TITLE: Introduction to Environmental Chemistry of the Arctic
NUMBER: CHEM 194
CREDITS: 3
PREREQUISITES: MATH 107X or higher
LOCATION: TBD
MEETING TIME: On Campus: 2hr Lecture, 3hr lab/wk
Distance: Remotely attend 2 hr synchronous lecture via Google Hangouts or watch lectures asynchronously. Lab experiments and collaboration performed asynchronously.

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COURSE DESCRIPTION
This course introduces students to environmental chemistry through investigating the air, water, and soil quality of the arctic environment as affected by natural and anthropogenic cycling of nutrients and contaminants. The lab component will focus on characterization of natural waters collected around the state. Pre-requisites: MATH 107X or higher

This 3 credit course cannot fulfill the core science requirement. Petitions to request that it counts as the core science requirement will be denied by the registrar.

COURSE GOALS
Students will gain an appreciation of the influence of chemistry in the natural, arctic environment and the implications of human-caused perturbations of these systems and potential remediation strategies.

STUDENT LEARNING OUTCOMES
Upon successful completion of this course, students will:

Understand the basic chemical concepts as they relate to the function of ecosystems and the existence/transformation of contaminants.

Outline basic metrics for assessing air, water, and soil quality and explain their importance as indicators of environmental health.

Identify examples of anthropogenic influences of natural cycles and explain how that impacts ecosystem health.

Evaluate student-generated water quality data from across the state and interpret data to assess anthropogenic perturbation of ecosystems.

COURSE READINGS/MATERIALS
Required readings are available on Blackboard or on course website.
Distance students must purchase and receive lab kits by week 2.

TECHNICAL REQUIREMENTS FOR COURSE
Students must have regular access to a computer and the Internet to access online materials in Blackboard. Students will be expected to download course material as well as upload assignments. Students are also expected to regularly use their UAF Gmail accounts, Blackboard, Google Hangouts, and screencast-o-matic as methods of collaboration and sharing of their understanding.

INSTRUCTIONAL METHODS
Course material will be delivered through a combination of lectures incorporating active learning techniques, lab exercises (a combination of virtual, field, and kitchen-based labs), and weekly activities (ie case studies, interviews with experts, developing screencasts, etc). Research teams of on-campus and distance students (2 on-campus for every distance student at max enrollment) will generate lab-based replicate data sets of surface water quality data from communities across the state. Student groups will work closely and engage in peer mentoring (distance student is the expert on the field site while on-campus students will become instrumentation experts) and build a community of learners across the state of Alaska.

COURSE SCHEDULE
See attached.

COURSE POLICIES
Continued attendance to class indicates each student agrees to the policies set forth in this syllabus. Distance course attendance will be measured through effort on assignments, collaborative activities, and exams.

Collaboration and Classroom Behavior - Collaboration and working in small groups is a key component of classroom and lab time. Your group is there to support your learning, not do the work for you.

week. Grades in Blackboard will be updated weekly.

HOW TO CHECK YOUR GRADE

To check your grades for assignments and find comments from your instructor, click on the My Grades link in the sidebar menu in Blackboard. All the assignments and their due dates are listed. If your instructor has left comments, there will be a Comments link. Click on this link to view comments.

another person in preparing written work for fulfillment of any course requirement. Scholastic dishonesty is punishable by removal from the course and a grade of “F.” For more information go to Student Code of Conduct. (http://uaf.edu/usa/student-resources/conduct)

SUPPORT SERVICES

UAF eLearning Student Services helps students with registration and course schedules, provides

Tentative Lecture and Lab Schedule

Week 1 - Introduction

Environmental science connection between health of ecosystems, animals, and communities types of contaminants and how we will look for them in lab. History of environmental monitoring and activism (*Silent Spring*, silent snow, living downstream, etc).
Case study: Ch 1-2 excerpt from Silent Spring by Rachel Carson

Lab 1: Safety and Scientific Method

Get kit and unpack it
Escience Safety lab
EscienceLabs scientific method exercise

Week 2 – Air Quality

Introduction to indoor and outdoor air quality. Description of air quality parameters and natural and anthropogenic factors that degrade air quality. Transportation of air masses and pollutants, especially to the arctic (Grasshopper Effect). Legislative history and discussion of where we go from here.
Case study: Bear Trouble

Lab 2: Air Quality Experiments

Modeling pollution in student communities
Modeling movement of volcanic plumes

Week 3: Introduction to Water Quality

Water cycle and distribution on earth, metrics of water quality, History of water quality legislation, legacy and emerging contoJ 9.23Body <<Td (eay.2(m)-4 Td [(W)4o /TT2 1 Tf -0.002 Tc 0.007 Tw -42.141 -1.

Lab 5: Analysis of natural waters

Escience Labs – Water quality parameters of natural water (sampled in week 4).
Site descriptions (distance) and analytical jigsaw screencasts (on-campus) due.

Week 6