

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

**ED 581 Professional Learning in Science Education:  
Mushrooms of Denali**

**1 Credit, Graded P/NP  
Summer 2019**

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

**Instructor:** Dr. Gary A. Laursen

**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.

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**Course Meeting Information**

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

**Start and End Date:** July 26, 2019 to July 28, 2019

**Class Day(s) & Time(s):** July 26th, 2019 6:30pm through July 28th, 2019 4pm, continuous residential course.

**Final Project Due:** Last day of class showing.

**Course Description:** Mycologist Dr. Gary Laursen will teach various techniques for identifying native wild mushrooms. Participants will gain experiences using field guides, learn how to make spore prints and “field” identify mushrooms. Participants will hone observational skills and learn how to look for landscape and substrate clues to help in the identification of wild, native and indigenous mushrooms. Participants will learn about myriad roles mushrooms play in Denali’s vastly different environments and gain an appreciation for wild mushrooms and how they influence plant life and our lives. Participants will experience integrating fieldwork content with their own learning and teaching about natural environments.

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

**Enrollment Restrictions:** None

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

**Course Design:**

1. Requires 15 contact hours and approximately 30 hours of engaged learning.
2. Does not apply to any UAA certificate or degree program.
3. No UAA lab and/or materials fees beyond standard charges.
4. The Murie Science and Learning Center Mycology course will be entirely hands/minds-on and field-based. Learning will be achieved through lectures, group and individual 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.

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

Instructional Goals:

1. The instructor will engage and guide students in becoming familiar with myriad, readily available literature sources.
2. The instructor will demonstrate preferred ways of learning about fungi by actually working with fresh specimen materials in the field.
3. The instructor will provide a rich assortment of audiovisuals in PPT presentations to enhance an exciting and rewarding Audio-visuals learning experience.
4. The instructor will assist students in gaining greater understanding of our fungal world.

Defined Outcomes: Participating students will

1. Examine and use Field Guides to the fungi, review pertinent websites, research on-line literature and may be asked to read specific scientific papers.
2. Engage in out-door field activities of searching for, collecting, photographing, spore printing, describing and labeling fungi and become steeped in the art forms of preserving fungi for multiple purposes.
3. Interact with audio-visual presentations to develop further understanding of what fungi are and what they do in natural habitats; i.e., roles played as saprophytes, parasites, mycorrhizal or lichenicolous associates.
4. Develop an increased appreciation for the many forms, diversity, life histories, ecological relationships as biological control mechanisms, symbiotic associations, taxonomic and evolutionary position, industrial importance, physiological mechanisms important to fungal survival, their toxins (poisons), medical, and religious implications and how fungi impact the DNP&P boreal forest, tundra and man.

**THEORY INTO PRACTICE (APPLICATION)**

Instructional Goal:

1. Provide the needed input, guidance, resources and inspiration to meet and translate most if not all Defined Outcomes into applicable practices.

Defined Outcomes: Participating students will

1. Become somewhat proficient at identifying, describing, labeling, and preserving wild Fungi.
2. Learn basic fungal taxonomy focusing on Basidio- & Ascomycota to genus and species levels.

3. Come to understand the four primary roles fungi play in different DNP&P environments.
4. Come to understand host specificities and fungal ecology.
5. Apply knowledge of mycological science.
6. Design and conduct simplistic mycological experiments, analyze and interpret data.
7. Design a macro- and micro-morphological description of fructifications (fruit bodies) using hand lenses and/or microscopes.
8. Function as a multi-disciplinary field investigation team.
9. Formulate and solve basic taxonomic and/or field mycological queries.
10. Understand personal, professional and ethical responsibility for mycophagy.
11. Communicate a basic understanding of mycological host relationships.
12. Understand the impact of mycological determinations in economic, environmental, and societal contexts.
13. Recognize the need for and an ability to engage in life-long learning about fungi.
14. Gain knowledge of contemporary mycological issues.
15. Use observational and deterministic techniques, skills, and modern observational tools necessary to practice mycological science.
16. Describe how participants will integrate their experiences into own their teaching or educational environments. And to
17. Gain a basic understanding of fungal edibility by distinguishing edibles from non-edibles.

#### REFLECTION ON THEORY INTO PRACTICE (REFLECTION)

##### Instructional Goal:

Engage participants in discussions, reflective journaling and informal sharing about science instruction and how to incorporate gained knowledge and experience into their educating opportunities.

##### Defined Outcome:

Participants will review and reflect upon the scientific information covered. Participants will complete a self-determined journal, reflecting on how the information can be shared with others.

#### RELATIONSHIP TO STANDARDS

##### Instructional Goal:

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

##### Defined Outcome:

Participants will identify Science-Content standards applicable to classroom material.

#### **Writing Style Requirements:**

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

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

Participants will be expected to actively and collegially participate in all class activities 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:

1. Participation

50%

Participants will be expected to actively and collegially participate in discussions, activities, and other process experiences during the seminar.

2. Final Project – Professional Development Field 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. – 8:00 p.m.	Introduction, orientation & overview of fungal <ul style="list-style-type: none"><li>○ Forms,</li><li>○ Diversity,</li><li>○ Life histories,</li><li>○ Ecological relationships</li><li>○ As biological control mechanisms,</li><li>○ Symbiotic associations,</li><li>○ Taxonomic and evolutionary position,</li><li>○ Industrial importance,</li><li>○ Physiological mechanisms important to fungal survival,</li><li>○ Toxins (poisons),</li><li>○ Medical, and religious implications</li><li>○ How fungi impact the DNP&amp;P boreal forest, tundra and humans.</li></ul>
	8:00 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 <ul style="list-style-type: none"><li>○ Visit two major habitat types for collecting<ul style="list-style-type: none"><li>9-11:30am mountain tundra,</li><li>12:30-4pm riparian deciduous forest elements,</li></ul></li></ul> with fungal foraging after each visit.
	6:00 p.m. – 8:00 p.m.	Dinner and evening discussions <ul style="list-style-type: none"><li>○ PPT presentation on High Latitude Fungi</li><li>○ Develop study groups to discuss and report the day’s activities and how the information can be shared with students.</li></ul>

- Identify applicable science content standards addressed by course content

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

- Visit two major habitat types for collecting
  - 9-11:30am coniferous forest,
  - 12:30-4pm upland deciduous forest elements, with fungal foraging after each visit.

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

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

Required Text/Materials:

None

Suggested Text/Material:

Laursen, G.A. and R.D. Seppelt. (2009). Common Interior Alaska Cryptogams: Fungi, Lichenicolous Fungi, Lichenized Fungi, Slime Molds, & Mosses and Liverworts. University of Alaska Press, 218 pp.

Laursen, G.A. and B. Neil McArthur. (2016). Alaska's Mushrooms: A Wide-Ranging Guide. Graphic Arts Books within Alaska Northwest Books®, 225pp.

Supplemental information can be found in the following sources:

Content References: **Common Mushroom Field Guides**

1. Atkinson, George Francis. 1900. Studies of American Fungi, Mushrooms Edible, Poisonous, Etc. Andrus & Church, Ithaca, N.Y. 275 p.
2. Arora's, *Mushrooms Demystified*, \$40, or \$25 via the Kenai Peninsula Mycological Soc. Contact Janice Chumley, at 776-5277 or Steve Scott at 262-3541.
3. Bandoni, Robert J. and Adam F. Szczawinski. 1964. Guide to Common Mushrooms of British Columbia. A. Sutton, Victoria. 179 p.
4. Bigelow, Howard E. 1974. Mushroom Pocket Field Guide. Macmillan Publishing Co., Inc., New York, N.Y. 117 p.
5. Christensen, Clyde M. 1943. Common Edible Mushrooms. The Univ. of Minn. Press, Minneapolis, Minn. 124 p.
6. Christensen, Clyde M. 1965. Common Fleshy Fungi. Burgess Publishing Co., Minneapolis, Minn. 237 p.
7. Coffin, George and Margaret Lewis. 1965. Twenty Common Mushrooms and How to Cook Them. International Pocket Library, Boston, Mass.
8. Faubion, Nina Lane. 1964. Some Edible Mushrooms and How to Cook Them. Binford & Mort, Portland, Oregon. 198 p.
9. Funk, A. 1981. Parasitic Microfungi of Western Trees. Can. For. Serv. BC-X-222. 190 p.
10. Funk, A. 1985. Foliar Fungi of Western Trees. Can. For. Serv. BC-X-265. 159 p.
11. Graham, Verne Ovid. 1944. Mushrooms of the Great Lakes Region. Spec. Pub. No. 5, The Chicago Academy of Sciences, Chicago, Illinois. 390 p.
12. Groves, J. Walton. 1962. Edible and Poisonous Mushrooms of Canada. Publication 1112, Research Branch, Canada Dept. of Agric., Ottawa. 298 p.

13. Guba, Emil F. 1970. Wild Mushrooms Food and Poison. Published by the Author, 36 Marianne Road, Waltham, Massachusetts. 118 p.
14. Güssow, H. T. and W. S. Odell. 1927. Mushrooms and Toadstools. F. A. Acland, Ottawa, Canada. 274 p.
15. Hard, M. E. 1908. The Mushroom Edible and Otherwise. The New Franklin Printing Co., Columbus, Ohio. 609 p.
16. Hesler, L. R. 1960. Mushrooms of the Great Smokies. The Univ. of Tenn. Press, Knoxville, Tenn. 289 p.
17. Holsten, E. H., P. E. Hennon and R. A. Werner. 1985. Insects and Disease of Alaskan Forests. USDA-FS AK. Reg. Rpt. # 181. 217 p.
18. Huffman, D. M., L. H. Tiffany and G. Knaphus. 1989. Mushrooms and Other Fungi of the Mid Continental U.S. Iowa St. Univ. Press. 326 p.
19. Jenkins, D. T. 1986. Amanita of North America. Mad River Press. 197 p
20. Katsaros, P. 1989. Illustrated Guide to Common Slime Molds. Mad River Press. 66 p.
21. Krieger, Louis C. C. 1936. The Mushroom Handbook. Macmillan Publishing Co. 560 p.
22. Lange, Morten and F. Bayard Hora. 1963. A Guide to Mushrooms and Toadstools. E. P. Dutton & Co., Inc.
23. Laursen, G.A. and R.D. Seppelt. (2009). Common Interior Alaska Cryptogams: Fungi, Lichenicolous Fungi, Lichenized Fungi, Slime Molds, & Mosses and Liverworts. University of Alaska Press, 218 pp.
24. Lincoff, G. and A. A. Knopf. 1981. The Audubon Society Field Guide to Mushrooms. Chanticleer Press. 926 p.
25. Marshall, Nina L. 1905. The Mushroom Book. Doubleday, Page & Co., N.Y. 170 p.
26. McDougall, W. B. 1925. Mushrooms. The Riverside Press, Cambridge. 151 p.
27. McIlvaine, Charles and Robert K. Macadam. 1902. One Thousand American Fungi. Revised Ed. 729 p.
28. McKenny, Margaret. 1971. The Savory Wild Mushroom (Rev. by Daniel E. Stuntz). Univ. of Washington Press, Seattle, Washington. 242 p.
29. Miller, O. K., Jr. 1972. Mushrooms of North America. E. P. Dutton & Co., Inc., New York. 360 p.
30. Miller, O. K., Jr. and D. Farr. 1975. An Index of the Common Fungi of North America (Synonymy and common names). Band 44,
31. Orr, Robert T. and Dorothy B. Orr. 1968. Mushrooms and Other Common Fungi of Southern California. Univ. of California Press, Berkeley, Ca. 91 p.
32. Parker, H. 1994. Alaska's Mushrooms: A Practical Guide. AK NW Books.
33. Peck, Charles H. 1897. Mushroom and Their Use. Cambridge Botanical Supply Co., Cambridge. 80 p.
34. Pomerleau, Rene. 1951. Mushrooms of Eastern Canada and the United States: How to recognize and prepare the edible varieties. In cooperation with H. A. C. Jackson. Chanticleer. 302 p.
35. Pray, Leon L. 1936. Common Mushrooms. Botany Leaflet 18. Field Museum of Natural History, Chicago. 68 p.
36. Seymor, J. 1978. A Color Nature Library: Mushrooms and Toadstools. Crown Publ.
37. Smith, A. H. 1949. Mushrooms in Their Natural Habitat. Vol. I. Sawyer's Inc., Portland, Oregon. 626 p.
38. Smith, A. H. 1963. The Mushroom Hunter's Field Guide. The Univ. of Michigan Press, Ann Arbor, Michigan. 264 p.

39. Smith, A. H. 1971. *The Mushroom Hunter's Field Guide: Revised and Enlarged*. The Univ. of Michigan Press, Ann Arbor, Michigan. 264. p.
40. Smith, H. V. and A. H. Smith. 1973. *How to Know the Non-gilled Fleshy Fungi*. Wm. C. Brown Co., Dubuque, Iowa. 402 p.
41. Smith, A. H. and N. Smith-Weber. 1988. *The Mushroom Hunter's Field Guide: All Color and Enlarged*. U. M. Press. Ann Arbor.
42. Steinbeck, M. 1984. *Mushrooms in the Garden*. Mad River Press. 152 p.
43. Stephenson, S. L. and M. Stempen. 1994. *Myxomycetes: A Handbook of Slime Molds*. Timber Press. 183. p.
44. Stubbs, Ansel Hartley. 1971. *Wild Mushrooms of the Central Midwest*. The Univ. of Kansas Press, Lawrence, Kansas. 135 p.
45. Thomas, William S. 1948. *Field Book of Common Mushrooms*. G. P. Putnam's Sons, New York. 369 p.
46. Wells, Mary H. and D. H. Mitchell. 1966. *Mushrooms of Colorado and Adjacent Areas*. Museum Pictorial #17. Denver Museum of Natural History. Denver, Colorado. 81 p.

#### 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).