Biology/Geology 250, 4 Undergraduate Credits (GL)

Travel to the Black Hills in South Dakota, Makoshika State Park in Glendive, Montana, and the Yellowstone National Park in Wyoming. Participants will explore the Greater Yellowstone Ecosystem from ecological and geological perspectives. While on the road to and from Yellowstone, we will stay at local motels (multiple occupancy). The K Bar Z Guest Ranch in Cody, Wyoming, will be our group’s primary residence while in the Yellowstone area. Presentations on carnivore ecology, botany, mining and human environmental impacts, fire ecology, and paleontology will be offered on site. Students will have opportunities to use global positioning systems and other field survey equipment for the study of geology and ecology.

What will I study?

Plants, animals and their adaptations will be identified in a number of ecosystems. Students will participate in ecological data collection. We will visit a variety of biomes, from alpine meadows to rivers carving spectacular canyons to the fragile “badlands.” The environmental impacts of human activity and the current land use issues will be explored. In addition, we will have the opportunity to observe the aftermath of various forest fires in the Yellowstone area and to see some of the best geology that the West has to offer. We will study present and paleoecosystems and visit geothermal sites, fossil beds, mines and caves.

Who can come?

It is open to all university students and anyone else who has serious interest in these topics. The course is one week online, one class meeting, two weeks of travel, and one week online to wrap up. This is a 4-credit general lab (GL) course!

Mark your calendar and take this opportunity to experience the American West, to study ecology and geology, and to sample the spirit of this region of our country.
**DAY 1 (Mitchell, SD)**

We will discuss WI, MN and SD biomes, geology, unique vegetation and climate change. As we travel, we will point out and discuss formation and significance of the unique features of geology and ecology. We will discuss large scale climatic influences such as air circulation cells and the effects of mountain ranges on rainfall. As we progress from east to west we will point out changes in vegetation and agriculture brought about by these climatic changes. As opportunity presents we will discuss unique biomes of the region such as oak savannas and unique flora and their adaptations.

**DAY 2 (Spearfish, SD)**

We’ll drive across SD to the Black Hills. We’ll stop at Mt. Rushmore and the Homestake Mine in Lead, SD. We’ll discuss the geology of the Black Hills. We’ll also cover why the Hills have such unique biology. We’ll discuss the conflict that the development of the Black Hills has generated with resource preservation and the American Indian culture.

**DAY 3 (Cody, WY)**

We’ll drive to the K Bar Z Guest Ranch. Along the way we’ll cover desert climates and cross through the Big Horn Mountain. The K Bar Z Guest Ranch will be our base of operations for the majority of the trip.

**DAY 4 (Cody, WY)**

We will learn how to use GPS, read USGS quadrangle maps and determine position by compass and GPS. We will establish a trapping grid for small mammals. We will conduct a capture/recapture study and analyze the data using various statistical methods. We will also engage in other common techniques for sampling small mammals.

**DAY 5 (Cody, WY)**

We will learn several sampling techniques for vegetation including plot and pointless methods. We will conduct age determination by tree coring. We will analyze the data using various statistical methods. We will conduct an analysis of carbon flux in the living and non-living parts of the ecosystem and determine where carbon is going to and coming from. We will visit Sunlight Creek for work on stream chemistry and biology.

**DAY 6 (Cody, WY)**

In the morning we will finish the various labs and collect equipment. After all work is finished, you will have time to study for the first test. After the test, you are free to do what you wish.

**DAY 7 (Cody, WY)**

This is a free day. We can offer a van to Yellowstone for sightseeing or to Cody for the museum (Buffalo Bill Museum, Whitney Gallery of Western Art, Plains Indian Museum, Cody Firearms Museum and Draper Natural History Museum), etc. Cody has many unique educational opportunities and the museums are excellent. There are also horseback rides, trips on the lake and fishing offered by the K Bar Z Guest Ranch. All extra expenses are the responsibility of the student.

**DAY 8 (Cody, WY)**

We will travel to Yellowstone National Park to study the two major types of geothermal features found in the Park. These are represented by Upper Geyser Basin (Old Faithful) and Mammoth Hot Springs. We will study fumaroles, hot springs, mud pots, geysers, travertine terraces and sinter deposits. We will explore the unique microenvironment created by the geothermal features and discuss the thermophilic bacteria and algae that live in these extreme environments.

**DAY 9 (Cody, WY)**

We’ll leave the K Bar Z Guest Ranch to be on site in Lamar Valley early. Dr. Jim Halfenny, Wildlife Biologist/Naturalist, will talk on carnivore ecology of Yellowstone National Park and the reintroduction of wolves. We will learn tracking techniques and their interpretations. We’ll try to view wolves and any other large mammal we find (coyote, pronghorn, bison, etc.).

**DAY 10 (Cody, WY)**

We will view the Grand Canyon of the Yellowstone and the Tower Falls basalt flows. We will discuss how the Canyon formed and why Yellowstone Falls is located where it is. We will see effects of hot springs on geology and ecology. We will discuss the three caldera events that shaped Yellowstone. We will look at the basin’s lava flow and see paleosols. Ecologic succession will be explained and viewed at Mt. Washburn.

**DAY 11 (Cody, WY)**

We will cross the Beartooth Mountains to Rock Creek to study alpine glacial processes and high altitude ecology. We’ll stop at Beartooth Lake for landslides and the ecologic disturbance they cause, and at Beartooth Pass for tundra biomes and permafrost geology. We will view adaptations that the various plants have that allow them to survive in the harsh environments found at these elevations. We will see unique micro ecosystems such as “pink snow.”

**DAY 12 (Spearfish, SD)**

We’ll leave the K Bar Z Guest Ranch and travel to Spearfish, SD. We’ll travel through Shell Creek Canyon over the Big Horn Mountains. We’ll make a stop at Devils Tower and discuss the formation of this feature. In the evening we will meet with a Lakota Pipe Carrier, Dr. Jace DeCory of Black Hills State University. We’ll discuss the significance of the Black Hills to the Lakota Sioux.

**DAY 13 (Mitchell, SD)**

We’ll travel to Mitchell, SD. When we arrive in Mitchell, you’ll take the second test.

**DAY 14 (Whitewater, WI)**

Leave Mitchell, SD, in the morning and arrive in Whitewater in the evening.

*This is a tentative itinerary and subject to change.*
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**Program Cost:** $2,600 (estimate) which includes lodging, transportation, meal allowance, entrance fees and all instructional costs including four undergraduate credits. Financial aid may apply.