Ecosystems of Utah Field Course

A 16-day field course for first and second year graduate students and, in special cases, advanced undergraduates in the environmental sciences. The course is 5 credits and is intended to expose students to a wide range of environmental science theory, methodology and the applicability of methodologies and technologies across diverse ecosystems in Utah. Topics will include landscape patterns of vegetation, plant ecology and invasive species, range management, soils, microbes, wildlife and natural history as they relate to each of the research stations in Utah.

I. The goals of this course are to:

1) Introduce incoming graduate students to Utah's diverse ecosystems (Great Basin, Mojave, Colorado Plateau and Alpine) with the intention to foster research across the state.
2) Provide students with field and instrumentation skills by exposing them to key research efforts associated with particular research stations, such as ecological gradients, land use patterns, species interactions. Where appropriate, students will have the opportunity to monitor long-term plots and gain familiarity with a range of instruments used in environmental research.
3) Connect students with land management professionals from the BLM, Forest Service, USGS and National Parks. Conversations with these professionals are intended to expose students to a diverse set of perspectives that motivate environmental science and potentially stimulate academic research that answers questions pertinent to land managers.
4) Provide students with experience developing and writing research proposals as well as experience with the peer review process (both as providers of peer review and receivers of review).

These goals will be achieved through three main activities. First, students will be provided with a reading list at the beginning of spring semester 2010. They will be expected to read these papers and attend two pre-course seminars (March and April). Second, students will participate in a 16-day field course during which they will visit and conduct hands-on projects at 7 of Utah's field stations, including all of the major ecosystems (Great Basin, Colorado Plateau, Mojave Desert and Alpine). Finally, students will produce a 15-page proposal on a research topic (NSF style). This proposal will be due 14 days after the field course. Each student's proposal will be peer-reviewed independently by two faculty and two of their fellow course colleagues. After students receive comment, they will have 10 days in which to respond to comments and submit a revised version of their proposal.

Students in this course will gain experience with the following:

1) Exposure to and familiarity with all of the major ecosystems in Utah.

2) Communication skills with a diverse set of scientists, including academic and land managers.

3) Development of testable hypotheses in response to stated scientific needs as they relate to land management, ecosystem studies, ecology and economy across the State.

4) Exposure and experience using technology such as geographic information systems; remote sensing; isotope tracer and natural abundance field applications; photosynthesis, soil respiration and gas exchange measurement systems; and *in situ* real-time sensor networks below and aboveground.

5) Scientific, proposal writing and the peer review process.

II. Requirements: Graduate level, and in some cases, advanced undergraduates

III. Syllabus

Seminars in March and April at each of the three campuses to discuss reading list and major environmental questions relevant to Utah.

Student participants: Graduate students in the environmental sciences from Utah State University, University of Utah and Brigham Young University. The course will capped at 20 students with preference given to first and second year graduate students. Two faculty coordinators will travel with the students.

Course Coordinators: Drs. Zach Aanderund (BYU), Sylvia Torti (UU) and Barry Baker (Utah State, TNC) will act as course coordinators and travel with the students for the 16 days.

Faculty: Faculty and/or Directors from each field station will be responsible for designing and running the program at their field station and for establishing meetings with local, relevant land managers. All course participants (faculty, students, land managers, etc.) will be invited to the course wrap up at the end.

Course Administration: Each institution is responsible for establishing the course within their schools, recruiting and funding students.

Course Itinerary: DRAFT

COLORADO PLATEAU

Day 1: Salt Lake City to Capitol Reef Field Station
Dr. Renee van Buren, Director of Capitol Reef Field Station, Utah Valley University
Hau Trong: Station Manager

Afternoon Lecture: Orientation to Colorado Plateau: geology and history
National Park Ecology needs and challenges to land management within a Park
Meeting with local organic farmer in Caineville; invasive species and alternative methods for plant control.

Day 2: Capitol Reef to Entrada Field Station
Dr. Sylvia Torti, Station Manager and Dr. Jim Ehleringer, Scientific Director

Lecture: Orientation to Entrada, history and water on the Colorado River: watersheds, Dolores River, water quantity and quality on Colorado Plateau

Day 3: Entrada Field Station

Establishment of three, long-term vegetation plots/transects from Dolores River to canyons. GPS/GIS mapping.

Day 4: Entrada Field Station to Moab via water to Canyonlands Research Center

Morning: Float from Entrada to Dewey Bridge.

Afternoon: 1:30-4:30 meet with BLM, USGS in Moab, Drs. Jayne Belnap, Mark Miller, Jeff Troutman (NPS), Anne Brasher. Issues faced by diverse land managers on the Colorado Plateau

Day 5: Canyonlands Research Center
Dr. Barry Baker, Director Canyonlands Research Center

Lecture: Global Change, grazing and human use of landscapes.
Site visits to NEON location, North Cottonwood Creek, and exclosures in the Indian Creek corridor.

Day 6: Canyonlands Research Center, Canyonland Park and Park Administrators.
Speakers to be determined.

Day 7: Canyonlands Research Center to Escalante
Dr. Dennis Bramble, land manager, Advisory Committee member to Entrada Research Station and Escalante Research Center

Lecture: Grazing, vegetation, species interactions
Data collection: possible; to be determined

Day 8: Escalante National Monument to Lytle Ranch
Steve Roberts and Friends of Monument, Carolyn Shelton (BLM). Discussion with ranchers and local land owners and director of Escalante National Monument (Shelton)

MOJAVE DESERT

Day 9: Lytle Ranch
Dr. Zach Aanderund, Brigham Young University

Lecture: Mojave Desert
Research/Data collection: to be determined

Day 10: Lytle Ranch

Research/data collection to be determined

GREAT BASIN DESERT

Day 11: Travel from Lytle to Great Basin Site: Desert Experimental Range

Lecture: Great Basin & Range Desert, Range Ecology

Day 12: Desert Experimental Range

Day 13: Great Basin to Salt Lake City to Snowbird
Stop in Onaqui (NEON Great Basin site). Dr. Jim Ehleringer

MONTANE HABITATS

Days 13-15: Snowbird.
Snowbird Resort

Lecture: montane habitats. Urban/wilderness interface. Issues of population growth, snowpack, dust and pollution to ecology and economy of Wasatch Front (speaker to be determined)
Wrap up, break out sessions, and begin development of proposal ideas, experimental designs, etc.