PACKAGING SCIENCE
Bachelor of Science
The Bachelor of Science degree in Packaging Science prepares students for careers in industries producing and utilizing packages for all types of products. Packaging is an essential part of industrialized economies, protecting, preserving, and helping to market products. The field of packaging is highly competitive and highly innovative, requiring an ever-increasing number of professional positions.

Opportunities for employment include a wide variety of career paths such as manufacturing, marketing, sales, design, purchasing, quality assurance, and customer services. Most career opportunities are in positions requiring technical knowledge combined with marketing and management skills.

The core curriculum assures graduates of having the skills and knowledge required by most entry-level packaging positions. Emphasis area choices or minors allow students to select courses to improve career preparation for specific industry segments, including: Distribution, Transportation and Engineering Technology; Food and Health Care Packaging; Materials; and Package Design and Graphics. Alternatively, any University-approved minor may be completed.

Students changing majors into Packaging Science must:
1. have an overall minimum GPA of 2.0; and
2. have completed four of the following courses with an average GPA of 2.7:
   - BIOL 1030, 1040, CH 1010, 1020, MATH 1060, PHYS 1220, 2070, 2080, 2210; or both MATH 1040 and 1070; and
3. have completed PKSC 1020 with a grade of B or higher.

Combined Bachelor of Science/Master of Science Degree Program
The Department of Food, Nutrition and Packaging Sciences also offers an accelerated five-year combined bachelor’s/master’s program that allows students to count up to twelve hours of graduate credit toward both the BS degree in Packaging Science and the MS degree in Packaging Science. Details are available from the Department of Food, Nutrition and Packaging Sciences or at www.clemson.edu/pnps.

Freshman Year
First Semester
- BIOL 1030 General Biology I
- BIOL 1050 General Biology Lab. I
- CH 1010 General Chemistry
- MATH 1060 Calculus of One Variable I
- PKSC 1010 Packaging Orientation
- Social Science Requirement

Second Semester
- BIOL 1040 General Biology II
- BIOL 1060 General Biology Lab. II
- CH 1020 General Chemistry
- COMM 1500 Intro to Human Comm or COMM 2500 Public Speaking
- ENGL 1030 Composition and Rhetoric
- PKSC 1020 Intro. to Packaging Science

Sophomore Year
First Semester
- CH 2100 Survey of Organic Chemistry and
- CH 2200 Organic Chemistry and
- PHYS 1220 Physics with Calculus I and
- PHYS 1240 Physics Lab. II or
- PHYS 2070 General Physics I and
- PHYS 2090 General Physics I Lab.
- PKSC 2020 Packaging Materials and Manuf.
- PKSC 2200 Product/Package Design and
- Prototyping

Second Semester
- PHYS 2080 General Physics II and
- PHYS 2100 General Physics II Lab. or
- PHYS 2210 Physics with Calculus II and
- PHYS 2230 Physics Lab. II
- PKSC 2010 Packaging Perishable Products
- PKSC 2040 Container Systems
- PKSC 2060 Container Systems Lab.
- Arts and Humanities (Literature) Requirement

Summer
- COOP 1010 Cooperative Education

Junior Year
First Semester
- ENGL 3140 Technical Writing
- GC 1030 Graphic Comm. I for Packaging Sci.
- PKSC 4010 Packaging Machinery
- PKSC 4040 Mechanical Properties of Packages and Principles of Protective Packaging
- PKSC 4540 Product and Package Eval. Lab.
- Emphasis Area Requirement

Second Semester
- PKSC 3200 Package Design Theory
- PKSC 3680 Packaging and Society
- PKSC 4300 Converting for Flexible Packaging
- PKSC 4400 Packaging for Distribution
- Emphasis Area Requirement

Senior Year
First Semester
- PKSC 4160 Appl. of Polymers in Packaging
- PKSC 4640 Food and Health Care Pkg. Syst.
- STAT 2300 Statistical Methods I
- Emphasis Area Requirement

Second Semester
- AGRB 2020 Agricultural Economics or
- ECON 2110 Principles of Microeconomics
- PKSC 4200 Packaging Career Preparation
- PKSC 4200 Package Design and Development
- Arts and Humanities (Non-Lit.) Requirement
- Emphasis Area Requirement

Total Semester Hours
1. Complete PKSC 1020, 2020, 2040, and 2060 with a grade of C or better before being allowed to register for PKSC 4010, 4040, 4100, 4300, 4400, 4540, 4640.
2. Earn a C or better in all PKSC courses in order to graduate

PACKAGING SCIENCE majors are required to:
- Complete PKSC 1020, 2020, 2040, and 2060 with a grade of C or better before being allowed to register for PKSC 4010, 4040, 4100, 4300, 4400, 4540, 4640.
- Earn a C or better in all PKSC courses in order to graduate

PLANT AND ENVIRONMENTAL SCIENCES
Bachelor of Science
The BS degree program in Plant and Environmental Sciences is a multidisciplinary program that educates students with expertise in soils, crop sciences, and applied agricultural biotechnology. It offers students a rigorous, science-based degree with educational opportunities related to management of agricultural commodities and natural resources, as well as soil and water resources. Students can tailor the program to fit their professional and academic goals by selecting one of three concentrations.

The Agricultural Biotechnology Concentration integrates conventional disciplines with molecular advances in plants, pathogens, and biosystem interactions and responds to the educational void between the rapid adoption of biotechnology products into agricultural production and the intermediate- and end-users, farmers, and consumers. Graduates in this concentration will be competitive as scientists in emerging agricultural biotechnology industries, as educators, and as policy makers and officers in regulatory agencies.

Students with a concentration in Agronomy will graduate with comprehensive knowledge to increase farm profits by decreasing the costs of crop production; build soil tilth and fertility through rotations, multiple cropping, and nutrient cycling; protect the environment by minimizing or more efficiently using synthetic agrichemicals; manage crop pests and weeds with integrated, ecologically sound strategies; develop strategies for profitable marketing of agricultural commodities; and create a strong, diversified agriculture that is stable through market and weather fluctuations. Graduates can assume positions as self-
employed farmers, farm managers, state and federal natural resource managers, research technicians, agricultural industry employees, greenhouse managers, consultants in pest management and sustainable agriculture, field ecology professionals, agritourism industry specialists, extension personnel, or regulatory officers.

Students with a concentration in Soil and Water Science can address compelling problems such as land application of agricultural and industrial wastes, reduction of contamination of ground and surface waters, establishment of functional septic drain fields, and production of food and fiber crops. Graduates will be able to establish careers in traditional agrarian fields such as soil scientists and conservationists, extension agents, and farm consultants, and in the broader environmental arenas of DHEC, consulting engineering firms, and environmental consulting. Graduates will be well prepared for graduate work in fields ranging from soil science to environmental engineering and law.

Combined Bachelor of Science/Master of Science Degree Program

Plant and Environmental Sciences students may begin a Master of Science degree in Plant and Environmental Sciences or a Master of Science degree in Entomology while completing their Bachelor of Science degree, and use up to 12 credits to satisfy the requirements of both the undergraduate and graduate degrees. To be eligible for this plan, students must have a 3.4 or higher grade-point average and have completed at least 90 credits of coursework. Details are available from the Department of Plant and Environmental Sciences.

Freshman Year

First Semester
3 - BIOL 1030 General Biology I
1 - BIOL 1050 General Biology Lab. I
1
4 - CH 1010 General Chemistry
3 - MATH 1020 Business Calculus I or
4 - MATH 1060 Calculus of One Variable I
3 - PES 1040 Introduction to Plant Science
14-15

Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab II
1
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - STAT 2300 Statistical Methods I
3 - Arts and Humanities (Non-Lit.) Requirement
17

Sophomore Year

First Semester
3 - BIOL 3040 Biology of Plants
3 - CH 2010 Survey of Organic Chemistry
4 - ENT 3010 Insect Biology and Diversity
3 - PES 3100 Principles of Plant Pathology
14

Second Semester
3 - AGRB 2050 Agriculture and Society
3 - BIOL 3350 Evolutionary Biology
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - GEN 3000 Fundamental Genetics
4 - MIR 3050 General Microbiology
1 - PES 4550 Seminar
17

Junior Year

First Semester
3 - BCHM 3050 Essential Elements of Biochem.
3 - ECON 2000 Economic Concepts or
3 - ECON 2110 Principles of Microeconomics
3 - PES 3500 Agricultural Biotechnology
3 - PES 4220 Major World Crops
3 - Social Science Requirement
13

Second Semester
3 - BIOL 4010 Plant Physiology
1 - BIOL 4020 Plant Physiology Lab.
3 - ENGL 3150 Scientific Writing and Comm.
1 - PES 4010 Academic and Professional Dev.
3 - PES 4050 Plant Breeding
3 - PES 4090 Biology of Invasive Plants
14

Summer
3 - PES 3400 Medical Botany

Senior Year

First Semester
3 - PES 4450 Regulatory Issues and Policies
3 - PES 4900 Beneficial Soil Organisms in Plant Growth
3 - Arts and Humanities (Literature) Requirement
6 - Concentration Requirement
15

Second Semester
3 - PES 3500 Practicum
9 - Concentration Requirement
12

121–122 Total Semester Hours

Agricultural Biotechnology Concentration

Sophomore Year

First Semester
3 - BIOL 3040 Biology of Plants
3 - CH 2010 Survey of Organic Chemistry
4 - ENT 3010 Insect Biology and Diversity
4 - PES 2020 Soils
3 - PLPA 3100 Principles of Plant Pathology
15

Second Semester
3 - AGRB 2050 Agriculture and Society
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - GEN 3000 Fundamental Genetics
4 - MIR 3050 General Microbiology
13

Summer
3 - ENT 4070 Applied Agricultural Entomology
3 - PLPA 4110 Plant Disease Diagnosis
6

Junior Year

First Semester
3 - AGRB 2020 Agricultural Economics or
3 - ECON 2110 Principles of Microeconomics
3 - BCHM 3050 Essential Elements of Biochem.
3 - IPM 4010 Principles of Integrated Pest Mgt.
3 - PES 4220 Major World Crops
3 - Concentration Requirement
15

Second Semester
3 - BIOL 4010 Plant Physiology
1 - BIOL 4020 Plant Physiology Lab.
3 - ENGL 3150 Scientific Writing and Comm.
1 - PES 4010 Academic and Professional Dev.
3 - PES 4050 Plant Breeding
3 - PES 4090 Biology of Invasive Plants
14

Senior Year

First Semester
3 - PES 4450 Regulatory Issues and Policies
3 - PES 4900 Beneficial Soil Organisms in Plant Growth
3 - Arts and Humanities (Literature) Requirement
6 - Concentration Requirement
15
3 - Social Science Requirement
15

Second Semester
3 - PES 3500 Practicum
3 - PES 4520 Soil Fertility and Management
1 - PES 4530 Soil Fertility Lab.
6 - Concentration Requirement
13

121–124 Total Semester Hours

Agronomy Concentration

Sophomore Year

First Semester
3 - CH 2010 Survey of Organic Chemistry
4 - ENT 3010 Insect Biology and Diversity
4 - PES 2020 Soils
3 - PLPA 3100 Principles of Plant Pathology
15

Second Semester
3 - AGRB 2050 Agriculture and Society
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - GEN 3000 Fundamental Genetics
4 - MIR 3050 General Microbiology
13

Summer
3 - ENT 4070 Applied Agricultural Entomology
3 - PLPA 4110 Plant Disease Diagnosis
6

Junior Year

First Semester
3 - AGRB 2020 Agricultural Economics or
3 - ECON 2110 Principles of Microeconomics
3 - BCHM 3050 Essential Elements of Biochem.
3 - IPM 4010 Principles of Integrated Pest Mgt.
3 - PES 4220 Major World Crops
3 - Concentration Requirement
15

Second Semester
3 - BIOL 4010 Plant Physiology
1 - BIOL 4020 Plant Physiology Lab.
3 - ENGL 3150 Scientific Writing and Comm.
1 - PES 4010 Academic and Professional Dev.
3 - PES 4050 Plant Breeding
3 - PES 4090 Biology of Invasive Plants
14

Senior Year

First Semester
3 - PES 4450 Regulatory Issues and Policies
3 - PES 4900 Beneficial Soil Organisms in Plant Growth
3 - Arts and Humanities (Literature) Requirement
6 - Concentration Requirement
15
3 - Social Science Requirement
15

Second Semester
3 - PES 3500 Practicum
3 - PES 4520 Soil Fertility and Management
1 - PES 4530 Soil Fertility Lab.
6 - Concentration Requirement
13

121–124 Total Semester Hours

1See General Education Requirements.
2See General Education Requirements.
3Select from AGRB 4520, BIOL 3020/3060, 3130, 3200/3201, 4060/4070, 4410, 4460, 4580, 4610, ECON 3100, ENR 4290, ENT 4000, 4070, 4150, 4360, 4950, GEN 4050, 4100, 4400, MIR 4010, 4200, 4200, 4330/4311, PES 4210, 4230, PLPA 4100, 4250, 4260, 4540, 4590. Courses to support proficiency in a modern language also are encouraged.

1See General Education Requirements.
2Select from AGM 2050/2051, 2060/2061, 3010, 4020, 4021, 4021, AGRB 3020, 3090, 3190, 4520, BIOL 3130 3200/3201, 4310, 4410, 4460, 4470, ENR 4130, ENT 3000, 3080, 4000, 4150, 4560, HORT 3100, 4040, 4050, 4550, 4560, MIR 4010, 4200, 4100, PES 3150, 4210, 4230, 4260, 4330, 4460, PLPA 4250, 4260, 4540, 4590

2See General Education Requirements.
SOIL AND WATER SCIENCE CONCENTRATION

Sophomore Year

First Semester
- CH 2010 Survey of Organic Chemistry
- GEOL 1010 Physical Geology
- GEOL 1030 Physical Geology Lab.
- GIS 2020 Soils
- PHYS 2070 General Physics I
- PHYS 2090 General Physics I Lab.

Second Semester
- AGRB 2050 Agriculture and Society
- COMM 1500 Intro. to Human Comm. or 1
- COMM 2500 Public Speaking
- MIRC 3050 General Microbiology
- PHYS 2080 General Physics II
- PHYS 2100 General Physics II Lab.

Junior Year

First Semester
- AGM 3010 Soil and Water Conservation
- PES 4220 Major World Crops
- Concentration Requirement 1

Second Semester
- BIOL 4010 Plant Physiology and 1
- BIOL 4020 Plant Physiology Lab.
- ENGL 3150 Scientific Writing and Comm.
- PES 3150 Environment and Agric.
- PES 4010 Academic and Professional Dev.
- Concentration Requirement 1
- Social Science Requirement 1

Senior Year

First Semester
- PES 3500 Practicum
- PES 4030 Soil Genesis and Classification
- PES 4550 Seminar
- Applied Spatial Technology Requirement 4
- Arts and Humanities (Literature) Requirement 1
- Field Scale Environmental Mgt. Requirement 4

Second Semester
- PES 4080 Land Treatment of Wastewater and Sludges
- PES 4900 Beneficial Soil Organisms in Plant Growth
- Concentration Requirement 1
- Social Science Requirement 1

Freshman Year

First Semester
- BIOL 1030 General Biology I
- BIOL 1050 General Biology Lab I
- CH 1010 General Chemistry
- HORT 1010 Horticulture
- MATH 1020 Business Calculus I
- Arts and Humanities (Non-Lit) Requirement 1

Second Semester
- BIOL 1040 General Biology II
- BIOL 1060 General Biology Laboratory II
- CH 1020 General Chemistry
- ENGL 1030 Composition and Rhetoric
- MATH 1010 Essential Math for Informed Soc.

Combined Bachelor of Science/Master of Science Degree Program

Turfgrass students may begin a Master of Science degree in Plant and Environmental Sciences or a Master of Science degree in Entomology while completing their Bachelor of Science degree, and use up to 12 credits to satisfy the requirements of both the undergraduate and graduate degrees. To be eligible for this plan, students must have a 3.4 or higher grade-point average and have completed at least 90 credits of coursework. Details are available from the Department of Plant and Environmental Sciences.

Sophomore Year

First Semester
- BIOL 3040 Biology of Plants
- BIOL 3080 Biology of Plants Lab
- HORT 2120 Introduction to Turfgrass Culture
- HORT 2130 Turfgrass Culture Lab.
- HORT 3030 Landscape Plants
- Social Science Requirement 1

Second Semester
- HORT 4270 Urban Tree Care
- PES 2020 Soils
- Arts and Humanities (Literature) Requirement 1
- Oral Communications Requirement 1
- Social Science Requirement 1

Summer
- HORT 2710 Internship 2 or 3
- HORT 4710 Advanced Internship 2

Junior Year

First Semester
- ENT 3010 Insect Biology and Diversity
- PLPA 3100 Principles of Plant Pathology
- Business Requirement 1
- Horticulture Specialization Requirement 4
- Social Science Requirement 1

Second Semester
- AGM 4020 Irrigation System Design
- BIOL 4010 Plant Physiology
- BIOL 4020 Plant Physiology Lab.
- HORT 4200 Applied Turfgrass Physiology
- PLPA (ENT) 4060 Diseases and Insects of Turfgrasses
- Horticulture Specialization Requirement 4

Summer
- PLPA (ENT) 4080 Diseases and Insects of Turfgrasses Laboratory

Senior Year

First Semester
- HORT 4090 Senior Capstone Course
- HORT 4120 Advanced Turfgrass Management
- PES 4460 Soil Management
- Business Requirement 1
- Related Science Requirement 1

Second Semester
- HORT (PES) 4330 Landscape and Turf Weed Management
- PES 4520 Soil Fertility
- PES 4530 Soil Fertility Lab
- Business Requirement 1
- Related Science Requirement 1

1See General Education Requirements.
2See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and the Science and Technology in Society Requirements.