1-2002

GEOL 572.01: Advanced Hydrogeology

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Geol. 572 Advanced Hydrogeology

Spring 2002

Instructor: William Woessner

Text: Groundwater and Wells (Driscoll)
Contaminant Transport (Fetter)
Outside readings as assigned (list attached)

Class Meeting: T, TH 8:00-9:30 A.M.

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Course Objectives:

Develop advanced theoretical and applied hydrogeologic skills, specifically in solute transport processes, interpretation of water level change, production well design and aquifer test analyses.

Course Assessment:

Completion of all assignments in a professional manner
Active class participation
Grading of assignments

Course Design:

Readings and lectures, problems sets, research paper, midterm and final exam

Course Requirements:

Complete readings
Actively participate in class discussions
Complete all assignments in a professional manner
10 page term paper on a research topic
Grading: Problem Sets 55%, Midterm 25%, Individual Report: Oral 5%, Written 15%, Final 25%.

Final Exam: Friday, May 17, 8:00-10:00 A.M.

All Assignments will be due on dates specified in class.

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GEOLOGY 572 - ADVANCED HYDROGEOLOGY
WILLIAM W. WOESSNER - SPRING 2002

DATE	TOPIC	READING
January 29	Intro - Solute Transport	Fetter, Ch. 1
February 31	Solute transport	Ch. 2-2.6
February 5	Solute Transport	Fetter
February 7	Solute Transport	
February 12	Solute Transport	Fetter
February 14	Solute Transport	
February 15	LAST DAY TO ADD/DROP BY CYBERBEAR	
February 19	Solute Transport	Fetter
February 21	Solute Transport	
February 26	Solute Transport	Fetter
February 28	Solute Transport	
March 5	Well Drilling Techniques	Driscoll
March 6	Well Drilling Techniques	
March 11	DROP/ADDS (NO $$$ BACK)	
March 12	Production Well Design	Driscoll
March 13	Production Well Design	
March 18-20	**SPRING BREAK**	
March 26	Production Well	Driscoll
March 28	Production Well Design	
April 2	Production Well	Lohman
April 4	Aquifer Test	
April 9	Aquifer Test	Lohman
April 11	Aquifer Test	
April 16	Aquifer Test	Lohman
April 18	Aquifer Test	
April 23	Aquifer Test	Lohman
April 25	Aquifer Test	
April 30	Paper	
May 2	Presentations	
May 7	Review	
May 9	Finish Up	

GEOLOGY 572 - ADVANCED HYDROGEOLOGY

MATERIAL WILL BE PLACED ON RESERVE AS REQUESTED

WELL DESIGN AND EVALUATION

Williams, 1981, Fundamental Concepts of Well Design

Clark and Turner, 1983, Experiments to Assess the Hydraulic Efficiency of Well Screens

Williams, 1981, The Well/Aquifer Model

Schafer, 1978, Casing Storage Can Affect Pumping Test Data

Harrill, 1970, Determining Transmissivity from Water-level Recovery of a Step-drawdown Test

Nahm, 1980, Estimating Transmissivity and Well Loss Constant Using Multi-rate Test Data from a Pumped Well

Turcan, 1962, Estimating the Specific Capacity of a Well

AQUIFER TESTING

Reed, 1980, Type curves for Selected Problems of Flow to Wells in Confined Aquifers

Neuman, and Witherspoon, 1969, Applicability of Current Theories of Flow in Leaky Aquifers

Jacob and Lohman, 1952, Non-steady Flow to a Well of Constant Drawdown in an Extensive Aquifer.

Theis, 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-water Storage.

Boulton, 1954, The Drawdown of the Water-table Under Non-steady Conditions Near a Pumped Well in an Unconfined Formation.

Walton, 1978, Comprehensive Analysis of Water-table Aquifer Test Data.

Jacob, 1940, On the flow of Water in an Elastic Artesian Aquifer.

Papadopulos and Cooper, 1967, Drawdown in a Well of Large diameter.

WATER LEVEL FLUCTUATIONS

Turk, 1975, Diurnal Fluctuations of Water-tables Induced by Atmospheric Pressure Changes.

Meyboom, 1967, Groundwater Studies in the Assiniboine River Drainage Basin.

Freeze, 1969, The Mechanism of Natural Ground-water Recharge and Discharge.

SOLUTE TRANSPORT

Sauty, 1980, An analysis of Hydrodispersive Transfer in Aquifers.

Garabedian et al, 1991, Large Scale Natural Gradient Tracer Test in Sand and Gravel, Cape Cod, Massachusetts.

Wheatcraft and Tyler, 1988, An Explanation of Scale-Dependent Dispersivity in Heterogeneous Aquifers Using Concepts of Fractal Geometry.

Gelhar, 1986, Stochastic Subsurface Hydrology from Theory to Applications

Anderson, Movement of Contaminants in Groundwater.

Bahr, 1992, Groundwater Transport of Contaminants.

Cherry et al, Contaminants in Groundwater Chemical Processes.

Cherry et al, Contaminant Hydrogeology Part 1, Physical Processes.

Domenico and Robbins, 1984, A Dispersion Scale Effect in Model Calibrations and Field Tracer Experiments.

Gillham and Cherry, 1982, Contaminant migration in Saturated Unconsolidated Geologic Deposits.

Lehr, 1988, An Irreverent View of Contaminant Dispersion.

Sudicky, 1986, A Natural Gradient Experiment on Solute Transport in a Sand Aquifer.

Robertson et al, 1989, Groundwater Contamination at Two Small Septic Systems on Sand Aquifers.

POSSIBLE RESEARCH PAPER TOPICS

1. Hydrogeology of river floodplains and streams
2. Fractal approaches to solute transport modeling
3. Scale dependent representation of dispersivity
4. DNAPL behavior in the saturated zone
5. The use and interpretation of ground penetrating radar and seismic reflection in groundwater studies
6. Depositional environments of high hydraulic conductivity aquifers

7. Transport of colloids in groundwater