“Thanks for the awesome adventure. I learned so much and enjoyed science more than I usually expect.” – Student, class of 2005

“This is truly the best course I have ever taken. I have learned more in these three weeks (about geology, myself, others, life, etc.) than I ever have or could have in one year.” – Student, class of 2007

INSTRUCTOR: Dr. David M. Harwood (dharwood1@unl.edu)

TEACHING ASSISTANT: Mr. Kyle Thompson (kthomps@lps.org)

CREDIT AND PREREQUISITES: 3 credits; no prerequisites.

OVERVIEW: A video describes the course and presents student perspectives - - http://www.andrill.org/oldsite/geo/video . GEOS 898 for in-service teachers is an 11-day inquiry-based field course; comprising an immersion, discovery experience in Wyoming, Nebraska and South Dakota. The primary aim of this course is to improve educators’ knowledge and understanding of geoscience, and to demonstrate effective teaching methods that can integrate geoscience into K-12 learning environments. Course content and field itinerary parallels a 3-week course offered in late May for pre-service educators. Campfire discussions will explore individual and group experiences and promote new approaches to expand science content into the classroom.

The major goals of GEOS 898 are:

1) To enhance the ‘geoscience experience’ for in-service science educators;
2) To teach scientific concepts & skills that K-12 educators are expected to understand and teach (as outlined in national standards);
3) To engage science educators in field-based geoscience education and inspire them to use geoscience as a unifying theme in their classes/teaching activities;
4) To provide participants with an opportunity to pursue authentic geoscience field work;
5) To enhance pedagogical understanding and provide all participants with a ‘tool-kit’ of effective teaching practices;
6) To strengthen collaborative relationships between UNL Geosciences, Teacher Education Programs, and Public School Systems.

When you take this course you will become a member of our field-based learning community comprising one faculty member, a teaching assistant, and up to twelve students. The composition of this community provides expertise and experience in both science and pedagogy. Through a collaborative teaching and learning structure, all course participants will learn about geoscience, geoscience education, group dynamics, and more about themselves.

The course will follow a route through Nebraska, Wyoming, and South Dakota and will expose you to scientific principles and practices through discovery- and inquiry-based learning. You will observe and study a variety of natural phenomena (with a focus on rocks, sediment and Earth history). You will utilize science process skills to include: documentation, classification, question formulation, development of hypotheses and models, debating interpretations, etc. Evening discussions will be conducted around the campfire where we will explore effective teaching practices. You will work to develop tools and techniques to teach others what you have learned. You will collaborate with your peers to evaluate, compare, criticize and adjust your work. At the end of the course we will visit a site where you will engage in an authentic geologic exercise and apply the skills you have learned over the previous 10 days to construct a geologic history for the region.
LEARNING OBJECTIVES:

Below is a list of some of the concepts and skills that you will learn:
1) that the Earth has a history recorded in rock and sediments
2) Steno’s principles
   i. Superposition
   ii. Lateral Continuity
   iii. Cross Cutting Relationships
3) Hutton’s and Lyle’s concept of uniformitarianism (actualism) and deep time
4) William Smith’s concept of faunal succession
5) plate tectonic theory
6) properties of Earth materials
7) how to develop and apply classification systems
8) to observe natural phenomena and carefully record your observations
9) to formulate and develop a scientific investigation
10) to practice scientific habits of mind
11) to work within a research team
12) to utilize various technologies (e.g. digital photography, microscopes, etc.)
13) to interpret topographic and geologic maps
14) to ‘survive’ in relatively remote areas
15) effective inquiry-based geoscience teaching practices (develop materials and assessment strategies)

SCHEDULE AND VENUE:

The course includes an 11-day field study that will follow the route outlined below (some modifications may occur). We will meet for one day during the week prior to departure, as an orientation, to identify what to bring and what to expect on the trip. This course is a mental boot-camp to discover Earth history as written in the rock record, and to explore effective means of science instruction.

All field equipment (tents and cook–gear) will be provided. Great food will be available. The companionship will be memorable. Your first-hand experience will be documented in photos to be shared with your students. Your spirit and dedication to pedagogy and scientific discovery will be refreshed. Bring clothes for all weather conditions, hiking boots/shoes, sleeping bag and pad. Explore the west as the pioneers did, and discover fundamentals of the geosciences. Revisit these field sites in the future with your family and share the experience. Build a collection of geological materials to use in your classroom, and discuss effective teaching methods approaches with your peers.
ASSESSMENT:

You will be required to construct and present a portfolio of work to include (at least):

1) Records of your observations (written and graphic);
2) Classification systems of the materials you will collect;
3) A collection of samples of Earth materials (with associated documentation describing collection location);
4) A record of questions, hypotheses, and interpretations you have generated, and reflection on your learning;
5) Lesson plan(s) to teach geoscience concept(s) of your choice;
6) A geologic history of a selected study region;
7) GeoTAT instrument to measure understanding of stratigraphic concepts; and
8) Virtual field trips to use in your classroom and share with colleagues.

Much of your portfolio will be incorporated into a field book that you will use throughout the field portion of the course. Final grades will be based on the following point system:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>Field Book</td>
<td>60</td>
</tr>
<tr>
<td>Lesson Plan</td>
<td>25</td>
</tr>
<tr>
<td>GeoTAT Questionnaire</td>
<td>10</td>
</tr>
<tr>
<td>Conduct and Community</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
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BOOKS:

**Required**


**Optional**

COST:

All costs for transport, food, accommodation and student fees will be covered by UNL. In short, you get a fantastic trip across Nebraska Wyoming and South Dakota, three college credits, and amazing exposure to geoscience for less than you would pay for an on-campus course (tuition is adjusted to a 80% rate, and books will cost ~$80).

Scholarships are available to help with tuition costs through the Department of Geosciences

Space in the course is limited so please contact David Harwood (dharwood1@unl.edu, 472-6745) soon if you are interested, or if you have any questions. Application materials will be provided upon request.

Picture yourself in the above scenes ……….

Watch this video about the course, and consider learning like a kid again - - [http://www.andrill.org/oldsite/geo/video](http://www.andrill.org/oldsite/geo/video)