COURSE OUTLINE
CIVE 440- Nonpoint Source Pollution

Credits: 3
Term(s) to be offered: Fall

Prerequisite: CIVE 300, Fluid Mechanics; or CIVE 322/ENVE 322, Basic Hydrology; or SOCR 240, Introductory Soil Science; or WR 416, Land Use Hydrology

Catalog description: Principles, processes, impacts, and control of nonpoint source pollution of surface and groundwater.

Instructor: Brian P. Bledsoe, ERC A-215, Phone: 491-8410

Text: Novotny, V. 2003. *Water Quality: Diffuse Pollution and Watershed Management. 2nd Edition.* John Wiley and Sons, New York.

Course Objectives: The course presents the principles, processes, and control of nonpoint source pollution. Particular emphasis is placed on problems associated with urban runoff, agricultural impacts on water quality, and impacts of mining and forestry. Surface and ground water pollution in diverse aquatic systems including stream, river, lake, reservoir, estuarine environments are considered. Students are exposed to a variety of structural and non-structural management practices.

Upon completion of this course, the student should be able to:

- Define the major components of the hydrologic cycle and describe how they affect surface runoff, subsurface flow, groundwater recharge, and surface and groundwater quality;
- Describe ways of measuring or estimating the hydrologic fluxes that are important in nonpoint source pollution;
- Describe the major chemical, physical, and biological processes affecting the fate and transport of nutrients, pesticides, sediment, heavy metals, and other pollutants in the soil, surface runoff, and groundwater;
- Describe the most important legislation and regulations associated with nonpoint source pollution;
- Perform rainfall-runoff, erosion, return period, and flood frequency calculations;
- Design stormwater conveyance channels, filter strips, and settling ponds;
- Compute retardation coefficients and degradation rates for pesticides;
- Compute urban pollutant buildup and wash off rates;
- Describe eutrophication and estimate limiting nutrient loading rates;
- Perform wetland design calculations for removal of nitrogen and other pollutants;
- Estimate long-term average annual soil loss using the USLE;
- Describe the effects of different production systems and land management practices on the
- hydrologic and water quality response of rural and urban watersheds;
- Describe the principal components and requirements of a TMDL plan;
- Describe the advantages and limitations of conventionally used techniques for diffuse pollution control;
- Understand the impacts of atmospheric pollution on water quality;
- Design a diffuse pollution control plan for a farm, agricultural watershed, or urban development.

Course Topics/Weekly Schedule:

Week	Topic
1.	Introduction to water quality, legal and regulatory framework for managing NPS pollution
2-3.	Causes of diffuse pollution / Basic concepts
4-5.	Hydrology
5-6.	Erosion and sedimentation
7.	Soil pollution
8.	Soil pollution / Groundwater
9.	Urban and highway diffuse pollution
10.	Control of urban diffuse pollution
11-12.	Agricultural issues
13.	TMDLs / Monitoring
14.	Waterbody assessment
15.	Modeling / Decision-making, management and restoration

Instructional Methodology: Three lectures per week.

Mode of Delivery: Traditional lectures in class and via the course website for distance students.

Methods of Evaluation: The course grade will be based on the following distribution:

Homework	35%
Exams (2)	30%
Quizzes	10%
Final Exam	25%
	100%