



INSTRUCTIONAL PACKAGE

BIO 209

Principles of Environmental Science

Effective Term

Fall 2024/Spring 2025/Summer 2025

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Part I: Course Information

Effective Term: Fall 2024/Spring 2025/Summer 2025

COURSE PREFIX: BIO 209

COURSE TITLE: Principles of Environmental Science

CONTACT HOURS: 3-3

CREDIT HOURS: 4

RATIONALE FOR THE COURSE:

BIO 209 introduces students to concepts of environmental biology and helps relate this information to real-world applications. This course intends to provide a laboratory science requirement for either Associate in Science or Associate in Arts majors. The course will enable students to develop a deeper understanding of the complex systems, which support life on Earth.

COURSE DESCRIPTION:

This course focuses on the investigation and analyses of environmental elements. Scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world will be explored. Students will analyze natural and man-made environmental problems and solutions.

PREREQUISITES/CO-REQUISITES:

Credit level BIO 101 Minimum Grade of C or Credit level BIO 101 Minimum Grade of TC or Credit level BIO 105 Minimum Grade of C or Credit level BIO 105 Minimum Grade of TC

***Online/Hybrid** courses require students to complete the [Distance Learning Orientation Video](#) prior to enrolling in an online course.

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:

A Connect access code from McGraw Hill is a required component of this course.

For Hybrid/Online Students Only: Each student will be required to view an orientation PowerPoint presentation during the first week of class. This presentation can be found on the course homepage in D2L under News. After viewing the presentation, all online students must complete the orientation quiz, which can be found under the dropdown assignment menu. A student will not be considered officially enrolled in the course until the presentation has been viewed and the quiz completed with a 100%

score. Any submitted work from the student including discussion posts, assignments, etc. will not be given a grade until the presentation has been viewed and the quiz has been submitted. Failure to view the presentation and take the quiz before midnight on the last day to add/drop classes will result in the student being automatically dropped from the course.

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.

STUDENT IDENTIFICATION VERIFICATION

Students enrolled in online courses will be required to participate in a minimum of one (1) proctored assignment and/or one (1) virtual event to support student identification verification. Please refer to your Instructor Information Sheet for information regarding this requirement.

CLASSROOM ETIQUETTE:

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 for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

NETIQUETTE: is the term commonly used to refer to conventions adopted by Internet users on the web, mailing lists, public forums, and in live chat focused on online communications etiquette. For more information regarding Netiquette expectations for distance learning courses, please visit [Online Netiquette](#).

ACADEMIC DISHONESTY:

All forms of academic dishonesty, as outlined in the Student Code in the HGTC catalog, will NOT be tolerated and will result in disciplinary action. Anyone caught cheating (Defined in the code as: "a. Copying from another student's test or answer sheet. b. Using materials or equipment during a test not authorized by the person giving the test. c. Collaborating with any other person during a test without permission. d. Knowingly obtaining, using, buying, selling, transporting, or soliciting in whole or in part the contents of a test prior to its administration. e. Bribing or coercing any other person to obtain tests or information about tests. f. Substituting for another student or permitting any other person to substitute for oneself. g. Cooperating or aiding in any of the above.") or committing plagiarism (Defined in the code as: "(1) the appropriation of any other person's work and the unacknowledged incorporation of that work in one's own work or (2) submitting content for academic purposes that are created by artificial intelligence, technology platforms, or writing services and representing that such content is the person's own work product.") will be given a grade of a zero for that assignment and reported to the Senior VP of Academic Affairs, in accordance with the student handbook. A second offense will result in the student being withdrawn from the course with a W or WF at the professor's discretion and charges being filed with the Chief Student Services Officer.

Part II: Student Learning Outcomes

COURSE LEARNING OUTCOMES and ASSESSMENTS*:

Lecture Student Learning Outcomes:

Chapter 1: Understanding Environmental Science

Define environmental science.
Describe environmental issues facing the world.
List examples of progress in environmental quality.
Define sustainability and sustainable development.
Explain and give examples of ecosystem services.
Summarize the concept of the "Tragedy of the Commons".
Explain the process of science and the components of scientific research.
Define probability.
Define critical thinking and explain the importance of critical thinking to environmental science.
Describe outlooks on the relation of humans to the environment.
Identify individuals who helped shape outlooks and policies on resource conservation.

Chapter 2: Environmental Systems: Matter, Energy, and Life

Define systems and explain how feedback loops affect them.
Describe the materials that flow through ecosystems.
Define energy and differentiate between forms of energy.
Explain the first and second laws of thermodynamics and their application to living systems.
Summarize the flow of energy through ecosystems.
Explain the processes of photosynthesis and cellular respiration.
Define levels of biological organization.
Define biomass.
Explain the links between organisms in food webs.
Summarize the flow of carbon, nitrogen, phosphate, and sulfur through ecosystems.

Chapter 3: Evolution, Species Interactions, and Biological Communities

Explain how species diversity arises.
Describe the factors that lead to species distribution.
Define types of competition.
Explain adaptations related to predation.
Define and exemplify types of symbiotic relationships.
Explain the importance of keystone species in ecosystems.
Differentiate between exponential and logistic growth.
Define carrying capacity.
Differentiate between density-dependent and density-independent factors.
Differentiate between r-selected and K-selected species.
Analyze survivorship curves to determine life history strategies.
Explain factors affecting diversity, abundance, and distribution.
Describe the relationship between species diversity and community stability.
Define disturbance and explain how it affects communities.
Explain ecological succession and give examples of its stages.

Chapter 4: Human Populations

Describe the growth of human population throughout history.
 Explain concerns about continued growth of human populations.
 Explain perspectives on human population growth.
 Describe the components of the "I=PAT" formula.
 Explain the relationships between population growth and environmental impacts.
 Define demography.
 Define and explain statistical measures used in demographic calculations.
 Describe differences in population growth in different parts of the world.
 Describe factors which increase and decrease human population growth.
 Interpret age-class histograms.
 Describe factors that affect decisions about family size.
 Explain the "demographic transition".
 List methods of regulating fertility.
 Explain population growth projections.

Chapter 5: Biomes and Biodiversity

Describe the nine major terrestrial biomes and factors controlling their distribution.
 Describe open ocean and shoreline communities.
 Explain the biological importance of coral reefs, mangroves, estuaries, and wetlands.
 Describe types of freshwater ecosystems.
 Define biodiversity.
 List biodiversity hotspots.
 Explain the benefits of biodiversity.
 Describe the major threats to biodiversity.
 Differentiate between endangered, threatened, and vulnerable species.
 Describe efforts to protect biodiversity.

Chapter 6: Environmental Conservation: Forests, Grasslands, Parks, and Nature Preserves

Identify the amount of forested land remaining in the world.
 Describe causes of deforestation.
 Explain steps to preserve forests.
 Describe the distribution of grasslands worldwide.
 Explain activities that degrade grasslands.
 List categories of protected areas.
 Summarize the amount and type of protected land worldwide.
 Describe the importance of preserve size and shape on species survival.

Chapter 7: Food and Agriculture

Define food security and explain its distribution worldwide.
 Explain the health risks of undernourishment, poor diet, and overeating.
 List primary food sources worldwide.
 Describe components of soil and their relationship to soil fertility.

Explain a typical soil profile.
 Describe causes of soil degradation.
 Describe the environmental costs of farming.
 Explain the costs and benefits of the green revolution.
 Describe the use of genetically modified organisms in farming.
 Describe ways to minimize the environmental costs of agriculture.
 Describe the benefits of "locavorism" and eating low on the food chain.

Chapter 8: Environmental Health and Toxicology

Define environmental health.
 Explain the concept of disability-adjusted life years as a measure of disease burden and list the leading causes of global disease burden.
 Define and give examples of emergent diseases and their causes.
 Define and explain categories of toxic substances.
 Explain connections between ecology and health.
 Describe movement of toxins through ecosystems.
 Describe biological processes that reduce the effects of toxins.
 Differentiate between acute and chronic effects of toxins.
 Define and calculate LD50.
 Contrast risk perception and actual risk.
 Explain the factors that influence risk acceptability.
 Rank relative risks to human welfare.

Chapter 9: Climate

Compare and contrast the troposphere and stratosphere.
 Identify factors in natural climate variability.
 Explain the greenhouse effect.
 Identify how the greenhouse effect is changing the climate.
 List effects of climate change.
 Identify the strategies for minimizing global climate change.

Chapter 10: Air Pollution

Identify the main types and sources of conventional pollutants.
 Describe hazardous air pollutants and their effects.
 Discuss how air pollutants affect the climate and stratospheric ozone.
 Describe the ways air pollution can affect human health.
 Identify the policies and strategies for reducing air pollution.
 Explain how the world air quality has changed over time.

Chapter 11: Water: Resources and Pollution

Identify how water is used and list its various sources.
 Explain why water shortages occur.
 Identify how water supplies can be increased.
 Explain the costs associated with the different methods to increase water supplies.

Identify the ways in which water can be conserved.
Explain water pollution and its effects.
Describe the importance of sewage treatment and clean water in developing countries.
Explain how water pollution can be controlled.

Chapter 13: Energy

List the dominant sources of energy.
Explain peak oil production and the changing estimates of oil resources.
Compare and contrast the increasing use of natural gas.
Describe the environmental effects of coal burning.
Describe how nuclear reactors work and advantages and disadvantages of their use.
List the main renewables forms of energy.
Describe how solar, wind, hydropower, and other renewables effects the need for fossil fuels.
Describe a photovoltaic cell and its function.
Describe what biofuels are and the advantages and disadvantages of being used.

Chapter 14: Solid and Hazardous Waste

List the major components of the waste stream.
Describe how sanitary landfills operate and alternatives to landfills.
Explain the problems associated with ocean dumping.
Identify the "three Rs" of waste reduction, and which is most important.
Describe the process of converting biomass waste to natural gas.
Describe toxic and hazardous wastes and how they are disposed.
Explain bioremediation.
Describe the Superfund and its progress.

Chapter 16: Environmental Policy and Sustainability

Explain environmental policy and how it is formed.
Identify the NEPA and its role.
Describe some of the important US environmental laws.
Describe several international environmental laws and conventions.
Explain how the different branches of government influence environmental policy.
Explain some of the ways students can contribute to environmental protection.
Identify the Millennium Development Goals.

Lab Student Learning Outcomes:

Learning outcomes for the lab portion of this course are the Objectives given for each lab in the manual and can be found at the start of each lab. They include hands-on items such as identification of lab equipment, models, and specimens on slides, and the use of microscopes and lab equipment.

****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*

Lecture	75%
Lab	25%
	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, WFs and Is also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the [academic calendar](#) for deadlines for add/drop. You must attend at least one meeting of all of 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.

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 in order 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, check your Instructor's Course Information Sheet for any required on-site meeting times. Please note, instructors may require tests to be taken at approved testing sites, and if you use a testing center other than those provided by HGTC, the center may charge a fee for its services.

Science Department Attendance Policies

For a 15-week course (fall and spring) or a 10-week course (summer), the allowed number of absences for a MW or TR class is as follows: 4 absences are allowed for lecture and 2 are allowed for lab,

regardless of reason. For a lecture class that meets once a week, the allowed number of absences is 2.

For a 7-week fast-paced course (fall and spring) or a 5-week fast-paced course (summer), the allowed number of absences is as follows: 1 absence is allowed for lecture and 1 for lab, regardless of reason.

When a student surpasses the allowed number of absences, the student will be dropped automatically from the course with a W or a WF. Remember, an absence is an absence, no matter if it is excused or not!

Online/Hybrid Attendance:

Students enrolled in distance learning courses (hybrid and online) are required to maintain contact with the instructor on a regular basis to be counted as "in attendance" for the course. All distance learning students must participate weekly in an Attendance activity in order to demonstrate course participation. Students showing no activity in the course for two weeks (these weeks do not need to be consecutive) will be withdrawn due to lack of attendance.

Lab Attendance for Hybrid Courses:

Students in hybrid classes in which labs meet weekly, are allowed two (2) lab absences. Students in hybrid labs that only meet 5 or 6 times during the semester, must attend all lab sessions for its entirety. When a student surpasses the allowed number of absences, the student will be dropped automatically from the course with a W or a WF.

Part V: Student Resources



THE STUDENT SUCCESS AND TUTORING CENTER (SSTC):

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

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

Visit the [Student Success & Tutoring Center](#) website for more information. To schedule tutoring, 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 [Online Resource Center](#) to access on-demand resources.



STUDENT INFORMATION CENTER: TECH Central

TECH Central offers to all students the following free resources:

1. **Getting around HGTC:** General information and guidance for enrollment, financial aid, registration, and payment plan support!
2. Use the [Online Resource Center \(ORC\)](#) including Office 365 support, password resets, and username information.
3. **In-person workshops, online tutorials and more services** are available in Desire2Learn, Student Portal, Degree Works, and Office 365.
4. **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. Or please call (843) 349 – TECH (8324), Option #1.



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 are equipped with computers to support academic research and related schoolwork; printing is available as well. Visit the [Library](#) website for more information or call (843) 349-5268.

STUDENT TESTING:

Testing in an **online/hybrid** course and in **make-up exam** situations may be accomplished in a variety of ways:

- Test administered within D2L
- Test administered in writing on paper
- Test administered through Publisher Platforms (which may have a fee associated with the usage)

Furthermore, tests may have time limits and/or require a proctor.

Proctoring can be accomplished either face-to-face at an approved site or online through our online proctoring service. To find out more about proctoring services, please visit the [Online Testing](#) section of the HGTC's Testing Center webpage.

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. Inquiries may be directed to HGTC's [Accessibility and Disability Service webpage](#). The Accessibility and Disability Services staff will review documentation of the student's disability and, in a confidential setting with the student, engage in an interactive process to develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided. Students will need to reach out to the Accessibility and Disability Services staff each semester to renew their accommodations.

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:

Horry-Georgetown Technical College shall not discriminate in employment or personnel decisions or in student admissions or in student decisions, or in all other segments of the College community on the basis of race, color, sex, national or ethnic origin, age, religion, disability, marital or family status, veteran status, political ideas, sexual orientation, gender identity, or pregnancy, childbirth, or related medical conditions, including, but not limited to, lactation, in the educational programs and activities which it operates, and the college is prohibited from discrimination in such manner by applicable laws. Practices and requirements for nondiscrimination extend to the enrollment of students in programs and activities of the College and employment by the College.

All inquiries regarding the federal laws as they relate to discrimination on the basis of sex may be directed to Tamatha Sells, Title IX Coordinator, Horry-Georgetown Technical College, Building 1100C, Room 107B, 2050 Hwy 501 E, PO Box 261966, Conway, SC 29528-6066, 843-349-5218, tamatha.sells@hgtc.edu or to the US Department of Education Office of Civil Rights. (Telephone: 800-421-3481/Email: OCR@ed.gov).

Other 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 & 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.

Other 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, Section 504 & Title II Coordinator Horry-Georgetown Technical College, Building 1100C, Room 107A, 2050 Hwy 501 E, PO Box 261966, Conway, SC 29528-6066, 843-349-5228, melissa.batten@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 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).

For more information, contact Tamatha Sells, Title IX Coordinator, Conway Campus, Building 1100C, Room 107B, 843-349-5218, tamatha.sells@hgtc.edu.

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**](#).