

Prof. Mesut Pervizpour

Course URL:	http://widener.parameterid.com/										
Teaching Assistant:	TBA										
Textbook:	<i>Ground Water Contamination Transport and Remediation</i> , by P. B. Bedient, H. S. Rifai, and C. J. Newell, Prentice Hall, 2 nd Edition, ISBN 0130138401.										
Reference book for Laboratory:	<i>Bioscreen/BioChlor Contaminant Transport Model</i> Documentation <i>Modflow Finite Difference Groundwater Flow Model</i> (Groundwater Vistas)										
Tentative Grading: (± will be used)	<table> <tr> <td>Mid-term test average</td><td>25%</td></tr> <tr> <td>Periodic Quizzes</td><td>20%</td></tr> <tr> <td>Projects & Paper Reviews</td><td>20%</td></tr> <tr> <td>Final Exam</td><td>35%</td></tr> <tr> <td>Total:</td><td>100%</td></tr> </table>	Mid-term test average	25%	Periodic Quizzes	20%	Projects & Paper Reviews	20%	Final Exam	35%	Total:	100%
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Class Schedule:	Lecture Office Hours:										

GENERAL CONDUCT OF COURSE

- During the semester, 2 one-hour tests will be given. The student MUST take all tests. **NO** make-ups are granted unless absence from a test is justified with proper documentation. All tests will be based on the material covered up to the date of test. Unless otherwise instructed, closed-book tests should be expected. Any grade review you see justified should be brought to my attention within the first week of receiving the grade.
- Homework assignments and solution key will be posted but not collected. There will be **regular in class quizzes** from the assigned homework problems. A **design problem** will be assigned where analysis and work will be submitted in a report format.
- It is not possible to thoroughly learn all of the material in the *Available Resources* this semester. As you go through different sections (Contamination Sources in Chap. 4 for example), focus will be upon the contaminant of immediate interest (Benzene), but will include some other contaminants, primarily TCE. The major objective is for you to learn how to solve selected problems for selected contaminants.
- The project assigned to you as part of the course is to help assess extent of contaminant and appropriate response (no action, remediation, monitoring, etc.) at our client's hypothetical CPI site. Grad students will perform additional modeling and analysis (e.g. Bio-screen model, sorption model) of contaminant fate and transport.
- The main contaminants of concern are TCE and Benzene, both organic contaminants. Because TCE can degrade into other compounds, those compounds must also be considered. Gasoline contains benzene and several other less mobile compounds; although all the compounds should be considered separately, sometimes a "worst case" scenario is considered by assuming all compounds are as mobile as benzene. We will only have time for a very brief introduction to inorganic contaminants. Inorganic contaminants have many complexities including speciation (different valence states). Grad students will review additional contaminants.

COURSE DESCRIPTION

The study of subsurface water, its environment, distribution, and movement. Included are flow patterns, well hydraulics, and an introduction to the movement of contaminants. Design problems are included to simulate flow with analytical and numerical models, and contaminant migration using analytical models. Prerequisites: TBD or permission of instructor.

COURSE LEARNING OBJECTIVES

Upon successful completion of this course, students will be able to:

- Ability to calculate water levels, flow, and water budgets in confined aquifers (Bedient Chap. 1,2)
- Ability to calculate water levels, flow, and water budgets in unconfined aquifers (Bedient Chap. 1,2)
- Ability to solve well hydraulics problems (Bedient Chap. 3)
- Apply basic principles of fate and transport for selected contaminants (Bedient Chap. 4,5)
- Perform simple fate and transport calculations using analytical expressions that incorporate advection, diffusion, and dispersion (Bedient Chap. 6)
- Analyze impact of benzene at the CPI site using the USGS's Modflow and EPA's Bioscreen Contaminant Transport Models (Bedient Chap. 8)

COURSE INFO

The course site has numerous files, please access and follow the instructions;

1. Download and print the file: "USGS Ground- and Surface Water: A single Resource, USGS Circular 1139."
This 11 MB file has numerous color photographs, so you should read online or print on a color printer. This is an important document which will be discussed/ referred during class lectures for different contexts as the course progresses.
2. The course is divided in two broad parts, namely, "Groundwater flow" and "Groundwater contamination"
3. The first part has both study materials in word files and power point for class lectures. "Student Notes Groundwater Flow – First Part of the Course" are Word files which are available in course site in advance of the class lectures.
Power point files used for lecture in class will be also available before the class. Print them and this will go along with the word files.
4. The "Student Notes – Groundwater Contamination" (second part of course) are all PowerPoint. These will be available as the course progresses.
5. Homework, projects, other assignments and documents will be posted in course site from time to time as the course progresses and will be announced in the class.