



WISCONSIN

UNIVERSITY OF WISCONSIN-MADISON

University of Wisconsin - Madison
College of Engineering [EGR]
Last Offered: 2015 Spring [1154]
Direct Link to this Syllabus :

<http://aefis.engr.wisc.edu/index.cfm/page/CourseAdmin.ViewABET?coursecatalogid=495&pdf=True>

1. **G L E 629, Contaminant Hydrogeology**
2. **Credits : 3 Contact Hours : 2.5**
3. **Textbook and Materials :** Fundamentals of Ground Water by F. W. Schwartz and H. Zhang, 2003, Wiley

a. Other Supplemental Materials :

Basic Ground-Water Hydrology by R. C. Heath, 1983, USGS Water Supply Paper 2220
<http://pubs.usgs.gov/wsp/wsp2220/>

Groundwater by R. A. Freeze and J. A. Cherry, 1979, Prentice Hall

Applied Hydrogeology by C. W. Fetter, 4th Edition, 2001, Prentice Hall

Groundwater and Wells, F. G. Driscoll, 2nd Edition, 1986, Johnson Division

Physical and Chemical Hydrogeology, by P.A. Domenico and F.W. Schwartz, 2nd Edition, 1998, Wiley

Groundwater Science, by C.R. Fitts, 2002, Academic Press

Introduction to Hydrogeology, by D. Deming, 2002, McGraw Hill

• **Specific Course Information :**

- a. **Brief description of the content of the course (Course Catalog Description) :** Physical and chemical processes governing the transport of solutes in groundwater; application of hydrogeologic and geochemical theory and practice to the protection of aquifers from contamination; problem sets and group projects.
- b. **Pre-requisites or Co-requisites :** Geoscience 627 and college level chemistry or cons inst
- c. **This is a Elective course.**

• **Specific Goals for the Course :**

- a. **Course Outcomes :**
- b. **ABET Student Learning Outcomes :**

• **Brief List of Topics to be Covered :**

Introduction; the hydrologic cycle and water;

Porosity;

Darcy's experiment and hydraulic head;

Hydraulic Gradient, hydraulic conductivity, permeability;

Heterogeneity and anisotropy;

Well construction, field mapping of heads;

Transmissive and storage properties;

Geology and hydraulic properties;

Hydrogeologic regions;

GW flow equation I (Derivation);

GW flow equation II (Simple Solutions);

Flownets, regional flow;

GW-surface water interactions;

Aquifer Tests I (Theis solution);

Aquifer Tests II (Superposition and boundaries);

Pumping test film, slug tests;

Ground water modeling;

Ground water modeling II (BC/IC);

Ground water modeling III (Applications);

Intro to ground water chemistry;

Acid-base, complexation,;

Surface reactions, redox;

Isotopes and age;

Chemical evolution of groundwater;

Intro to solute;

Intro to contaminant hydrogeology