Introduction:
This course provides students an introduction to research in alpine environments through a field-based course in the Peruvian Andes. Students will participate in field-based research, learn the skills to safely conduct research in mountain environments, engage with the Peruvian landscape through studies of ecology and culture, and consider the work of science through an environmental stewardship lens.

Materials & Preparation:
Students are expected to come prepared with the necessary gear and materials each day of the course to best encourage a safe and meaningful abroad experience. Students are expected to participate fully in academic and physical course activities and are trusted to ensure this participation by taking responsibility for themselves, their learning, and their health and safety.

Gear & Materials needed:
- All camping and travelling gear listed on packing list
- Two field journals (one for note-taking & data collection, one for daily entries).
- ESCI 498D Course Reader (available on PDF)

Goals and Outcomes of the Course:
- Students will be introduced to the techniques necessary to safely carry out data collection in rugged environments so that they will be prepared to be active participants in data collection and field projects in alpine environments.
- Students will learn how to link research questions, methodologies, and field data collection so that they will be prepared to turn in assignments and participate in a research symposium in Bellingham, WA (following the international experience) to share their experience with the greater WWU community.
- Students will be introduced to the ecology and cultural aspects of place through experience, field journaling, and connecting with a variety of stakeholders and community members so that they will be able to explain the ecological and human aspects of the Peruvian mountain landscape.
- Students will gain experience backpacking, camping, and traveling in remote and alpine environments so that they have the skills to engage in mountain research.
- Backcountry and Field Research Skills
  - Traveling and working in a foreign country
  - Backcountry skills: backpacking, camping, and traveling in remote and mountain environments
  - Leadership and collaboration with a research team
  - Data collection protocols and implementation in the field
- Ecology of the Peruvian Environment
  - Introductions to ecology, plant and animal identification, and current environmental understandings and challenges
  - Study the human influence on the area and seek understanding of culture, local systems, and conservation efforts in Peruvian mountain environments
Course Structure:
Students will focus on a variety of skills and research techniques throughout the field course. The course will begin by focusing on backcountry and field research skills and with an introduction to Andean ecology. The course will culminate with participation in data collection and mountain research in a beautiful alpine environment. Students can choose to engage in their own research projects but will be required to also participate in the data collection for all course projects and research. There will be an optional climb of two easy peaks over 5000 meters led by professional Peruvian IMGA guides towards the end of the class - if conditions are favorable and students have demonstrated that they are prepared.

Instructors:
Dr. John All is a Research Professor in the Department of Environmental Science and the Director of the Mountain Environments Research Institute. He has been a mountain guide and served on search and rescue teams for over a decade. His research includes the impact of climate change on endangered species, on subsistence grazing, on fire, and on glacier particulates as they affect water supply. Dr. All works primarily in Peru and Nepal, but has led expeditions on five continents to extreme locations -- from deep caves to tropical rain forests; remote deserts to the great mountain ranges of Asia and South America -- and he summited Mt. Everest in 2010.

Dr. Elizabeth Balgord is a geology professor at Weber State University in Ogden, UT, specializing in sedimentology and tectonics. Her current projects include uplift history of the Rocky Mountains in WY and UT as well as the controls on ore genesis in the Cordillera Blanca. Her PhD came from the University of Arizona where she spent much her time working in the high Andes of central Argentina studying early foreland basin deposits in order to determine the timing of initial mountain uplift. She has summited Aconcagua and numerous other Andean high peaks.

Brief Schedule (See attached longer schedule):
June 18-22 Pre-Departure Classroom meetings – preparation for international travel, preparation for field research, packing and gear essentials, initial safety briefings, Peruvian Andes research background literature reviews and class presentations
June 25th Arrive in Lima
June 26th Bus to Huaraz
June 27th – July 1st Fieldwork preparation and acclimatization – visit to mountain permaculture installations, visit to National Institute for Glaciers and Alpine Ecosystems, visit to pre-Incan ruins, visit to the Huascaran National Park office, visit with the Environmental Science faculty at the local university in Huaraz (UNASAM), background lecture on the geology of the Cordillera Blanca and Negro, Peruvian Andes research background literature reviews and class presentations, day hikes to lakes and grazing areas, daily medical monitoring
July 2nd – July 24th visits to Ulta, Quilcayhuanca, and Ishinca valleys. Students will engage in research data collection working with the instructors, Peruvian researchers and students, and other US faculty associated with the Mountain Environments Research Institute, American Climber Science Program, and the American Alpine Club. Research projects include: glacier particulates monitoring, water quality, vegetation change, grazing impacts, geologic mapping, macroinvertebrate monitoring, bird monitoring, developing an Andean plant guide, and algae diversity studies.
July 25th and 26th Final class presentations in Huaraz and preparations for departure
July 27th end of the class, arrive in Lima for departure


Deliverables:

Active Participation
The opportunity to study in Peru requires students to take responsibility for themselves and their learning community. As a small study abroad program, students will be working closely with instructors and peers. Students will need to participate fully in cultivating a respectful, welcoming, and inclusive learning space. It is up to students to show up present and prepared - ready to take responsibility for their learning experience.

Peruvian Research Literature Summaries
Students will give oral summaries to background literature on Peruvian literature to the class.

Field Journal
Students will be required to keep a field journal throughout their experience in Peru. The field journal is an opportunity for students to delve deeply into the ecology of the Peruvian landscape and to record observations, data collections, and ideas throughout the research experience. Students will begin reporting on the day they to Peru and will record their experiences daily – summarizing what they have learned during the initial field site visits and then as they progress through working on the different research projects.

Video Presentation
Science communication is critical in today’s society and students will work in groups of two to create a short video production (roughly 5 minutes) to convey what you have learned and experienced through visual media. The video shouldn’t just be a summary of the trip or a ‘video-diary’, it should convey a message – about grazing in the Andes, about the local people and their resource use, about climate change impacts, about how geology affects water quality, etc. The instructors will help with the planning and implementation of this assignment and students should plan on using free video editing software such as iMovie.

Research Summary
Students will have the opportunity to focus on data collection techniques and will learn how to plan a collection framework using a random stratified and other sampling designs. The final component of the course will be to combine what you have learned in the field and in lectures to create a summary of data collection for one of the environmental parameters we examined (you will choose the specific parameter in consultation with the instructors).

Grading:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Active Participation</td>
<td>20%</td>
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<tr>
<td>Literature Summaries</td>
<td>10%</td>
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<tr>
<td>Field Journal</td>
<td>20%</td>
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<tr>
<td>Video Presentation</td>
<td>25%</td>
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<tr>
<td>Research Summary</td>
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Academic Dishonesty: All students should review Appendix D, Academic Dishonesty Policy and Procedure Appendix D, Academic Dishonesty Policy and Procedure in the back of the University Catalog for a discussion of what constitutes academic dishonesty. [http://libguides.wwu.edu/plagiarism](http://libguides.wwu.edu/plagiarism)

Reasonable Accommodation: Reasonable accommodation for persons with documented disabilities should be arranged through Disability Resources for Students: Telephone 650-3083; email drs@wwu.edu and on the web at http://www.wwu.edu/depts/drs/