UNLV – College of Education

Preparing Professionals for Changing Educational Contexts

Department of Teaching and Learning
Inquire. Educate. Innovate.

Course Information

Prefix & Number	CIG 777
Title	**PRINCIPLES OF LEARNING SCIENCE**
Credits	3 Credit Hours
Semester	
Instructor	
Office/Phone/Email	
Class Location	
Office Hours	
Prerequisites	
Course Description (Course Introduction)	This advanced course is designed to develop an understanding of how major science education policy documents attempted to shape science education in the United States. Students will explore the development of ideas in science education in the 19th and the 20th centuries. More specifically, students will explore the ideas in major science education policy documents within the last 30 years and their implications for practice through critical readings, discussions, and reflections.
SPA Standards Addressed: Standard Domain Areas Addressed in this Course **INTASC Principles Addressed in this Course (please insert three subcomponents to them (performance,**	

essential knowledge, and critical dispositions	

Textbooks

Required

Deboer, G. E. (1991). *A History of Ideas in Science Education: Implications for Practice*. New York: Teachers College Press.

American Association for the Advancement of Science (AAAS). (1990). *Project 2061: Science for all Americans*. New York: Oxford University Press. http://www.project2061.org/publications/sfaa/online/sfaatoc.htm

American Association for the Advancement of Science (AAAS). (1993). *Project 2061: Benchmarks for Science Literacy*. New York: Oxford University Press. http://www.project2061.org/publications/bsl/online/index.php

National Research Council. (1996). *National Science Education Standards*. Washington, DC: National Academy Press.

National research Council (2000). *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning*. Washington, DC: National Academy Press.

National Research Council (2005). *How Students Learn: Science in the Classroom.* Committee on *How People Learn,* A Targeted Report for Teachers, M.S. Donovan and J. D. Bransford, Editors. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

National Research Council (2006). *America's Lab Report: Investigations in High School Science.* Committee on High School Science Laboratories: Role and Vision, S. R. Singer, M. L. Hilton, and H. A. Schweinburger, Editors. Board on Science Education, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

National Research Council (2007). *Taking Science to School: Learning and Teaching Science in Grades K-8*. Washington, DC: National Academy Press.

Michaels, S., Shouse, A. W., & Schweinburger, H. A. (2008). *Ready, Set, Science! Putting Research to Work in K-8 Science Classrooms.* Board on Science Education, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

National Research Council. (2012). A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

NGSS Lead States (2013). *Next Generation Science Standards: For States, by States.* Washington, DC: National Academies Press.

Bybee, R. W. (2013). *Translating the NGSS for Classroom Instruction.* Arlington, VA: NSTA Press.

Konicek-Moran, R. & Keeley, P. (2015). *Teaching for Conceptual Understanding in Science*. Arlington, VA: NSTA Press.

In addition to the readings that are listed in the course syllabus, the instructor may assign additional readings for each week. In this case, the readings will be announced at least one week before the class meets in that particular week.

Policy

1. You are expected to attend all class meetings.
2. If you are unable to attend class, it is your responsibility to inform the instructor *prior* to the class meeting.
3. Reading assignments are to be completed before the class meeting for which they are assigned.
4. All assignments should be handed in on or before the due dates indicated in the course outline.

You should notify me, preferably *in advance*, if you know you will be absent or tardy from class. You are responsible for turning in assignments on the due date, emailing them if necessary.

Course Requirements

1. Active participation: This course is conducted in a seminar format. Thus the success of the course depends on the active participation of all members in helping to shape shared understandings. Our primary activity will be in-depth discussions of course

ideas based on readings. Other learning activities are aimed at helping you in your meaning-making endeavors. It is expected that you actively participate in class discussions and activities.

2. Reading reflections: It is suggested that you keep a course notebook in which you take notes, ask questions, and write reflections on readings and discussions. You may choose to do your reading reflections before or after the class discussion.

Your reading reflections should address the following questions:

a) What are the major ideas discussed in the readings? Which of these ideas do you consider most important? Why?
b) Do these ideas reinforce or diverge from your own ideas about science teaching? In what ways?
c) Which, if any, of your own ideas about science teaching have changed?

3. Discussion Facilitation: For one session in the course, you will serve as a major reader and lead discussant. You will prepare a presentation that summarizes the major ideas in the assigned reading(s). Your presentation make take any format, such as oral or PowerPoint, and might include handouts, overheads, slides, etc. You will also lead and facilitate ensuing discussions.

4. Topic Paper: This paper allows each student to gain some depth related to one of the major topics introduced in this course. Using the provided readings as a starting point, students will construct at least 10-page (double-space) review using at least 10 references. This topic paper will explore the recent literature related to a course topic of particular interest. References should be primary, empirical sources from peer-reviewed educational journals. Student writing should follow APA format (6^{th} Edition).

Grading Philosophy

This course will be delivered under a mastery framework whereby the course requirements are given a grade of unacceptable, acceptable, or target. With the exception of the discussion facilitation and participation, all course requirements may be redone until the target standard is met. All work will be returned with feedback. Unsatisfactory work can be re-done until a grade of target is achieved.

Incomplete grades will be provided in special situations for students who require more time than the semester allows. The instructor reserves the right to assign ANY other grade as they see fit for students who do not provide satisfactory work.

Discussion Facilitation Rubric

I. Knowledge of the Topic				
A clear outline of the reading is provided (handout).	U	A	T	
The leader demonstrates a thorough grasp of the reading.	U	A	T	
The discussion reflects the ideas/research in the reading.	U	A	T	
The discussion expands on the general course topic.	U	A	T	
II. Presentation/Discussion				
The presentation/discussion is organized.	U	A	T	
The leader encourages discussion by raising important issues/questions.	U	A	T	
Class involvement is achieved.	U	A	T	
	U	A	T	**Overall**

Grading Rubric

Grade	***Student Characteristics***
A	All student papers are graded target and demonstrate a degree of thoughtful consideration and creativity beyond the stated expectations. Facilitation of discussion by the student is timely, thoughtful, and engaging. Student discussion comments go beyond simply answering the question or generating effortless responses. All reflective essays are complete. Student responses to reflective essay questions demonstrate consideration and application beyond a simple answer.
A-	All student papers are graded target and demonstrate a degree of thoughtful consideration and creativity beyond the stated expectations. Facilitation of discussion by the student is not timely, thoughtful, or engaging. Student discussion comments demonstrate a minimal attempt at stimulating discussion. All reflective essays are complete. Student responses to reflective essay questions typically require multiple attempts at mastery.
B+	All student papers are graded at least acceptable. Facilitation of discussion by the student is timely, thoughtful, and engaging. Student discussion comments go beyond simply answering the question or generating effortless responses. All reflective essays are complete. Student responses to reflective essay questions demonstrate consideration and application beyond a simple answer.
B	All student papers are graded acceptable. Facilitation of discussion by the student is not timely, thoughtful, or engaging. Student discussion comments are generally not helpful. At least 80% of the reflective essays are complete. Student responses to reflective essay questions typically require multiple attempts at mastery.

Tentative Course Outline

Session	Readings and Assignments
August 30	Introduction
Sept 6	Deboer, G. E. (1991). *A History of Ideas in Science Education: Implications for Practice*. New York: Teachers College Press. Chs 1-6
Sept 13	Deboer, G. E. (1991). *A History of Ideas in Science Education: Implications for Practice*. New York: Teachers College Press. Chs 7-11
Sept 20	American Association for the Advancement of Science (AAAS). (1990). *Project 2061: Science for all Americans*. New York: Oxford University Press. http://www.project2061.org/publications/sfaa/online/sfaatoc.htm
Sept 27	American Association for the Advancement of Science (AAAS). (1993). Project *2061: Benchmarks for Science Literacy*. New York: Oxford University Press. http://www.project2061.org/publications/bsl/online/index.php
Oct 4	National Research Council. (1996). *National Science Education Standards*. Washington, DC: National Academy Press.
Oct 11	National research Council (2000). *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning*. Washington, DC: National Academy Press.
Oct 18	National Research Council (2005). *How Students Learn: Science in the Classroom.* Committee on *How People Learn,* A Targeted Report for Teachers, M.S. Donovan and J. D. Bransford, Editors. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.
Oct 25	National Research Council (2006). *America's Lab Report: Investigations in High School Science.* Committee on High School Science Laboratories: Role and Vision, S. R. Singer, M. L. Hilton, and H. A. Schweinburger, Editors. Board on Science Education, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
Nov 1	National Research Council (2007). *Taking Science to School: Learning and Teaching Science in Grades K-8*. Washington, DC: National Academy Press.
Nov 8	Michaels, S., Shouse, A. W., & Schweinburger, H. A. (2008). *Ready, Set, Science! Putting Research to Work in K-8 Science Classrooms.* Board on Science Education, Center for Education, Division of

	Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
Nov 15	National Research Council. (2012). A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
Nov 22	NGSS Lead States (2013). *Next Generation Science Standards: For States, by States.* Washington, DC: National Academies Press.
Nov 29	Konicek-Moran, R. & Keeley, P. (2015). *Teaching for Conceptual Understanding in Science*. Arlington, VA: NSTA Press.
Dec 6	Conceptual Change Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accommodation of a scientific conception: Toward a theory of conceptual change. *Science Education, 66*, 211-227. Strike, K. A., & Posner, G. J. (1992). A revisionist theory of conceptual change. In R. A. Duschl & R. J. Hamilton (Eds.), Philosophy of science, cognitive psychology,and educational theory and practice (pp. 147-176). Albany, NY: State University of New York Press. Pintrich, P. R., Marx, R. W., & Boyle, R. A. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research, 63(2)*, 167-199. **Reading Reflections and Topic Paper are due**

COLLEGE OF EDUCATION POLICIES

College Accreditation

Assignments completed for this course may be used as evidence of candidate learning in national, regional and state accreditation reports of COE programs. Names and other identifying elements of all assignments will be removed before being included in any report. Students who do not wish their work to be used for accreditation purposes must inform the instructor in writing by the end of late registration. Your participation and cooperation in the review of COE programs is appreciated.

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Teacher Licensure
Misdemeanor or felonious conviction(s) may bar teacher licensure in Nevada or other states. If you have any questions, please direct them to the Director of Teacher Education, CEB 301, 895-4851.

SPECIAL NOTES
Academic Misconduct
Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: https://www.unlv.edu/studentconduct/student-conduct.

Copyright
The University requires all members of the University Community to familiarize themselves with and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: http://www.unlv.edu/provost/copyright.

Disability Resource Center (DRC)
The UNLV Disability Resource Center (SSC-A 143, http://drc.unlv.edu/, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both

your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Religious Holidays Policy
Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: http://catalog.unlv.edu/content.php?catoid=6&navoid=531.

Transparency in Learning and Teaching
The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:
https://www.unlv.edu/provost/teachingandlearning
https://www.unlv.edu/provost/transparency

Incomplete Grades
The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Tutoring and Coaching
The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit http://www.unlv.edu/asc or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

UNLV Writing Center
One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: http://writingcenter.unlv.edu/.

Rebelmail
By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. Emailing within WebCampus is acceptable.

Final Examinations
The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: http://www.unlv.edu/registrar/calendars.

Library Resource
Students may consult with a librarian on research needs. For this class, the Subject Librarian is (https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at https://www.library.unlv.edu/.

Any other class specific information
(e.g., absences, make-up exams, status reporting, extra credit policies, plagiarism/cheating consequences, policy on electronic devices, specialized department or college tutoring programs, bringing children to class, policy on recording classroom lectures, etc.)