



Horry-Georgetown
Technical College

COURSE INSTRUCTIONAL PACKAGE

HRT 125

Soils

Effective Term

Fall 2026/Spring 2027/Summer 2027

Part I: Course Information

Effective Term: Fall 2026/Spring 2027/Summer 2027

COURSE PREFIX: HRT 125

COURSE TITLE: Soils

CONTACT HOURS: 6.0

CREDIT HOURS: 4.0

RATIONALE FOR THE COURSE:

HRT 125 provides students a basic understanding of soils and other root media are basic to the culture of all plants. An understanding of the properties of soils and plant nutrition is necessary for mastery of horticultural practices.

COURSE DESCRIPTION:

This course is a study of soils and plant nutrition. Emphasis is on physical and chemical properties, water, organic matter, and life of soils. Materials and methods for supplying nutrients to horticulture plants are also include.

PREREQUISITES/CO-REQUISITES:

None

REQUIRED MATERIALS:

Please visit the [BOOKSTORE](#) online site for most current textbook information. Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

ADDITIONAL REQUIREMENTS:

None

TECHNICAL REQUIREMENTS:

- Access to Desire2Learn (D2L), HGTC's learning management system (LMS) used for course materials.
- Access to myHGTC portal for student self-services.

- College email access – this is the college’s primary official form of communication.

ATTENDANCE VERIFICATION:

The Add/Drop Period is the first 7 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format classes. Please refer to the [academic calendar](#) for deadlines for add/drop. You must attend at least one meeting of all your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly

IDENTIFICATION VERIFICATION:

Students enrolled in online courses will be required to complete identity verification. Please refer to your Instructor’s Course Information Sheet for information regarding this requirement.

STUDENT COURSE EVALUATIONS:

Each semester, students are provided with an opportunity to participate in course evaluation surveys. These evaluations offer crucial feedback to instructors and the College, leading to enhancement of educational quality. By completing these surveys, you play a key role in the ongoing improvement of teaching methods and course content, ensuring future students enjoy a better learning experience. Students are encouraged to complete these surveys as your active participation in this process reflects your dedication to your education and drives positive change.

CLASSROOM ETIQUETTE AND STUDENT RIGHTS AND RESPONSIBILITIES:

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

To ensure a positive College experience, guidelines exist in numerous areas of campus life. The Student Code for The South Carolina Technical College System “The Student Code” (3-2-106.1) applies to all HGTC students. The Student Code sets

forth rights and responsibilities of the individual student, identifies behaviors that are not consistent with the values of college communities, and describes the procedures that will be followed to adjudicate cases of alleged misconduct. Students are expected to conduct themselves in a civil manner, that is respectful of the rights of others, and that is compatible with the college's educational mission. Students are expected to comply with all of the college's duly established rules and regulations regarding student behavior while on campus; while participating in off-campus college sponsored activities; and while participating in off-campus clinical, field, internship, or in-service experiences. Students are expected to comply with all course requirements as specified by instructors in course syllabi and to meet the standards of acceptable classroom behavior set by instructors. For more information, login to your myHGTC account under "Student Rights and Responsibilities" card then select "Student Code of Conduct" or the "Student Catalog and Handbook."

Part II: Student Learning Outcomes

COURSE LEARNING OUTCOMES and ASSESSMENTS*:

Unit 1 Intro to Soils

- Soil is essential to life, shaping ecosystems and supporting human and animal society.
- Soils perform five key ecosystem functions: plant support, water regulation, recycling, habitat provision, and engineering medium.
- Soil is a dynamic natural body formed from weathered regolith and composed of air, water, minerals, and organic matter.
- Soil texture (sand, silt, clay) influences water-holding capacity, reactivity, and overall soil behavior.
- Soils develop layered horizons that create a soil profile, enabling nutrient exchange crucial for plant growth.

Unit 2 Soil Forming Factors

- Definition of soil as a loose layer of Earth's crust composed of mineral and organic materials.

- Five primary soil-forming factors: Parent Material, Climate, Biosphere, Topography, and Time.
- Soil horizons include O, A, E, B, C, and R, each with distinct characteristics such as color, texture, structure, and organic matter.
- Parent material categories: Residual, Transported (alluvial, eolian, colluvial, glacial), and Cumulose.
- Residual soils form in place over bedrock and are relatively rare (5%).
- Transported soils vary by agent: water (alluvial), wind (eolian), gravity (colluvial), and ice (glacial).
- Climate influences soil development through precipitation, leaching, temperature, and microbial activity.
- The biosphere affects soil through organisms, nutrient cycling, and organic matter processes.
- Topography shapes soil through slope, erosion potential, and aspect influences on temperature and moisture.
- Time determines soil profile maturity; older soils have more horizons.

Unit 3 Soil Surveys, Maps and Classes

- Definition and purpose of soil surveys, including mapping soils in Horry County and nationwide.
- Produced by USDA, Soil Conservation Service, Clemson Agricultural Experiment Station, and SC Land Resources Conservation Commission.
- USDA mission: leadership in agriculture, natural resources, rural development, and conservation.
- Soil Conservation Service roles: conservation practices, wetland restoration, groundwater protection, erosion control, and education.
- South Carolina Agricultural Experiment Station: established 1887; now part of Clemson with six research centers statewide.
- Clemson Research and Education Centers: Baruch, Coastal, Edisto, Pee Dee, Piedmont, Sandhill.
- SCDNR Division of Land, Water and Conservation manages and conserves state natural resources through planning, research, and education.

- Soils classes overview and link to Web Soil Survey for detailed soil information.

Unit 4 Turf Soils

- Soils are fundamental to turfgrass growth, providing water, nutrients, and anchorage.
- Understanding soil physical, chemical, and biological properties helps prevent many turfgrass problems.
- Soil texture (sand, silt, clay) strongly influences water holding capacity, nutrient retention, drainage, and playability.
- Soil structure—arrangement into aggregates and pore spaces—affects aeration, compaction, and water movement.
- Organic matter is essential for soil structure, nutrient retention, and moisture regulation; both soil organic matter and total organic material have distinct roles.
- Water movement in soils involves infiltration, drainage, and retention—all influenced by texture, structure, compaction, and thatch.
- CEC (Cation Exchange Capacity) reflects a soil's ability to store nutrient cations and is higher in clay and organic matter-rich soils.
- Soil pH affects nutrient availability; turfgrasses generally perform best between pH 5.5 and 8.5.
- Routine soil testing is essential for monitoring nutrient availability, organic matter levels, and guiding management decisions.

Unit 5 Soil Testing

- Chemical, physical, and biological testing
- Total Organic Matter Testing
- Cation Exchange Capacity (CEC): Indicates soil's ability to hold nutrients like K, Ca, and Mg.
- Soil pH (Active & Buffer): Determines acidity/alkalinity and how much lime is required.

- Macronutrients (N–P–K): Essential for growth, root development, and stress tolerance.
- Secondary Nutrients (Mg & S): Important for chlorophyll production and pH-related deficiencies.
- Correcting pH Problems: Lime for acidic soils; sulfur/aluminum sulfate for alkaline soils.
- Collection and Lab Procedures

Unit 6 Essential Nutrients for Turfgrass Growth and Development

- Turfgrass requires three categories of essential nutrients: macronutrients, secondary nutrients, and micronutrients.
- Primary macronutrients (N, P, K) are required in largest amounts and are key components of fertilizer labels.
- Atmospheric macronutrients (C, H, O) are supplied by air and water and support fundamental plant processes.
- Nitrogen promotes leafy growth, chlorophyll development, and overall plant vigor.
- Phosphorus drives energy transfer, rooting, flowering, and carbohydrate storage.
- Potassium supports water regulation, stress tolerance, disease resistance, and winter hardiness.
- Secondary nutrients (Ca, Mg, S) support pH adjustment, cell wall structure, photosynthesis, and microbial activity.
- Micronutrients such as Fe, Mn, B, Cu, Mo, Zn, and Cl are required in small quantities but play vital roles in enzymatic reactions, chlorophyll maintenance, and overall plant health.

Unit 7 Turfgrass Fertilization

- Nitrogen sources for turfgrass fertilization
- Nitrogen fertilizer definitions
- P,K,S,Ca,Mg and Minor nutrient sources
- Reading and understanding fertilizer labels and labeling.
- Methods of turfgrass fertilization

- Turfgrass fertilization calculations.

Unit 8 Topdressing Sands and Construction

- Topdressing is the application of a thin layer of soil or sand to a turf surface to improve playing conditions and turf health.
- Key benefits include increased thatch decomposition, smoother and truer playing surfaces, reduced grain, enhanced turf recovery, improved overseeding, and soil modification.
- Detriments include risks when applied during stressful environmental conditions, the need for quality sand, and temporary declines in putting quality.
- Effective programs require consistent application frequency and rate, proper material selection, and adaptation to site-specific conditions.
- Topdressing materials and rates must be selected to avoid layering issues and ensure proper incorporation into existing soil.
- Proper incorporation techniques and mowing practices post-topdressing are essential for uniform turf recovery and playability.
- Overview of putting green construction methods including USGA, Modified USGA, California, and Push-up designs.
- USGA method is the most stringent, requires lab-tested materials, and is typically the most expensive option.
- California greens eliminate the gravel layer, reduce costs, and use pure sand that still meets USGA standards.
- Modified USGA greens substitute local materials but may not meet full USGA specifications.
- Key construction principles include saturated hydraulic conductivity, capillary porosity, coefficient of uniformity, drainage, and water quality.
- Research indicates no major performance differences between USGA and California profiles when constructed properly.
- Drainage designs must maintain a 0.5% slope and can follow patterns such as herringbone, gridiron, random, or smile patterns.

- Rootzone mixes require careful consideration of physical and chemical properties to support turf performance.
- Organic and inorganic amendments (e.g., peat, biochar, calcined clay) are used to adjust soil characteristics.
- Material quantities for 1000 sq ft USGA green include gravel, intermediate layer, rootzone mix, and drainage tile.

Unit 9 Drainage

- Importance of drainage for maintaining healthy, playable golf course turf
- Key impacts of poor drainage: waterlogging, turf diseases, erosion, soil compaction, high water tables
- Types of drainage systems: surface, subsurface, sand channel, and combination systems
- Surface drainage: uses swales, ditches, and surface drains to remove excess surface water
- Subsurface drainage: uses perforated pipes, gravel trenches, sand slits to move water through soil profile
- Sand channel drainage: narrow sand-filled trenches for rapid infiltration; low disruption to turf
- Drainage design principles: proper slope (1:100 minimum), uniform fall, correct pipe sizing and spacing
- Common installation methods: trenching, pipe placement, backfilling, compaction, sod replacement
- Maintenance best practices: routine inspections, cleaning catch basins, repairing damaged pipes
- Site assessment factors: soil type, permeability, topography, slope, organic matter, ISTRC testing
- Strategies to address drainage issues: aeration, topdressing, traffic management, irrigation control

Unit 10 Cultivation

- Three primary aeration classes: Coring, Venting, Injecting.
- Coring removes soil/thatch, is most disruptive, and supports OM dilution, gas exchange, and growth stimulation.
- Venting creates channels without removing soil; includes needle, solid, cross, knife, and deep tines; can be done year-round if soil is not frozen.
- Injecting adds material (sand, amendments, air, water) into channels; includes DryJect, WetJect, Drill & Fill, Hydroject, and Air Injection.
- Coring recovery depends on turf type and conditions; planning, trial attempts, and material preparation are essential.
- Topdressing strategy (before vs after coring) impacts sand needs, incorporation of amendments, and surface disruption.
- Cleanup is labor-intensive and may involve sweeping, dragging, blowing, or multiple methods depending on conditions.
- Amendments (lime, gypsum, organic fertilizers, controlled release fertilizers) can be incorporated with topdressing.
- Rolling, mowing at higher HOC, verticutting, and foliar sprays aid surface recovery after coring or venting.
- Deep-tine and drill-and-fill technologies improve compaction relief and water infiltration at greater depths.

****Students – please refer to the Instructor’s Course Information sheet for specific information on assessments and due dates.***

Part III: Grading and Assessment

EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS*:

Students’ performance will be assessed, and the weight associated with the various measures/artifacts are listed below.

EVALUATION*

Tests/Quizzes	30%
Assignments/Projects	30%
Class Participation	30%
<u>Final Exam</u>	<u>10%</u>
	100%

****Students, for the specific number and type of evaluations, please refer to the Instructor's Course Information Sheet.***

GRADING SYSTEM:

Please note the College adheres to a 10-point grading scale A = 100 – 90, B = 89–80, C = 79 – 70, D = 69 – 60, F = 59 and below.

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. Ds, Fs, Ws, and Is also negatively impact academic progression and financial aid status.

Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of 80 percent (80%) of their classes to receive credit for any course. Due to the varied nature of courses taught at the college, some faculty may require up to 90 percent (90%) attendance. Pursuant to 34 Code of Federal Regulations 228.22 – Return to Title IV Funds, once a student has missed over 20% of the course or has missed two (2) consecutive weeks, the faculty is obligated to withdraw the student, and a student may not be permitted to reenroll. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

For online and hybrid courses, refer to your Instructor's Course Information Sheet for any required on-site meeting times. In online courses, attendance is fulfilled through the submission of academic work. Please be aware that instructors may require exams to be proctored either online or at an approved testing site. If you choose to use a testing center other than those provided by HGTC, that center may charge a fee for its services.

Part V: Student Resources



THE STUDENT SUCCESS AND TUTORING CENTER (SSTC):

The SSTC offers all students the following **free** resources:

1. Academic tutors for most subject areas, Writing Center support, and Academic Coaching for college success skills.
2. Online tutoring and academic support resources.
3. Professional and interpersonal communication coaching.

Visit the [Student Success & Tutoring Center](#) website for more information. To schedule tutoring or coaching, contact the SSTC at sstc@hgtc.edu or self-schedule in the Penji iOS/Android app or at www.penjiapp.com. Email sstc@hgtc.edu or call SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455, or go to the SSTC [Online Resource Center](#) to access on-demand resources.

STUDENT INFORMATION CENTER – TECH Central:



TECH Central offers all students the following **free** resources:

1. Getting around HGTC: General information and guidance for enrollment, financial aid, registration, and payment plan support!
2. In-person and remote assistance are available for Desire2Learn, Student Portal, Degree Works, and Office 365.
3. Chat with our staff on TECH Talk, our live chat service. TECH Talk can be accessed on the student portal and on TECH Central's website, or by texting questions to (843) 375-8552. Visit the [Tech Central website](#) for more information. Live Chat and Center locations are posted on the website. You may also call (843) 349-5199.

HGTC LIBRARY:



Each campus location has a library where HGTC students, faculty, and staff may check out materials with their HGTC ID. All three HGTC campus libraries have librarians and staff who can aid with research, computers to support academic research and related school-work, and individual/group study rooms. Printing is

available as well at each location. Visit the [Library](#) website for more information or call (843) 349-5268.

STUDENT TESTING:

Testing in HGTC courses may occur during regularly scheduled class time or online, with or without proctoring. Tests may be delivered in the following formats:

- Digitally through D2L
- In writing on paper
- Through a publisher platform (note: some publisher platforms carry an associated fee)

Tests may include time limits and may require proctoring depending on the course.

When proctoring is required and is not provided by the course instructor in the classroom, students may complete their test face-to-face at an [HGTC Testing Center](#) or another approved testing site, or online using HGTC's online proctoring provider. For more information about available proctoring options, visit the [Online Testing](#) section of the HGTC Testing Center webpage.

Students testing at an HGTC Testing Center should note the following:

- **Appointments must be scheduled at least 24 hours in advance.**
- **A physical, government-issued photo ID is required to test.**

The **Instructor Information Sheet** will have more details on test requirements for your course.

DISABILITY SERVICES:

HGTC is committed to providing an accessible environment for students with disabilities. Students seeking accommodations are encouraged to visit HGTC's [Accessibility and Disability Service webpage](#) for detailed information.

It is the student's responsibility to self-identify as needing accommodations and to provide appropriate documentation. Once documentation is submitted, the student will participate in an interactive process with Accessibility and Disability

Services staff to determine reasonable accommodations. Students may begin the accommodations process at any time; however, accommodations are **not retroactive** and will only be applied from the point at which they are approved. Students must contact the office **each semester** to renew their accommodations.

For assistance, please contact the Accessibility and Disability Services team at disabilityservices@hgtc.edu or 843-796-8818 (call or text).

COUNSELING SERVICES:

HGTC Counseling Services strives to optimize student success through managing personal and academic concerns that may interfere with achieving educational goals. Staff are available to every student for assistance and guidance on personal matters, academic concerns and other areas of concern. HGTC offers free in-person and telehealth counseling services to students. For more information about counseling services, please reach out to counseling@hgtc.edu or visit the website the [Counseling Services webpage](#).

STATEMENT OF EQUAL OPPORTUNITY/NON-DISCRIMINATION STATEMENT:

Our sincere commitment to both effective business management and equitable treatment of our employees requires that we present this Policy Statement as an embodiment of that commitment to the fullest.

Discrimination is conduct that includes unjust or prejudicial treatment based upon an individual's age, race, color, sex, religion, national origin, disability, and genetic information or any other protected classes deemed unlawful under State or Federal law that excludes an individual from participation in, denies the individual the benefits of, treats the individual differently, or otherwise adversely affects a term or condition of a person's working or learning environment. This includes failing to provide reasonable accommodation, consistent with state and federal law, to persons with disabilities.

All inquiries regarding the federal laws as they relate to discrimination on the basis of sex may be directed to Jen Riddei, Title IX Coordinator, Horry-Georgetown Technical College, Building 1100C, Room 107B, 2050 HWY 501 E, PO Box 261966, 843-349-5218, Jenifer.Riddei@hgtc.edu.

Student and prospective student inquiries concerning the federal laws and their application to the College or any student decision may be directed to Dr. Melissa Batten, Vice President, Student Affairs, and Section 504 & Title II Coordinator, Horry-Georgetown Technical College, Building 1100C, Room 107A, 2050 HWY 501 E, PO Box 261966-6066, 843-349-5228, Melissa.Batten@hgtc.edu.

Employee and applicant inquiries concerning the federal laws and their application to the College may be directed to Jacquelyne Snyder, Vice President, Human Resources and Employee Relations and the College's Affirmative Action/Equal Opportunity Officer, Horry-Georgetown Technical College, Building 200C, Room 205B, 2050 HWY 501 E, PO Box 261966, Conway, SC 29528-6066, 843-349-5212, Jacquelyne.Snyder@hgtc.edu.

TITLE IX REQUIREMENTS:

Title IX of the Education Amendments of 1972 protects students, employees, applicants for admission and employment, and other persons from all forms of sex discrimination.

HGTC prohibits the offenses of sexual harassment, domestic violence, dating violence, sexual assault, and stalking and will provide students, faculty, and staff with necessary information regarding prevention, policies, procedures, and resources.

Any student, or other member of the college community, who believes that they have been a victim of sexual harassment, domestic violence, dating violence, sexual assault, or stalking may file a report with the college's Title IX Coordinator or campus law enforcement*.

*Faculty and Staff are required to report these incidents to the Title IX Coordinator when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).

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PREGNANCY ACCOMMODATIONS

Under Title IX, colleges must not exclude a pregnant student from participating in any part of an educational program. Horry-Georgetown Technical College is committed to ensuring that pregnant students receive reasonable accommodations to ensure access to our educational programs.

Students should advise the Title IX Coordinator of a potential need for accommodations as soon as they know they are pregnant. It is extremely important that communication between student, instructors, and the Title IX Coordinator begin as soon as possible. Each situation is unique and will be addressed individually.

Title IX accommodations DO NOT apply to Financial Aid. Financial Aid regulations do not give the College any discretion in terms of Financial Aid eligibility.

Certain educational programs may have strict certification requirements or requirements mandated by outside regulatory agencies. Therefore, in some programs, the application of Title IX accommodations may be limited.

To request pregnancy accommodations, please complete the *Pregnancy Intake Form* that can be found [here](#).