CIVE 440 NONPOINT SOURCE POLLUTION

COURSE OUTLINE

Fall 2018

Tuesday and Thursday from 11 am – 12:15 pm in Engineering B105

DESCRIPTION: Principles, processes, and control of nonpoint source pollution. Particular emphasis is placed on non-point source (NPS) problems associated with urban runoff, agricultural influences 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 non-point source (NPS) problems, the fundamental processes that govern the fate and transport of diffuse pollution, and the design of effective pollution abatement measures.

INSTRUCTOR: Aditi S. Bhaskar, Ph.D.
Scott Bioengineering 250
Email: aditi.bhaskar@colostate.edu. *Please put CIVE440 in the subject line.*

OFFICE HOURS: Tuesdays 12:30 - 2, Wednesdays 3:30 - 5, or by appointment. Office hours are held in Scott Bioengineering 250.

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

GRADING: Plus/minus grading will be used with the following weighting:

HOMEWORK	35%
PRESENTATION	5%
MIDTERM	10%
QUIZZES	30%
FINAL EXAM	20%

POLICIES:

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. Quizzes may also be used to test understanding of concepts, and will be announced in advance. The lowest quiz grade will be dropped.

Homework Assignment Format: To ensure that you are presenting your homework solutions in a way that the grader can easily understand and give credit where appropriate, please observe these guidelines:

1. Homework assignments may be either handwritten or typed, pencil or ink, on any paper type, but must be legible.

2. Use only one problem per page, identify the problem number you are working on, and place name, class, and assignment number on each page. Put problem solution pages in order.
3. Clearly identify the answer to the problem statement in some way, such as a box or underline, including units.
4. Showing your work is worth points on the homework.
5. Do not turn in assignments with large portions crossed out or erased.
6. In some cases, showing results in a graph or figure is required. In these cases, label your axes, include units, and make sure solution information is clearly displayed.
7. If you use Excel for assignment calculations, you must document the equations you used in the calculations.

Homework Deadlines: Late homework will not be accepted for any reason, but the lowest homework grade will be dropped. Unless otherwise noted, the last submitted assignment in Canvas will be the one that is graded. Homework under my door will not be accepted as on time if homework is due at 11 am in class.

Homework Regrades: If you think an error has been made in grading on your homework assignment, you may request a regrade within 1 week (e.g., if the homework is handed back on a Tuesday, you may request a regrade up until before class the following Tuesday). Regrade requests will not be accepted after 1 week. To request a regrade, scan your homework assignment and email it to me as well as documenting (in writing) a detailed explanation of your identification of the problem. Verbal requests for regrade will not be considered. Note that a regrade may cause an increase or decrease of your score for the assignment.

Exams: Make-up exams will be given only for university-approved excuses or when you have a note from a medical professional.

Student Collaboration: I encourage students to work and study together to complete homework assignments, however each student is responsible for completing and submitting their own work. Copied work/answers will be identified by the grader and may result in all involved students receiving 0% for that assignment.

Communication: My suggestions for asking questions outside of class: (1) Canvas discussion boards, (2) office hours, and (3) emailing me. I suggest you subscribe to receive notifications from the Canvas discussion board. Posting a question on the Canvas discussion board is most likely to get you an answer quickly. Questions that are more conceptual may be better suited for office hours, and I encourage you to come to office hours. If neither of the above are suited to the issue you are having, I will also answer questions over email, provided that they clearly explain the problem/question and are written in a professional style (including salutation and attention to correct grammar and spelling), include CIVE440 in the subject line. Note that you should not anticipate a response any sooner than 24 hours after submission.

Academic Integrity: The course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog and the Student Conduct Code. CSU policies on academic integrity will be rigorously enforced in this course. Please examine the following references on academic integrity:
http://tilt.colostate.edu/integrity/honorpledge/
http://tilt.colostate.edu/integrity/faqs/what_are_rules.cfm
http://tilt.colostate.edu/integrity/resources/forstudents.cfm

CIVE 440 Learning Objectives:

Upon completion of this course, you 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

Topic	Week	Approx. Date
Introduction to water quality, legal and regulatory framework for managing NPS pollution: Chapter 1	1	8-21
Causes of diffuse pollution / Basic concepts: Chapters 2-3	2-3	8-28
Hydrology: Chapter 4	4-5	9-11
Erosion and sedimentation: Chapter 5	6-7	9-25
Soil pollution: Chapter 6	8	10-9
Midterm	9	**10-18**
Groundwater: Chapter 7	10	10-23
Urban and highway diffuse pollution: Chapter 8	11	10-30
Control of urban diffuse pollution: Chapter 9	12	11-6
Agricultural issues: Chapter 10	13	11-13
Fall Break – no class		11-20
Aquatic ecosystems and waterbody assessment: Chapter 12	14	11-27
Overview of TMDLs, Modeling, Watershed management and restoration Chapters 11, 13, 14	15	12-4
Final Exam	**Tuesday, December 11th, 6:20 – 8:20 in Engineering B105**	