Syllabus for UAF Summer Sessions Special Topic course, BIOL 495/695, Arctic Alaska Environmental Change: Field excursion to the North Slope, 10-30 Jun 2015

1. Course information
Title: Special Topic, Arctic Alaska Environmental Change: Field excursion to the North Slope
Number: BIOL 495 / 695
Credits: 4
Prerequisites: BIOL 115 & 116, or equivalent introductory physical science course intended for science majors in biology, geology or geography or instructor approval
Location: Murie, Room 330
Meeting time: 10 Jun, 9:00 am

2. Instructors and contact information
Prof. D.A. (Skip) Walker, (instructor and course leader) Alaska Geobotany Center, University of Alaska Fairbanks, Arctic Health Building, Room 254, X 2460, dawalker@alaska.edu. Martha Raynolds (instructor and course manager) mkraynolds@alaska.edu. Amy Breen (instructor with Wilderness First Responder training), albreen@alaska.edu.

3. Course readings/Material:
Readings (see daily readings in the course schedule):
- Daily readings: Each day 1-2 papers are required readings that we will discuss over breakfast and/or dinner. The required readings are in the “Syllabus and Course Reader” and in the book Arctic Voices: Resistance at the Tipping Point by Subhankar Banerjee. Copies of both are in the provided materials.
- Course library: The course also carries a book box with many other general references, relevant papers and books. Students can check these out for personal reading and as background for their course projects. The contents of the library are listed in the course “Syllabus and readings”.
- Good general references: These references provide a good overview of the Dalton Highway and research at the Toolik Field Station.


**Course equipment**
The course will provide a large group meeting and eating tent, Coleman stoves, water purification, first aid kit, satellite phone, generator, and vehicles. Students will need to purchase food and have money for meals at Coldfoot and Prudhoe Bay. Students will need to enroll early and contact the organizers to get a list of required equipment including: tent, sleeping bag, sleeping pad, rain gear, footwear, sun protection, bug protection, personal gear and other camping equipment. For students traveling from abroad or that do not own extreme weather gear, tents, sleeping bags and sleeping pads are available from the course instructors or can be rented from UAF’s Outdoor Adventures.

**4. Course description:**

**Course catalog description:**

BIOL F495_ Arctic Alaska Environmental Change: Field excursion to the North Slope. 4 Credits. Offered Summer 2015

21-day course, Includes 15-day field excursion along the Dalton Highway, Brooks Range, Arctic Foothills Arctic Coastal Plain, Prudhoe Bay. Climate, geology, permafrost, soils, vegetation, wildlife, local people, infrastructure impacts. Special fees apply. Stacked with BIOL F695(4)

**More detailed description:** This course will consist of:

1. 3 days of preparation with lectures, local field trips in the Fairbanks area and logistics for the excursion.
2. 16 day field excursion
3. 2 days of student presentations and local field trip at the end.

The trip will have a strong emphasis on Arctic environments, local people, and field sampling.

**5. Course goals and student learning outcomes**
The goals for the course are to: (1) Provide students with an in-depth field experience of Arctic environments, local people, and the oil industry’s environmental research program and application to current Arctic issues. (2) Provide methods of field sampling of Arctic vegetation, soils, and permafrost in a variety of Arctic ecosystems. (3) Visit Arctic research sites, including Finger Mountain, Atigun Pass, Toolik Lake, Imnnavait Creek, Happy Valley, Sagwon, and Prudhoe Bay.
6. Instructional method and grading criteria:

3-day preparation in Fairbanks

Introductory lectures will give an overview of the course and Arctic ecosystems, permafrost and local people along the Dalton Highway. Students will develop a research topic to be examined during the excursion. On the third day students will visit local boreal forest ecosystems and the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) Permafrost Tunnel at Fox. Students should become familiar with the field guides (Walker et al. 2009, Brown & Krieg 1983, Huryn & Hobbie 2013) for the Dalton Highway route.

16-day field excursion:

The course will follow the route of the Dalton Highway. The course will examine Arctic environments, with in depth examination of the physical, biological, and human responses and adaptations to changing climate. We visit an Athabascan native village at Minto and the old mining town of Wiseman to gain an understanding of village life in two very different settings. We will establish camps in the Boreal Forest, Brooks Range, Arctic Foothills, and Arctic Coastal Plain — at Minto, Coldfoot, Galbraith Lake, Happy Valley, Sagwon, and near Deadhorse — where we will camp and spend two days at each location exploring the local vegetation, soils, permafrost, geology, and land-use and climate-change issues. The course will have field lectures, conducted during hikes to different areas, using materials from past and existing research projects in the region. Students will learn the methods of vegetation, soil, and permafrost sampling and collect sample data from representative ecosystems. The course includes a portion at Prudhoe Bay with an overview of the environmental research of the oil companies at Prudhoe Bay. We will then return to UAF driving south from Prudhoe Bay to Fairbanks.

2-day presentation of student projects:

At the end of the course students will spend one day writing an oral presentation that summarizes their observations during the excursion. Students will present their findings on the second day with ample time for group discussions.

Research topics:

Students will develop a research topic that fits with the planned excursion. The topics should focus on descriptive aspects of Arctic environment along the climate gradient. Students should keep in mind that the analysis of the data will be limited by the short time available at the end of the course. At the end of the course, students will present 15-minute oral presentations summarizing aspects of their field observations, focusing on their research topic. Guidelines for these presentations will be handed out at the beginning of the course. Graduate students will also write a 10-15 page research paper focused on some aspect of observations during the course, which will be due 3 Jul 2014.
7. Course Schedule and reading assignments:

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Activity</th>
<th>Reading to be done in preparation for each day</th>
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<tbody>
<tr>
<td>9-Jun</td>
<td>Fairbanks, Hess commons</td>
<td>Arrival, check into dorm</td>
<td>None</td>
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| 10-Jun| Fairbanks, Margaret Murie Bldg Room 330 | 9:00 am: Cold breakfast. Introductions. Talks: Permafrost (Yuri Shur); Rural Alaska subsistence systems (Shauna Burnsilver); the Dalton Highway & introduction to Arctic ecosystems (Skip Walker).  
12:00 noon: Lunch  
1:00 pm: (outside Irving Bldg.), Health & safety, equipment check.  
6:00 pm: (College Pizzaria), dinner.  
| 11-Jun| Fairbanks Arctic Health Bldg. West Parking Lot | Breakfast: on own  
9:00 am: Permafrost coring; meet at Arctic Health Bldg, West Parking Lot, travel together to coring sites.  
Lunch: To be determined.  
1:00 pm: Define research topics. Help pack trailer for trip. Get ready for next day.  
Evening: Dinner on own,  
| 12-Jun| Fairbanks Arctic Health Bldg. West Parking Lot | Breakfast: on own.  
8:30 am: Boreal field trip, North Campus Lands, meet at Arctic Health Bldg, West Parking Lot.  
12:00 noon: Lunch on way to Permafrost tunnel.  
1:00 pm: CRREL Permafrost Tunnel (Elliot Highway).  
Evening: Dinner on own, final packing, get ready for next day.  
| 13-Jun| Fbks - Minto Meet at Arctic Health | Breakfast: Sourdough Sam’s  
6:30 am: Arctic Health West Parking Lot: Final packing, drive to Sourdough Sams for breakfast.  
8:00 am -12:00 noon: Drive to Minto Village.  
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<tr>
<th>Date</th>
<th>Location</th>
<th>AM to PM</th>
<th>Dinner</th>
<th>Night</th>
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<tr>
<td>14-Jun</td>
<td>Minto - Coldfoot</td>
<td>Drive to Coldfoot, with stops at Yukon River, Finger Mtn.</td>
<td>at Coldfoot truck stop.</td>
<td>Tent camp in Coldfoot vicinity</td>
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<tr>
<td>16-Jun</td>
<td>Coldfoot - Galbraith Lake</td>
<td>AM-PM: Drive to Galbraith Lake, with stops at frozen debris lobes, Sukakpak Mtn, Atigun Pass.</td>
<td>Cook camp dinner.</td>
<td>Tent camp at Galbraith Lake</td>
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<tr>
<td>17-Jun</td>
<td>Galbraith Lake</td>
<td>Day at Galbraith. AM: Aufeis hike. PM: Catch up reading, plant collections.</td>
<td>Cook camp dinner.</td>
<td>Tent camp at Galbraith Lake</td>
</tr>
<tr>
<td>18-Jun</td>
<td>Galbraith Lake</td>
<td>Day at Galbraith. AM: Aufeis hike. PM: Catch up reading, plant collections, journals.</td>
<td>Toolik Field Station</td>
<td>Toolik Field Station</td>
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O'Neil, D., "The Fall of the Yukon Kings" pp 142-164 in *Arctic Voices*

Kantner, S., "Caribou currency", pp 238-253 in *Arctic Voices*


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<th>Date</th>
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<th>Activities</th>
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| 19-Jun| Galbraith Lake - Innvat Creek - Toolik Lake | **Breakfast in camp.**  
**AM:** Drive to Innvait Creek.  
Innvait Creek orientation, R4D research.  
**PM:** Drive to Toolik Lake, Remote sensing talk (Martha Raynolds); plant collections, journals.  
Dave Klein arrives in pm.  
**Dinner and night:** Toolik Field Station. | **Gough, L.** and **S. E. Hobbie.** 2003. Responses of moist non-acidic arctic tundra to altered environment: productivity, biomass and species richness. *Oikos* 103:204. |
| 20-Jun| Toolik Lake - Drive to Sagwon in evening | **Breakfast at Toolik Lake.**  
**AM-PM:** Martha Raynolds departs in am.  
Toolik research, Jade Mountain hike. Local glacial geology, landforms, soils, wildlife.  
**Dinner:** at Toolik Field Station  
**Evening:** Drive to Sagwon.  
| 21-Jun| Sagwon | **Breakfast in camp.**  
**AM:** Sagwon pH boundary, biocomplexity of frost boils,  
**PM:** Drive to Prudhoe Bay, stops at Franklin Bluffs, and for wildlife.  
| 22-Jun| Sagwon - Prudhoe Bay | **Breakfast in camp.**  
**AM:** Percy Pingo hike;  
**PM:** Prudhoe Bay, Lake Colleen Research site.  
| 23-Jun| Prudhoe Bay, drive to Happy Valley in evening | **Breakfast in Prudhoe Bay Oilfield.**  
**AM-PM:** Prudhoe Bay Oilfield tour, BP Environmental Studies Program, Bill Streever.  
**Dinner:** Prudhoe Bay Oil Field.  
**Late PM:** Drive to Happy Valley.  
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<tr>
<td>29-Jun</td>
<td>Fairbanks</td>
<td>Breakfast: on own. 8:00 am: Unload vehicles.</td>
<td>Papers relevant to presentations</td>
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<tr>
<td>Date</td>
<td>Location</td>
<td>Breakfast</td>
<td>Lunch</td>
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<tr>
<td>30-Jun</td>
<td>Fairbanks</td>
<td>Room.</td>
<td>8:00 am: Unload vehicles.</td>
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Rest of day: Final presentations preparation.

**Academic integrity:**
Plagiarism and cheating will not be tolerated. Plagiarism is presenting another’s work as new or original without citing your source. For additional detail, see [http://www.uaf.edu/library/instruction/handouts/Plagiarism.html](http://www.uaf.edu/library/instruction/handouts/Plagiarism.html)

Please speak with me if you have any questions about how to properly use other people’s work.

**Attendance policy:**
Students are expected to actively participate in both the academic part and expedition part of camp, cooking, clean-up, waste management, emergencies, group decisions, and keeping a cheerful attitude in sometimes difficult field conditions such as rain, cold or snow.

**9. Evaluation:**

**Summary of grading points:**

**Undergraduate student grading (BIOL 495 students):**

- Attendance and participation lectures, field trips, and discussions: 200 pts
- Field notebooks and plant collections: 200
- Oral presentation of research topic: 200
- TOTAL: 600 pts

**Graduate student grading (BIOL 695 students):**

- Attendance and participation in discussions: 200 pts
- Field notebooks and plant collections: 200
- Oral presentation of research topic: 200
- Final research paper: 200
- TOTAL: 800 pts
These criteria may be modified somewhat as the course progresses. Final grades will be as follows: greater than or equal to 90% = A; 80-89% = B; 70-79% = C; 60-69% = D; < 60% = F.

**Graduate student grading:**
Graduate students will be graded according to the same criteria as the undergraduate students except that the graduate students are required to turn in 3-5 page research paper on a topic of their choice. Guidelines for this paper will be handed out on the first day of class. Due date is 3 Jul. Students should arrange for an incomplete grade if they cannot meet this deadline.

**10. Support Services:**
Students are encouraged to contact the instructor with any questions, or to clarify the lecture or the assignments. I will be happy to review drafts of assignments and answer questions any time. Arctic Health, Room 254. Phone 474-2460, dawalker@alaska.edu. Home phone: 451-0800.

**11. Disabilities services:**
The instructor will work with the Office of Disabilities Services (203 WHIT, 474 7043, to provide reasonable accommodation to students with disabilities.
Course Library (2015)

Items not in manila folders: Books, data reports, natural history guidebooks, guides to the Dalton Highway and floras:

Items in manila folders (arranged alphabetically by author within subject folders): Journal articles and book chapters:

ANIMALS


CLIMATE CHANGE

GEOLOGY

HUMAN, INDUSTRIAL & SOCIAL SYSTEMS
Klein, David R. 2002. Perspectives on wilderness in the Arctic. Wilderness in the circumpolar north: searching for compatibility in ecological, traditional, and ecotourism values. USDA, Ogden UT.

PLANTS
Klein, D. R., Bruun, H. H., Lundgren, R., & Philipp, M. 2008. Climate change influences on species interrelationships and distributions in high-Arctic Greenland. Advances in


SOILS AND PERMAFROST


