A. Course Description

Credits: 5

Prerequisites:

GEOL 110 Introduction to Earth Sciences or instructors permission. AND
MATH 115 College Algebra
OR
GEOL 118 Environmental Geology AND
MATH 115 College Algebra or equivalent.

Lab Hours/ Weeks: Corequisites: None

Lecture Hours/ Week :

MnTC Goals: Goal LS - Upper Division Liberal Studies, Goal 10 - People/Environment

This course develops topics in earth surface processes, including geomorphology and general hydrology. Studies of Late Cenozoic landscape change will focus on glacial and fluvial processes in the Upper Midwest. We will examine surface water and groundwater hydrology with an emphasis on the Twin Cities and southern Minnesota. The course will employ college algebra skills to develop a semi-quantitative approach to groundwater and surface water hydrology. Mandatory Saturday field trips are an essential component of this course.

B. Course Effective Dates: 09/14/2011 - Present

C. Outline of Major Content Areas:

See Course Description for major content areas.

D. Learning Outcomes (General)

1. Articulate and defend the actions they would take on various environmental issue
2. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
3. Demonstrate mastery of the concepts, knowledge and vocabulary of earth surface processes at the level upper division level, the level necessary for post-graduate study.
4. Demonstrate quantitative reasoning skills and use arithmetic, algebra and statistics at a level appropriate for graduates of bachelors degree science programs.
5. Demonstrate understanding of scientific theories and knowledge in geomorphology and hydrology.
6. Describe the basic institutional arrangements (social, legal, political, economic, etc.) that are evolving to deal with environmental and natural resource challenges.
7. Develop a qualitative understanding of the three-dimensional complexity of groundwater flow, particularly in urban watersheds.
8. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems, and institutions.
9. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.
10. Formulate and test hypotheses by performing experiments in geology, including the collection of data, statistical and graphical analysis of results, and an interpretation of its sources of error and uncertainty.
11. Have familiarity with experimental and simple quantitative models for fluid flow through porous geologic materials.
12. Propose and assess alternative solutions to environmental problems.
13. Recognize the potential for and consequences of geologic hazards associated with rapid landscape disturbances such as floods, landslides, and coastal erosion.
14. Understand and competently articulate the conditions under which soil resources can be managed sustainably, in agricultural, urban, and in less-disturbed settings.
15. Understand and competently articulate the roles of agriculture, urbanization, and mineral resource extraction in landscape disturbance.
16. Understand the nature and structure of soil resources. Identify key components of soils in the field, and the physical,
biological, and chemical properties of soil horizons.
17. Understand the role of fluvial (river) erosional and depositional processes in shaping landscape.
18. Understand the role of glaciation in shaping landscape, with specific reference to Minnesota.
19. Understand the unequal distribution of water resources and the cultural and political implications.
20. Use topographic maps, surficial geologic maps, aerial photographs, and satellite imagery to recognize landforms and interpret the processes necessary for their development.

E. Learning Outcomes (MN Transfer Curriculum)

Goal LS - Upper Division Liberal Studies
None

Goal 10 - People/Environment

1. Propose and assess alternative solutions to environmental problems.
2. Discern patterns and interrelationships of bio-physical and socio-cultural systems.
3. Describe the basic institutional arrangements (social, legal, political, economic, religious) that are evolving to deal with environmental and natural resource challenges.
4. Evaluate critically environmental and natural resource issues in light of understandings about interrelationships, ecosystems, and institutions.
5. Articulate and defend the actions they would take on various environmental issues.

G. Special Information

Note: First day attendance required except by instructor permission.