

COLLEGE OF NATURAL & HEALTH SCIENCES
COURSE SYLLABUS For Extended Campus Expedited Review

↑ **Course Number and Prefix: ESCI 575-601**

↑ **Title: Contemporary Field Issues –Energy Institute(2 Credits). Instructor: Amy Nicholl.**

↑ **Co-Requisites/Prerequisites** – *NONE, but students must apply through online application described in course announcement provided through UNC Extended Campus.*

↑ **Course Description** – June 20-23, 2022; 8 am-4:30 pm, Teacher Workshop at the Poudre Learning Center on energy derived from the contemporary oil and gas industry in Colorado.

↑ **Course Objectives** –

- Participants will be able to describe the geologic processes that occurred to create oil and natural gas
- Participants will identify that petroleum and natural gases are made of hydrocarbons.
- Participants will be able to explain how oil and natural gas get trapped beneath rock layers
- Participants will be able to describe how a core sample can help geologists interpret rock layers and find oil and natural gas formations.
- Participants will be able to describe how porosity of a rock layer is important for oil and natural gas exploration and production.
- Participants will be able to describe the relationship between well depth and effort to recover resources.
- Participants will be able to describe the process of hydraulic fracturing and why the process is used.
- Participants will be able to describe how density differences can be utilized to help retrieve petroleum resources.
- Participants will be able to identify the properties of polymers
- Participants will be able to list and describe the different steps needed to produce natural gas and bring it to market.
- Participants will be able to describe the pros and cons of oil and gas production.
- Participants will develop a science notebook as a model to be used in their classrooms.
- Participants will be able to identify and use NGSS (Next Generation Science and Engineering Practices).
- Participants will be able to develop STEM (Science, Technology, Engineering, and Mathematics) lesson plans using NGSS and the 5E Learning Cycle (Engage, Explore, Explain, Elaborate, Evaluate).

↑ **Outline of Course Content** *Instructors from the Poudre Learning Center and the experts in the field of oil and gas production will lead the participants into the following topics through immersion in STEM lessons, models, and field trip experiences to oil/gas extraction sites:*

- Formation of oil and gas deposits
- Processes of extracting oil and gas
- Positive and negative impacts of oil and gas production
- Immersion into NGSS Science and Engineering Practices
- Developing STEM lessons based on NGSS (2017, The Three Dimensions of Science Learning, <https://www.nextgenscience.org/>) and the 5E Learning Cycle (R. Bybee and others, 2006, The BSCS 5E Instructional Model: Origins, Effectiveness, and Applications-Executive Summary, Biological Sciences Curriculum Study, Colorado Springs, CO).

↑ **Course Requirements**

- Participation in all sessions (20% of course).

- Students will maintain a science notebook with materials and notes gained from the course (20% of course).
- Students will create a lesson plan for their students based on standards and information gained from the course (60% of course).

↑ **Method of Evaluation** (letter graded)

A- 90% and up

B- 80-89.9%

C- 70-79.9%

D- 60-69.9%

F- Below 60%

↑ **Required Texts and Required Reading List** – Selected Readings from:

Alternative Energy Encyclopedia, 2016, Editors J. Lehr, J. Keeley, and T. Kingery, Wiley Interscience Series on Energy, Hoboken, NJ; and other public domain or accessible oil and gas energy-production information.

The Three Dimensions of Science Learning, 2017, <https://www.nextgenscience.org/>

The BSCS 5E Instructional Model: Origins, Effectiveness, and Applications-Executive Summary, 2006, R. Bybee and others, Biological Sciences Curriculum Study, Colorado Springs, CO).

†**Disability Support Services** - Any student requesting disability accommodation for this class must inform the instructor giving appropriate notice. Students are encouraged to contact Disability Support Services at (970) 351-2289 to certify documentation of disability and to ensure appropriate accommodations are implemented in a timely manner. (updated per DSS 8-24-09)

Honor Code - All members of the University of Northern Colorado community are entrusted with the responsibility to uphold and promote five fundamental values: Honesty, Trust, Respect, Fairness, and

Responsibility. These core elements foster an atmosphere, inside and outside of the classroom, which serves as a foundation and guides the UNC community's academic, professional, and personal growth. Endorsement of these core elements by students, faculty, staff, administration, and trustees strengthens the integrity and value of our academic climate.

UNC's Policies - UNC's policies and recommendations for academic misconduct will be followed. For additional information, please see the Student Code of Conduct at the Dean of Student's website <http://www.unco.edu/dos/Conduct/codeofconduct.html>. In the case of academic appeals, university procedures will be followed. For information on academic appeals, see <http://www.unco.edu/regrec/Current%20Students/AcademicAppeals.html>.

Portable Electronic Devices –Please extend courtesy to your instructor and fellow students by turning off your portable electronic devices such as: cell phones, pagers, and iPods. Although not an audio issue, text-messaging is a distraction to other students and prevents you from full participation in class. You should keep your portable electronic devices in your backpack or purse during class. Your personal electronic devices should not be on your desks. If you know that you may need to accept an emergency phone call during class or if you have children in childcare or school, please let the instructor know. If you need to take a phone call during class, please step out of the classroom while you complete your call. Thank you for your cooperation.