Requirement (p. 1) | | 3 |
| GN 311 | Principles of Genetics | 4 |
| ARE 304 | Agribusiness Management | 3 |
| Restricted Elective (p. 4) | | 3 |

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| GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) | | 3 |
| | **Hours** | **16** |
| **Fourth Year** | | |
| **Fall Semester** | | |
| ARE 321 or BUS 320 | Agricultural Financial Management or Financial Management | 3 |
| ARE/EC Elective (p. 1) | | 3 |
| Free Elective [2] | | 2 |
| Restricted Elective (p. 4) | | 3 |
| Restricted Elective (p. 4) | | 3 |
| | **Hours** | **14** |
| **Spring Semester** | | |
| Advanced Writing Requirement (p. 1) | | 3 |
| Restricted Elective (p. 4) | | 3 |
| Free Electives [2] | | 8-9 |
| | **Hours** | **14** |
| | **Total Hours** | **120** |

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

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

## Career Opportunities

The Agricultural Business Management Program prepares graduates for careers in management, marketing, sales, finance, supply chain, entrepreneurship, and related fields. The program has sufficient flexibility to provide more extensive course work in science and math for those students desiring to prepare for advanced graduate study. The concentration in biological sciences prepares graduates for management, marketing, and sales careers in fields such as biotechnology, pharmaceuticals, health care, environmental protection, and food processing. Graduates specializing in agribusiness entrepreneurship are trained in value creation and prepared to address the strong demand in agtech, biotech, and foodtech.

## Career Titles

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

## 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.

Agricultural and Applied Economics Association (https://www.aaea.org/employmentopps/)
AgCareers.com (https://www.agcareers.com/newsletters/AgCareers.com-Electronic-Internship-Flyer.htm)
National Agri-Marketing Association (https://www.nama.org/)