

University of Alaska Anchorage  
College of Education  
3211 Providence Drive  
Anchorage, Alaska 99508-8269

ED 581 Professional Learning in Science Education:  
Denali's Small Mammals

1 Credit, Graded P/NP

Summer 2019

**Course Sponsor:** Alaska Geographic, Murie Science and Learning Center, Denali National Park

**Instructor:** Melanie Flamme

**Education Instructor:** Paula Davis

**Facilitating Instructor:** David Tomeo

**Contact Information Address:** Alaska Geographic, Murie Science and Learning Center, P.O. Box 136, Denali Park, AK 99755

**Telephone:** (907) 683-6432

**Email address:** courses@alaskageographic.org

**Course Meeting Information**

**Location:** Murie Science and Learning Center, Denali National Park & Preserve entrance

**Start and End Date:** June 21, 2019 – June 23, 2019

**Class Day(s) & Time(s):** June 21st, 2019 6:30pm through June 23, 2019 4pm, continuous residential course

**Final Project Due:** Final day of course

**Course Description:** Participants will join National Park Service wildlife biologist Melanie Flamme for an in-depth look into Denali's 26 year study of voles, mice, shrews and other small mammals. Class will look for signs of these elusive mammals and learn to identify the ones that are seen. Participants will get hands-on experience with field research tools and collect data to add to the study. Course will investigate why small mammals are so significant in Denali, including cutting-edge research on how small mammals influence their predators and what lessons might be learned about the effects of weather and climate in Denali. Participants will consider how to integrate their learning from this fieldwork course into their teaching or educational environments.

**Intended Audience:** Teachers and other interested educators

**Enrollment Restrictions:** None

**Course Prerequisite/Co-requisites:** None

**Course Design:**

- a. Requires 15 contact hours and approximately 30 hours of engaged learning.
- b. Does not apply to any UAA certificate or degree program.
- c. No UAA lab and/or materials fees beyond standard charges.
- d. This Murie Science and Learning Center course will be entirely field-based. Learning will be achieved through lectures, group discussions, field observations, and field activities. This course is based upon the collegial sharing, collaboration, and support of the participants and facilitator as a community of learners. Course activities will include common readings and group discussions, collective learning processes, peer coaching/mentoring, and reflective practices.

**Instructional Goals and Defined Outcomes:**

RESEARCH BASED THEORY/PRINCIPLES/PRACTICES/TRENDS (CONTENT)

1.0 Instructional Goal:

Instructors will discuss their primary research question—assessing small mammal density and abundance and how these fluctuate through natural population cycles. What factors may be drivers that influence changes in the amplitude of these cycles? How may these patterns be affected by climate change?

Defined Outcomes:

Participants will learn about the motivation for this particular research question, and how much there is still to learn about small mammal cycles and ecology in Alaska. What kinds of questions might be appropriate for a school project with their students?

2.0 Instructional Goal:

Instructors explain history of 26-year small mammal monitoring program, study design, selection of target species, sampling methods and technology used.

Defined Outcomes:

Participants discuss the pros and cons of various sampling strategies, and how suitable some of these techniques and designs may be used for student projects.

3.0 Instructional Goal:

Instructors give a brief overview of the major orders and families of small and medium sized mammals found in Denali and the focus on the target species included in their study. Discuss the natural history of these taxa, their position in the food web, their role as a vital food resource for many species, and the ecosystem services they provide.

Defined Outcomes:

Participants will learn about common small and meso mammal taxa, their habitats, life histories and importance to a functioning ecosystem. They will integrate this knowledge into their own teaching curriculums.

THEORY INTO PRACTICE (APPLICATION)

4.0 Instructional Goal:

Instructors will take students out into the field to set up and simulate sampling trap lines; observe and simulate how relevant environmental data are collected.

Defined Outcomes:

Participants will learn good field techniques by actively participating in field trips and taking detailed field notes. They will gain practical experience in observing and simulating collection of small mammals.

5.0 Instructional Goal:

Instructors will teach students to look for small mammal sign on field trips (scat, evidence of foraging, trails, burrows).

Defined Outcomes:

Participants will learn to identify small mammal sign by participating in field trips and taking detailed field notes and photographs. They will gain practical experience in finding small mammal sign.

6.0 Instructional Goal:

Instructors will teach students to dissect owl pellets and look for evidence of small mammal prey within. Instructors will teach students to identify bones found and which species the owls may have consumed. Instructors will reiterate the importance of small mammals as prey to a variety of species, including owls, raptors, carnivores, wading birds and fish.

Defined Outcomes:

Participants will learn to dissect owl pellets and identify small mammal bones. They will learn to match those bones to a bone chart and assess the type of small mammal consumed by the owl. They will assess the predator/prey relationship between owls and small mammals and consider how to integrate this into their own curriculums.

## REFLECTION ON THEORY INTO PRACTICE (REFLECTION)

7.0 Instructional Goal:

Share small mammal observations from Murie and others and show clip of Never Cry Wolf. Engage participants in discussions, reflective journaling and informal sharing about the perception of small mammals in general, science instruction and how to incorporate gained knowledge and experience into their classrooms.

Defined Outcome:

Participants will review and reflect upon the scientific information covered. Participants will complete a journal, reflecting on how the information can be shared with their students.

## RELATIONSHIP TO STANDARDS

8.0 Instructional Goal:

Familiarize participants with science content standards addressed by the strategies and concepts presented.

Defined Outcome:

Participants will identify the Science-Content standards applicable to their classroom.

### **Writing Style Requirements:**

Participants' writing will reflect the clarity, conciseness, and creativity expected of post-baccalaureate certificated educators.

### **Attendance and Make-up Policy:**

Participants are expected to actively and collegially participate in all classes as a contributing member of a learning community. Attendance at every session is mandatory.

### **Course Assignments, Assessment of Learning, and Grading System:**

Course grading will be Pass/No Pass based upon the following:

- a. Participation 50%  
Participants will be expected to actively and collegially participate in discussions, activities, and other process experiences during the seminar.
- b. Final Project - Journal completion 50%  
Participants will complete journal assignments to be turned in to MSLC field guide on the last day of class. Assignments will include thoughtful reflection based upon seminar experience and an application plan of how participants will integrate issues and content discussed into their own classroom setting.

### **Quality of Work**

#### **Grade of "Pass"**

Passing work includes all components of the assignment and meets proficient criteria. It is focused, developed, supported, logical, and acceptable work with minimal errors. Work of this quality indicates understanding of key concepts and knowledge base.

#### **Grade of "No Pass"**

Work graded "No Pass" may lack key criteria/components of the task and show little or no evidence of conceptual understanding or knowledge utilization. Work may also show minimal or no organization/development and/or clear focus (may be difficult to follow) and may contain numerous errors. This grade indicates minimal or no knowledge or concept development. It may also mean that work was not attempted.

### **Course Calendar/Schedule:**

- Friday 6:00 p.m. – 6:30 p.m. Greeting and check in at MSLC  
6:30 p.m. – 7:30 p.m. Introduction, orientation & overview
- o Instructor introductions
  - o Overview-Small mammal monitoring in Denali
  - o Research question in Denali
  - o Focal taxa for project
  - o Course objectives, structure, and activities
- 7:30 p.m. – 9:00 p.m. Drive to MSLC Field Camp and settle in
- Saturday 9:00 a.m. – 5:00 p.m. Exploration of Denali
- o Visit a meadow and boreal habitat. Show prepared small mammal specimens and briefly describe life histories, focusing on target species. Set up simulated trap lines and discuss sampling design, habitat/environmental measurements; simulate trapping and data collection methods.
  - o Visit additional habitats of interest (e.g., gravel bars, subalpine rocks) to look for small mammal sign
  - o Observe, collect, photograph small mammals and their sign.
- 6:00 p.m. – 8:00 p.m. Dinner and evening discussions

- Recap on the species and sign observed
- After dinner, short presentation-readings about small mammals from early naturalists; clip from Never Cry Wolf
- Teacher study group to discuss the day's activities and how the information can be shared with students
- Identify applicable science content standards addressed by course content

Sunday 9:00 a.m. – 3:00 p.m. Continued exploration of Denali

- Owl pellet dissection and predator/prey discussion.
- Searching for marmots and pika

3:00 p.m. – 4:00 p.m. Return drive to MSLC

**Final Project Due:** last day of course

### **Course Texts, Readings, Handouts, and Library Reserve:**

#### Required Text/Materials:

Hope, A. et al. Small Mammals as Indicators of Climate, Biodiversity, and Ecosystem Change. *Alaska Park Science* 16-1 pp72-78. Retrieved from: <https://www.nps.gov/articles/aps-16-1-16.htm>

NPS. 2014. Small Mammal Resource Brief. National Park Service Central Alaska Inventory and Monitoring Network. Retrieved from: <https://irma.nps.gov/DataStore/DownloadFile/546024> (Instructors will provide updated paper copies)

#### Suggested Text/Material:

MN Dept. of Health. 2018. About Powassan Virus Disease. Retrieved from: <https://www.health.state.mn.us/diseases/powassan/basics.html>. (PVD Fact Sheet provided by instructors)

Schmidt, J. et al. 2017. Weather-driven change in primary productivity explains variation in the amplitude of two herbivore population cycles in a boreal system. *Oecologia* Retrieved from: <https://www.akgeo.org/wp-content/uploads/2019/06/Schmidt-et-al-2017-vole-hare-cycle-amplitude-1.pdf>

Schmidt, J. et al. 2017. Bottom-up processes drive reproductive success in apex predator. *Ecology and Evolution* 2018; 1-9. Retrieved from: <https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.3800>

U.S. CDC. 2013. Hantavirus Pulmonary Syndrome (HPS). Retrieved from <https://www.cdc.gov/hantavirus/hps/index.html>. (HPS Fact Sheet provided by Instructors.)

Supplemental information can be found in the following sources:

#### Content References:

Macdonald, S.O. 2003. The Small Mammals of Alaska; A field handbook of the shrews and small rodents. Retrieved from: <https://www.arlis.org/docs/vol1/71125094.pdf>

- Macdonald, S.O., & J.A. Cook. 2001. Recent Mammals of Alaska. University of Alaska Museum.
- Mäkeläinen, S., Trebatická, L., Sundell, J., & H. Ylönen. 2013. Different escape tactics of two vole species affect the success of the hunting predator, the least weasel. *Behav. Ecol. Sociobiol.* Retrieved from: [https://www.researchgate.net/publication/257618899\\_Different\\_escape\\_tactics\\_of\\_two\\_vole\\_species\\_affect\\_the\\_success\\_of\\_the\\_hunting\\_predator\\_the\\_least\\_weasel](https://www.researchgate.net/publication/257618899_Different_escape_tactics_of_two_vole_species_affect_the_success_of_the_hunting_predator_the_least_weasel)
- Osgood, W.H. 1909. Biological Investigations in Alaska and Yukon Territory. U.S. Dept. of Interior North American Fauna No. 30 pp1-96. Retrieved from: <dx.doi.org/10.3996/nafa.30.0001>
- Sanborn, C.C. 1948. Wilfred Hudson Osgood: 1875-1947. *Journal of Mammology* 29-2; pp95-112. Retrieved from: <https://www.akgeo.org/wp-content/uploads/2019/06/OsgoodNorthAmericanFaunaBiologicalInvestigationsinAKYukon.pdf>

#### Standards References:

- Alaska Comprehensive Center. (2012). *Guide to Implementing the Alaska Cultural Standards for Educators*. Juneau, AK: Alaska Department of Education and Early Development. Retrieved from: [https://education.alaska.gov/akstandards/cultural/cultural\\_standards.pdf](https://education.alaska.gov/akstandards/cultural/cultural_standards.pdf)
- Alaska Native Knowledge Network. (1998). *Alaska standards for culturally responsive schools*. Fairbanks, AK: University of Alaska Press. Retrieved from: <http://www.ankn.uaf.edu/publications/culturalstandards.pdf>
- National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve. (2013). *The next generation science standards*. Retrieved from <http://www.nextgenscience.org/next-generation-science-standards>.
- National Research Council (NRC) of the National Academies and Board on Science Education. (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: National Academies Press. Free download retrieved from: <http://www.nap.edu/catalog/13165/a-framework-for-k-12-science-education-practices-crosscutting-concepts>
- State of Alaska Department of Education and Early Development. (1997). *Standards for Alaska teachers*. Juneau, AK: Author. Retrieved from: <https://education.alaska.gov/TeacherCertification/standards/pdf/teacher.pdf>
- State of Alaska Department of Education and Early Development. (2016). *Content and performance standards for Alaska students*. Juneau, AK: Author. Retrieved from: <https://education.alaska.gov/akstandards/standards/ContentStandards.pdf>

#### **Alignment with College of Education Vision, Mission, and Conceptual Framework:**

We believe that the preparation and support of professional educators is the shared responsibility of the University of Alaska Anchorage and our partners, and that our programs must evolve dynamically in response to unique community needs, research, and continuous program assessment. This PACE course is designed to meet a professional development need in response to our partner school districts and professional organizations. The course fits within the mission of the UAA College of Education as we encourage lifelong learning to meet the challenges of a rapidly changing world.

#### **Link to Standards for Alaska Teachers:**

This professional development effort is firmly rooted in the fundamentals of the standards for Alaska Teachers. It is offered to encourage and support practicing educators in attaining, maintaining, or surpassing the standards that, as

stated in Standards for Alaska's Teachers, "define the skills and abilities our teachers and administrators need to possess to effectively prepare today's students for successful lives and productive careers." (Roger Sampson, <http://www.eed.state.ak.us/standards/pdf/teacher.pdf>)

### **Course Policies:**

#### **Incomplete Grades**

**Due to the nature of this course, grades of incomplete will not be permitted.**

#### **ADA Policy**

The provision of equal opportunities for students who experience disabilities is a campus-wide responsibility and commitment. Disabilities Support Services (DSS) is the designated UAA department responsible for coordinating academic support services for students who experience disabilities. To access support services, students must contact DSS (786-4530 or 786-4536 TTY) and provide current disability documentation that supports the requested services. Disability support services are mandated by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. Additional information may be accessed at the DSS Office in Business Education Building (BEB105) or on-line at [www.uaa.alaska.edu/dss](http://www.uaa.alaska.edu/dss).

#### **Academic Dishonesty Policy**

Academic integrity is a basic principle that requires all students to take credit only for the ideas and efforts that are their own. Cheating plagiarism, and other forms of academic dishonesty are defined as the submission of materials in assignments, exams, or other academic work that is based on sources prohibited by the faculty member. Academic dishonesty is defined further in the "student Code of Conduct." In addition to any adverse academic action that may result from the academically dishonest behavior, the University specifically reserves the right to address and sanction the conduct involved through student judicial review procedures and the Academic Dispute Resolution Procedure specified in the University catalog.

#### **Professional and Ethical Behavior**

University of Alaska Anchorage College of Education students are expected to abide by the State of Alaska Code of Ethics of the Education Profession and professional teaching standards as they concern students, the public, and the profession. The standards, adopted by the Professional Teaching Practices Commission, govern all members of the teaching profession. A violation of the code of ethics and professional teaching standards are grounds for revocation or suspension of teaching certification.

#### **Technology Integration**

University of Alaska Anchorage College of Education students are expected to (a) demonstrate sound understanding of technology operations and concepts; (b) plan and design effective learning environments and experiences supported by technology; (c) implement curriculum plans that include technology applications in methods and strategies to maximize student learning; (d) facilitate a variety of effective assessment and evaluation strategies; (e) use technology to enhance productivity and professional practice; and (f) understand the social, ethical, and human issues surrounding use of technology in PreK-12 schools and apply those principles in practice.

#### **Course Safety and Risk**

This course is sponsored by Alaska Geographic and the Murie Science and Learning Center. The University of Alaska Anchorage provides the credit option for interested participants. This course takes place entirely outdoors and within a remote area of Alaska. Field courses, such as this, do have inherent risks. These risks will be outlined in the Alaska Geographic Acknowledgement of Risk form and by the course instructors. The Acknowledgement of Risk form will be provided at the time of registration and a signed copy is required in order to attend.

#### **Non-Discrimination Policy**

The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at [www.alaska.edu/nondiscrimination](http://www.alaska.edu/nondiscrimination).