



DEPARTMENT OF SCIENCE
COURSE INFORMATION SHEET FOR
**ENV210 – ENVIRONMENTAL
TECHNOLOGY**

All members of the Science Department at Clinton Community College use the respective course templates as a basis for their course syllabi. Faculty may, at their discretion, change the order of the course content or add course content.

COURSE NUMBER AND TITLE: ENV210 – Environmental Technology

COURSE SECTION: *TBA*

CONTACT HOURS: 5 **CREDIT HOURS:** 4

SEMESTER AND YEAR: *TBA*

INSTRUCTOR'S NAME, TELEPHONE NUMBER, EMAIL ADDRESS, OFFICE NUMBER, AND OFFICE HOURS: *TBA*

I. COURSE DESCRIPTION:

The occurrence, physical, and chemical nature of groundwater in the context of a variety of geologic settings is the background for applying practical methods of site characterization. Topics include pollution sources, and the fate of pollutants in the air, water and soil. Emphasis is placed on technologies to deal with hazardous materials, hazardous waste pollution prevention, and occupational health safety, as well as the concepts of environmental management. Field methods and the use of Global Positioning System (GPS) and the Geographic Information System (GIS) as integrated tools used by environmentalists will be integrated into the course. There are two hours of lecture and one four-hour laboratory per week.

II. COREQUISITE: ENV101 – Environmental Science or equivalent

III. COURSE OBJECTIVES:

As the result of instructional activities, students will be able to:

1. describe and explain the hydrologic cycle, the hydrologic equation, and the role of energy transformations.
2. apply the principles of evaporation and transpiration toward understanding the role of precipitation in the hydrologic cycle.
3. explain the basic concepts of runoff and stream flow and use them to interpret stream hydrographs, including measuring stream flow, and determining groundwater recharge from baseflow.
4. demonstrate an understanding of the relationship between soil moisture and groundwater by measuring aquifer parameters.

5. identify the principles of groundwater flow and apply groundwater flow equations such as Darcy's Law to calculate groundwater movement in different aquifers.
6. describe the dynamics of groundwater flow to wells, including the design, implementation, and interpretation of a pump test.
7. describe the nature of aquifers in different geologic settings.
8. apply the basic concepts of water chemistry toward understanding the interaction between chemicals and water and subsequent influence on contaminant fate.
9. identify the ways in which water quality and groundwater contamination are determined and the means of attaining groundwater restoration.
10. explain the principles of groundwater development and management, including the nature of groundwater budgets, artificial recharge, how to protect water quality in aquifers, and current trends in water resource management.
11. demonstrate an ability to use basic field methods to collect data for successful site characterization, and to write a project report.
12. demonstrate the use of GIS and GPS as an integral tool of environmental and resource management.
13. identify different types of groundwater models and demonstrate an ability to use them to characterize a site.
14. identify the broad range of environmental laws and regulations that drive decisions made in the environmental technology field.
15. demonstrate knowledge of various environmental management systems, i.e., ISO 14000 and their applications.
16. describe and explain the processes used by government to regulate hazardous materials, hazardous waste, and work place safety.
17. demonstrate knowledge of groundwater remediation technologies and their application to a variety of settings.
18. identify the health effects of hazardous materials.
19. identify air sampling techniques and how to use the data to compute atmospheric loadings and assimilation.
20. describe and explain the principles of water and wastewater treatment and be able to apply the appropriate environmental technology for maintaining potable water and proper solid waste treatment/disposal.
21. differentiate between various waste streams and the environmental technologies associated with the treatment/disposal of non-hazardous, hazardous, and nuclear wastes.
22. demonstrate an understanding of how OSHA regulations and operations insure a safe work place environment for all citizens and residents of the U.S,
23. describe the techniques used to prevent pollution.

IV. REQUIRED TEXTBOOK AND MATERIALS:

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REQUIRED MATERIALS:

Safety glasses are required for all on-campus sections.

V. METHODS OF INSTRUCTION/COURSE ORGANIZATION: *To be determined by the respective instructor.*

VI. ATTENDANCE PROCEDURE (INCLUDING MAKEUP POLICY): *To be determined by the respective instructor.*

VII. BIBLIOGRAPHY OF READINGS (IF APPLICABLE): *To be determined by the respective instructor.*

VIII. METHODS OF EVALUATION (INCLUDING THE CALCULATION OF COURSE GRADE): *To be determined by the respective instructor. The methods of evaluation shall include tests (test types, length and weight of each), papers (weight of each), projects (weight of each), and other forms of evaluation (weight of each).*

IX. GRADING SCALE: *To be determined by the respective instructor. The grading scale shall indicate what numerical scores correspond to the following grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.*

Please Include: If you have, or suspect you may have, any type of disability or learning problem that may require extra assistance or special accommodations, please speak to me privately after class or during my office hours as soon as possible so I can help you obtain any assistance you may need to successfully complete this course. You should also contact Laurie Bethka, Room 420M in the Academic Assistance Center, for further assistance.

X. GENERAL TOPICS OUTLINE:

1. Water
2. Evaporation and Precipitation
3. Runoff and Stream Flow
4. Properties of Aquifers
5. Principles of Groundwater Flow
6. Soil Moisture and Groundwater Recharge
7. Groundwater Flow to Wells
8. Regional Groundwater Flow
9. Geology of Groundwater Occurrence
10. Water Chemistry
11. Water Quality and Groundwater Contamination
12. Groundwater Development and Management
13. Field Methods
14. Groundwater Models
15. Overview of Governmental Processes
16. Environmental Laws and Regulations
17. Environmental Management Systems
18. Health Effects of Hazardous Materials
19. Groundwater Remediation
20. Air
21. Water, Wastewater and Solid Waste

- 22. Hazardous, Non-Hazardous, and Nuclear Waste
- 23. OSHA Pollution Prevention

XI. ACADEMIC INTEGRITY: Academic honesty is expected of all Clinton Community College students. It is academically dishonest, for example, to misrepresent another person's work as one's own, to take credit for someone else's work or ideas, to accept help on a test, to obtain advanced information on confidential test materials, or to intentionally harm another student's chances for academic success.

XII. COURSE CONTINUITY PLAN: In the case that the college officially closes because of an emergency which causes a short term disruption of this course, we will utilize e-mail to continue this course in the short term (1-3 weeks). All students need to utilize their campus e-mail to receive course related information.