

Climate Change for Science Teachers Course Syllabus

Science Teacher Education Program (STEP)

Course Information:

Title: Climate Change for Science Teachers

Course Number: ED 595/ATM 595

Credits: 3

Prerequisites: Participating educators must be from schools involved in the Science Teacher Education Program administered by the Geophysical Institute.

Location: Session 1: IARC 401

Dates: Monday-Friday, Session 1: July 9 – 20, 2007; Session 2: July 23-August 3, 2007

Meeting Time: 8 AM - Noon

Session 1 Instructor: Gerhard Kramm

Phone: 474-5992

Office Location: IARC 318

Office Hours: TBA

E-mail: kramm@gi.alaska.edu

Course materials/textbooks: TBD

Course Description:

Climate Change for Science Teachers is a special topics course designed to introduce K-12 science teachers to current studies in Climate Change through lecture, modeling exercises and tactile demonstrations at research facilities. Within the context of Earth's climate, the course builds a foundation of understanding in topics such as scientific processes, physics, chemistry and dynamics of the Earth's atmosphere, balance of Earth's systems, dynamics and structure of sea ice, arctic hydrology, climatology, and oceanography, all of which are included in the Alaska Grade Level Expectations (GLEs) for Science. The GLEs identify concepts Alaska K-12 students should master by graduation. Course lectures and experiences are presented for a collegiate audience, with in-class discussions to help participants simplify concepts for K-12 students. Modeling exercises and experiments demonstrated by course instructor are designed for easy duplication in (or modification for) elementary and secondary classrooms. Instruction also includes training in technology used in modern research, such as computer modeling and data interpretation with access to geophysical and space physics data from the Internet.

Course Goals and Student Learning Outcomes:

The goal of this course is to provide participants with an understanding of current climate change research and the scientific expertise needed to simplify this content knowledge for K-12 students. The instructor will model various climate phenomena and concepts; demonstrate research methods and tools at research facilities and guide participants in writing simplified climate change activities for K-12 students, which address the Alaska Science GLEs.

Instructional Methods:

This course utilizes a variety of instructional methods including:

- Lecture-delivered by instructor and/or guest lecturers
- Large group discussion
- Scientific modeling demonstrations
- Instructor-led tactile demonstrations at research facilities

(GLEs to be addressed: SB1-Students demonstrate an understanding of the structure and properties of matter; SB2-Students demonstrate an understanding of how energy can be transformed, transferred, and conserved; SD1-Students demonstrate an understanding of geochemical cycles; SD2-Students demonstrate an understanding of the forces that shape the Earth; SD3-Students demonstrate an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system.)

Assignments:

Each participant must complete two Climate Change Lesson Plans; one prepared individually, one prepared by a grade-level group, for K-12 students (assigned on Day 3 and due on Day 10). Lesson Plans should target a specific grade level or range. The instructor will evaluate each 3-5 page Lesson Plan for the following:

- Accuracy of climatological concepts presented
- Alignment of lesson content with appropriate Alaska Science GLEs
- Inclusion of hands-on, age-appropriate scientific models, experiments and/or demonstrations
- Understanding of the processes of science
- Clarity of writing
- Statement of goals, learning objectives, GLEs addressed, detailed procedure, and assessment plan

Each participant must present their Climate Change Lesson Plans to the instructor and peers on Day 10. Presentations will be evaluated for scientific integrity, clarity, integration of stated GLEs, and applicability to the K-12 classroom.

Course Policies:

Attendance is essential due to the condensed nature of the course. Make up assignments may be arranged as necessary. Participation in class discussions is required. Transportation for trips beyond UAF will be provided.

Evaluation:

Grades will be based on the following:

1. Class attendance: 10%
2. Participation in class discussions: 20%
3. Climate Change Lesson Plan #1: 30%
4. Climate Change Lesson Plan #2: 30%
5. Presentation of Climate Change Lesson Plans: 10%

A grade of **A** will be given for an overall score of 90% or higher. A grade of **B** will be given for 80-89%, **C** for 70-79%, **D** for 60-69% and **F** for <60%.

Disabilities Services:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials. We will work with the Office of Disability Services (203 WHIT, 474-7043) to provide reasonable accommodations to students with disabilities.