

Office of Academic Affairs  
Tarleton State University  
September, 2003

Master Course Syllabus Outline

**Department:** Chemistry, Geosciences, and Environmental Science

**Course Prefix/Number:** GEOL320

**Official Course Title:** Hydrogeology

Master Syllabus Approved by Department on: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
month date year

**I. Catalog Description**

Aquifer characteristics, physical principles of groundwater flow, well analysis, geologic controls on local and regional groundwater movement, water chemistry, groundwater pollution, legal issues in groundwater.

**II. Prerequisites**

GEOL 1054, CHEM 1084, MATH 1093, or approval of department head.

**III. Expanded Course Description**

Hydrogeology is the study of groundwater movement and characteristics. It is assumed the student has a general knowledge of basic geology including sediments, rocks, stratigraphy, and structural geology. In addition, the student must be able to manipulate and solve equations and to have a familiarity with unit conversions. Topics in the class include the hydrologic cycle, surface water processes, the geology of groundwater, fundamentals of groundwater flow, well analysis methods, groundwater chemistry and contamination issues. This course is required in the Hydrogeology track of Geosciences and is an elective in other tracks.

**IV. Intended Student Learning Outcomes**

**Knowledge outcomes**

Upon completion of this course students will:

- understand the processes in the water cycle
- understand the proper methods for hydrogeologic evaluation
- understand proper well analysis methods
- be able to list common water contaminants and their sources

**Skill outcomes**

Upon completion of this course students will:

- be able to read, access, and critically evaluate the scientific literature
- be able to use some of the tools of the research and professional hydrogeologist
- describe the processes in the hydrologic cycle and explain how rates of each are quantified
- use lab and non-lab methods to estimate values of porosity, specific yield, permeability, and hydraulic conductivity for any given type of porous medium
- describe a hydrogeologic setting in terms of aquifers, aquitards, and hydrostratigraphic units
- know the basics of aquifer testing and be able to interpret aquifer test results
- use well logs, regional geologic data, surface water records, and other hydrogeologic data to construct hydrogeologic cross sections and maps for a given area

**Value outcomes**

Upon completion of this course students will:

- appreciate the importance of groundwater as a resource
- understand the problems both scientific, social, and economic associated with groundwater pollution

V. Unless otherwise stipulated in this master syllabus by the department, the following items are subject to faculty discretion as described in each faculty member's individual course outline/syllabus:

**Course Requirements** (*grading/evaluation procedures; class attendance policy; term papers, projects, field assignments; examinations; class participation, etc.*)

3 exams, weekly lab exercises and reports, weekly homework assignments, synopsis of a professional publication.

**Required Text(s)** Applied Hydrogeology, 4<sup>th</sup> edition, 2001, C.W. Fetter, Prentice-Hall

Department Head Signature/Date:

\_\_\_\_\_  
Signature

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Date