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ASUW PASSED Student Government

SENATE RESOLUTION #3065

TITLE: ASUW Supports the Creation of an Undergraduate Subsurface Energy Certificate

DATE INTRODUCED: 10/28/2025

AUTHOR: Senator Pollock

SPONSORS: Senators Morales, Robinson, Shosh, & Smith

WHEREAS, the purpose of the Associated Students of the University of Wyoming (ASUW) is to serve our fellow students in the best manner possible; and,

WHEREAS, many students have expressed hesitation of obtaining a petroleum engineering degree due to the specificity of the program; and,

WHEREAS, enrollment in the undergraduate petroleum engineering program has decreased at the University of Wyoming; and,

WHEREAS, there are numerous opportunities in the oil and gas industry across the nation; and,

WHEREAS, subsurface technologies extend beyond oil and gas development and into the geothermal, carbon storage, and blockchain and digital technology space; and,

WHEREAS, there is an entry-level skill gap in the subsurface energy industry; and,

WHEREAS, there is a growing demand for certificate programs in various areas of the energy industry; and,

WHEREAS, there are no other Undergraduate Subsurface Energy Certificate programs offered in the nation; and,

WHEREAS, a certificate program would give UW graduates the skills and education students would need to be competitive in the energy industry; and,

WHEREAS, adding an Undergraduate Subsurface Energy Certificate will make the

Passed 16-0-2

19. University of Wyoming a pioneer in the subsurface energy space; and,
20. WHEREAS, the certificate will require 18 credit hours consisting of the 2 foundational
21. petroleum engineering courses and an additional 12 credit hours of elective courses
22. in a specialized area which are listed in Addendum A; and,
23. WHEREAS, the certificate program will utilize only existing courses, resources, and
24. staff from the School of Energy Resources and the College of Engineering and Physical
25. Sciences as outlined in Addendum A; and,
26. WHEREAS, the program will be launched in Fall of 2026; and,
27. WHEREAS, there is much support for this program at the University of Wyoming and
28. the subsurface energy industry as seen in Addendum A.
29. THEREFORE, be it resolved by the Associated Students of the University of
30. Wyoming (ASUW) Student Government supports the creation of an Undergraduate
31. Subsurface Energy Certificate; and,
32. THEREFORE, be it further resolved that this resolution be circulated to the student body
33. through ASUW channels; and,
34. THEREFORE, be it further resolved that this resolution be sent to the Board of Trustees
35. and all applicable departments immediately upon its passage.

Referred to: ___Committee of the Whole_____

Date of Passage: October 28, 2025 **Signed:** Aidan McGuire
(ASUW Chairperson)

"Being enacted on October 28, 2025**, I do hereby sign my name hereto and approve this Senate action."** Kayla Medina

ASUW President

Passed 16-0-2

Addendum A

SUBSURFACE ENERGY CERTIFICATE FEASIBILITY STUDY

Passed 16-0-2

UNIVERSITY OF WYOMING | Office of Academic Affairs

Office of Academic Affairs
Dept. 3302 • 1000 E. University Avenue
Laramie, WY 82071
(307) 766-4286 • (307) 766-6476 • fax (307) 766-2606
www.uwyo.edu/acadaffairs

This form is to be used with all new degree/certificate proposals as outlined in the process on the Academic Affairs website at https://www.uwyo.edu/acadaffairs/degrees. Departments shall use this form to provide documentation of collaboration and support for any courses and/or resources that will be contributing to the new degree/certificate that are not within the home department.

Date: 8/15/2025

Name of Proposal: Subsurface Energy Certifica

Department: SER/DEPE

College: SER/CEPS

The above-named degree/certificate proposal has been reviewed by the following departments/colleges and all appropriate courses and resources have been discussed prior to proposal submission:

Kami J. Danaei	Kami J Danaei
Department Head	Signature
Vamegh Rasouli	
Department Head	Signature
Holly Krutka	Holly Krutka
Dean	Signature
Daniel Dale	
Dean	Signature

Submitted on: _____(date)

By: _____

Passed 16-0-2

Subsurface Energy Certificate Feasibility Study

Feasibility Study for Subsurface Energy

Executive Summary

Degree or Certificate Title: Subsurface Energy

Level of Degree or Certificate: Undergraduate Certificate

Delivery Mode(s): In-Person/Online/Hybrid

Estimated Startup Cost of Degree: $12,000- paid by SER

Anticipated Launch Date: Fall 2026

Description: Across the Nation, petroleum engineering undergraduate enrollment has decreased, even as domestic oil and gas production is at record levels and companies have begun expanding their subsurface energy offerings to include carbon storage, geothermal energy, blockchain and digital innovation and more.

While some students have expressed reservations about obtaining a petroleum engineering degree due to its perceived specificity compared to other engineering disciplines, employment opportunities exist for this skill set. To fill the current entry-level skill gap, oil and gas companies have hired engineers from other disciplines and trained them, post-employment, in oil and gas and subsurface disciplines. This certificate is designed to provide University of Wyoming (UW) students with a unique, interdisciplinary credential that includes the basics of petroleum engineering coupled with other subsurface energy topics. This certificate is jointly proposed by the School of Energy Resources (who will list and manage the credential within the UW Catalog) and the Department of Energy and Petroleum Engineering in the College of Engineering and Physical Sciences (who will offer the courses and conduct advising).

Passed 16-0-2

Table of Contents

Passed 16-0-2

Overview and Description of Degree or Certificate, Purpose, Strategic Play Overlay

Across the nation, petroleum engineering undergraduate enrollment has decreased, even as oil and gas remain a sizeable industry and companies have begun expanding their subsurface energy offerings to include carbon storage, geothermal energy, blockchain and digital innovation and more. While some students have expressed reservations about obtaining a petroleum engineering degree due to its perceived specificity compared to other engineering disciplines, employment opportunities exist for this skill set; especially when coupled with a strong subsurface background. To fill the current entry-level skill gap, oil and gas companies have hired engineers from other disciplines and trained them post-employment. This certificate is designed to provide University of Wyoming (UW) students with a unique, interdisciplinary credential that includes the basics of petroleum engineering with other subsurface energy topics.

Target Audience

Students with technical backgrounds and interests in subsurface energy are the target of this certificate, including undergraduate students studying Geology and Geophysics, Mechanical Engineering, Chemical Engineering, Civil Engineering, Energy Systems Engineering, etc.

The student survey data reveals a generally positive interest in the proposed Subsurface Certificate Program at UW. A strong majority expressed interest in the core required courses (PETE 2050 and PETE 2070). Among the optional focus areas, the Geoscience and Environment tracks were the most positively received, with more than half of students finding them either "somewhat" or "extremely interesting." The Economics and Digital Innovation tracks received more mixed responses but still showed moderate interest.

In terms of potential enrollment, most students reported that they were "somewhat likely" or "neither likely nor unlikely" to pursue the certificate, suggesting an openness to the program that could grow with continued outreach and clarification of its value. It is important to note that this initial student survey was conducted over the summer, a period when most UW students are not regularly checking their university email. To ensure broader student input, the survey will remain open through the fall semester. Targeted email campaigns through Navigate will be launched once the semester begins to increase participation and achieve a larger representative sample. Updated survey results will be provided during oral updates on the feasibility study throughout the fall.

Relationship with Other Offerings/Demand

The proposed Certificate in Subsurface Energy offers a unique and forward-looking credential that bridges traditional petroleum engineering foundations with multidisciplinary electives in digital innovation, energy economics, and emerging subsurface technologies such as carbon storage, hydrogen, and geothermal systems. The electives include coursework from departments across UW. In addition, courses based on the Department of Energy and Petroleum Engineering's M.S. are also included as undergraduate, cross-listed electives. While some of the electives are new, they are being developed for other credentials already approved at UW. No new courses are being developed specifically for this proposed certificate.

Compared to other petroleum related programs in the U.S., this certificate is distinctive in both scope and intent. It fills a critical gap in subsurface energy education by offering a hybrid credential that is rooted in petroleum engineering while incorporating contemporary digital and sustainability themes. The limited

Passed 16-0-2

competition in this space, combined with emerging workforce trends, positions UW to lead in offering an innovative and relevant credential that supports both student success and energy workforce development. Compared to other credentials currently available in the U.S., this program stands out in several key areas:

- **Limited National Offerings:** Only two U.S. institutions currently offer undergraduate certificates directly related to petroleum engineering. Texas A&M University offers *Data Analytics for the Petroleum Industry* and *Petroleum Ventures*. However, both have seen declining completions over the past three years, reflecting the broader trend of reduced undergraduate enrollment in petroleum disciplines. The University of North Dakota also offers a certificate, but with very low completion numbers (only one in the latest reporting year), it is not considered a viable or competitive benchmark.
- **Broader Scope and Interdisciplinary Design:** Unlike these narrowly focused petroleum certificates, the proposed program includes not only core petroleum engineering courses but also flexible elective pathways in Geoenergy Engineering, Energy Economics, Law and Communication, Digital Technologies such as GIS, blockchain, data analytics, and emerging energy technologies such as CCUS and geothermal. This broader scope distinguishes the UW certificate from other programs.
- **Growing National Trends in Related Areas:** According to Gray Decision Intelligence data, programs under Energy Systems Engineering and Science, Technology & Society are seeing increased development. These programs typically emphasize interdisciplinary and systems-level approaches, similar to our proposed structure, but few are grounded in subsurface applications like the proposed Certificate in Subsurface Energy.

The proposed Certificate in Subsurface Energy strongly supports the University of Wyoming's Strategic Plan by advancing several of the university's core objectives and commitments. Rooted in interdisciplinary collaboration and real-world application, the certificate aligns with UW's commitment to enhance student success by preparing students for a rapidly evolving, and increasingly digital, energy sector. The program also directly supports the university's mission to engage with and serve the state of Wyoming by leveraging regional strengths in subsurface energy resources, addressing critical workforce needs, and contributing to the state's economic development. By offering components of the program online and making it accessible to engineering students, the certificate expands educational opportunity and promotes inclusive student engagement. Moreover, it reinforces UW's role as a catalyst for innovation and economic vitality through its emphasis on emerging technologies such as carbon sequestration, geothermal systems, and data-driven energy solutions, fulfilling the vision of using UW's unique strengths to make Wyoming and the world a better place.

This certificate also aligns closely with the strategic goals and aspirations of both the Department of Energy & Petroleum Engineering (DEPE) and the College of Engineering and Physical Sciences (CEPS). Building on DEPE's long-standing legacy of excellence in petroleum engineering education and research, this certificate supports the department's mission to provide contemporary, industry-relevant training that prepares students to address the evolving challenges of global energy systems. By offering a multidisciplinary curriculum that integrates foundational petroleum engineering coursework with emerging topics in carbon storage, geothermal systems, energy economics, and digital innovation, the program enhances undergraduate education and fosters the interdisciplinary thinking essential for world-

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class research and innovation. The certificate also contributes to CEPS's Tier-1 goals by expanding educational access, particularly through its online components, and cultivating partnerships with industry to ensure the program produces workforce-ready graduates who will advance economic development in Wyoming and beyond.

Student Learning Outcomes (SLOs)

1. Demonstrate a fundamental understanding of petroleum engineering concepts, including reservoir properties, phase behavior, drilling methods, and production techniques.
2. Apply principles of petroleum engineering to identify, analyze, and solve practical challenges in reservoir management, drilling, and production operations.
3. Develop specialized knowledge in areas of interest, such as energy law and economics, digital innovation or energy sustainability, based on elective coursework.
4. Apply interdisciplinary knowledge to address complex energy engineering problems in a professional context.

Curriculum Map

The proposed certificate requires 18 credits to be completed.

The curriculum consists of two courses (no shading in table below) that are foundational for petroleum engineering. All students in the certificate program will take these two courses for a total of six credits. In addition, 12 credits will be required from a grouping of electives (each grouping is color coded in the table below) in targeted areas:

Courses/SLO	SLO 1	SLO 2	SLO 3	SLO 4
PETE 2050 *Fundamentals of Petroleum Engineering*	I			
PETE 2070 *Geology/Geophysics for Petroleum Engineers*	I			
PETE 3110 *Reservoir Petrophysics*	I			
PETE 3200 *Reservoir Engineering*		D		
PETE 3255 *Drilling Engineering*		D		
PETE 3715 *Production Engineering*		D		
PETE 4*** *Petroleum and Geothermal Engineering*			D	M
PETE 4*** *Subsurface Energy Storage*			D	M
ERS 1300 *Oil: Business, Culture, Power*			I	
ERS 3000 *Energy Project Outreach and Communications*			D	
ERS 4130 *Oil and Gas and the Law of Subsurface Property*			D	

Passed 16-0-2

ERS 4135 *Advanced Energy Law*			D	M
PETE 4340 *Petroleum Economics and Law*			D	M
GIST 2310 *Intro to Geographic Information Systems*			I	
PETE 4820 *Blockchain in Energy*			I	D
PETE 4*** *Energy Data Analysis using Python*			I	
PETE 4*** *Data Analytics Applications in the Energy Industry*			D	M
PETE 4*** *Visual Analytics for the Energy Industry*			D	
ERS 4480 *Carbon Capture and Storage*			D	
ERS 4481 *Geological Carbon Sequestration*			D	M
ERS 4482 *Global Climate Governance*			D	
PETE 4820 *Blockchain in Energy*			I	D
PETE 4*** *Petroleum and Geothermal Engineering*			D	M
PETE 4*** *Subsurface Energy Storage*			D	M

Passed 16-0-2

Core & Elective Courses:

Required /Optional	Prefix	Course Number	Course Title	Course Description	Credits	Current Pre-Requisites
Required	PETE	2050	Fundamentals of Petroleum Engineering	General introduction to petroleum engineering, including petroleum geology, exploration, reservoir rocks, and fluid flow through porous media, drilling fundamentals, completion technology, well logging and testing, methods of production, stimulation methods, enhanced oil recovery, reserves and economics.	3	C or better in MATH 2200 or Concurrent in MATH 2200
Required	PETE	2070	Geology/Geophysics for Petroleum Engineers	This course covers key geological and geophysical principles applied to petroleum engineering, including hydrocarbon systems, sedimentology, and structural geology. Topics such as field life cycles (exploration, development, production), porosity, permeability, and subsurface stresses are examined, highlighting the impact of geology on drilling, reservoir management, and production activities.	3	C or better in PETE 2050
Optional - Geoenergy Engineering Focus Area	PETE	3110	Reservoir Petrophysics	Provides a comprehensive understanding of principles of rock and fluid properties and their associated interactions. and their measurement as part of conventional and special core analysis. Students will learn to calculate and measure the hydrocarbon reservoir's main properties using both mathematical and experimental approaches as part of reservoir characterization routines.	3	C or better in PETE 2050; PETE Major
Optional - Geoenergy Engineering Focus Area	PETE	3200	Reservoir Engineering	Covers rock and fluid properties, reserve estimation using volumetric and material balance methods, discussion of different reservoir drive mechanisms, aquifer models, Darcy's law and single-phase flow through porous media, introduction to well testing, solution of radial diffusivity equation, immiscible displacement, decline rate analysis, and reservoir simulation.	3	PETE 3110; PETE Major
Optional - Geoenergy Engineering Focus Area	PETE	3255	Drilling Engineering	Principles and practices of oil and gas well rotary drilling, including rock mechanics, drilling hydraulics, drilling fluids, and hold deviation. Application of modern computer-based analysis and design methods. Drilling equipment analysis, casing design, measurements of physical and chemical properties of drilling fluids explored in lab sessions.	3	C in ES 2330 and D in PETE 2070
Optional - Geoenergy Engineering Focus Area	PETE	3715	Production Engineering	Provides technical insight for calculating the production rate and deliverability of oil or gas reservoirs, which includes petroleum production systems, well performance, flow assurance, reservoir stimulation, pumping systems and production decline analysis. Students will also be exposed to practical applications of theoretical lectures during lab sessions.	3	C or better in ES 2310, ES 2330 and PETE 2050; PETE Major

Passed 16-0-2

Optional - Geoenergy Engineering Focus Area	PETE	4*** **NEW**	Petroleum and Geothermal Engineering	This course introduces the subject of Petroleum Engineering and Geothermal Energy Engineering by comparing these two fields. Disciplines in each of these engineering domains will be reviewed and each discipline described with its relationship with the entire domain. Types of data and tools used in each discipline will be discussed.	3	*TBD*
Optional - Geoenergy Engineering Focus Area	PETE	4*** **NEW**	Subsurface Energy Storage	Some "green energy" sources operate sporadically under only specific conditions. This course will investigate methods for storing energy from these sources in the subsurface of the earth, for later use when needed. Some of these methods utilize processes and equipment repurposed from the oil and gas industry.	3	*TBD*
Optional - Economics, Law, Communication Focus Area	ERS	1300	Oil: Business, Culture, Power	A multi-disciplinary approach to understanding how oil affects the international relations and commerce. The relationships between oil technology, social and political institutions, the unique cultures in oil-producing regions will be investigated in case studies.	3	
Optional - Economics, Law, Communication Focus Area	ERS	3000	Energy Project Outreach and Communications	Development of energy projects requires broad skills related to communications and outreach, especially to express complex energy concepts and projects to the public. Students will develop interdisciplinary communication skills from an energy resources perspective. Communication will include oral, digital, and written forms. Audiences for communication projects will often be live, and from a variety of backgrounds.	3	WA/COM1
Optional - Economics, Law, Communication Focus Area	ERS	4130	Oil and Gas and the Law of Subsurface Property	This course focuses on the two subsurface property interests -the mineral interest and ownership of pore space- and their use and occupation for oil and gas and carbon storage. The course focuses on civil law applicable to subsurface property including property, contract, and tort.	3	ERS 2010 or PETE 3200 and WB/COM2 OR admission into CCUS Certificate
Optional - Economics, Law, Communication Focus Area	ERS	4135	Advanced Energy Law	Energy development/financing arrangements including assignments, leases, farmouts, joint operating agreements, purchase and sale agreements, service agreements and marketing agreements. Energy development regulation of oil and gas conservation commission and state and federal environmental regulation. Ethics of oil and gas, renewables, nuclear, CCUS, hydrogen, and various agreement/regulatory nuances of energy development.	3	ERS 4130
Optional - Economics, Law, Communication Focus Area	PETE	4340	Petroleum Economics and Law	Applies principles of economics to petroleum-related projects. Studies time value of money, economic analysis of private and public sector projects, taxation, sensitivity analysis and decisions under uncertainty. Covers principles and variety of petroleum laws and energy market trends.	3	PETE 3715; PETE Major

Passed 16-0-2

Optional - Digital Innovation Focus Area	GIST	2310	Intro to Geographic Information Systems	Introductory course covering fundamental principles of geographic information systems (GIS). Students will be introduced to both the theory and application of GIS, including GIS components, the nature of geospatial data, methods for data acquisition, database models, and GIS operations. Includes hands-on laboratory exercises using widely used software.	4	
Optional - Digital Innovation Focus Area	PETE	4820	Blockchain in Energy	This course provides an overview of the global energy transition. It introduces Blockchain technology and provides hands-on experience in developing Smart Contracts, digital tokes, and Decentralized Applications. The application of Blockchain in energy, sustainability, and the carbon economy will also be explored.	3	Junior status or higher
Optional - Digital Innovation Focus Area	PETE	4*** **NEW**	Energy Data Analysis using Python	This course introduces programming for energy data analysis using the Python programming language. Topics include data import-export, data types, control statements, functions and data visualization. Students will get hands-on training on writing programs for analyzing data from the energy industry using Jupiter Notebook as the Integrated Development Environment (IDE).	3	TBD
Optional - Digital Innovation Focus Area	PETE	4*** **NEW**	Data Analytics Applications in the Energy Industry	This course will provide students with the fundamental concepts of data mining and machine learning methodologies and hands-on experience on applying cutting-edge tools and techniques to solve real-world challenges within the energy sector, such as optimizing energy production, forecasting demand, and enhancing operational efficiency.	3	TBD
Optional - Digital Innovation Focus Area	PETE	4*** **NEW**	Visual Analytics for the Energy Industry	This course presents visual analytics concepts for the energy industry in a comprehensive manner. Information visualization is presenting data in an easy-to-understand manner to help comprehend the underlying information and make useful decisions. Students will gain the required knowledge and skills for visually analyzing energy data through hands-on labs.	3	TBD
Optional - Emerging Subsurface Energy Technologies Focus Area	ERS	4480	Carbon Capture and Storage	To stabilize climate change, carbon capture and storage (CCS) is a key option for deeply reducing carbon dioxide (CO_2) emissions from fossil fuel-fired energy systems. This course offers a systematic view of CCS and then addresses technical, economic, and policy issues related to CCS and its applications.	3	ES 2310 and CE 3400; waived for non-CE students

Passed 16-0-2

Optional - Emerging Subsurface Energy Technologies Focus Area	ERS	4481	Geological Carbon Sequestration	Various aspects of Carbon Capture, Utilization and Storage, including Policy & Regulations, Geology, Geostatistics, and Engineering. Students will learn geological concepts, models of the subsurface, engineering of fluids and flow, policy and regulations related to CO2 emissions, pore-volume use, injection, monitoring and safety.	3	MATH 2200
Optional - Emerging Subsurface Energy Technologies Focus Area	ERS	4482	Global Climate Governance	The 2015 Paris Agreement marked a new, more participatory and decentralized, approach to global climate governance which provides countries with substantial latitude to develop plans to adapt to climate impacts and reduce emissions. This course will examine the conceptual framework of climate governance and the challenges of its implementation.	3	Completion of a COM 2 class with a grade C or better
Optional - Emerging Subsurface Energy Technologies Focus Area	PETE	4820	Blockchain in Energy	This course provides an overview of the global energy transition. It introduces Blockchain technology and provides hands-on experience in developing Smart Contracts, digital tokes, and Decentralized Applications. The application of Blockchain in energy, sustainability, and the carbon economy will also be explored.	3	Junior status or higher
Optional - Emerging Subsurface Energy Technologies Focus Area	PETE	4*** **NEW**	Petroleum and Geothermal Engineering	This course introduces the subject of Petroleum Engineering and Geothermal Energy Engineering by comparing these two fields. Disciplines in each of these engineering domains will be reviewed and each discipline described with its relationship with the entire domain. Types of data and tools used in each discipline will be discussed.	3	TBD
Optional - Emerging Subsurface Energy Technologies Focus Area	PETE	4*** **NEW**	Subsurface Energy Storage	Some "green energy" sources operate sporadically under only specific conditions. This course will investigate methods for storing energy from these sources in the subsurface of the earth, for later use when needed. Some of these methods utilize processes and equipment repurposed from the oil and gas industry.	3	TBD

I = Introduced; D = Developed (formative assessment); M = Mastered (summative assessment)

This table identifies seven "new" courses; however, it is important to note that all of these courses already exist and are being offered at the EPE 5000 level. This would create an undergraduate section to be paired with the graduate section so these will occur at the same time/place as existing courses. This will not require any additional funds for content development since these are already being offered at the graduate level.

The sequence of courses largely depends on the focus area the students select. Students must start with PETE 2050, and then PETE 2070, but after that two-course required sequence, it could change based on the students primary major and focus area within the certificate.

Passed 16-0-2

Assessment Plan

The program assessment plan is designed to provide actionable feedback for continuous improvement, while remaining sustainable and appropriate for an 18-credit certificate program. To ensure that students achieve the program's learning outcomes and meet UW's Learning Outcomes Assessment standards, the following comprehensive assessment strategy will be employed:

Course-Level Assessments: The course-level assessment will be focused on the two required core petroleum engineering courses and one representative elective from each of the four interest areas. This scaled and sustainable approach allows the program to assess all four learning outcomes using a manageable number of courses and ensures that the program is evaluated in alignment with best practices for certificate-level programs. It allows for meaningful data collection without imposing significant new demands on instructors or departments, while supporting the university's commitment to continuous program improvement and student success. Each of the selected courses for assessment (foundational and electives) will clearly identify relevant program-level learning outcomes in their syllabi, aligning them with at least one explicit assessment method. Examples of these assessments could include:

- Exams or quizzes assessing foundational knowledge.
- Written reports or research papers demonstrating analytical and interdisciplinary skills.
- Practical projects or presentations illustrating applied knowledge and problem-solving capabilities.

Course instructors will consistently collect assessment data each semester to document student performance in relation to these outcomes.

Data Collection and Analysis: A designated faculty member will serve as coordinator and oversee the collection of syllabi and associated course assessment data each semester. This coordinator will ensure timely reminders and consistent communication are conducted with all instructors teaching the selected courses in the certificate program regarding assessment obligations and will collect and aggregate assessment data every semester, making it available for program-level analysis.

Annual Program Assessment Review: An assessment review team consisting of 2-3 faculty members will review the aggregated assessment data annually to evaluate overall student achievement against stated program learning outcomes. The team will also generate an annual Assessment Report detailing findings, strengths, weaknesses, and areas requiring improvement.

Continuous Improvement: Based on the findings of the annual reviews, actionable recommendations will be made to refine curriculum content, teaching methods, and assessment practices. Feedback from this process will be communicated to all instructors involved in the certificate program to inform improvements at the course level. The review team will also track progress on implemented recommendations in subsequent assessment cycles, ensuring continuous improvement.

Passed 16-0-2

Stakeholder Engagement: Key insights and outcomes from the annual assessment report will be shared periodically with the Industry Advisory Boards at the department and college level to ensure alignment with current industry needs and expectations. Recommendations from industry stakeholders will inform future adjustments and enhancements to the certificate program.

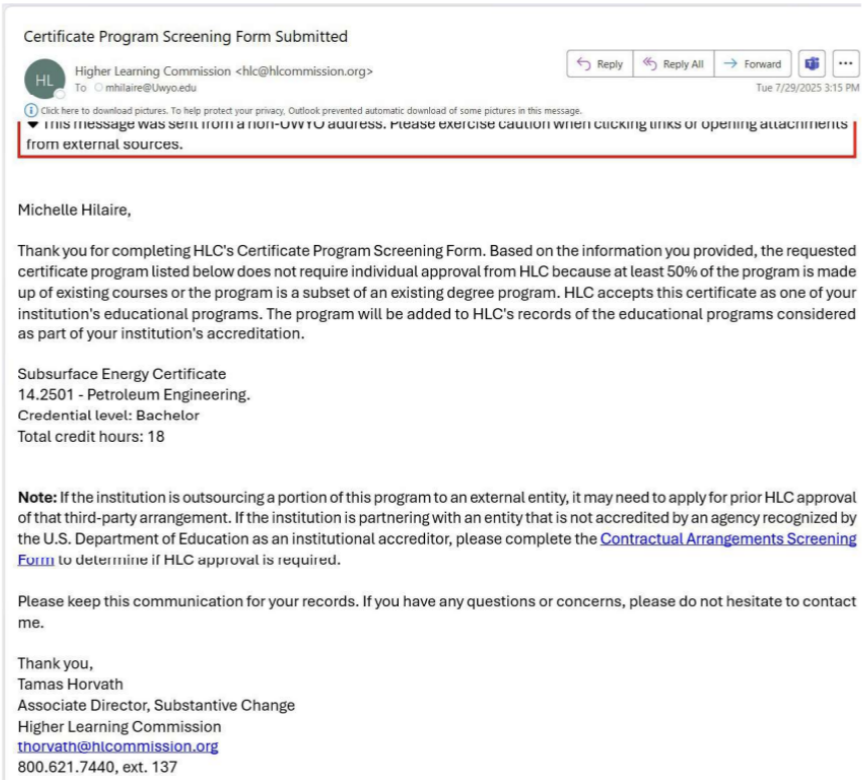
Degree Program Evaluation

Program evaluation is the process of systematically collecting, analyzing, and using data to review the effectiveness and efficiency of an academic program offering. These are used to: identify methods of improving the quality of higher education; provide feedback to students, faculty, and administrators; and ensure that programs, policies, curriculum, departments, and/or institutions are functioning as intended and producing desirable outcomes. Admissions and SER will collect detailed demographic and academic data on each student who declares this undergraduate certificate. Analyzing these data will allow SER/CEPS to better understand the specific student populations drawn to the degree. This knowledge will inform potential curricular changes to the degree, assist in the projection of degree enrollment, and may also identify larger pockets of recruitment and targeted territory for this undergraduate certificate.

The School of Energy Resources will assess student learning outcomes through their assessment process. This will require course data from the courses listed as part of this certificate, as outlined above, and continued collaboration with CEPS. At the conclusion of the certificate, students will complete the first destination survey and gather information on economic benefits from the credential. Additionally, certificate graduates will be required to complete an exit survey to measure students' perception of the certificate. Student reflections will be analyzed to address degree structure, learning outcomes, and the performance of this credential.

Passed 16-0-2

Substantive Change Determination



Certificate Program Screening Form Submitted

Higher Learning Commission <hlc@hlcommission.org>
To mhilaire@Uwyo.edu

Reply | Reply All | Forward | Tue 7/29/2025 3:15 PM

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

This message was sent from a non-UWYO address. Please exercise caution when clicking links or opening attachments from external sources.

Michelle Hilaire,

Thank you for completing HLC's Certificate Program Screening Form. Based on the information you provided, the requested certificate program listed below does not require individual approval from HLC because at least 50% of the program is made up of existing courses or the program is a subset of an existing degree program. HLC accepts this certificate as one of your institution's educational programs. The program will be added to HLC's records of the educational programs considered as part of your institution's accreditation.

Subsurface Energy Certificate
14.2501 - Petroleum Engineering.
Credential level: Bachelor
Total credit hours: 18

Note: If the institution is outsourcing a portion of this program to an external entity, it may need to apply for prior HLC approval of that third-party arrangement. If the institution is partnering with an entity that is not accredited by an agency recognized by the U.S. Department of Education as an institutional accreditor, please complete the Contractual Arrangements Screening Form to determine if HLC approval is required.

Please keep this communication for your records. If you have any questions or concerns, please do not hesitate to contact me.

Thank you,
Tamas Horvath
Associate Director, Substantive Change
Higher Learning Commission
thorvath@hlcommission.org
800.621.7440, ext. 137

New Resources Required

- *Faculty and instructional staffing* – SER and CEPS anticipate this certificate could be well supported without the addition of any faculty. This certificate is built on courses that already exist and are offered at UW, with the exception that we will create seven new courses at the 4000 level that are already being offered at the 5000 level. Because these will be in the same place, at the same time, with the same instructor, no new resources are required. There will be incremental costs for advising and marketing, which are expected to be $12,000 or less and covered by existing SER funds. Initial funds to support the cost will come from one-time state funding to SER.

Passed 16-0-2

- *Program administration and staff support* - Administration and curriculum development for the certificate is the responsibility of SER and CEPS.
- *Technology* - Because this is built on existing course work, no further technology is needed outside of new catalog entries and a certificate website, both of which SER will oversee.
- *Library and digital resources* - No new resources needed beyond website additions to describe the certificate program to prospective students.
- *Marketing* - This certificate would be marketed by SER and new brochures and pamphlets would be budgeted for at around $1,000. SER and CEPS will jointly market this certificate through established platforms and methods. SER will work with Institutional Marketing to create an SEO website.
- *Support* - No other support is needed outside of a website, catalog entry, and marketing materials- all of which is funded by SER.

Executive Summary of Demand Statistics

The proposed Subsurface Energy Certificate Program aligns with emerging workforce needs and addresses critical gaps in current academic offerings across the nation. It is designed to provide flexible, high-value training for students and professionals interested in subsurface resource development, energy systems, and geoscientific applications.

The national landscape shows very limited availability of undergraduate certificates in petroleum or subsurface-related fields. Only two undergraduate certificate programs in petroleum engineering exist in the U.S. offered by Texas A&M (Data Analytics for Petroleum Industry and Petroleum Ventures) and the University of North Dakota, with the latter producing just one graduate per year. The Subsurface Energy Certificate would therefore offer a unique and differentiated credential, especially if positioned with a focus on data analytics, digital innovation, and workforce-ready applications in energy and environmental sectors.

Demand Growth for Certificates

Over the past decade (2013–2023), student demand for certificates, especially online certificates, has surged, with the undergraduate certificate completions growing 314%, post-baccalaureate certificate completions growing 259% and master's certificate completions growing 268%. This trend underscores a strong national shift toward short-term, skills-focused credentials that support workforce entry, transition, or upskilling, which are the value proposition of this certificate.

National Job Alignment

The program aligns well with national workforce needs, including annual job openings of 663 in Petroleum Engineering and entry-level wages from $77,900, rising to $103,000+ at the median. Statistics suggest that while petroleum engineering programs are experiencing a national decline in enrollment (44.5% decrease from 2013 to 2023), there is growing interest in interdisciplinary energy systems that incorporate digital tools and sustainability themes, which are the key components of this proposed certificate. The certificate is also likely to be attractive to existing and prospective Petroleum Engineering students to demonstrate subsurface mastery above the current core program. Industry favors Petroleum Engineering graduates with a sound subsurface background.

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Program Delivery Mode

Research shows that offering programs online or in a hybrid format could significantly enhance enrollment by attracting transfer students from regional community colleges and working professionals and recent graduates interested in flexible upskilling. A number of courses included in the proposed Subsurface Energy Certificate are already being offered in an online format, providing a solid foundation for flexible program delivery. Additionally, the Department of Petroleum Engineering, which contributes a significant portion of the required and elective courses for this certificate, is actively working toward the launch of a fully online B.S. degree in Petroleum Engineering in the near future. As part of this strategic initiative, the department is in the process of recording and preparing all core petroleum engineering courses for online delivery. This forward-looking effort not only supports the scalability of the certificate program but also ensures that students, whether on campus or remote, can access high-quality, asynchronous instruction aligned with workforce needs and modern educational modalities.

Passed 16-0-2

Title IV (Federal Student Aid) Program Eligibility Determination Form

Passed 16-0-2

UNIVERSITY OF WYOMING

Title IV (Federal Student Aid) Program Eligibility Determination
(For programs that seek to be eligible for Title IV financial aid awards to students)

Certain non-degree seeking programs are eligible for Title IV financial aid. In order for these programs to gain and maintain Title IV financial aid eligibility, federal regulations must be followed to report information about the program to the Department of Education.

Answers to the following questions will determine if the program is considered eligible (circle one) –

1. Yes Does the coursework lead to a certificate awarded by the institution?
   a. If YES, continue below to question 2.
   b. If NO, stop. This program is not considered to be Title IV eligible.

2. No Is the program an embedded certificate in which ALL certificate recipients are enrolled in a degree program and students are awarded the certificate for completing hours as part of and not exceeding those required for the degree plan? (Example: A student needs 120 hours to graduate with the degree. The student takes 120 hours and within those hours chooses required electives that satisfy the certificate requirements. After completing 120 hours the student is awarded the degree and certificate. No additional hours are needed for the certificate.)
   a. If YES, stop. This is not a stand-alone program. Title IV aid would be offered based on the degree program as long as the degree program is Title IV eligible (most degree programs at UW are Title IV eligible).
   b. If NO, continue to question 3. Certificate is considered a stand-alone program in which hours required for the certificate are in excess of those required for the degree plan. This program must be approved in order for students to be eligible for Title IV financial aid. (Example: A student needs 120 hours to graduate with the degree. In order to earn a certificate, the student must take an additional 6 hours, bringing the total hours taken to 126. Since the student is taking hours in excess of those required for the degree, the certificate is stand-alone.)

3. No Do any of the recognized occupations for which this certificate prepares students require a state or federal certification or licensure?
   a. IF YES, continue to question 4
   b. IF NO, please complete the remainder of the Program Worksheet (excluding question 4 below). This program COULD be considered for Title IV financial aid eligibility.

4. Please choose Have you updated your website to include the required disclosures as described in 34 CFR 668.43? Generally, institutions must provide a list of all States for which the institution has determined that: its curriculum meets; curriculum does not meet; and has not made a determination that curriculum meets the State educational requirements for licensure or certification.
   a. IF YES, please complete the remainder of the Program worksheet. This program COULD be considered for Title IV financial aid eligibility.
   b. If NO, stop here and contact the University Compliance & Review Specialist to discuss what information is needed and where it must be posted. Return to this worksheet once you have completed the necessary steps.

Passed 16-0-2

Program Worksheet

Please answer the following questions about the program. The information ensures the University of Wyoming remains compliant with federal regulations to ensure that this program and other degree programs remain eligible for Title IV financial aid.

Title of the program	Subsurface Energy Certificate
Total tuition and required fees for the entire program, assuming normal time to completion	In-State 15 credits, $2,700 in tuition and $448.6 in fees: $3148.60
Total estimated costs of books and supplies for the entire program	$275
If the student will be required to live on campus, total costs to the student for on-campus room and board for the entire program, assuming normal time to completion	n/a
Total fees or expenses that students will have in addition to those already entered for tuition and required fees, books and supplies, and room and board (for example: optional equipment, parking permits, etc.)	n/a
Normal time to complete the program that will be published in the catalog and other publications. Enter the amount as weeks of instruction and include only whole numbers. This information is required by the Department of Education.	16-64, depending on full-time status or not
List the website that contains information on the program.	An SEO page will be made with IM if the BOT approve the feasibility study.
List name, email, and phone number for the point of contact to make updates to the website listed above.	for now, Kami Danaei 307-766-6879 kdanaei@uwyo.edu
List name, email, and phone number for the point of contact to update print material and advertisements for this program.	for now, Kami Danaei 307-766-6879 kdanaei@uwyo.edu

1. No If applicable, has this program been programmatically approved by federal/state accrediting agencies as required for graduates to be eligible for employment? (i.e., Dental certificates are accredited by the Commission on Dental Accreditation)
   a. If YES, please attach accreditation documentation to this form.
   b. If NO, please explain.

No, this certificate requires no additional approvals beyond HLC.

2. Term or Module Is the program term based, or module based? (circle one)

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a. No If module, is there more than a 2 week break between modules? (select one)

Certification Statement
By signing below, I certify that the information reported here is complete and accurate. I understand that information provided on this form will be reviewed to determine the program's Title IV eligibility for financial aid and additional documentation may be requested.

Signature of Dept. Head _____ Date _____

Please attach the following documentation with this completed worksheet.

1. A copy of the Feasibility Study Template
2. A copy of the program of study.
3. A copy of the program certificate approval by the Faculty Senate and Provost's Office.
4. A copy of the certificate approval documentation for the program (if applicable).
5. If applicable, a copy of any required programmatic accreditation in order for graduates of program to be eligible for occupation.
6. If applicable, a copy of any federal or state licensure or certification requirements for occupations for which this program prepares students.
7. Send completed/signed form to the Director of Scholarships & Financial Aid.

Last updated 1/4/2022

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Letters of Support

- DEPE/CEPS/GIST
- Industry

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BEACON
OFFSHORE ENERGY

August 12, 2025

University of Wyoming – Board of Trustees
1000 E. University Ave - Room 206
Laramie, WY 82071
Dept. 3434

Subject: Subsurface Energy New Certificates

On behalf of the Industry Advisory Board (IAB) of the Department of Energy and Petroleum Engineering (DEPE), I am writing to express our strong support of the School of Energy Resources and the College of Engineering and Physical Sciences for their proposed Undergraduate certificate in Subsurface Energy.

As an advisory body representing diverse sectors of the subsurface energy industry, we recognize the pressing need for a workforce that is well-prepared to address the evolving challenges and opportunities in subsurface energy and storage. The proposed certificate program's structure, anchored in foundational petroleum engineering courses and complemented by multidisciplinary electives aligns closely with the skill sets and knowledge areas demanded by today's energy employers.

We are particularly encouraged by the program's alignment with emerging industry priorities and needs, including carbon capture and storage, geothermal energy development, and advanced data analytics for subsurface operations. These areas are not only vital for the long-term sustainability of the energy sector but also represent high-growth career pathways for students. We also find value in the certificate for conventional Petroleum Engineering graduates. A sound, practicing Petroleum Engineer with a demonstrable knowledge of subsurface geology and economics would be a benefit to our conventional graduates as well.

In closing, we believe the Subsurface Energy Certificate will strengthen the talent pipeline for the energy industry and support innovation and economic development in Wyoming and beyond, by fostering cross-disciplinary skills essential for solving complex energy challenges.

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BEACONOFFSHORE.COM

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The DEPE-IAB stands ready to support this initiative through ongoing engagement, including curriculum feedback, industry guest lectures and student mentorship.

Please do not hesitate to reach out if you need any further information or have any questions.

Joseph Leimkuhler
Chief Operating Officer
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