

## *Introduction to the Geosciences for K-8 Teachers*

### **Course Information**

*Department and course number: GEO 595 or C&I 595 (4 Credits)*

June 14<sup>th</sup> – 18<sup>nd</sup> and June 21<sup>th</sup> – 25<sup>th</sup>, 2010

8:30AM to 4:30PM

*Course Location:* CHCB (Clapp Building) Room 348

#### *Course Instructors:*

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Department of Geosciences

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### **Course Description**

The primary focus of this course is on the deepening of K-8 teachers' Geoscience content knowledge. Teachers enrolled in the course will engage in a variety of learning experiences designed to investigate the past, present, and future behavior of Earth's interacting physical systems. Topics explored will be in alignment with the National Science Education Content Standards [NSES] and Montana Science Education Standards, and will include the formation and structure of the Earth, the rock cycle, plate tectonics, geologic time, glacial and fluvial geomorphology, geologic mapping, the hydrologic cycle as well as topics that are socially relevant to Montana, such as water quality issues, tribal natural resource management, and mineral resources. Classroom, laboratory and field-based instructional methods will be employed.

The secondary focus of the course is on the development of teacher professional knowledge and skills that support rigorous K-8 science instruction, including pedagogical methods, curriculum development, cultural competency and teacher leadership. Teachers will develop proficiency in these areas through critical examination of science education issues, professional discourse with peers and mentors, and the production and sharing of artifacts such as lesson plans and science teacher leadership plans. Course activities will model effective Geoscience instructional methods and assessments, providing opportunities for teachers to experience, critique, and adapt activities and methods for use in their own classrooms.

### **Course Learning Outcomes:**

Through the successful completion of this course teachers will

- 1) deepen their understanding of Geoscience content knowledge,
- 2) improve their ability to use scientific skills employed in the geosciences,

- 3) improve their understanding of the nature of science and how scientific knowledge is generated,
- 4) heighten their awareness of the interaction of science and society,
- 5) improve their ability to use educational technology that supports Geoscience education,
- 6) gain professional skills and knowledge that support the design and implementation of rigorous science instruction,
- 7) improve cultural competency in teaching American Indian students and
- 8) develop skills as science teacher leaders.

**Course Materials:**

- Textbook: *Essentials of Geology, 3<sup>rd</sup> ed.*, Stephen Marshak, W.W. Norton, 518pp.
- Other readings as assigned by instructors

**Course Content:**

<b>Day</b>	<b>Content and Skills</b>
Day 1	Course Introduction and Expectations
	Geosciences Pretest
	Plate Tectonics
	Intro to Argumentation
Day 2	Minerals
	Mineral Classification
	Rocks
Day 3	Crystallization Processes
	Weathering & Erosion
	Metamorphism
	Argumentation in Science Instruction
Day 4	Field trip to the Bitterroot Valley: Bedrock Geology
Day 5	Earth Structure
	Geologic Time
Day 6	Topographic Maps
	Google Earth Introduction
	Geologic Structures & Maps
	Place Names
Day 7	Revising a Lesson Plan
	Fieldtrip to Arlee: Glacial Geomorphology
Day 8	Hydrological Cycle
	Groundwater
Day 9	River Geomorphology
	Google Earth Rivers
	Watershed Education Network
Day 10	River Geomorphology Fieldtrip
	Course Wrap-up: Posttest, Surveys, Work on Course Assignments

## Evaluation

Students enrolled in the course will receive a traditional letter grade. Students will be evaluated using multiple methods and all assignments must be completed to at least a minimum standard of proficiency specified by instructors in order to receive a passing grade for the course. All course assignments must be completed by **August 1<sup>st</sup>**.

Points will be awarded to students as follows:

### Assignments:

1. Leadership Plan (**10 points**)
2. Grant Proposal (**15 points**)
3. Field Reports (**10 points each: 30 points total**)
4. In-Class assignments (**6 points each: 30 points total**)
  - a. Plate Tectonics – Discovering Plate Boundaries
  - b. Rocks Activity – Igneous rocks & crystallization
  - c. Geologic Structures – Modeling & Interpreting Geologic Structures
  - d. Groundwater – Groundwater Models
  - e. River Geomorphology – Google Earth Rivers
5. Revise a Geosciences Lesson Plan to Focus on Argumentation (**15 points**)

Maximum total points: **100 points**

***Directions and instructions for completing all course assignments will be provided in class.***

### Grades will be awarded using the following scale:

93 to 100% = A	73 to 76% = C
90 to 92% = A-	70 to 72% = C-
87 to 89% = B+	67 to 69% = D+
83 to 86% = B	63 to 66% = D
80 to 82% = B-	60 to 62% = D-
77 to 79% = C+	Less than 60% = F

## Attendance

Regular attendance is expected and recommended in order for students to have access to a rich and comprehensive learning experience. Please arrive on time each morning. We will begin promptly at 8:30AM. At least sixty percent of the course grade is based on in-class assignments, therefore regular attendance is also recommended for the successful completion of the course with a passing grade.

## Academic Integrity & Plagiarism

*All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students*