

**GEOG 3090**  
**ARCTIC AND ALPINE ENVIRONMENTS**  
Spring 2014

**Where:** Social Sciences building, room 333 (SS 333)

**When:** Tuesdays and Thursdays, 12 noon to 1:15 PM

**Class Website:** Access via <http://faculty.weber.edu/dbedford>

**Instructor:** Dan Bedford

**Office:** Social Sciences building, room 338 (SS 338)

**Office Hours:** Mondays and Wednesdays 11 AM to noon; Tuesdays and Thursdays 8:00 to 8:45 AM, **or by appointment.**

**Contact Information:**

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**Course outline and goals**

Mountains and arctic regions have long held a particular fascination for people. Mountains have, throughout history, been imbued with religious significance, military significance, and significance as a source of recreation. The indefinable “lure of the Arctic” is often given as a reason by polar explorers to return again and again to places in which they undergo incredible hardship. Arctic and alpine environments are at the heart of current issues of the relationship between modern, urban society and wilderness areas, as exemplified by regular horrific events on Mt. Everest, or by the perennial debate over the opening of the Arctic National Wildlife Refuge for oil exploration. The impacts of global warming are already being observed in the Arctic as sea ice melts, and in high mountains as glaciers recede.

All too often, however, the physical characteristics of arctic and alpine environments are forgotten in a clash of opinions and ideologies. This class aims to provide a strong scientific grounding in the nature of arctic and alpine environments, from which a deeper understanding of these debates can be gained. In a systematic approach, we will examine the global-scale processes of tectonics and climate that are responsible for the larger physiographic and climatic characteristics of arctic and alpine areas, before moving on to examine the regional scale features and processes of glacial, periglacial and marine environments. Arctic and alpine ecosystems will also be considered, along with human interactions with those ecosystems.

Learning outcomes for this class are:

1. Develop a basic understanding of the geography of the Arctic (where things are)
2. Understand the key physical processes relevant to cold environments, namely climatic, tectonic, glacial, periglacial and sea ice processes.
3. Develop a basic understanding of the workings of ecosystems in cold environments.
4. Understand the importance of arctic and alpine environments in the study of climate change, both natural and anthropogenic.

## Readings

The required texts for the class are:

- Krakauer, J., 1999, *Into Thin Air: A Personal Account of the Mount Everest Disaster*, Anchor Books, New York, NY.
- Streever, B., 2009, *Cold: Adventures in the World's Frozen Places*, Little, Brown and Company, New York, Boston and London.

These two books will be used partly as references for written assignments, but mostly for in-class discussion: Krakauer's for a focused discussion towards the end of the semester, Streever's as the semester goes along, a chapter a week. In addition, several e-reserve readings will be required throughout the semester to provide the necessary depth.

## Web Resources

The course web page will be accessible via <http://faculty.weber.edu/dbedford>. Check here for course updates, copies of reading lists and assignments, and links to useful web sites, maps, and articles.

## Grades

Course components will be weighted as follows:

Mid-term exam	20%
Final exam	25%
Term papers	45% (three papers at 15% each)
Overall class participation	10%

*Exams:* Exams will be a mix of short answer and essay questions, with a small number of map questions as well. Everything covered in both lecture and discussion up to the date of the exam is eligible to be on the test; the final will therefore be comprehensive, though the emphasis will be on newer material. (The final will be about 20% on old material.) Exams will take place in the regular class meeting room, and **must not be missed**. Make-up exams will not be offered. Be aware also that, for upper-division classes such as this one, **I do not provide study guides**. Attend class regularly, pay close attention and take good notes, and make sure you do your reading carefully. A review session will be offered before each exam.

*Papers:* Three term papers, each of 5-7 pages in length, are required during the semester. For each term paper, you will be able to select from a range of topics and titles. In many respects, however, the term papers for this class will be more like take-home essay exams. You will have a range of titles to choose from, but once you have chosen a title, you must write your paper specifically on that title. Each paper title will be accompanied by a reading list, which will provide the sources you must use for your paper. The reading lists will be comprehensive, and will include all permissible sources. You **may not** use additional outside sources unless you have cleared them with me first. The basic policies regarding term papers are as follows:

- *Drafts and the Writing Center:* **All** papers must be reviewed by a tutor at the Writing Center, and revised as necessary, before a final draft is turned in to me. Throughout the semester, we will be working with the same two Writing Center tutors to ensure consistent feedback. Please make sure you see the tutors

specifically assigned to this class. More information will be provided in the first couple of weeks of class.

- *Late policy:* No late papers will be accepted, except under the most extreme of extenuating circumstances (life-threatening accident, emergency surgery, death in the family).
- *Recycling bonus:* Use both sides of the paper, or use paper from a recycling bin, and you get one bonus point on your paper.
- *Writing/style guide:* A writing/style guide is posted to the class web site, on the HANDOUTS page. Please make use of this. Violation of obvious basic points covered on the writing and style guide will cost you points.
- *Plagiarism:* **Plagiarism is taken extremely seriously at WSU in general and my classes in particular.** If you plagiarize in this class, you will be caught, and you will in all likelihood be penalized by failing the entire class (not just the assignment). Don't do it. See the section below on academic honesty. All term papers **must** be accompanied by a signed copy of the statement on plagiarism, available from the class website.

*Class participation:* This is a necessarily subjective part of your grade, but there will be plenty of opportunities to be actively involved in the class. As noted on the schedule, at least three formal discussions will take place during class time, when discussion of key readings and ideas will take place. In addition, each Tuesday morning (with a couple of exceptions) will begin with a short discussion of a chapter from Bill Streever's *Cold*, and everyone should bring to class for that day a question, comment or observation about the relevant chapter written on a 3x5 index card. Furthermore, discussion is encouraged (and expected) from everyone in the class throughout the semester. Ask questions, raise points, make comments and observations, relate things said in class to your own experiences. **This is your class, too.** Make sure you are actively involved in it.

*Extra credit assignments:* My policy is not to offer any extra credit assignments.

### **Field Trips**

Field trips during the semester may be arranged, depending on interest and availability of vehicles. The Wasatch Front contains many excellent opportunities for hands-on demonstration of some of the issues and concepts raised in class.

### **Other Considerations**

I am very aware that many students have work and family commitments outside the classroom. I am willing to accommodate conflicts within reason, but keep in mind that your responsibilities outside class do not excuse you from your responsibilities as a student. If you have any questions about those responsibilities, please check the Student Code, available on the web at <http://documents.weber.edu/ppm/6-22.htm>.

Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in room 181 of the Student Service Center.

SSD can also arrange to provide course materials (including this syllabus) in alternative formats if necessary. The SSD office has a web page at <http://departments.weber.edu/ssd/>

### **Quick Reference: Important Dates**

Midterm exam	Thursday February 27 <sup>th</sup> during class time
Final exam	Thursday April 24 <sup>th</sup> , 1:00 PM to 2:50 PM
Paper #1 due	Thursday January 30 <sup>th</sup> , at the start of class
Paper #2 due	Thursday March 13 <sup>th</sup> , at the start of class
Paper #3 due	Thursday April 10 <sup>th</sup> , at the start of class

**A note on final exam dates and times:** These are scheduled by the Registrar's office, not by me. They are scheduled in order to prevent conflicts in final exam times between classes, and are not subject to change. You **must** plan on being on campus and available to take the exam at the scheduled time.

### **Plagiarism and Academic Honesty**

It should be basic common sense that nobody should cheat on exams. For this class, cheating means using any unauthorized aid to take the exam. Exams will be closed-book, closed-note, and no co-operating with other students will be permitted. The exams are intended to test the knowledge you have in your head. No external sources are allowed.

Plagiarism is a little more complex because it comes in many shapes and forms, but in simple terms it means copying material from somewhere else and passing it off as your own work, **either intentionally or unintentionally**. A more complete definition will be provided in the statement of plagiarism that you will be required to sign and attach to each of your term papers. For this class, the issue of plagiarism applies to your term papers. For the sake of clarity, keep in mind the following: **every word of each one of your papers is expected to be your own work, written specifically for this class** (no resubmitting papers from previous classes). It is acceptable to use *a few short* quotations so long as the source is properly attributed **and quotation marks are used**, but papers copied in whole or in part are entirely unacceptable. Failure to use quotation marks, even if only by accident, is still plagiarism.

If you are caught submitting a copied paper, you are guilty of plagiarism and the most likely consequence is failure of the class (not just the assignment). **It's very simple: don't copy your paper, not even a sentence.** All term papers for this class **must** be accompanied by a signed copy of the statement on plagiarism, available from the class website.

### **Do You Need a Minimum Grade In This Class?**

If you need a certain minimum grade in this class for **any reason** (graduation requirements, scholarship, athletics, etc.), it is **up to you** to monitor your progress and approach me for advice, extra help, etc. to ensure you end the semester with the grade that you need. The time to work on this is **during the semester**, and absolutely **not** after final grades are posted. By then, it is far too late.

## Lecture Schedule

Below is a tentative lecture schedule. Keep in mind that we may not stick precisely to this schedule, as some subjects may take longer to cover than others.

**Readings:** Most of the readings listed here are available on e-reserve, accessible via <http://ereserve.weber.edu/>. Numbers in parentheses refer to e-reserve readings number.

<i>Week beginning</i>	<i>Tuesday</i>	<i>Thursday</i>	<i>Reading</i>
<b>January 7</b>	Introduction	Plate tectonics and the formation of the Arctic	
<b>January 14</b>	Plate tectonics and the formation of alpine areas		Streever, <i>July</i> Ollier & Pain (1)
<b>January 21</b>	Plate tectonics and the formation of alpine areas	<b>Discussion: what is an arctic or alpine environment?</b>	Streever, <i>August</i> Price pp. 1-5 (handout) Pielou pp. xi-xv (handout) Barry and Ives (2) Ives <i>et al.</i> (3)
<b>January 28</b>	Arctic climates	<b>Paper #1 due Thursday</b>	Streever, <i>September</i> NSIDC- All About Arctic Climatology and Meteorology (online)
<b>February 4</b>	Arctic climates	Mountain climates	Streever, <i>October</i>
<b>February 11</b>	Mountain climates (continued)		Streever, <i>November</i> Steenburgh & Alcott (4)
<b>February 18</b>	Avalanches	Global environmental change and arctic/alpine environments	Streever, <i>December</i> Armstrong (5) Bedford (online article) Broecker & Denton (6)
<b>February 25</b>	Global environmental change (continued)	<b>Mid-term exam</b>	Streever, <i>January</i> Jeffries <i>et al</i> (7)
<b>March 4</b>	The glacial environment		
<b>March 11</b>	<b>SPRING BREAK- no classes</b>		
<b>March 18</b>	The Arctic periglacial environment	<b>Discussion: oil drilling in ANWR</b>  <b>Paper #2 due Thursday</b>	Streever, <i>February</i> Pielou (8) Kotchen & Burger (9) Arctic Power (online article)
<b>March 25</b>	The Arctic marine environment: sea ice		Streever, <i>March</i> NSIDC- All About Sea Ice (online materials) Sugden (10)
<b>April 1</b>	The Arctic marine environment: ecology		Streever, <i>April</i> Sugden (10)
<b>April 8</b>	Life in the cold: Arctic and alpine land ecosystems  <b>Paper #3 due Thursday</b>		Streever, <i>May and June</i>
<b>April 15</b>	Indigenous and non-indigenous people in alpine areas: <b>Discussion of Krakauer's <i>Into Thin Air</i></b>	Indigenous and non-indigenous people in the Arctic.	Krakauer Wohlforth (11)
<b>April 22</b>	<b>Final exam Thursday April 24<sup>th</sup>, 1:00 PM to 2:50 PM, SS 333.</b>		

The full titles of readings abbreviated in the schedule are:

Abbreviation	Full title
<b>Arctic Power</b>	Arctic Power, n.d., Top ten reasons to support ANWR development. Available online at <a href="http://www.anwr.org/ANWR-Basics/Top-ten-reasons-to-support-ANWR-development.php">http://www.anwr.org/ANWR-Basics/Top-ten-reasons-to-support-ANWR-development.php</a>
<b>Armstrong</b>	Armstrong, R.L., and Armstrong, B.R. (1987). Snow and avalanche climates of the western United States: a comparison of maritime, intermountain and continental conditions. In <i>Avalanche Formation, Movement and Effects</i> , IAHS Publication No. 162, 281-294.
<b>Barry and Ives</b>	Barry, R.G., and Ives, J.D., 1974, Introduction. In Ives, J.D., and Barry, R.G. (eds.), <i>Arctic and Alpine Environments</i> , pp. 1-13, Methuen, London.
<b>Bedford</b>	Bedford, D. (2009). Bytes of Note: Climate change and the cryosphere, <i>Environment</i> , 51(2), 5-6. Available online at <a href="http://www.environmentmagazine.org/Archives/Back%20Issues/March-April%202009/Bytes-ma09.html">http://www.environmentmagazine.org/Archives/Back%20Issues/March-April%202009/Bytes-ma09.html</a> or link from the class website.
<b>Broecker and Denton</b>	Broecker, W.S., and Denton, G.H. (1990). What drives glacial cycles? <i>Scientific American</i> , 262(1), 49-56.
<b>Ives et al.</b>	Ives, J.D., Messerli, B., and Spiess, E. (1997). Mountains of the world- a global priority. In Messerli, B., and Ives, J.D. (eds.), <i>Mountains of the World: A Global Priority</i> , pp. 1-15, The Parthenon Publishing Group, London and New York.
<b>Jeffries et al.</b>	Jeffries, M. O., Overland, J. E., and Perovich, D. K. (2013). The Arctic shifts to a new normal. <i>Physics Today</i> , 66(10), 35-40.
<b>Kotchen and Burger</b>	Kotchen, M.J., and Burger, N.E. (2007). Should we drill in the Arctic National Wildlife Refuge? An economic perspective. <i>Energy Policy</i> , 35(9), 4720-4729.
<b>Krakauer</b>	Krakauer, J., 1999, <i>Into Thin Air: A Personal Account of the Mount Everest Disaster</i> , Anchor Books, New York, NY.
<b>NSIDC- All About Arctic Climatology and Meteorology</b>	National Snow and Ice Data Center. All About Arctic Climatology and Meteorology. Available online at <a href="http://nsidc.org/cryosphere/arctic-meteorology/index.html">http://nsidc.org/cryosphere/arctic-meteorology/index.html</a> , specifically the Introduction and Arctic Weather and Climate sections.
<b>NSIDC- All About Sea Ice</b>	National Snow and Ice Data Center. All About Sea Ice. Available online at <a href="http://nsidc.org/cryosphere/seaice/index.html">http://nsidc.org/cryosphere/seaice/index.html</a> , specifically the Introduction, Characteristics, Processes and Environment sections.
<b>Ollier &amp; Pain</b>	Ollier, C., and Pain, C., 2000, <i>The Origin of Mountains</i> , Routledge, London and New York, pp. 1-20 (Introduction).
<b>Pielou</b>	Pielou, E.C., 1994, <i>A Naturalist's Guide to the Arctic</i> , University of Chicago Press, Chicago. <b>On print reserve in the library.</b>
<b>Price</b>	Price, L.W., 1981, <i>Mountains and Man</i> , University of California Press, Berkeley, CA. <b>On print reserve in the library.</b>
<b>Steenburgh &amp; Alcott</b>	Steenburgh, W. J., & Alcott, T. I. (2008). Secrets of the “greatest snow on Earth”. <i>Bulletin of the American Meteorological Society</i> , 89(9), 1285-1293.
<b>Streever</b>	Streever, B., 2009, <i>Cold: Adventures in the World's Frozen Places</i> , Little, Brown and Company, New York, Boston and London.
<b>Sugden</b>	Sugden, D., 1982, <i>Arctic and Antarctic: A Modern Geographical Synthesis</i> , Barnes & Noble Books, Totowa NJ. <b>On print reserve in the library.</b>
<b>Wohlforth</b>	Wohlforth, C., 2003, On thin ice, <i>Orion</i> magazine, online edition.