

**CE 440 NONPOINT SOURCE POLLUTION  
COURSE OUTLINE  
Fall 2005**

**DESCRIPTION:** Principles, processes, and control of nonpoint source pollution. Particular emphasis is placed on NPS 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.

**PURPOSE OF THE COURSE:** This course familiarizes students with the nature and extent of NPS problems, the fundamental processes that govern the fate and transport of diffuse pollution, and the design of effective pollution abatement measures.

**INSTRUCTOR:** Brian P. Bledsoe, Ph.D., P.E.  
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**COURSE HOME PAGE:** available via WebCT at <https://webct.colostate.edu/>

**OFFICE HOURS:** 11am-12 pm, MWF in A207G Engineering (Phone: 491-6580) or by appointment at the Engineering Research Center (Phone: 491-8410) at the Foothills Campus.

**TEXTBOOK:**  
Novotny, V. 2003. *Water Quality: Diffuse Pollution and Watershed Management*. 2<sup>nd</sup> Edition. John Wiley and Sons, New York.

<b>GRADING:</b>	HOMEWORK	35%
	EXAMS (2)	30%
	QUIZZES	10%
	FINAL EXAM	25%

**Quizzes:** I will endeavor to make this a discussion-oriented course. For this approach to be meaningful and effective, it is essential that you read material as it is assigned prior to our class discussions. To encourage you to do this, I will give several short quizzes throughout the semester to assess whether the reading assignments are being completed and comprehended. You will be able to drop a few of your lowest quiz scores or missed quizzes from your quiz grade.

**Policies:** I will accept late homework submissions up to five days after the due date or before solutions are distributed, whichever comes first. A **penalty of 20% per day** late will be assessed on these assignments. I will occasionally request abstracts (brief written summaries) of assigned reading material. Any requested abstract summaries of reading material are due in class on the date indicated with no exceptions. The purpose for this is to ensure that material has been studied prior to the class it will be discussed, so that we can have a meaningful discussion of it. Make-up exams will be given only for university-approved excuses or when you have a note from a medical professional. Please turn off cell phones in the classroom.

**Your work:** I encourage students to discuss and help each other on homework and other outside assignments but the final work you turn in should be distinctly your own.

**CE 440 Learning Objectives:**

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

1. Define the major components of the hydrologic cycle and describe how they affect surface runoff, subsurface flow, groundwater recharge, and surface and groundwater quality;
2. Describe ways of measuring or estimating the hydrologic fluxes that are important in nonpoint source pollution;
3. 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;
4. Describe the most important legislation and regulations associated with nonpoint source pollution;
5. Perform rainfall-runoff, erosion, return period, and flood frequency calculations;
6. Design stormwater conveyance channels, filter strips, and settling ponds;
7. Compute retardation coefficients and degradation rates for pesticides;
8. Compute urban pollutant buildup and washoff rates;
9. Describe eutrophication and estimate limiting nutrient loading rates;
10. Perform wetland design calculations for removal of nitrogen and other pollutants;
11. Estimate long-term average annual soil loss using the USLE;
12. Describe the effects of different production systems and land management practices on the hydrologic and water quality response of rural and urban watersheds;
13. Describe the principal components and requirements of a TMDL plan;
14. Describe the advantages and limitations of conventionally used techniques for diffuse pollution control;
15. Understand the impacts of atmospheric pollution on water quality;
16. Design a diffuse pollution control plan for a farm, agricultural watershed, or urban development.

## **Tentative Schedule**

<b><u>Topic</u></b>	<b><u>Week</u></b>	<b><u>Date</u></b>
Introduction to water quality, legal and regulatory framework for managing NPS pollution: Chapter 1	1	8-22
Causes of diffuse pollution / Basic concepts: Chapters 2-3	2-3	8-29
Hydrology: Chapter 4	4-5	9-12
Erosion and sedimentation: Chapter 5	5-6	9-26
Soil pollution: Chapters 6-7	7-8	10-3
Exam #1		10-10
Soil pollution / Groundwater: Chapters 6-7	7-8	10-12
Urban and highway diffuse pollution: Chapter 8	9	10-17
Control of urban diffuse pollution: Chapter 9	10	10-24
Agricultural issues: Chapter 10	11-12	10-31
TMDLs / Monitoring: Chapter 11	13	11-14
Exam #2		11-16
Fall Break – no class	14	11-23
Waterbody assessment: Chapter 12	15	11-28
Modeling / Decision-making: Chapter 13	16	12-5
Watershed management and restoration: Chapter 14	16	12-7
Final Exam		Monday Dec. 12 <sup>th</sup> , 9:10-11:10 am