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 employment. 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 request 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.

COURSE CATALOG DESCRIPTION 1

BA in Earth Science (48-62 Credits)
The Earth Science degree program consists of two concentrations. The General Earth Science Concentration is designed for students interested in a Liberal Arts Earth Science major, particularly for those students wishing to take an additional major or one or more minors. The student has an opportunity to focus in one or more areas of earth science, through the choice of electives with advisor approval.

The Environmental Geology Concentration is designed for students interested in the environmental aspects of geology. It includes required coursework in geology, groundwater hydrology, environmental regulation and geographic information science plus 3 credits of electives. For environmental careers students must complete a Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training class that is offered through Continuing Studies at SCSU. An appropriate senior research project is required of all majors.

Core Courses (24-25 Credits)
Required by all majors:
AHS 220, AHS 230, AHS 451, AHS 452, CHEM 210, MATH 115 or MATH 112 & MATH 113.
General Earth Science Concentration: (24 additional credits)
AHS 260 and 20 credits of AHS electives numbered 300 or above with advisor approval
Environmental Geology Concentration: (37 additional credits)
AHS 307, AHS 322, AHS 325, AHS 332, AHS 336, AHS 423, CHEM 211, ETS 367, GEOG 216, GEOG 316.
Additional electives (3 credits) selected from AHS 305, AHS 334, AHS 438, CHEM 320, ETS 368, ETS 373, ETYS 465, ETS 467, GEOG 350, GEOG 416, GEOG 472.

CORE COURSES (24-25 credits) 2

AHS 220 - Physical Geology (4 cr.)
Earth materials and plate tectonics are used to investigate deeply-buried, plutonic igneous and metamorphic systems and surface systems including sedimentary, fluvial, and glacial.

AHS 230 - Introduction to Hydrology (4 cr.)
Basic physical oceanography, elementary principles of hydrodynamics with applications to surface and groundwater hydrology.

AHS 451 - 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 452 - 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 (4 cr.)
General chemistry principles. Stoichiometry, solutions, bonding, quantum chemistry, thermochemistry, properties of solids, liquids. and gasses.

MATH 115 - Precalculus (5 cr.) **IS THIS ENOUGH MATH?**
Functions and their graphs; polynomial, rational, radical, logarithmic, trigonometric and inverse trigonometric functions; algebraic and trigonometric equations and inequalities, identities, trigonometric applications.
or **MATH 112 - College Algebra & MATH 113 - Trigonometry** (tot 5 cr.)

PHYS 231 - General Physics I (4 cr.)
Vectors; kinematics of uniformly accelerated motion; static equilibrium; work and energy; linear momentum; circular motion; rotational work, energy, and momentum; elasticity; fluid statics and dynamics; heat and temperature; kinetic theory of gasses; laws of thermodynamics.
or **PHYS 234 - Classical Physics I (requires calculus)** (5 cr.)

ENVIRONMENTAL GEOLOGY CONCENTRATION 3A

REQUIRED COURSES (37 additional credits)

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

AHS 322 - Surficial and Glacial Geology (3 cr.)
Geologic processes responsible for the development of landforms. Glacial geology will be strongly considered.

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

AHS 332 - Physical Hydrology (4 cr.)
Aquifer characteristics and geologic controls on ground-water occurence. Groundwater movement, regional groundwater flow, and groundwater interactions with wetlands, lakes, and streams. 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 - Sedimentation 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 211 - 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 regulatory actions.

GEOG 216 - Principles of Geographic Information Science (3 cr.)
Basic principles, concepts and technology that are universal to all parts of Geographic Information Science and geographic information systems software. Integrated Lab.

GEOG 316 - Geographic Information Systems (3 cr.)
Concepts of GIS, including the capture, processing, storage, manipulation, and display of spatial data.

ENVIRONMENTAL GEOLOGY CONCENTRATION 3B

ELECTIVES (select one - min of 3 credits)

AHS 305 - Historical Geology (3 cr.)
Evolution of the earth with emphasis on biological and physical events of the stratigraphic record. Field Work.

AHS 334 - Surface Hydrology (4 cr.)
Conceptual basis and modeling of hydrologic processes on Earth's surface: precipitation, infiltration, evaporation, runoff. Rainfall-runoff transformation at the watershed level. Hydrologic routing of floods. Application to water-resource management and 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. Application of quantitative hydrologic analysis to flooding, 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-wetland interactions.

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

GEOG 350 - Introduction to Remote Sensing (3 cr.)
Analysis of photographic images on the earth's landscape to identify objects that reveal spatial relations, and interpreting their significance.

GEOG 416 - Techniques in GIS (3 cr.)
Standard techniques in geographic information systems

GEOG 472 - Geomorphology (3 cr.)
The configuration of the earth's surface and physical processes that have brought the surface to its present condition.

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.

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

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