

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

### **Course Information**

*Department and course number:* GEOS 595

*Credits:* 4 graduate

*Course meeting dates and times:* June 14<sup>th</sup> – 18<sup>th</sup> and June 21<sup>st</sup> – 25<sup>th</sup> from 8:30 AM to 4:30 PM

*Course Locations:* Beaverhead Building, Room 102, Salish Kootenai College

### **Course Instructors:**

#### Instructor of Record

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### **Course Description**

The primary focus of this course is on the deepening of K-8 teachers' understanding of Geoscience content knowledge through an Earth Systems Science approach. 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 will include the rock, water, and carbon cycles, the fossil record, the structure and formation of Earth's physical features, mapping, and topics that are culturally relevant to western Montana, such as water quality issues, fire ecology and Tribal natural resource management. Classroom, laboratory and field based instructional methods will be employed. Teachers will engage in extensive fieldwork and laboratory experiences designed to increase their understanding of Earth's composition and the processes that form it.

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 begin to develop proficiency in these areas through critical examination of science education issues and the research literature, professional discourse with peers and mentors, and the production and sharing of artifacts such as lesson plans, curriculum implementation 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 science to American Indian students and
- 8) develop skills as science teacher leaders.

### Course Materials:

- Textbook: *Essentials of Geology, 3<sup>rd</sup> Edition*, Stephen Marshak, W.W. Norton and Company, 2009
- Other readings as assigned by instructors

### Course Content:

Day	Content and Skills
Day 1	Course introduction and expectations
	Earth's creation and geologic history
	Tribal perspectives on Earth formation and history
	Plate tectonics
	Earth's composition
Day 2	Density of rocks
	Minerals and mineral identification
	The rock cycle and rock identification
	Mining issues for Montana's Kootenai People
Day 3	Geology of the Flathead Reservation and Western Montana
	Stratigraphy and geologic structures
	Using models to model geologic formations and processes
	Fieldtrip to McDonald Lake to examine rock formations
	Tribal oral history of the Mission Valley
Day 4	Maps and mapping: Topography and geology
	Glaciers and glaciation
	Glaciation fieldtrip
Day 5	Google Earth inquiry investigation of Glacial Lake Missoula
	Glacial Lake Missoula and the geology of the northwestern U.S.
	Concept maps in Earth Science education
	Glacial Lake Missoula fieldtrip
	Tribal oral history of the Big Draw and Camas Prairie

Day 6	Introduction to stream morphology
	Stream table inquiry investigation
	Inquiry based instruction/Shifting a lesson to inquiry
	Stream morphology fieldtrip
Day 7	Fieldtrip to Jocko River Restoration Area for field study
	Designing inquiry investigations
	Cultural significance of water/Tribal water management
Day 8	The hydrologic cycle
	Groundwater
	Schwartz lake fieldtrip for hydrology study
Day 9	Introduction to fire ecology
	Tribal fire management/"Fire on the Land" curriculum resource
	Fire on the Land lesson development
	Fieldtrip to study fire regimes
	Cultural use of fire by the Salish, Kootenai and Pend d' Oreille people
Day 10	Introduction to dendrochronology
	Dendrochronology inquiry investigation
	Carbon cycle inquiry investigation
	Carbon cycle and climate change theories
	Teacher leadership and development of preliminary leadership plans
	Summative assessment and course evaluation

## Evaluation

Students enrolled in the course will receive a traditional letter grade. Students will be evaluated using multiple assessment 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 July 30th.

Points will be awarded to students as follows:

In class activities	40 points maximum
Field journal	25 points maximum
PowerPoint on course concepts	15 points maximum
Science Leadership Plan (graduate credit only)	<u>20 points maximum</u>
Maximum total points	100 points maximum

Grades will be awarded using the following scale:

90 to 100% = A
80 to 89% = B
70 to 79% = C
60 to 69% = D
Less than 60% = F

**Attendance**

This is an intensive two week course. Full attendance is expected. No opportunities for makeup assignments will be offered except in cases of extreme emergency. Forty percent of the course grade is based on in class assignments therefore full attendance is required for the successful completion of the course with a passing grade. Any absences must be approved in advance with the course instructors.

**Academic Integrity**

*All students must practice academic honesty. Plagiarism is unacceptable and will result in a failing grade. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/SA/VP/SA/index.cfm/page/1321>*

**Stipend Payment**

*All participants enrolled in this course are required to complete the entire course and all of its assignments to a minimum standard of proficiency as determined by the instructors and to receive a minimum grade of "B" in the course before they will receive their stipend and course credit. The stipend will be paid by check to each participant in full, if all requirements are met, in August 2010, after the submission of final grades. No partial stipends will be paid.*