The Evolving Environmental Geology Concentration at St. Cloud State University: Soliciting Feedback

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ABSTRACT
The Atmospheric and Hydrologic Sciences Department at St. Cloud State University recently established an Environmental Geology Concentration. The aim of the concentration is to provide students with a pathway to careers in environmental geology across the spectrum of consulting, state and federal agencies, watershed districts, and non-profit organizations. The concentration also provides a means for the Atmospheric & Hydrologic Sciences Department to package the existing geology courses in a manner that both attracts students and prepares them for advanced study. The concentration draws on courses across multiple colleges (College of Science and Engineering, School of Public Affairs, College of Liberal Arts), and is multidisciplinary in nature.

The aim of this poster is to solicit feedback on the content and structure of the concentration. We would like to know whether you think that the courses included prepare students adequately for employment.

Our questions for you include: What is missing? What could be eliminated? How much math, physics, and chemistry should be required vs. recommended?

We will be able to respond to some changes to the concentration if we are able to demonstrate that potential employers have reviewed, commented on, and made specific suggestions regarding the concentration.

ENVIRONMENTAL GEOLOGY CONCENTRATION

ELECTIVES
(1-3 credits)

AHS 305 - Historical Geology (3 cr.)
Evolution of the earth with emphasis on historical and practical aspects of the stratigraphic record Field Work

AHS 334 - Surface Hydrology (4 cr.)
Conceptual basis and modeling of hydrological systems including surface, precipitation, infiltration, evaporation, runoff, and subsurface transformation at the watershed level. Hydrologic routing of flood flows, techniques to detect and manage environmental problems

AHS 438 - Water Resources Management (3 cr.)
Scientific, engineering, historical, political, economic, and social aspects of water-resource management, allocation, and conflict. Characterization of water supply and demand. Applications of quantitative hydrologic analysis to flood, drought, water quality, and surface and subsurface basin management.

CHEM 320 - Environmental Chemistry (3 cr.)
Identification and analysis of elements and compounds of environmental importance. Special attention to pollutants and toxins

ETS 368 - Introduction to Soil Science (3 cr.)
Soil formation and classification. Relationship between physical, chemical and biological characteristics and processes of soil with the environment

ETS 373 - Environmental and Technology Assessment (3 cr.)
Assessment of technological development and environmental quality in society

ETS 465 - Wetland Environments (3 cr.)
Wetland types, definitions, and formation. Wetlands identification and delineation. Human-wildland interactions.

ETS 467 - Soils and Environmental Quality (3 cr.)
Chemical, physical, and biological principles of soil influences on biogeochemical cycling of nitrogen, phosphorus, sulfur and trace elements. Management polluted soils

ETS 470 - Environmental Science Program (3 cr.)
Conservation of natural ecosystems and diversity. Environmental science program in the community

ETS 475 - Geomorphology (3 cr.)
The configuration of the earth surface and physical processes that have brought the surface to its present condition

CORE COURSES
(24-25 credits)

AHS 230 - Introduction to Hydrology (3 cr.)
Basic principles of hydrography, elementary principles of hydrodynamics with applications to surface and groundwater hydrology

AHS 250 - Water Resources Management (3 cr.)
Water materials and plate tectonics are used to investigate deeply buried, planar, syenograms and metamorphic systems and surface systems including sedimentary, fluvial, and glacial

AHS 251 - Senior Research Proposal (1 cr.)
Description of the senior research project or study. Examination of the procedural steps and tools available at SCSU for completing the research project. Preparation of a proposal for a viable research project or study

AHS 252 - Senior Research (2 cr.)
Complete a concentrated study or research project in an area of earth and atmospheric science. Complete written and oral presentations of the results

CHEM 210 - General Chemistry 1 (3 cr.)
General chemistry principles. Stoichiometry, solutions, bonding, quantum chemistry, thermodynamics, properties of solids, liquids, and gases

CHEM 324 - Environmental Chemistry (3 cr.)
Principles of aquatic chemistry; chemistry of natural ground waters; water quality standards; contaminant detection and migration; remediation and treatment techniques, and ground-water risk assessment

CHEM 335 - Sedimentology and Stratigraphy (3 cr.)
Sedimentary processes and environments, formation of sedimentary rocks, stratigraphy, and basin analysis. Use of stratigraphic principles to interpret earth history

CHEM 411 - General Chemistry 2 (4 cr.)
Kinetics, chemical equilibrium, acid-base chemistry, solubility equilibrium, thermodynamics, electrochemistry, coordination chemistry, nuclear chemistry, and descriptive chemistry

ETS 367 - Environmental Regulation (3 cr.)
Environmental regulations that control human impacts to air, water, and land resources. Processes of administering environmental laws in the US including national, state, and local legislation, administrative agencies, and litigation

ETS 416 - Principles of Geographic Information Science (3 cr.)
Basic concepts, principles and technology that are universal to all parts of Geographic Information Science and geographic information systems. Software. Integrated Lab

ETS 416 - Geographic Information Systems (3 cr.)
Concepts of GIS, including the capture, processing, storage, manipulation, and display of spatial data.

Would you be able to visit us?
We would also be looking for volunteers for our Advisory Board (2x/year)- please let us know if you are interested.

Please look at the Syllabi (below) for the Core Courses and Electives. Please let us know what YOU think you need to be added or removed. Thank you.

We would like feedback on the content of the Environmental Geology Concentration. If we get feedback we will be better able to make changes. Thank you for your suggestions.

ENVIRONMENTAL GEOLOGY CONCENTRATION

REQUIRED COURSES
(17 additional credits)

AHS 307 - Field Geology (3 cr.)
Field-based problem solving of local geological relationships in central Minnesota. Field trips to northern, southwestern, and southeastern Mn.

AHS 322 - Surficial and Glacial Geology (3 cr.)
Geologic processes responsible for the development of landforms. Field trips to northern, southwestern, and southeastern Mn.

AHS 325 - Rocks and Minerals (4 cr.)
Physical and chemical properties of minerals, and igneous, sedimentary, and metamorphic rocks. Hand-sample identification.

AHS 322 - Physical Hydrology (4 cr.)
Aquifer characteristics and geologic controls on ground-water occurrence. Groundwater movement, regional groundwater flow, and groundwater interactions with streams and rivers. Well hydraulics and water supply, vadose zone processes.

AHS 336 - Chemical Hydrogeology (3 cr.)
Groundwater chemistry, groundwater contamination, and remediation. Principles of aquatic chemistry; chemistry of natural ground waters; water quality standards; contaminant detection and migration; remediation and treatment techniques, and ground-water risk assessment.

AHS 423 - Sedimentology and Stratigraphy (3 cr.)
Sedimentary processes and environments, formation of sedimentary rocks, stratigraphy, and basin analysis. Use of stratigraphic principles to interpret earth history.

MATH 211 - General Physics 1 (4 cr.)
Vectors, kinematics of uniformly accelerated motion; static equations; work and energy, linear momentum; circular motion; rotational work, energy, and momentum; electricity; solid statics and dynamics; heat and temperature; kinetic theory of gases, laws of thermodynamics.

MATH 212 - General Physics 2 (4 cr.)
Temperature; kinetic theory of gasses; laws of thermodynamics. Energy, work and energy; linear momentum; circular motion; rotational work, energy, and momentum; electricity; solid statics and dynamics; heat and temperature; kinetic theory of gases, laws of thermodynamics.