Syllabus
BIOL 488/688, Arctic Vegetation Ecology: Geobotany
Spring 2013

1. Course information

Title: Arctic Vegetation Ecology: Geobotany
Number: BIOL 488 / 688
Credits: 3
Prerequisites: BIOL 115 & 116, Introduction to Plant Biology (BIOL 239) or Principles of Ecology (BIOL 271) or instructor approval
Location: 103 Irving I
Meeting time: ***Lecture***: T, Th: 2:00-3:30; ***Lab***: Th: 3:40-5:00

2. Instructor and contact information

Prof. D.A. (Skip) Walker, Alaska Geobotany Center, University of Alaska Fairbanks, Arctic Health Building, Room 254, 474- 2460, dawalker@alaska.edu. Office hours: M, W, F: 9:00-11:00.

3. Course readings /materials

Numerous papers will be read and are in the assignments listed in the course calendar and will be posted on line at http://www.geobotany.uaf.edu/teaching/biol488. These three references provide a good overview of the Arctic Vegetation in North America and Russia and the current issues relevant to Arctic vegetation.

1. Bliss, L.C. 1997. Arctic Ecosystems of North America. Polar and Alpine Tundra. Elsevier. Amsterdam. pp. 551-683.
2. Callaghan, T.V., Bjorn, L.O., Chapin III, F.S., et al. 2005. Chapter 7, Arctic tundra and polar desert ecosystems. Arctic Climate Impact Assessment - Scientific Report. Cambridge University Press. Cambridge. pp. 243-352.
3. Chernov, Y.I., Matveyeva, N.V. 1997. Arctic ecosystems in Russia. Polar and Alpine Tundra. Elvesier. Amsterdam. pp. 361-507.

Required supplies:
10x-power hand lens for field identification of snow grains and plant specimens.
8.5 x 11-inch notebook or field book for field reference collection and methods notes.
Back country skis or snow shoes with appropriate boots and poles,
Clothing adequate for spending a full days outdoors during winter conducting field work, (including day pack, rain gear (top & bottom, necessary for digging qinzhee), warm winter clothing, including long underwear, sweater, boots, parka, warm ski cap, gloves, sun glasses, sun protection).
Sleeping bag and pad.
Water bottle, sack lunches
A full list of equipment and expectations for the field trip will be provided well before the field trip.

4. Course description

Course catalog description:
BIOL F488 Arctic Vegetation Ecology: Geobotany
3 Credits Offered Spring even numbered years
Arctic plants in relationship to the Earth, including arctic plant identification, climate, geology and geography controls on arctic plant communities, snow ecology, applications to wildlife studies and current Arctic issues. Lectures, labs, and 1 winter field trip. Prerequisites: BIOL 115 and 116 or equivalent; BIOL 239 or BIOL 271; or approval of instructor. Special fees apply. Stacked with BIOL F688 (3 + 1).

Expected proficiencies for taking the course: Ability to read, comprehend, and assimilate written information in scientific texts and journals; basic math skills (including algebra); basic word processing and spreadsheets; basic writing and presentation skills, background in biology, ecology, and plants and/or other biological or Earth sciences such as geology, geomorphology, zoology, climatology and remote sensing.

More detailed description: This course consists of four major parts:

1. **Lectures:** Thirteen lectures. This portion will examine the tundra plant communities and ecology of Arctic tundra. The emphasis will be on Arctic Geobotany, i.e. the relationship of arctic plants and vegetation to the Earth. The focus will be on the factors controlling vegetation patterns, including climate, permafrost, geomorphology, soils, animals, zonation, paleogeography, plant communities, floristics, plant adaptations, and succession patterns.
2. **Snow Ecology component:** Three lectures plus a 3-day spring field excursion to examine the taiga and tundra systems in winter conditions. The focus will be on snow as a habitat. Activities will include describing snow profiles, observing snow and snow-free habitats and their use by animals in winter, identifying plants in their winter conditions, examining subnivian environments and the effects of topography and snow distribution patterns on plant and animal habitat distribution. Students will keep a field book of their observations. A list of required equipment, including outdoor clothing, sleeping bags, pads and other items will be provided prior to the field trip. The trip will not be cancelled because of bad weather unless the roads are impassable. In such case, local day trips will be arranged in the UAF North Campus Lands. Students will be graded on their attendance, snow descriptions and their field notebooks.
3. **Arctic plant identification component:** Ten labs. Students will learn about 160 of the most common Arctic species in Alaska, including trees, shrubs, dwarf shrubs, grasses, sedges, rushes, bryophytes, and lichens. Students will keep a notebook of plant identification and will be tested over their ability to identify these species.
4. **Written & oral (graduate students) or Oral (undergraduate students) presentations of research topics:** Presentations of in-depth literature review on Arctic Vegetation topic of choice.

5. Course goals and student learning outcomes:

General coarse goals: Provide students with an in-depth knowledge of Arctic vegetation from a geobotanical perspective, knowledge of the relevance of Arctic vegetation to

Alaskan climate- and land-use change issues, an introduction to snow ecology, and knowledge of a core set of common Arctic Alaskan plants.

Student outcomes: (1) Students will gain an understanding of the relationships of arctic plants and vegetation to climate, permafrost, geomorphology, soils, and animals, and the role of these systems in climate change and land-use change issues affecting Alaska. (2) During the snow-ecology portion of the course they will gain an in-depth understanding of the physical, chemical and biological properties of snow cover. They will learn to describe snow profiles, identify plants in winter, keep field notebooks for their field observations, and learn modern approaches of snow ecological research. (3) Students will learn to identify a foundation set of 160 Arctic plant species that will allow them to better undertake vegetation sampling and understand wildlife habitat. (4) All students will gain experience giving oral presentations regarding Arctic-vegetation topics of their choice. (5) Graduate students will gain experience in writing and giving oral reviews of the key literature regarding Arctic vegetation and summarizing and presenting material in a conference format.

6. Instructional method:

Lectures:

On Tuesdays, a lecture will examine various aspects of Arctic tundra. The emphasis will be on the factors controlling vegetation patterns, including climate, permafrost, geomorphology, soils, animals, zonation, paleogeography, biogeographic history, plant adaptations, and succession patterns, effects of climate and land-use change. Students are expected to attend the lectures and read the assigned literature. Attendance will be recorded. There will be a final exam over the lecture material and the readings.

Literature discussion sessions:

On Thursdays, during the literature discussion sessions (1.5 hours), we will review a key paper related to the week's lecture. 4-6 students will be assigned to the paper to present various parts of the paper during a 30-minute presentation, followed by 15 minutes for class discussion. A designated lead will organize the presentation. These overviews should focus on the principal points of the paper and major concepts, and discuss the significance of the paper. All students are expected to read the papers and participate in the discussion. **Total time for each paper presentation and discussion is 45 minutes.** Students making the presentation will be graded on criteria that will be handed out early in the semester. Each student will present material at 2 discussion groups during the semester.

Oral and written presentation of research topics:

During the semester students will research an Arctic vegetation ecology topic of their choice. Near the end of the course, each student will present a 30-minute oral summary of of their topic — as long as the topics involve Arctic vegetation ecology. Guidelines for these presentations will be handed out early in the semester. Graduate students will be expected to also turn in a 2000-3000-word paper on an Arctic Vegetation topic of their choice at the end of the course. This paper can (but not necessarily) cover the same topic as the oral presentation.

Snow Ecology field trip:

A 3-day mandatory field excursion will occur the first weekend of spring break. Students should plan in advance to attend. We will visit a variety of sites with different snow regimes, examine the vegetation beneath the snow and on exposed sites, record subnivian temperatures, and examine evidence of winter animal use in the various habitats. The field trip will be to an area with a high concentration of wildlife so students can observe winter use of plant communities by animals. Students will receive credit for attendance at during the three days of the field trip, and will be graded on their field notebooks, and field descriptions of snow pits.

Plant identification component:

Plant identification will be conducted in the Room 103 classroom on Thursday during the lab session and will last up to 1.5 hours. During most sessions a brief lecture will present slides and photos of the plants to be learned that day with a focus on plant family characteristics and morphological and ecological characteristics that help in identification. Students will work with herbarium specimens and literature sources to learn to identify about 160 common Arctic Alaska plants. Students are expected to read information on plant family characteristics and supplement the class information with information available on the class web site. Students are also expected to keep a notebook with key information for each species covered in class. The final test will cover identification of about of 75 selected plants and key plant characteristics. Students will turn in their notebook for a grade (100 points) on the day of the final exam.

7. Course Schedule and Assignments:

Lesson 1.5-hr each	**Dates**	**Topic**	**Reading assignment (available online at the course web site http://www.geobotany.uaf.edu/teaching/biol488/materials):**
Lecture 1	Jan 17	Introduction	Read syllabus
Lab 1	***Jan 17***	***Plant identification: Overview of plant terminology guides dichotomous keys. Common Arctic trees and shrubs***	***Read Web site links to family characteristics for Pinacea, Betulaceae, Salicaceae,*** ***Plant identification: Trees (6 species) and tall shrubs (5 species) during lab.***
Lecture 2	Jan 22	Overview of Arctic Ecosystems: The role of climate	Callaghan, T.V., Bjorn, L.O., Chapin III, F.S., et al. 2005. Chapter 7, Arctic tundra and polar desert ecosystems. Arctic Climate Impact Assessment - Scientific Report. Cambridge University Press. Cambridge. pp. 243-352. This is an excellent summary of the current state of

			knowledge of Arctic terrestrial ecosystems. Use as a standard reference, skim it now, begin reading and complete by Mar 21, Literature discussion 7.
Lecture 3	Jan 24	The role of permafrost and micro-topography	Bliss, L.C. 1997. Arctic Ecosystems of North America. Polar and Alpine Tundra. Elsevier. Amsterdam. Pp. 551-683. Focus on p. 551-568.
Lab 2	***Jan 24***	***Plant identification: Low Shrubs***	***Read Web site links to family characteristics for Betulaceae, Salicaceae, Caprifoliaceae, Elaeagnaceae, Myricaceae, Rosaceae.*** ***Review required low shrub species (13 species).***
Lecture 4	Jan 29	The role of soils: pH, texture, moisture	Tedrow, J.C.F. 1977. Chapter 9. The tundra zone and its soils, pp. 145-196, In: Tedrow, J.C.F. Soils of the Polar Landscapes. New Brunswick, NJ: Rutgers University Press. Bliss, L.C. 1997. Arctic Ecosystems of North America. Polar and Alpine Tundra. Elsevier. Amsterdam. Pp. 551-683. Focus on p. 551-539.
Lab 3	***Jan 31***	***Plant identification: Arctic dwarf shrub***	***Read Web site links to family characteristics for Betulaceae, Salicaceae, Cornaceae, Cupressaceae, Rosaceae, Ericaceae, Diapensiaceae, Empetraceae, Caprifoliaceae, Pyrolaceae*** ***Review required dwarf shrub species (24 species).***
Lecture 5	Feb 5	Loess ecosystems and the Mammoth Steppe	Guthrie, R.D. Mammals of the mammoth steppe as paleoenvironmental indicators. In: Hopkins et al. 1987. *Paleoecology of Beringia,* New York: Academic Press, p. 307-326. Guthrie, R.D. 2001. Origin and causes of the mammoth steppe: a story of cloud cover, wooly mammal tooth pits, buckles, and inside-out Beringia. *Quaternary Science Reviews* 20: 549-574.
Lab 4	***Feb 7***	***Plant identification: Grasses, sedges, rushes***	***Read Web site links to family characteristics for Poaceae, Cyperaceae, Juncaceae.*** ***Review required grasses (11 species), sedges (11 species), rushes (5 species) during lab.***
Lecture 6	Feb 12	Permafrost 1: Physical processes	Davis, N. 2001. Chapter 1 & 2. A short introduction to permafrost and seasonally frozen ground. And the Whys a wherefores of permafrost In: *Permafrost: A Guide to Frozen Ground in Transition.* Fairbanks: University of Alaska Press, p. 1-44. Davis, N. 2001. Chapter 3. When the ground freezes. In: *Permafrost: A Guide to Frozen Ground in Transition.* Fairb University of Alaska Press, p. 45-99.

Lab 5	***Feb 14***	***Plant identification: Forbs 1***	***Read Web site links to family characteristics for Asteraceae (Compositae), Caryophyllaceae, Cruciferae, Fabaceae (Leguminosae), Liliaceae, Onagraceae, Polygonaceae, Ranunculaceae, Rosaceae, Saxifragaceae, Apiaceae (Umbelliferae).*** *Review photos, descriptions, and specimens of required forbs (25 species) during lab.*
Lecture 4	Jan 29	The role of substrate, the "Mammoth Steppe" and soil pH. Lecture 4	1. Tedrow, J.C.F. 1977. Chapter 9. The tundra zone and its soils, pp. 145-196, In: Tedrow, J.C.F. Soils of the Polar Landscapes. New Brunswick, NJ: Rutgers University Press. PDF 2. Bliss, L.C. 1997. Arctic Ecosystems of North America. Polar and Alpine Tundra. Elsevier. Amsterdam. Pp. 551-683. Focus on p. 551-539.
Lab 3	Jan 31	Plant identification: Arctic dwarf shrub. Lab 3	Read Web site links to family characteristics for Betulaceae, Salicaceae, Cornaceae, Cupressaceae, Rosaceae, Ericaceae, Diapensiaceae, Empetraceae, Caprifoliaceae, Pyrolaceae Review required dwarf shrub species (24 species).
Lecture 5	Feb 5	Arctic terrestrial carbon budgets and biocomplexity of patterned ground 1. Lecture 5 2.	1. Walker, D.A., Epstein, H.E., Romanovsky, V.E., et al. 2008. Arctic patterned-ground ecosystems: A synthesis of field studies and models along a North American Arctic Transect. Journal of Geophysical Research - Biogeosciences. 113:G03S01. PDF 2. Walker, D.A., Kuss, P., Epstein, H.E., Kade, A.N., Vonlanthen, C.M.,

		Guidelines and grading criteria for oral presentations	Raynolds, M.K. Daniels, F.J.A. 2011. Vegetation of zonal patterned-ground ecosystems along the North American Arctic Transect. Applied Vegetation Science, 14: 440-463. PDF
Lab 4	Feb 7	Plant identification: Review of all trees and shrubs	Review all shrubs in the teaching collections. Create Flash Cards. (put link to flash cards here. Flash Cards for Alaska Arctic and Boreal Trees and shrubs Plant Families Flash Cards for Alaska Arctic and Boreal Plant Species
Lecture 6	Feb 12	Toposequences and review climate, permafrost and substrate effects on vegetation. Lecture 6	Catch up on reading
Lab 5	Feb 14	Plant identification: Continue review of shrubs. Begin Grasses, sedges, rushes	Read Web site links to family characteristics for Poaceae, Cyperaceae, Juncaceae. Review required grasses (11 species), sedges (11 species), rushes (5 species) during lab.

Literature Review 1	Feb 19	Literature review of Guthrie (discussion session during class)	1. Guthrie, R.D. Mammals of the mammoth steppe as paleoenvironmental indicators. In: Hopkins et al. 1987. Paleoecology of Beringia, New York: Academic Press, p. 307-326. PDF 2. Guthrie, R.D. 2001. Origin and causes of the mammoth steppe: a story of cloud cover, wooly mammal tooth pits, buckles, and inside-out Beringia. Quaternary Science Reviews 20: 549-574. PDF.
Lab 6	Feb 21	Plant identification: Finish grasses, sedges, and rushes and review all Lab 6	Review all Poaceae, Cyperaceae and Juncaceae, in the teaching collections. Create flash cards for grasses, sedges and rushes List of assigned cards.
Lecture 7	Feb 26	Snow Ecology: Physical and chemical characteristics of snow Lecture 7	1. Pomeroy, J.W. and E. Brun. 2001. Physical properties of snow. In: Jones, H.G., J. Pomeroy, D.A. Walker, and R. Hoham (eds.) Snow Ecology. Cambridge: Cambridge University Press, pp. 45-117. PDF 2. Sturm, M. et al. 2001. Snow-shrub interactions in Arctic tundra: a hypothesis with climatic implications. Journal of Climate, 14, 336-344. PDF
Lab 7	Feb 28	Plant identification: Review of tree shrubs and graminoids Lecture 7A Lab 7	Continue review of all trees, shrubs and graminoids in the teaching collections.
Lecture 8	Mar 5	Snow Ecology 2: Biological aspects of	1. Walker, D.A., J.G. Molenaar, and W.D. Billings. 2001. Snow-vegetation interactions in tundra environments.

		snow Lecture 8	In: Jones, H.G., J. Pomeroy, D.A. Walker, and R. Hoham (eds.) Snow Ecology. Cambridge: Cambridge University Press, pp. 266-322. PDF 2. Aitchison, C.W. 2001. The effects of snow cover on small animals. In: Jones, H.G., J. Pomeroy, D.A. Walker, and R. Hoham (eds.) Snow Ecology. Cambridge: Cambridge University Press, pp. 229--265. PDF
Lab 8	Mar 7	Finish Lecture 8A, End of snow ecology lectures. Continue review of graminoids and shrubs (Labs 1-5). Lab 8	Introduction to Forbs 1, Read Web site links to family characteristics for Apiaceae (Umbelliferae), Asteraceae (Compositae), Brassicaceae (Cruciferae) Caryophyllaceae, Fabaceae (Leguminosae), Liliaceae.
Lab 9	Mar 9 and 10	Spring Break Snow Ecology Field Trip to Smith Lake and Murphy Dome Field Trip Logistics Excel Workbook-note that there are several sheets. Updated March 5, 2013.	
Literature Review 2	Mar 19	Literature review of snow ecology papers (discussion session during class)	**Discussion Group 1:** Aitchison, C.W. 2001. The effects of snow cover on small animals. In: Jones, H.G., J. Pomeroy, D.A. Walker, and R. Hoham (eds.) Snow Ecology. Cambridge: Cambridge University Press, pp. 229--265. PDF **Discussion Group 2:** 1. Ehrich, D., J.-A. Henden, R. A. Ims, L. O. Doronina, S. T. Killengren, N. Lecomte, I. G. Pokrovsky, G. Skogstad, A. A. Sokolov, V. A. Sokolov, and N. G. Yoccoz. 2011. The importance of willow thickets for ptarmigan and hares in shrub tundra:

			the more the better? Oecologia 168:141–151. 2. PDF Tape, K. D., R. Lord, H.-P. Marshall, and R. W. Ruess. 2010. Snow-Mediated Ptarmigan Browsing and Shrub Expansion in Arctic Alaska. dx.doi.org 17:186–193. PDF
Lab 10	Mar 21	Plant identification: Forbs 1 Lab 10	Forbs 1: Apiaceae (Umbelliferae), Asteraceae (Compositae), Brassicaceae (Cruciferae) Caryophyllaceae, Fabaceae (Leguminosae), Liliaceae. Review photos, descriptions, and specimens of Forbs-1 (about 25 species) during lab.
Lecture 10	Mar 26	Climate change and circumpolar Arctic vegetation. Lecture 10	1. Bhatt, U.S., Walker, D.A., Raynolds, M.K., et al. 2010. Circumpolar Arctic tundra vegetation change is linked to sea-ice decline. Earth Interactions. 14:(8):1-20. PDF 2. Elmendorf, S. C., G. H. R. Henry, R. D. Hollister, et al. 2011. Global assessment of experimental climate warming on tundra vegetation: heterogeneity over space and time. Ecology Letters 15:164–175. PDF
Lab 11	Mar 28	Review Forbs 1 Lab 10	Continue Forbs 1: Apiaceae (Umbelliferae), Asteraceae (Compositae), Brassicaceae (Cruciferae) Caryophyllaceae, Fabaceae (Leguminosae), Liliaceae. Review photos, descriptions, and specimens of Forbs-1 (about 25 species) during lab.
Lab 12	Apr 2	Plant identification Introduction to Forbs 2. Lab 12	Read Web site links to family characteristics for Onagraceae, Orobanchaceae, Papaveraceae, Polygonaceae, Ranunculaceae, Rosaceae, Rubiaceae, Santalaceae,

			and Saxifragaceae. Review photos, descriptions, and specimens of Forbs-2 (about 25 species) during lab.
Lecture 11 and Lab 13	Apr 4	1.Lecture: Cumulative effects of oil development on Arctic ecosystems Lecture 11 2. Lab: Review Plant identification: Forbs 2 Lab 12	1. NRC, Orians, G., Albert, T., et al. 2003. Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope. National Academies Press. Washington, D.C.: pp.: 288. PDF. *This volume summarizes the entire issue related to cumulative effects of oil development in Alaska. The effects on vegetation are summarized in chapter 7, p. 76-97.* 2. Review Forbs 2: family characteristics for Onagraceae, Orobanchaceae, Papaveraceae, Polygonaceae, Ranunculaceae, Rosaceae, Rubiaceae, Santalaceae, and Saxifragaceae. 3. Review photos, descriptions, and specimens of Forbs-2 (about 25 species) during lab.
Reviews by Erin while Skip is in Europe	Apr 9, 11, 16, 18	1. Review sessions of all plants during class periods Apr 9, 11, 16 and 18. 2. Review flash cards, Lab lectures, and on line material for the species ID final exam. 3. Work on oral presentations and final papers. Guidelines and grading criteria for oral presentations.	
Student research talks 1	Apr 23	1. 4 Student presentations: 20 minutes each including questions: Strehlow, Leigh E. Suzuki, Aina Swanberg, Sheila R. Yancey, Laramie L.	

		2. Turn in Plant ID Notebooks for quick review and grade by instructors. They will be returned April 25.
Student research talks 2	Apr 25	8 student presentations: Jones, Samantha N. Klingensmith, Sara M. Liebermann, Robert J. Luce, Jamie R. McClendon, Stephanie Nakanishi, Eri Pavic, Karolina Skinner, Kailey E.
Student research talks 3	Apr 30	4 student presentations: Gilbert, Breanne M. Grimes, Amanda L. Hendricks, Amy S. Hogan, David A.
Student research talks 4 + Lecture 12: Mosses and lichens	May 2	1. 3 student presentations: Frehill, Victoria A. Friedrich, Kayla D. Garrett, Emily 2. Lecture 12 (Mosses and Lichens)
Finals Week	**May 9, 1-3 pm**	**1. 2 hour exam Identification of 50 plants, 25 questions on plant and family characteristics** **2. Final papers for those unable to attend the snow ecology field trips are due May 10.**

8. Course policies:

Academic integrity:

Anyone observed cheating on an examination will receive a "0" for that examination. Anyone found to have used someone else's work without crediting that person (plagiarizing) will receive a "0" for the assignment. When in doubt, always identify your sources. This applies to all material derived from the web. Please speak with me if you have any questions about how to properly use other people's work.

For additional detail, see

http://www.uaf.edu/library/instruction/handouts/Plagiarism.html

Attendance policy:
Students are expected to attend every class and lab and be seated at the beginning of the class. Student will receive 3 points for attendance at each lecture and each of the student oral presentation classes. No points will be received for late attendance.

9. Evaluation:

Summary of grading points:

Undergraduate student grading (BIOL 488 students):	
Attendance at lectures and labs (3 pts/class, 33 classes)	100 pts
Presentations at 2 literature review sessions (50 pts each)	100
Snow Ecology Field Trip	200
Plant identification exam	200
Plant id notebook	100
Oral presentation of research topic	200
TOTAL	***900 pts***
Graduate student grading (BIOL 688 students):	
Attendance at lectures and labs (3 pts/class, 33 classes)	100 pts
Presentations at 2 literature review sessions:	100
Snow Ecology Field Trip	200
Plant identification exam	200
Plant id notebook	100
Final research paper	300
Oral presentation of research topic	200
TOTAL	***1200 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.

Undergraduate student expectations and grading:
All students are expected to accomplish the following:

(a) Attend all lectures, labs and exams on time There will be no make-up for missed classes or late attendance. (3 points for each for 33 sessions, 100 total points).
(b) Present material at two literature discussion sessions (100 pts)
(c) Give a 30-minute final talk on topic of interest related to Arctic vegetation. Guidelines for the presentations and grading criteria for the presentations will be handed out early in the semester. (200 points).
(d) Attend the 3-day snow ecology field trip (100 points).
(e) Do the readings, study the on-line material including lecture slides and complete final lecture exam (200 points).
(f) Learn 160 Arctic plant species and take the exam (200 points).

Graduate student expectations and grading:
Graduate students will be graded according to the same criteria as the undergraduate students except for the following:

(g) Write a 2000-3000-word synthetic research paper based on the primary literature on an Arctic Vegetation topic of your choice. This paper should have at least 15

literature citations and can include additional tables and figures. This can be the same topic as that of your oral presentation. Late papers will receive a deduction of 15 points of the 300 total for every day late and no credit beyond 3 days late. Students should arrange for an incomplete grade if they cannot meet this deadline (300 points).

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. AHRB, 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 (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities. Any student needing special accommodation should talk with the instructor before the class or lab in question. These discussions will be held confidential.