

# Bemidji State University

## GEOL 3211: Environmental Hydrology

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

The course provides a basic understanding of the principles and processes governing the movement of water through the hydrologic cycle, including atmospheric moisture flow, surface runoff, infiltration, and groundwater flow. Environmentally relevant applications based on case studies will be studied. The course include coverage of contemporary global issues related to water resources, sustainable development, and climate change. Prerequisites: GEOL 1110 and MATH 1170 or equivalent, or consent of instructor.

**B. COURSE EFFECTIVE DATES:** 08/02/2011 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Introduction, Energy and the hydrologic cycle. Tips for working problems in hydrogeology; working in different unit systems.
2. Evaporation, transpiration, precipitation. Water budgets and the hydrologic equation
3. Surface water hydrology
4. Properties of fluids; aquifer and aquitard properties, porosity
5. Types of aquifers, geology of aquifers, Aquifer characteristics
6. Geology of Groundwater. Geologic settings of aquifer types. Groundwater regions.
7. Energy in the groundwater system, hydraulic head and groundwater flow; Darcy's Law and equations of groundwater flow. Flow nets.
8. Regional Groundwater flow.
9. Introduction to Hydrogeochemistry
10. Application of chemical principles to groundwater, geochemical cycling in groundwater environments.
11. Basics of flow to wells.

### D. LEARNING OUTCOMES (General)

1. learn to identify specific problems in hydrology/hydrogeology
2. effectively present hydrologic information in oral or written format
3. demonstrate an understanding of specific knowledge pertaining to hydrology/hydrogeology
4. solve hydrologic problems through formulation and evaluation of hydrologic hypotheses by evaluating data in light of hydrologic principles
5. design a strategy for solving hydrologic problems;

### E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted