

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

**ED 581 Professional Learning in Science Education:  
Denali's Cycles and Climate Change**

**1 Credit, Graded P/NP**

**Summer 2019**

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

**Instructor:** Dave Schirokauer

**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](mailto:courses@alaskageographic.org)

**Course Meeting Information**

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

**Start and End Date:** July 29, 2019 to July 31, 2019

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

**Class Day(s) & Time(s):** July 29th, 6:30 pm through July 31st, 4pm, continuous residential course

**Course Description:** Denali is well known as a living laboratory, an intact ecosystem with naturally occurring cycles like plant succession, predator prey connections, glacial movements, and permafrost dynamics. Many studies have examined how all of Denali's components interact, and how these systems change over time. However, in recent years, scientists have witnessed significant changes in those systems due to a rapidly changing climate. Participants will join Denali National Park Service lead scientist Dave Schirokauer in the field for a close up look at Denali's ecosystem and learn the latest in climate change research. Course will visit hotspots in the park to learn about causes of change in Denali and seek to determine what is normal and what isn't. Participants will consider ways to integrate their experience into their teaching or educational environment.

**Intended Audience:** Teachers and Adults (18+)

**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:

Instructor will introduce the concept of cycles researched in Denali National Park.

Defined Outcomes:

Participants will demonstrate an understanding of current cycles in Denali including current and past research of Denali's plants, animals, and climate.

2.0 Instructional Goal:

The instructor will introduce the natural history of Dall Sheep and other large mammals in Denali National Park.

Defined Outcomes:

Participants will demonstrate an understanding of Denali's large mammals including population sizes and interactions among these populations.

3.0 Instructional Goal:

The instructor will introduce the meaning of permafrost and its existence in Denali National Park.

Defined Outcomes:

Participants will demonstrate an understanding of permafrost and be able to describe how its existence is changing in the park.

4.0 Instructional Goal:

The instructor will introduce the concept of wildfire in Denali National Park and how its probability changes given certain climate conditions.

Defined Outcomes:

Participants will demonstrate an understanding of wildfire and its probability in a changing climate.

THEORY INTO PRACTICE (APPLICATION)

5.0 Instructional Goal:

The instructor will introduce the concept of Denali National Park as an intact ecosystem and how climate change may affect cycles currently in place.

Defined Outcomes:

5.1 Participants will be able to describe current cycles in Denali and make predictions on how climate change may affect them.

5.2 Participants will describe how they will integrate their experiences into their teaching or educational environments.

REFLECTION ON THEORY INTO PRACTICE (REFLECTION)

6.0 Instructional Goal:

Instructor will introduce the Organic Act which created the National Park Service and its mission and lead discussion on implementing this mission in today's world.

Defined Outcome:

Participants will reflect on the National Park Service mission and the challenges park managers face.

7.0 Instructional Goal:

Engage participants in discussions, reflective journaling and informal sharing about 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

4.0 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, but are not limited to, thoughtful reflection based upon seminar experience and an application plan of how participants will integrate issues and content discussed into their own classroom setting.



National Park Service. (2016) *Monitoring climate change*. Retrieved from: <https://www.nps.gov/articles/denali-monitoring-climate-change.htm>

National Park Service. (2015) *Permafrost thaw and carbon balance*. Retrieved from: <https://www.nps.gov/articles/denali-permafrost-carbon.htm>

National Park Service. *Treeline shifts in Denali: influences of climate change and local site conditions* (2011). Retrieved from: <https://www.nps.gov/articles/denali-treeline-shifts.htm>

National Weather Service (n.d.) *Alaska fire weather watch/warning information*. Retrieved from: <https://www.weather.gov/arh/fire>

Panda, et al. (2014) *Denali modeled permafrost maps comparison* Retrieved from: <https://permafrost.gi.alaska.edu/sites/default/files/DENA-Modeled-maps-comparision.png>

#### Suggested Text/Material:

Mizel, J. D., J. H. Schmidt, C. L. McIntyre, and C. A. Roland. (2016) *Rapidly shifting elevational distributions of passerine species parallel vegetation change in the subarctic*. *Ecosphere* 7(3):1-15. Retrieved from: <https://www.nps.gov/articles/shiftingpasserines.htm> or <https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.1264>

National Park Service. *Learning about climate change from ice cores*. (2016). Retrieved from: <https://www.nps.gov/articles/denali-climate-change-ice-cores.htm>

#### Supplemental information can be found in the following sources:

##### Content References:

Beach, R., Share, J., & Webb, A. (2017). *Teaching climate change to adolescents: Reading, writing, and making a difference*. New York: Routledge. Online site for book retrieved from: <http://climatechangeela.pbworks.com/w/page/104422813/Nonfiction%20books%20on%20climate%20change%20for%20early%20adolescents>

Collier, M. (2011) *The melting edge*. Anchorage, AK: Alaska Geographic.

Kaiser, Bettina, et al. (eds.) (2010) *Polar science and global climate: an international resource for education and outreach*. Pearson Education Unlimited: Essex.

NASA (n.d.) Global Climate Change. Retrieved from: <https://climate.nasa.gov/>

Stanford University (n.d.). *Climate change education*. Retrieved from: <https://pangea.stanford.edu/programs/outreach/climatechange/>

##### 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. 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).