

University of Montana
ScholarWorks at University of Montana

Syllabi

Course Syllabi

Spring 2-1-2004

GEOL 572.01: Advanced Hydrogeology

William W. Woessner

University of Montana - Missoula, william.Woessner@umontana.edu

Let us know how access to this document benefits you.

Follow this and additional works at: <https://scholarworks.umt.edu/syllabi>

Recommended Citation

Woessner, William W., "GEOL 572.01: Advanced Hydrogeology" (2004). *Syllabi*. 9455.
<https://scholarworks.umt.edu/syllabi/9455>

This Syllabus is brought to you for free and open access by the Course Syllabi at ScholarWorks at University of Montana. It has been accepted for inclusion in Syllabi by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

Geol. 572 Advanced Hydrogeology

Spring 2004

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.

Dr. Woessner's travel and meeting schedule will require some movement of class meeting times. A weeks notice will be given for rescheduling. A few two hour evening classes may need to be scheduled.

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%, Individual Report: Oral 5%, Written 15%, Final 25%.

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

All Assignments will be due on dates specified in class.

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

DATE	TOPIC	READING
January 26 February 29	Intro Water Level Changes	
February 3 February 6	Water Level Changes No Class - MT American Fisheries, Whitefish	
February 10 February 12	Water Level Changes Well Drilling Techniques	Driscoll
February 13	LAST DAY TO ADD/DROP BY CYBERBEAR	
February 17 February 19	Production Well Production Well	Driscoll
February 24 February 26	Production Well Production Well	Driscoll
March 2 March 4	Aquifer Test Aquifer Test	Lohman
March 9 March 9 March 11	DROP/ADDS (NO \$\$\$ BACK) Aquifer Test Aquifer Test	Lohman
March 16 March 18	Aquifer Test Aquifer Test	Lohman
March 23 March 25	Solute Transport Solute Transport	Fetter
Mar. 29 - Ap. 2	SPRING BREAK	
April 6 April 8	Solute Transport Solute Transport	Fetter
April 13 April 15	Solute Transport Solute Transport	Fetter
April 20 April 22	Solute Transport Solute Transport	Fetter
April 27 May 29	Paper Presentations	
May 4 May 6	Review Finish Up	

GEOLOGY 572 - ADVANCED HYDROGEOLOGY

SUGGESTED OUTSIDE READING

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.

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