UW Board of Trustees Committee on Academic and Student Affairs
Agenda-FINAL 11.07.2024

Closed Session: If necessary, a separate agenda and materials for the Closed Session.

COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Notice of Intent: Bachelor of Science in Applied Computing**
Ahern/Allen

☒ PUBLIC SESSION
☐ EXECUTIVE SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
- ☐ Yes
- ☒ No

FOR FULL BOARD CONSIDERATION:
- ☒ Yes
  [Note: If yes, materials will also be included in the full UW Board of Trustee report.]
- ☐ No

☒ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY:
The School of Computing is proposing a new Bachelor of Science in Applied Computing. This program will equip students with the necessary knowledge and skills to apply computing to disciplines across the sciences, social sciences, arts, and humanities by combining critical domain expertise with the power of computing.

WHY THIS ITEM IS BEFORE THE COMMITTEE:
A Notice of Intent to the Board will allow the program proposers to complete the review process internally with the shared-governance bodies (Faculty Senate, ASUW, and Staff Senate), and Academic Forum (Deans and Directors). Academic Affairs and the School of Graduate Education support the degree proposal. The Request for Authorization will be submitted for the Board's consideration and approval later in the Spring of 2025.

ACTION REQUIRED AT THIS COMMITTEE MEETING:
Approval of the Notice of Intent for the Bachelor of Science in Applied Computing.

PROPOSED MOTION:
I move to approve the Notice of Intent for the Bachelor of Science in Applied Computing

Notice of Intent: **BS in Applied Computing**, **School of Computing**

1. Program: Bachelor of Science in Applied Computing offered in-person in the School of Computing.

2. Description: The proposed B.S. in Applied Computing empowers students from a diverse range of academic backgrounds and interests to combine critical domain expertise with the power of computing. It is designed to equip students with the necessary knowledge and skills to apply computing to disciplines across the sciences, social sciences, arts, and humanities. Students will ultimately be prepared to innovate and solve real world challenges with the best technology, enhancing their lives as well as the communities around them.

Curriculum Outline: Includes foundational computational methods coupled with interdisciplinary courses focused on the applied use of computational tools for discipline specific problems.

The anticipated credit breakdown (total = 120 credits): (BS Applied Computing_8semester.pdf)

- Applied Computing Core requirement (23 credits): breadth and depth of computing applications, ethics and society; programming; quantitative thinking; computing practice;
- Experiential Learning requirement (6 credits): undergraduate research; internship; ind. study; practicum
- Applied Computing Elective requirement (18 credits): data visualization and storytelling; data analysis and modeling; software applications; tools and methods; automation, and efficiency; communication and collaboration; and creative and innovative problem-solving;
- Discipline Concentration requirement (30 credits): foundational and elective courses from within any single major on campus.
- Unrestricted Electives (13 credits): can add to discipline concentration, or meet prerequisite requirements, if necessary, for Applied Computing Electives.
- University Studies Program (30 credits)

Learning Outcomes:

1. Design, implement, and evaluate interdisciplinary computing solutions to successfully analyze and address complex real-world problems.
2. Apply computer science practice and domain fundamentals to produce effective solutions across disciplines.
3. Communicate effectively and responsibly across a variety of disciplines and professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in applied computing activities appropriate to interdisciplinary contexts.

3. Relevance of Academic Program: This program will give structure to the wide array of computational courses on campus by requiring the integration of core and elective computing classes with applied or interdisciplinary courses, and discipline focused courses. This curricular structure is similar to several successful existing degree programs (e.g. B.S. in GIST, B.S. in ENR, and B.S. in ESS, B.S. in LM). A table of the different computing programs available (or in development) at UW and how they differ can be found at this link: BS in Applied Computing_Related Program Matrix_08-24.pdf

4. Market Analysis: The Office of Online & Continuing Education has generated a market analysis from Gray Decision Intelligence data. Currently, there is no CIP code that matches Applied Computing. The report provides initial information on program demand, projected enrollment, equality evaluation, and graduate employability based on several related existing CIP codes. A few items from the market analysis indicate there is demand both regionally and nationally (~12% increase in demand over a 3-year average (2020-2022)). A bachelor's program with a focus on applied computing will provide increased opportunity to incorporate computational thinking and digital fluency into many disciplines, opening new pathways to diverse careers for students. We will make a concerted effort to provide data focused on enhancing Wyoming's desire to diversify its economy and keep alumni in Wyoming and driving innovation. Refinement of the number of CIP codes used in the initial analysis may be needed to get a more nuanced idea of the market demand for this type of program.

5. Preliminary Budget: Minimal additional resources are needed to initiate this program, assuming that current needs for faculty are met through recent and planned joint hires with the School of Computing. This program will benefit from additional faculty hires in computing across the university, especially those who can provide computing application courses and computing research opportunities in humanities, social sciences, and the arts. Sustainability and growth costs will need to be determined during program review periods. Self-sustaining funding will be pursued. Strategic funding for other School of Computing initiatives that further support this program are being addressed in different venues.

Use of current resources:

- SoC Faculty and instructional staffing, including SoC new hires currently teaching COMP minor courses; encourage other departments to offer more computing-based options within their curriculum,
- Program administration and staff support (SoC leadership are committed to this program and the use of internal resources to help support its development as well as providing academic program coordination, administrative support, marketing coordination, and office associate staffing),
- Technology resources (use of current teaching spaces and available technology will be adequate to get the program established). In particular the computing resources of the NCAR Wyoming Supercomputing Center and the Advanced Research Computing Center will provide education allocations to support computing classes and training.

Need for new resources: Added resources are not initially needed, but program growth may require additional coordination not covered by current resource load. Projected program revenue will be used to support these costs. Total projected additional revenues due to added course requirements for this degree, assuming a minimum of 10 students per year is calculated below:

Increased tuition generation per year (based on AY24-25 rates):

- Per resident student in program at $5,190 per year (block tuition)
- Per non-resident students in program at $21,600 (block tuition)
- Estimate: 5 resident students and 5 non-resident each year = **$133,950**

6. Timeline:

- Fall 2024: Notice of Intent and Feasibility Study with Budget submitted for consideration. Campus Reviews. Request for Authorization and Letter of Commitment from Provost submitted for Board of Trustees approval.

- Spring 2025: Program updates in the UW MCC Catalog. CAP submissions for new courses submitted through UW MCC system. Admissions and website inclusion and updates.
- Spring 2025-Summer 2025: Ability of students to apply for admission into program.
- Fall 2025 – Fall 2028: Student cohort #1, #2, #3, #4 start program.
- Fall 2027: Graduation of some Cohort #1 students. Program completion data collection to begin.
- Spring 2028: Graduation of Cohort #1 and #2 students. Continuation of collecting program completion data. Start collection of employer survey data.

7. Approval: The curriculum will be informed and evaluated by an interdisciplinary curricula committee and will adopt best practices for computing curricula as outlined in the report "CC2020 Paradigms for Global Computing Education" by the international recognized Association for Computing Machinery (specifically utilizing the concepts of Computing + X, and X + Computing).

8. Alignment: *UW Mission (As Wyoming's university, we unlock the extraordinary in every person through education, research, innovation, engagement, and service.):*

- The proposed B.S. in Applied Computing empowers students from a diverse range of academic backgrounds and interests to combine critical domain expertise with the power of computers. Students will ultimately be prepared to innovate and solve real world challenges enhancing their lives as well as the communities around them.

UW Strategic Plan (https://www.uwyo.edu/strategic-plan/_files/docs/uw-strategic-plan-2023.pdf):

- *Values 4, 6, 7; Goal 1, 4: Solving the world's challenges requires effective teams with diverse expertise empowered by the best technology has to offer. The B.S. in Applied Computing will train students to contribute to and lead these groundbreaking interdisciplinary efforts* ultimately supporting UW's efforts to accelerate its role as an engine of economic development.
- *Values 1, 3, 4; Goal 1, 5: This degree emphasizes "learning by doing" both in the classroom and beyond the campus and is designed to be accessible to much more of the campus community than is currently served by existing computation related degree programs.*
- *Values 1, 2, 4, 5, 6, 7; Goal 1, 2, 4, 5: Through their training, students will be able to assist in impactful computationally driven transdisciplinary research while on campus and, upon graduation, will be competitive to lead these projects as graduate researchers, in the private sector or in government*
- *Values 2, 6, 7; Goals 1, 2, 4, 5: This pipeline of well trained and in demand students will encourage business and research collaborations with the School of Computing and its partners.*

9. Rationale: The demand for professionals who can apply computing skills to solve real-world problems is high and growing. This demand is driven by the increasing digitization of all types of operations and the need to understand, analyze, present, and utilize large amounts of data. Businesses that have employees with strong applied computing skills can create new content and experiences, develop innovative solutions, and make data-driven decisions, as well as consider the societal and ethical implications of their computing-related products and actions. Because computing is integral to almost every field, graduates of this degree will have valuable, transferable skills. They will be able to adapt to different roles and industries along their career pathways. Job opportunities for individuals with applied computing skills are abundant and diverse, providing a promising career path for those entering the field.

BS in Applied Computing

PROGRAM SHEET

Major Description: The B.S. in Applied Computing degree empowers students from a diverse range of academic backgrounds and interests to combine critical domain expertise with the power of computation and technology. It is designed to equip students with the necessary knowledge and skills to apply computing to disciplines across the sciences, social sciences, arts, and humanities. Students will ultimately be prepared to innovate and solve real world challenges with the application of computational thinking and technology, enhancing their lives as well as the communities around them.

Students must complete 120 Credit Hours as follows.

- Applied Computing Core Courses (23 Credit Hours)
  1. COMP 2000 Computing and Society: 2 Credit Hours
  2. COMP 2500 Foundations of Programming: 3 Credit Hours
  3. COMP 2750 Probability and Practice 1: 3 Credit Hours
  4. COMP 3000 Basic Computing: 3 Credit Hours
  5. COMP 3500 Advanced Computing: 3 Credit Hours
  6. COPM 3750 Probability and Practice 2: 3 Credit Hours
  7. COMP 3725 Storytelling with Data: 3 Credit Hours
  8. COMP 4051 Computing Seminar: 3 Credit Hours

- Experiential Learning (6 Credit Hours) – Students must participate in one or more of the following: Undergraduate Research Experience, Service Learning, Internship, Capstone Project, Practicum I.
- Computing Electives (18 Credit Hours) – Students must take 15 credits of computing-related electives from any discipline.
- Discipline Concentration (30 Credit Hours) – Students choose an application area (following another degree plan / any major).
  Unrestricted Electives (13 Credit Hours) – which could be additional hours in the Discipline Concentration and or prerequisites for Applied Computing Electives (if necessary).
  USP University Studies Program: (30 Credit Hours).

Example Schedule

Course Code	Course Name	Term Taken	Credits
COMP 2000	Computing and Society	Fall Year 1	2
	Discipline concentration course 1	Fall Year 1	3
	Applied Computing elective 1	Fall Year 1	3
	USP 1	Fall Year 1	3
	USP 2	Fall Year 1	3
	First year experience (Saddle Up)	Fall Year 1	1
COMP 2500	Foundations of Programming	Spring Year 1	3
	Discipline concentration course 2	Spring Year 1	3
	Applied Computing elective 2	Spring Year 1	3
	USP 3	Spring Year 1	3
	USP 4	Spring Year 1	3
COMP 2750	Probability and Practice 1	Fall Year 2	3
	Discipline concentration course 3	Fall Year 2	3
	Applied Computing elective 3	Fall Year 2	3
	USP 5	Fall Year 2	3
	USP 6	Fall Year 2	3
COMP 3000	Basic Computing	Spring Year 2	3
	Applied Computing elective 4	Spring Year 2	3
	Discipline concentration course 4	Spring Year 2	3
	USP 7	Spring Year 2	3
	USP 8	Spring Year 2	3
COMP 3500	Advance Computing	Fall Year 3	3
COMP 3725	Storytelling with Data	Fall Year 3	3
	Discipline concentration course 5	Fall Year 3	3
	Applied Computing elective 5	Fall Year 3	3
	USP 9	Fall Year 3	3
COMP 3750	Probability and Practice 2	Spring Year 3	3
	Unrestricted elective	Spring Year 3	3
	Discipline concentration course 6	Spring Year 3	3
	Discipline concentration course 7	Spring Year 3	3
	USP 10	Spring Year 3	3
COMP 4000 / 4780 / 4950	Experiential Learning (Internship, Undergraduate Research, Practicum I)	Fall Year 4	6
	Discipline concentration course 8	Fall Year 4	3
	Applied Computing elective 6	Fall Year 4	3
	Unrestricted elective	Fall Year 4	3
COMP 4051	Computing Seminar	Spring Year 3	3
	Discipline concentration course 9	Spring Year 4	3
	Discipline concentration course 10	Spring Year 4	3
	Unrestricted elective	Spring Year 4	3
	Unrestricted elective	Spring Year 4	3

BS in Applied Computing

Related Degree Matrix

The following table describes the different computing programs available (or in development) at UW and how they differ.

Proposed or in Development	**Content**	**Careers**
This NOI: Applied Computing (BS); builds on Minor in Computing approved Spring 2023)	Practical problem solving with computing and use of digital strategies coupled with a disciplinary focus.	Broad range of career options; graduates will be able to fill the increasing demand for interdisciplinary talent in both industry and academia, where computing plays a major role.
In development: Data Science (BS)	Problem solving through using and preparing data for analysis, coupled with a disciplinary focus.	Data analysts, business analysts, machine learning engineers.
Existing Degree	**Content**	**Careers**
Applied Software Development (BS)	Practical software development skills. Learning how software is designed, built, and maintained.	Write, change, and debug software with a focus on end-customers and front end (web development, mobile computing).
Computer Science (BS/Minor)	Apply computer science theory and software development fundamentals to produce computing-based solutions.	Tech firms devising new ways to use computers and solve computing problems. Includes design and implementation of back end and comprehensive systems.
Computer Engineering (BS/Minor)	Analysis, design and implementation of computer system hardware and software, exploration and understanding of Internet of Things and devices.	Tech companies dealing with design, installation and support of computer hardware and computer-driven technologies
Computing (Minor)	Broad and practical understanding of computing and digital skills balanced with a focus on the liberal arts.	Broad range of career options; graduates will be attractive to any employer who wants both computational and other disciplinary skills.
Geospatial Information Science & Technology (BS)	The nature of geospatial information and the application of geospatial technologies that support the acquisition, management, analysis, and visualization of geo-referenced data.	Environmental management, public health, civil engineering, urban planning, economic analysis, marketing.
Interdisciplinary Computational Science (Minor)	Use computing and numerical modeling to solve complex science and engineering problems.	Broad range of career options; graduates will be attractive to any employer who wants both computational and other disciplinary skills.
Statistics (BS/Minor)	Develop or apply mathematical or statistical theory and methods to collect, organize, interpret, and summarize numerical data to provide usable information..	Demographer, statistician, research analyst, with specialize in fields such as, mathematics, biostatistics, agricultural statistics, business statistics, or economic statistics.

COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Notice of Intent: Bachelor of Science in Data Science** Ahern/Allen

☒ PUBLIC SESSION
☐ EXECUTIVE SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
- ☐ Yes
- ☒ No

FOR FULL BOARD CONSIDERATION:
- ☒ Yes
  [Note: If yes, materials will also be included in the full UW Board of Trustee report.]
- ☐ No

☒ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY:
The School of Computing is proposing a new Bachelor of Science in Data Science. This interdisciplinary program will equip students with the ability to extract meaningful insights from modern data. The program will enable students to solve problems across fields by considering the full data "life cycle." Furthermore, it will integrate coursework with experiential learning opportunities in which students tackle real-world data projects in partnership with employers across a diversity of sectors, including private industry, government, academia, and non-profits.

WHY THIS ITEM IS BEFORE THE COMMITTEE:
A Notice of Intent to the Board will allow the program proposers to complete the review process internally with the shared-governance bodies (Faculty Senate, ASUW, and Staff Senate), and Academic Forum (Deans and Directors). Academic Affairs and the School of Graduate Education support the degree proposal. The Request for Authorization will be submitted for the Board's consideration and approval later in the Spring of 2025.

ACTION REQUIRED AT THIS COMMITTEE MEETING:
Approval of the Notice of Intent for the Bachelor of Science in Data Science.

PROPOSED MOTION:
I move to approve the Notice of Intent for the Bachelor of Science in Data Science.

Notice of Intent: B.S. in Data Science
School of Computing, University of Wyoming

Name: Bachelor of Science in Data Science, offered in-person in the School of Computing (SoC).

Description: The proposed B.S. degree in Data Science is an interdisciplinary program designed to equip students with the ability to extract meaningful insights from modern data. It emphasizes the development of strong analytical and computational skills coupled with applied investigations of data arising in diverse fields (e.g., biology, environmental science, business, health science, and many more). The program enables students to solve problems across fields by considering the full data "life cycle" (e.g., data acquisition and study design, data wrangling and management, databases, statistical and machine learning, and data ethics), and to present data-informed solutions, visualizations, and reports to future employers. It also integrates coursework with experiential learning opportunities in which students tackle real-world data projects in partnership with Wyoming and national employers across a diversity of sectors including private industry, government, academia, and non-profits.

Outline of Anticipated Curriculum: (120 total credit hours) A detailed curriculum and an example schedule can be found in the Program Sheet. We summarize core aspects below.

- Data Science Foundation Courses (54) Students will take courses in eight data-science areas: Mathematical & Statistical Foundations (15 credit hours), Computational Foundations (15), Technical Writing (3), Data Ethics and Governance (3), Machine Learning and AI (6), Data Wrangling and Visualization (3), Databases (6), and Study Design (3).
- Concentration Electives (9) Students take approved data-oriented courses from a discipline concentration including (but not limited to) Biology, Social Science, Environmental Science, Geographic Information Science, Business/Finance, Community & Public Health, Engineering, Physics, Statistics, and Scientific Computing.
- Interdisciplinary Data Electives (6) Students take two interdisciplinary data courses from disciplines outside their concentration (excludes theory and computation courses).
- Experiential Learning (12) Students participate in one or more of the following: Industry Internship, Service Learning, Undergraduate Research Experience, or Capstone Project.
- Remaining credits include Unrestricted Electives (9) and the University Studies Program (30).

Learning Outcomes:

- Foundational Knowledge: Acquire foundational knowledge in core areas of data science including statistics, math, computer science, and data-driven inquiry.
- Computational Thinking: Develop computational thinking skills that are essential for handling data-intensive problems across various fields.
- Data Management and Analysis: Develop skills in managing and analyzing a diverse array of modern datasets and the ability to translate data analysis into actionable insights.
- Interdisciplinary Collaboration: Work effectively in interdisciplinary teams, integrating domain-specific knowledge and data-science skills.
- Study Design: Ability to plan how data will be gathered, trading off the cost of data acquisition with the analysis and modeling opportunities afforded by it.
- Ethical Reasoning: Understanding of ethical issues related to data privacy, security, and usage, ensuring responsible handling, analysis, and interpretation of data.

Relevance: From agriculture and environmental management to tourism and health science, nearly all areas of the economy are being transformed by integrating large-scale data with computational resources and analytical techniques to extract meaningful and actionable insights. Due to the ubiquity of data-driven inquiry and management, data-scientist positions are among the fastest-growing jobs, with a 35% projected growth from 2022 to 2032 (U.S. Bureau of Labor Statistics). To meet this changing workforce demand, the proposed B.S. in Data Science will leverage the cross-disciplinary expertise in data science of UW Faculty (and the many data-oriented courses across disciplines) to provide a strong, well-rounded curriculum that

brings together analytical/computational foundations, training on core data-science topics, and hands-on experience through both interdisciplinary applications and experiential learning. The program complements disciplinary degree programs that focus on a particular area (e.g., computation or statistics) but do not span the full range of data-science concepts (e.g., from data wrangling and machine learning to ethics and decision making). Further course comparisons can be found in a Degree Comparison Spreadsheet.

Market Analysis: The job market for data science professionals is robust, with promising career prospects and competitive salaries. In 2022-2023, the U.S. Bureau of Labor Statistics reported that there were approximately 168,900 data scientists employed. The median salary for entry-level data scientists with a bachelor's degree in the U.S is approximately $108,020 per year (and $130,370 for those working in Wyoming). The Institute of Data and Indeed reveal thousands of open data-scientist positions fueled by a demand to bring data and computation-driven insights and methods to diverse economic industries. The B.S. in Data Science degree will prepare students to meet this demand by equipping them with the necessary skills and knowledge to succeed in various data-centric roles.

A Market Analysis was performed by the Office of Online & Continuing Education using the Gray Decision Intelligence database. A few key findings are below:

- Programs in (i) Data Science, (ii) Data Analytics or (iii) Data Visualization already exist in nearby states (CO, ID, NE, MT, UT, and SD) but not yet in Wyoming or North Dakota.
- In-person bachelor completions in these fields over a three-year span 2020-2022 nationally increased by 55.329% (and regionally by 92.592%).
- There is a strong regional demand for online degrees and M.S. degrees in data science (which we plan to develop following the successful launch of this B.S. degree).
- Enrollment and graduation rates are difficult to measure (or are unknown) for many programs due to the newness of the field (e.g., the classifications (i)--(iii) were just created in 2020).

Preliminary Budget: Minimal additional resources are needed to initiate this program. Sustainability and growth costs will need to be determined during program review periods. Self-sustaining funding will be pursued. Strategic funding for other School of Computing initiatives that further support this program are being addressed in different venues. This includes a proposal to the NSF Data Science Corps program to help fund experiential learning activities and engage with Wyoming employers.

Use of current resources:

- Faculty and Courses: The program relies on existing UW courses that span core data-science topics and are dispersed across different disciplines. Interdisciplinary data electives will be coordinated with many departments, who will be encouraged to offer additional data-driven sections and courses.
- Program Administration and Staff Support: SoC leadership are committed to this program and the use of internal resources to help support its development as well as providing academic program coordination, administrative support, marketing coordination, and office associate staffing.
- Technology Resources: Current teaching spaces and available technology are adequate to get the program established. In particular, the computing resources of the NWSC and ARCC will provide education allocations to support computing classes and training. The UW SOAR Program will be utilized to track experiential learning and incorporate micro-credentials into the curricula.
- Industry Partnership: The SoC has established partnerships with many Wyoming employers and is working with Nevin Aiken (UW Director for Experiential Learning) to consolidate these connections.
- UW Centers: The Wyoming Data Science Center and UW Data Hub will support the degree program by providing a central repository for information on Wyoming-centric data, educational materials, and experiential-learning opportunities. Some of these resources will emanate from the Science Initiative Centers (e.g., WyldTech), and new data will be disseminated and integrated into data-science elective courses.

Need for new resources: Nearly all resources are already available, but we highlight *databases* as a key area requiring additional courses and faculty resources. Additional hires are expected to be needed after program growth to cover increased enrollment in introductory computer science and statistics courses. Offering larger sections is an option, but it may require larger technology-equipped rooms or (ideally) a broader laptop-rental program. Additional hires in SoC (including those with expertise in humanities, social sciences, and the arts) can support and open new concentrations areas; however, the program needs additional faculty hires in computing across the university to ensure that the concentration areas are robustly supported and do not hinge on just a single faculty.

Projected program revenue will be used to support these costs. Total projected additional revenues due to added course requirements for this degree, assuming a minimum of 10 students per year is calculated below:

- Per resident student in program at $5,190 per year (block tuition)
- Per non-resident students in program at $21,600 (block tuition)
- Estimate: 5 resident students and 5 non-resident each year = **$133,950**

Timeline:

- Fall 2024: NOI and Feasibility Study. Campus Reviews. Request for Authorization and Letter of Commitment from Provost submitted for Board of Trustees approval.
- Spring 2025: Program updates in the UW MCC Catalog. Admissions and website inclusion.
- Spring 2025-Summer 2025: Ability of students to apply for admission into program.
- Fall 2025 – Fall 2028: Student cohort #1, #2, #3 and #4 start program.
- Spring 2029: Graduation of Cohort #1. Begin collection of program completion data. Begin collection of employer survey data.

Information on Other Required Approvals: No accreditation exists or is needed. The curriculum will be informed and evaluated by a cross-disciplinary committee with feedback from Wyoming employers.

Alignment: The proposed B.S. in Data Science aligns with the University of Wyoming's strategic research, education, and innovation plans by equipping students with knowledge and skills to leverage data and computation resources for collaboration, problem-solving, and better decision-making. This program will support students from different disciplines, enhance their ability to engage with and serve their communities, and enable them to contribute to technological advancements and societal improvements. By preparing graduates to thrive in a data-driven world, the program supports UW's commitment to its mission of unlocking the extraordinary in every person through education, research, innovation, engagement, and service. The program coordinates with related SoC activities including the UW Data Science Center, Data Hub, and new degrees focused on software development, computation, and AI. The proposed B.S. in Data Science is also planned to lead into future masters, minors and certificates in Data Science, and it will coordinate with community colleges including those working on Data Science associates degrees and certificates (e.g., Eastern Wyoming College). These coordinated efforts are designed to broaden participation into computation and data science, helping these fields extend into new domains to strengthen Wyoming’s workforce and economy.

Rationale: Data Science is a rapidly growing field for which there is huge demand but too few degree programs. UW has key faculty, data resources, and computational infrastructure in place to produce more data scientists for the region. Wyoming’s economy has and will continue to benefit from data science across key areas including environmental management, natural resources, agriculture, energy, tourism, and health science. Offering this program will address this rising workforce demand, build on UW strengths, and seize the opportunity. In doing so, UW will enhance its leadership role regionally and beyond, in fostering economic development, innovation, and workforce preparedness, ensuring that graduates are well-equipped to excel in a data-driven world.

BS in Data Science

PROGRAM SHEET

Major Description: The Bachelor of Science in Data Science degree is an interdisciplinary program designed to equip students with the ability to extract meaningful insights from large and complex datasets. It emphasizes the development of strong analytical and computational skills as well as the application of data-science methods to interdisciplinary applications arising in biology, engineering, physics, environmental science, social science, business, health science, and many other domains. The program will enable students to solve real-world problems and make informed decisions across these fields by considering the different steps of the data-science "life cycle": data acquisition and study design, data wrangling and management, statistical and machine learning, decision making, and ethical considerations. It also integrates coursework with experiential learning opportunities in which students gain immersive, hands-on experience by tackling real-world projects in partnership with Wyoming and national employers. Through this curriculum, students will develop the theoretical, analytical, computational, and scientific expertise required to successfully tackle the diverse data-driven challenges of our future.

Students must complete 120 Credit Hours as follows.

- Data Science Foundation Courses (54 Credit Hours)
  1. Mathematical & Statistical Foundations: 15 Credit Hours
  2. Computational Foundations: 15 Credit Hours
  3. Technical Writing: 3 Credit Hours
  4. Data Ethics and Governance: 3 Credit Hours
  5. Machine Learning and AI: 6 Credit Hours
  6. Data Wrangling and Visualization: 3 Credit Hours
  7. Databases: 6 Credit Hours
  8. Study Design: 3 Credit Hours

- Concentration Electives (9 Credit Hours) Students choose a concentration and will take interdisciplinary data courses in one of the following areas: Biology, Social Sciences & Humanities, Engineering & Physics, Business/Finance, Environmental Science, Geographic Information Science, Community & Public Health, Statistics, and Scientific Computation

- Interdisciplinary Data Electives (6 Credit Hours) Students will take interdisciplinary data courses outside their concentration (excludes theory and computation courses).

- Experiential Learning (12 Credit Hours) Students must participate in one or more of the following: Undergraduate Research Experience, Service Learning, Internship, Capstone Project

- Unrestricted Electives (9 Credit Hours)

- USP University Studies Program: (30 Credit Hours)

***Some courses may have prerequisites that students and advisors need to be aware of.

1. Mathematical & Statistical Foundations (required, 15 credits)

Course Code	Course Name	Term Taken	Credits
MATH 2200	Calculus I	Fall Year 1	3
MATH 2205	Calculus II	Spring Year 1	3
MATH 2250	Elementary Linear Algebra	Fall Year 2	3
STAT 2050	Fundamentals of Statistics	Fall Year 2	3
STAT 4015	Regression Analysis	Spring Year 2	3

2. Computational Foundations (required, 15 credits)

COSC 1015	Intro to Programming for Data Science	Fall Year 1	3
COSC 1030	Computer Programming	Spring Year 1	3
COSC 2030	Data Structures	Fall Year 2	3
COSC 3020	Algorithm Design and Analysis	Spring Year 2	4
COMP 2000	Computing and Society	Spring Year 2	3

3. Technical Writing (choose 1 of the following)

ENGL 2005	Writing in Technology and the Sciences	Spring Year 2	3
BOT 4444	Senior Capstone	Spring Year 4	3

4. Data Ethics and Governance (required, 3 credits)

COSC 3050	Ethics for the Computer Professional	Spring Year 3	3

5. Machine Learning and AI (required, 6 credits)

COSC 4550	Introduction to Artificial Intelligence	Fall Year 3	3
COSC 4555	Machine Learning	Spring Year 3	3

6. Data Wrangling and Visualization (choose 1 of the following)

STAT 4005	Data Wrangling	Fall Year 4	3
RNEW 4130	Applied Remote Sensing	Fall Year 4	3
GIST 2200	Spatial Data Visualization	Spring Year 2	4

7. Databases (choose 2 of the following)

COMP 2000?	Applied Database Systems 1	Fall Year 3	3
COMP 3000?	Applied Database Systems 2	Spring Year 3	3
GIST 3050	Spatial Database Design and Management	Fall Year 4	3
COSC 4820	Database Systems	Fall Year 4	3

8. Study Design (choose 1 of the following)

STAT 4025	Design and Analysis of Experiments I (R based)	Spring Year 4	3
STAT 4155	Fundamentals of Sampling (R based)	Spring Year 4	3
STAT 4350	Survey Construction & Analysis (R based)	Spring Year 4	3

Interdisciplinary Data Electives

Course Code	Course Name	Term Taken	Credits
	BIOLOGY		
LIFE 2100	Intro Research and Analysis		
LIFE 2200	Research in Action		
MOLB 4260	Quantitative Microscopy		
PLNT 4520	Plant Breeding		
ZOO 4530	R Introduction for Wildlife Ecology		
BOT 4790	Data Wrangling and Visualization in R (undergrad option planned)		
	SOCIAL SCIENCES		
SOC 2465	Research Methods		
ANTH 3310	Introduction to Anthropology Research Methods		
POLS 3680	Introduction to Empirical Political Analysis		
ANTH 4135	Quantitative Methods in Anthropology		
ANTH 4155	Applied Computing for Archaeologists		
PSYC 4740	Advanced Social Psychology		
ORTM 4901	Human Dimensions of Outdoor Recreation and Tourism Management		
COJO 5070	Quantitative Research Methods		
	ENGINEERING & PHYSICS		
PETE 2060	Computing and Data Mining		
CHEM 2230	Quantitative Analysis		
ME 3160	Thermal/Fluid Science Lab		
PHYS 3640	Modern Electronics and Experimental Techniques		
BE 4820	Biomedical Signal Processing		
	Unrestricted Elective 2		
	BUSINESS, ECONOMICS & FINANCE		
CRMJ 2465	Research Methods		
FIN 4400	Financial Modeling		
IMGT 4500	Data & Business Analytics		
ECON 4115	Time Series Analysis & Forecasting		
ECON 4230	Intermediate Econometric Theory		
ECON 4530	Computational Economics		
MKT 4520	Market Research & Analysis		
DSCI 4240	Computer Applications for Decision Science (DSCI)		
	ENVIRONMENTAL SCIENCE		
GEOL 2120	Quantitative GeoMethods		
GEOG 4000	Terrain Analysis		
ESS 4001	Analysis of Nature's Data		

ATSC 4009	Objective Data Analysis and Machine Learning in the Physical Sciences		
RNEW 4130	Applied Remote Sensing		
REWM 4330	Rangeland Ecosystem Assessment and Monitoring		
ENR 4500	Risk Analysis		
ENR 4525/ GEOL 4525	Environmental Data Analysis		
REWM 4600	Drone-Based Remote Sensing		
	GEOGRAPHICAL INFORMATION SCIENCE		
GIST 2190	Introduction to Programming in Geospatial Information Science and Technology		
GIST 2200	Spatial Data Visualization		
GIST 2310	Intro to Geographic Information Systems		
GIST 3050	Spatial Database Design and Management		
GIST 4130/ PLNT 4130	Applied Remote Sensing		
GIST 4211	Advanced Remote Sensing		
	COMMUNITY & PUBLIC HEALTH		
HLED 3020	Community and Public Health		
SOC 3550	Medical Sociology		
SOWK 4560	Social Work Research		
SOWK 4570	Research Informed Practice		
	STATISTICS		
STAT 4025	Design and Analysis of Experiments I (R based)		
STAT 4115	Time Series		
STAT 4155	Fundamentals of Sampling (R based)		
STAT 4255	Mathematical Theory of Probability		
STAT 4240	Data Mining		
STAT 4265	Introduction to the Theory of Statistics		
STAT 4270	Applied Bayesian Statistics (R based)		
STAT 4300	Applied Multivariate Analysis (R based)		
STAT 4350	Survey Construction & Analysis (R based)		
	SCIENTIFIC COMPUTING		
MATH 3340 /COSC 3340	Introduction to Scientific Computing		
MATH 4340 /COSC 4340	Numerical Methods 1		
COSC 4557	Practical Machine Learning		
COSC 4570	Data Mining		

Example Schedule (Concentration Biology)

Course Code	Course Name	Term Taken	Credits
MATH 2200	Calculus I	Fall Year 1	3
COSC 1015	Intro to Programming for Data Science	Fall Year 1	3
	Unrestricted Elective 1	Fall Year 1	
	USP 1	Fall Year 1	3
	USP 2	Fall Year 1	3
MATH 2205	Calculus II	Spring Year 1	3
COSC 1030	Computer Programming	Spring Year 1	3
ENGL 2005	Writing in Technology and the Sciences	Spring Year 1	3
	USP 3	Spring Year 1	3
	USP 4	Spring Year 1	3
MATH 2250	Elementary Linear Algebra	Fall Year 2	3
STAT 2050	Fundamentals of Statistics	Fall Year 2	3
COSC 2030	Data Structures	Fall Year 2	3
	USP 5	Fall Year 2	3
	USP 6	Fall Year 2	3
STAT 4015	Regression Analysis	Spring Year 2	3
COSC 3020	Algorithm Design and Analysis	Spring Year 2	3
COMP 2000	Computing and Society	Spring Year 2	3
	USP 7	Spring Year 2	3
	USP 8	Spring Year 2	3
COSC 4550	Introduction to Artificial Intelligence	Fall Year 3	3
LIFE 2100	Intro Research and Analysis (concentration elective 1)	Fall Year 3	3
ESS 4001	Analysis of Nature's Data (interdisciplinary elective 1)	Fall Year 3	3
COMP ?	Applied Database Systems 1	Fall Year 3	3
	USP 9	Fall Year 3	3
COSC 4555	Machine Learning	Spring Year 3	3
COSC 3050	Ethics for the Computer Professional	Spring Year 3	3
LIFE 2200	Research in Action (concentration elective 2)	Spring Year 3	3
COMP ?	Applied Database Systems 2	Spring Year 3	3
	USP 10	Spring Year 3	3
	Unrestricted Elective 2	Fall Year 4	3
BOT 4790	Data Wrangling and Visualization in R	Fall Year 4	3
MOLB 4260	Quantitative Microscopy (concentration elective 3)	Fall Year 4	3
COMP ?	Internship (experiential learning)	Fall Year 4	6
STAT 4025	Design and Analysis of Experiments I	Spring Year 4	3
RNEW 4130	Applied Remote Sensing (interdisciplinary elective 2)	Spring Year 4	3
COMP ?	Internship (experiential learning)	Spring Year 4	6
	Unrestricted Elective 3	Spring Year 4	3

BS in Data Science

DEGREE COMPARISON SPREADSHEET

The table below compares related UW programs that are available (or in development).

Proposed or in Development	**Content**	**Careers**
This NOI: Data Science (BS)	Problem solving through using and preparing data for analysis, paired with a disciplinary concentration.	Data scientist/analyst serving any discipline area (e.g., business analysts), scientific machine learning, consulting.
In development: Applied Computing (BS); builds on Minor in Computing approved SP 2023	Practical problem solving with computing and use of digital strategies coupled with a disciplinary focus.	Broad range of career options; graduates will be able to fill the increasing demand for interdisciplinary talent in both industry and academia, where computing plays a major role.
Existing Degree	**Content**	**Careers**
Applied Software Development (BS)	Practical software development skills. Learning how software is designed, built, and maintained.	Write, change, and debug software with a focus on end-customers and front end (web development, mobile computing).
Computer Science (BS/Minor)	Apply computer science theory and software development fundamentals to produce computing-based solutions.	Tech firms devising new ways to use computers and solve computing problems. Includes design and implementation of back end and comprehensive systems.
Computer Engineering (BS/Minor)	Analysis, design and implementation of computer system hardware and software, exploration and understanding of Internet of Things and devices.	Tech companies dealing with design, installation and support of computer hardware and computer-driven technologies
Computing (Minor)	Broad and practical understanding of computing and digital skills balanced with a focus on the liberal arts.	Broad range of career options; graduates will be attractive to any employer who wants both computational and other disciplinary skills.
Geospatial Information Science & Technology (BS)	Geospatial information and the application of geospatial technologies that support the acquisition, management, analysis, and visualization of geo-referenced data.	Environmental management, public health, civil engineering, urban planning, economic analysis, marketing.
Interdisciplinary Computational Science (Minor)	Use computing and numerical modeling to solve complex science and engineering problems.	Broad range of career options; graduates will be attractive to any employer who wants both computational and other disciplinary skills.
Statistics (BS/Minor)	Develop or apply mathematical or statistical theory and methods to collect, organize, interpret, and summarize numerical data to provide usable information.	Demographer, statistician, data scientist, research analyst, with specialize in fields such as, mathematics, biostatistics, agricultural statistics, business statistics, or economic statistics.

Academic Affairs and Student Affairs
COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Request for Authorization: Graduate & Undergraduate Certificates in Nuclear Energy Science**, Ahern, Krutka, Wright

☒ OPEN SESSION
☐ CLOSED SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
☒ Yes
☐ No

FOR FULL BOARD CONSIDERATION:
☒ Yes *[Note: If yes, materials will also be included in the full UW Board of Trustee report.]*
☐ No

☒ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY: The School of Energy Resources and the College of Engineering & Physical Sciences is proposing two new certificates, one undergraduate and the other graduate, in Nuclear Energy Science. TerraPower's recent decision to build an advanced nuclear reactor in Wyoming has created a great deal of excitement surrounding nuclear energy within the state. These certificate programs will create new opportunities to compete for employment in the field of nuclear energy for UW students pursuing relevant technical degrees.

PRIOR RELATED COMMITTEE DISCUSSIONS/ACTIONS:
Notice of Intent approved by the Academic Affairs & Student Affairs Committee and the full Board, November 2023.

WHY THIS ITEM IS BEFORE THE COMMITTEE:
University of Wyoming Regulation 2-119 requires that the Board approve all new degree programs and lays out the process for that approval. The Academic and Student Affairs committee will report to the Board on recommended action for approval of the new degree program.

ACTION REQUIRED AT THIS COMMITTEE MEETING:
Consideration for approval of the Request for Authorization for the graduate and undergraduate certificates in Nuclear Energy.

PROPOSED MOTION:
"I move to approve the Request for Authorization for the graduate and undergraduate certificates in Nuclear Energy Science."

UNIVERSITY
OF WYOMING

Office of Academic Affairs
1000 E. University Avenue
Dept. 3302, 312 Old Main
Laramie, WY 82071
307.766.4286 • fax: 307.766.2606

November 5, 2024

Board of Trustees:

This letter serves as a Letter of Commitment for new graduate and undergraduate certificates in Nuclear Energy Science to be offered by the School of Energy Resources in collaboration with the College of Engineering & Physical Sciences. Both certificate programs comprise 15 credit hours of coursework within a two-year span. These certificate programs are a critical component of the University's focus on areas that have significant anticipated funding growth and that serve the state's economic needs.

Needs
TerraPower's decision to build an advanced nuclear reactor in Wyoming has created enthusiasm for nuclear energy within the state. Furthermore, many UW students are interested in pursuing careers in nuclear energy. Although the University offers some nuclear-related coursework, we do not currently offer any certificates or degrees in this area. In 2022, the Wyoming Legislature appropriated $2 million dollars to the School of Energy Resources to support the development of a 'nuclear energy collaboration and training program.' The School of Energy Resources has created the Nuclear Energy Research Center (NERC), and the proposed graduate and undergraduate certificates will establish credentials that UW students will be able to attain and will demonstrate their literacy in nuclear energy.

Requirements
The course hour requirement for both the graduate and undergraduate certificate programs is 15 credit hours. Both certificate programs would require students to take five three-credit hour courses, with two of these being required/core classes and the remaining courses being electives. The courses that can be applied to both certificate programs are the same but with the graduate-level dual-listed sections requiring graduate-level work. Each certificate program can be completed within a two-year timespan.

Resources
New resources will be required to standup these certificate programs. SER and CEPS anticipate that one additional tenure-track faculty member will be needed, and

Academic Affairs has already committed a faculty line, and startup funding for this position has already been acquired through a Nuclear Energy Commission grant to SER. Additionally, new technology required for new technical courses, will be funded by SER and with support from the Department of Energy Nuclear Energy Universities Program. SER and CEPS will jointly fund the marketing costs, which will be approximately $1000. Thus, although new resources will be required to standup these certificate programs, the University, SER, and CEPS have already acquired or committed the funding necessary.

Timeline
The present implementation timeline is designed to enable students to enroll in this certificate program in the Fall 2025.

Campus Review
I affirm that the university community, including the Executive Team, Deans and Directors, Faculty Senate, Staff Senate and ASUW, have been provided the opportunity to review and present feedback on the proposed degree program.

Best,

Tami Benham-Deal
Acting Provost

University of Wyoming
School of Energy Resources
College of Engineering and Physical Sciences
Undergraduate Nuclear Energy Science Certificate Feasibility Study

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Executive Summary

Degree or Certificate Title: **Nuclear Energy Science**

Level of Degree or Certificate: **Undergraduate**

Delivery Mode(s): **Traditional, Face-to-Face in Laramie, WY**

Estimated Startup Cost of Degree: **Up to $52,000/yr for supplemental instruction (includes proposed undergraduate and graduate certificates and will be covered by SER)**

Anticipated Launch Date: **Fall 2025**

Description: **Students in this certificate program would complete 15 credit hours of coursework within a 2-year span. The coursework will consist of a 2-course core series in nuclear energy science fundamentals and reactor design, supplemented by 3 elective courses covering different topical areas relevant to nuclear energy. The core series will expand upon the "Fundamentals of Nuclear Energy" course, which was successfully launched by The School of Energy Resources (SER) in Fall 2023 and Fall 2024. The electives will include new nuclear-relevant course offerings across several departments within UW. The certificate will be offered in person with hybrid options explored at instruction discretion. This certificate program will create new opportunities to compete for employment in the field of nuclear energy for UW students pursuing relevant technical degrees. These certificates are built in collaboration between SER and the College of Engineering and Physical Sciences (CEPS).**

Overview and Description of Degree or Certificate, Purpose, Strategic Plan

Certificate's Objectives

The objective of this certificate program is to provide UW students interested in pursuing careers in nuclear fields the opportunity to earn a credential requiring a strong technical background in nuclear energy science and technology.

Fit

There are currently no nuclear-focused certificate, minor, or major degree programs at UW. However, there are an increasing number of opportunities within the state and region for students graduating with currently offered degrees (e.g., Mechanical Engineering, Chemical Engineering, Civil Engineering, etc.) to engage with the nuclear energy industry upon graduation. The proposed nuclear-focused undergraduate certificate will leverage current faculty, new hires, and temporary lecturers, through generous philanthropic support, to make UW graduates more competitive for these opportunities.

Context and Rationale

TerraPower's recent decision to build an advanced nuclear reactor in Wyoming has created a great deal of excitement surrounding nuclear energy within the state. It has also generated interest and excitement from UW students. Unfortunately, UW currently offers little in the way of nuclear-energy focused coursework to prepare our students to engage with the state's burgeoning nuclear industry upon graduation. In fact, beyond geologic research on uranium resources, nuclear energy has not been a strong focus at UW in recent years. For many reasons, an increased emphasis on nuclear energy scholarship, outreach, and instruction is emerging at UW.

To support the development of a 'nuclear energy collaboration and training program', the Wyoming legislature appropriated $2 million to the School of Energy Resources in the 2022 legislative session. Using some of this financial support, the School of Energy Resources (SER) launched the Nuclear Energy Research Center (NERC) via a competitive RFP to select faculty co-directors. Caleb Hill, Associate Professor in Chemistry and JE Warren Chair in Energy and Environmental Policies and a Neilson Faculty Fellow, and Tara Righetti, SER Professor of Law and Occidental Chair in Energy and Environmental Policies, were selected as the inaugural co-directors of NERC, recognizing the need for a multi-disciplinary approach to nuclear energy instruction and scholarship. NERC is focused on increasing capacity around nuclear energy at UW.

In addition to growing research capabilities, creating a shared laboratory space, hosting conferences to increase network and collaboration with nuclear energy leaders, NERC has been leading discussions on the educational and instructional needs surrounding nuclear energy in Wyoming. These discussions have included engagement with industry partners including TerraPower and BWXT, elected Wyoming officials, mining industry representatives, academic leaders in nuclear energy and more. In discussions with these partners, a few key themes have emerged:

1. **A majority of the potential job opportunities for UW graduates do not require a degree in nuclear engineering.** The key distinction between nuclear power and more traditional forms of thermal power generation (e.g., coal or gas) is in how heat, which may be converted to electricity or utilized directly, is produced. Rather than burning fuel, heat is generated within the core of a nuclear reactor. While reactor core design is the realm of nuclear engineers, all other technical aspects of nuclear power generation are addressed by other disciplines. Both TerraPower and BWXT have emphasized that a majority of the university graduates they hire are *not* nuclear engineers, but instead come from disciplines covered by existing degree programs at UW (mechanical engineering, chemical engineering, physics, etc.).
2. **A credential which demonstrates nuclear literacy would help make UW graduates more competitive.** While there may be ample nuclear energy related employment opportunities for students in currently offered UW degree programs, UW students will

be at a disadvantage to those that have a demonstrated educational background in nuclear energy. Providing UW students with a modest amount of relevant nuclear coursework would greatly improve the competitiveness of their applications, based on conversations with our industry partners.

The first step taken to increase nuclear-specific coursework at UW has been through the 'Fundamentals of Nuclear Energy' course, which is being taught by an SER adjunct faculty member and funded by Idaho National Laboratory. The initial offering of this course had 24 students enrolled, demonstrating interest in nuclear-focused coursework among our student body, especially given the difficulty of this course. While this course represents an improvement, without additional instructional options UW students remain at a disadvantage (based on conversations between SER/CEPS and industry) for securing positions with nuclear-focused companies and national labs without equal or substantial coursework offered. Establishing a nuclear-focused undergraduate certificate to supplement existing undergraduate degree programs at UW would be an effective approach to serve UW students interested in employment within the nuclear energy field and increase the competitiveness of UW students for careers in the nuclear energy sector in Wyoming and beyond. The potential value for UW students has been emphasized in accompanying letters, see Appendix A, of support from both Idaho National Laboratory and TerraPower, both of which are heavily invested in the development of advanced nuclear systems within Wyoming.

SER and CEPS anticipate this undergraduate certificate will be of interest to current and future students at UW. In an internal survey of undergraduate and graduate students at UW, 39% of undergraduates and 24% of graduate student participants indicated they were at least "Somewhat Likely" to pursue a nuclear-focused certificate program if UW offered one. Students interested in this undergraduate certificate would largely be expected to be pursuing highly technical degrees in CEPS. There are considerable opportunities in the nuclear industry for chemical, civil, mechanical, and electrical engineers, chemists, computational sciences and other highly relevant disciplines [1]. SER, CEPS, and NERC will work to expand the list of available courses through discussions with relevant departments (mechanical and chemical engineering, chemistry, physics, School of Computing, etc.) and weight future faculty hires with nuclear interests. With this approach, expansion to include 6-8 elective courses may be achievable within a few academic years. With this number of available course options, students should be able to complete the undergraduate certificate requirements within 2 years. SER and CEPS will encourage all courses to be dual listed/crosslisted at the undergraduate and graduate levels so that the certificates can serve both undergraduate and graduate students at UW, although expectations and requirements will be different (as defined in UW Regulation 2-100).

Strategic Plan

How the degree will support UW's Strategic Plan, the relevant college's strategic plan, and the unit's strategic plan.

UW students have limited access to formal coursework in nuclear science, engineering, and policy. This undoubtedly puts UW students at a disadvantage for securing positions with nuclear-focused companies and national labs. Establishing a nuclear-focused undergraduate certificate to supplement existing undergraduate degree programs would be a timely, low-cost and an effective approach to better serve UW students interested in employment within the nuclear field, making UW students and graduates more competitive for careers in the nuclear energy sector in Wyoming and beyond.

This proposed certificate aligns with every aspect of the UW Mission, "We honor our heritage as the state's flagship and land-grant university by providing accessible and affordable higher education of the highest quality; rigorous scholarship; the communication and application of knowledge; economic and community development; and responsible stewardship of our cultural, historical and natural resources." This undergraduate certificate is being developed due to growing opportunities in the state and region, would increase research in a field important to Wyoming, and address topics already impacting Wyoming's economy and communities.

This proposed certificate also aligns with the UW Strategic Plan by providing the resources UW students need to find success in the nuclear field upon graduation (Enhancing Student Success) and by establishing a program which can directly engage with the growing nuclear sector in Wyoming (Engage with and Serve the State of Wyoming).

Learning Outcomes

The Nuclear Energy Science Undergraduate Certificate is intended to prepare students to engage with the nuclear energy sector through the following learning outcomes:

1. **Fundamentals of Nuclear Physics.** Students will demonstrate a strong fundamental understanding of basic physical principles relevant to nuclear energy production through the analysis of industrially relevant decay chains and fuel energy densities.
2. **Conventional and Emerging Reactor Designs**. Students will describe the basic operating principles of traditional light water reactors and emerging designs for grid-scale generation and remote deployment, highlighting the relative advantages of each with respect to safety, construction/operating costs, and fuel requirements.
3. **Economics of Nuclear Energy Production.** Students will build simple techno-economic models capable of analyzing the costs of nuclear energy projects.
4. **Public Engagement.** Students will demonstrate the ability to communicate, in simple terms, the execution of nuclear energy projects and the technical and environmental risks associated with nuclear energy generation.

Curriculum Map and Program Structure (with course descriptions)

Students in the Undergraduate Nuclear Energy Science Certificate program would complete the coursework in a two-year cycle. Courses will be offered on a set rotation to accommodate completion in two years. Courses can be completed in any order, which allows a student to

enter the program at any time. Due to alignment with existing technical degree offerings already at UW, it is highly likely interested students would already meet pre-requisites from the proposed courses within their primary major for their already required courses. If the courses become popular and start meeting capacity with full waitlists, SER and CEPS may look to expand the frequency in which the courses are offered. The list of optional coursework would accommodate students in a variety of CEPS majors.

The undergraduate certificate program would require students to take five 3-credit hour courses (15 total credits = 6 required credits, and 9 elective credits). These courses will need to be created upon approval of the certificate program (which is why many have *** as a course number has yet to be identified).

There will be a core two-course series that encapsulates nuclear science and reactor engineering and is required of all students:

- *ERS/ME 4***/ERS/ME 5*** Nuclear Energy Physics (NEP)* - Nuclear physics, radioactive decay, nuclear fission and fusion, neutron transport, criticality conditions, reactor kinetics.
    - *Prerequisites: PHYS 1220*
- *ERS/ME 4***/ERS/ME 5*** Nuclear Power Systems (NPS)* - Analysis of current and emerging reactor designs, plant configurations, thermal hydraulics, reactor operation, and fuel cycle management.
    - *Prerequisites: PHYS 1220*

Students would complement this core series with 3 relevant electives (9 credits) offered by a variety of departments across campus. Offerings would include (but are not limited to):

- *ERS/CHEM 4***/ERS/CHEM 5*** Nuclear Fuel Cycles* (NFC) - Overview of processes employed in nuclear fuel cycles including mining, milling, conversion, enrichment, fuel fabrication, interim storage, reprocessing, and disposal.
    - *Prerequisites: CHEM 1030*
- *ERS/ME 4***/ERS/ME 5*** Nuclear Materials* (NM) - An overview of materials commonly employed in nuclear systems and their interactions with radiation.
    - *Prerequisites: CHEM 1030*
- *ERS 4***/5*** Law and Nuclear Technology (LNT)* - This class explores legal and policy frameworks applicable to development and deployment of nuclear technologies, including international law, state and federal regulations, and the role of nuclear in a net-zero economy.
    - *Prerequisites*: COM2 and/or Junior Standing
- *ERS/CHEM 4***/ERS/CHEM 5*** Nuclear Forensics* - Overview of analytical techniques commonly employed in the characterization of nuclear materials.
    - *Prerequisites: CHEM 1030*

- *ERS 3000/ERS 5*** - Energy Project Outreach and Communication (meets COM2 in USP's)* - 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.
    - *Prerequisites: WA/COM1*

Course/TERM	FA25	SP26	FA26	SP27	FA27	SP28	FA28
ERS/ME 4/ERS/ME 5****Nuclear Energy Physics							
ERS/ME 4/ERS/ME 5**** Nuclear Power Systems							
ERS/CHEM 4/ERS/CHEM 5**** Nuclear Fuel Cycles							
ERS/ME 4/ERS/ME 5**** Nuclear Materials							
ERS 4*/5***** Law and Nuclear Technology							
ERS/CHEM 4/ERS/CHEM 5**** Nuclear Forensics							
ERS 3000 Energy Project Outreach and Communication							

Curriculum Map

Undergraduate Program Name: **Nuclear Energy Science Certificate**	Date Submitted: August 2024
Type of Map: Overview Map	

Student Learning Outcomes (SLOs)	***ERS/ME 4***/ERS/ME 5***** *Nuclear Energy Physics (NEP)*	***ERS/ME 4***/ERS/ME 5****** *Nuclear Power Systems (NPS)*	***ERS/CHEM 4***/ERS/CHEM 5****** *Nuclear Fuel Cycles* (NFC)	***ERS/ME 4***/ERS/ME 5****** *Nuclear Materials* (NM)	**ERS 4***/5***** *Law and Nuclear Technology (LNT)*	***ERS/CHEM 4***/ERS/CHEM 5****** *Nuclear Forensics*	*ERS 3000 Energy Project Outreach and Communication*
Fundamentals of Nuclear Physics.	X					X	
Conventional and Emerging Reactor Designs.		X	X	X			
Economics of Nuclear Energy Production.		X					
Public Engagement.			X		X	X	X

Notes: If you choose to use overview map, please use "X" to indicate where a specific SLO "occurs" within a course.

Assessment Plan

1. **Fundamentals of Nuclear Physics.** Students will demonstrate a strong fundamental understanding of basic physical principles relevant to nuclear energy production through the analysis of industrially relevant decay chains and fuel energy densities.
    a. *ERS/ME 4***/ERS/ME 5*** Nuclear Energy Physics (NEP)*
        i. Students will demonstrate a firm qualitative and quantitative understanding of nuclear physics principles through a series of mid-term and final exams.
    b. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Forensics*

i. Students will describe techniques commonly employed in the analysis of nuclear material and apply fundamental nuclear physics concepts in forensic calculations in a series of mid-term exams and homework assignments.

2. **Conventional and Emerging Reactor Designs**. Students will describe the basic operating principles of traditional light water reactors and emerging designs for grid-scale generation and remote deployment, highlighting the relative advantages of each with respect to safety, construction/operating costs, and fuel requirements.
    a. *ERS/ME 4***/ERS/ME 5***Nuclear Power Systems (NPS)*
        i. Students will demonstrate an understanding of conventional grid-scale reactor systems through a series of mid-term exams.
        ii. Students, working in small groups, will prepare and deliver a final presentation on an emerging reactor design which covers the basic principles of operation, fuel requirements, and economics.
    b. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Fuel Cycles* (NFC)
        i. Students will complete a series of projects focused on open/closed nuclear fuel cycles for different fuel types and enrichment levels.
    c. *ERS/ME 4***/ERS/ME 5*** - Nuclear Materials* (NM)
        i. Students will demonstrate familiarity with the physical and chemical requirements placed on materials in nuclear power systems and suitable material systems through a series of homework assignments and mid-term exams.
3. **Economics of Nuclear Energy Production.** Students will build simple techno-economic models capable of analyzing the costs of nuclear energy projects.
    a. *ERS/ME 4***/ERS/ME 5*** Nuclear Power Systems (NPS)*
        i. Students, working in small groups, will prepare and deliver a final presentation on an emerging reactor design which covers the basic principles of operation, fuel requirements, and economics.
4. **Public Engagement.** Students will demonstrate the ability to communicate, in simple terms, the execution of nuclear energy projects and the technical and environmental risks associated with nuclear energy generation.
    a. *ERS 4***/5*** Law and Nuclear Technology (LNT)*
        i. Students will research applicable laws to nuclear power in a jurisdiction of their choice
        ii. Students will write a "regulatory analysis" paper that would describe the applicable legal framework and identify strengths and weaknesses for potential projects
        iii. Students will present findings to the class in an oral presentation.
    b. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Forensics*
        i. Students will research technical safeguards employed to limit the unwanted proliferation of nuclear material
        ii. Students will write a paper detailing the environmental/political context and technical execution of a particular forensic analysis.

c. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Fuel Cycles (NFC)*
    i. Students will prepare a technical presentation detailing the potential benefits and technical challenges associated with adopting "closed" nuclear fuel cycles.

ci. ERS 3000/5*** - Energy Project Outreach and Communication (meets COM2 in USP's)
    i. 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.

Degree Program Evaluation

Explain how the program will be evaluated. Will you use exit surveys of graduates, employer surveys, mid- or end-of-program feedback through focus groups or surveys, etc.? Remember that by policy, all new degree will be evaluated within 5 years of startup, so this will help you in gathering artifacts upon which that evaluation can be based.

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/NERC 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.

SER 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 asked to complete and 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.

New Resources Required

Describe new resources required, including:

- *Faculty and instructional staffing* – SER and CEPS anticipate this certificate could be well supported by one additional tenure-track faculty member, for which Academic Affairs has already committed a faculty line and also for which SER and a grant from the Nuclear Regulatory Commission will provide a competitive startup package. In addition, incremental costs for advising, lecturers and/or additional courses from existing UW faculty are expected to total ~$52,000/yr or less. Initial funds to support the cost will come from one-time state funding to SER. This certificate will be financially supported over the long term by an endowment pledged by the John P. Ellbogen Foundation which created the John P. Ellbogen Foundation Nuclear Energy Research Center Fund.
- *Program administration and staff support* - Administration and curriculum development for the certificate is the responsibility of SER and CEPS and guided by the co-directors of the Nuclear Energy Research Center, which is already funded by SER.
- *Technology* - Several technical courses will be supported by a new nuclear laboratory facility currently under construction, supported through funds from SER and the Department of Energy Nuclear Energy Universities Program (NEUP). No further technology is needed outside of new catalog entries and a certificate website.
- *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.
- *Support* - No other support is needed outside of a website, catalog entry, and marketing materials- all of which is funded by SER.

Substantive Change Determination

Higher Learning Commission (HLC), UW's regional accrediting agency, must approve all substantive changes to UW's offering. HLC considers substantive change as the addition of a program (degree or certificate/credential level) not previously included in the institution's accreditation, usually judged to be a program that is a significant departure from normal offerings, the addition of a program with 50%+ new coursework required, or the addition or change to an existing program which will be delivered 50%+ through alternative (hybrid, online) delivery. After submitting the HLC screening form, this undergraduate certificate is considered a substantive change and will require review. SER will work with Academic Affairs to prepare for and execute this review.

Relationship to Other Offerings/Demand

Other nuclear energy science and engineering-focused certificate programs exist in the U.S. However, given Wyoming's unique status as a host for a first advanced reactor nuclear power system and other emerging projects, it is critical that UW creates opportunities for its students

in this field. By establishing nuclear-focused certificates (both at the undergraduate level and graduate level) at UW, the university can tailor the design and delivery of material to emphasize technologies slated for deployment in Wyoming and other opportunities surrounding the nuclear supply chain. An on-campus traditional/face-to-face nuclear program at UW will help drive student interest in the field and connect students with exciting opportunities within the state and beyond.

This undergraduate certificate feasibility study is being submitted concurrently with a study for a corresponding graduate nuclear energy science certificate. While the subject matter of these certificate programs will be similar and rely on the same selection of dual-listed/crosslisted courses, these programs will be differentiated by placing additional requirements on students pursuing the graduate certificate compared to their undergraduate counterparts. In each course, graduate students will be expected to complete additional assignments demonstrating the deeper level of understanding and rigor expected of students pursuing a degree at the masters/doctoral level and the capability to independently research topics in the field.

Executive Summary of Demand Statistics

Nuclear power generation, nuclear fuels production, and related fields employed >66,000 workers across the U.S. in 2022 [2]. While this number is currently small in comparison to natural gas (>580,000) and petroleum (>740,000), strong growth in this field is expected in coming years due to increasing demands for carbon-free baseload power generation, the advent of advanced nuclear reactor systems with improved safety features, and small modular reactors/microreactors which can be more easily deployed. These developments have already led to a surge of activity within Wyoming, including the construction of the first advanced reactor in Kemmerer (TerraPower's Natrium^{TM}), strong engagement with other advanced nuclear companies such as BWXT, and improved prospects for the state's uranium mining industry. Strong growth in nuclear-related mining/extraction industries has already been observed across the U.S., with growth of 12.9% in 2021-2022 [2].

The proposed undergraduate certificate in nuclear energy science at UW will be targeted towards undergraduate students pursuing degrees in technical disciplines relevant to nuclear energy, particularly mechanical engineering, chemical engineering, chemistry, physics, computing and geology. Projected job growth data for these fields is included in the table below, with all showing strong (>5%) projected growth through 2032 [3].

Profession	2023 Median Pay	Typical Entry-Level Education	Number of Jobs 2022	Job Outlook 2022-2032
Nuclear Engineer	$125,460	B.S.	13,800	1%
Mechanical Engineer	$99,510	B.S.	286,100	10%
Chemical Engineer	$112,100	B.S.	20,800	8%
Chemist	$87,180	B.S.	95,000	6%

Physicist	$149,530	Ph.D.	23,600	5%
Geologist	$92,580	B.S.	26,300	5%

All data obtained from the Bureau of Labor Statistics (https://data.bls.gov)

There are currently 74 nuclear-related major/minor/certificate programs offered at 36 universities across the U.S. (see Figure 1). Of these schools, <10 offer nuclear-focused certificate programs which could be utilized by B.S.-graduates seeking additional focused training in nuclear or M.S./Ph.D. students pursuing degrees in closely related fields. Based on the geographic distribution of these programs and the regional developments in the nuclear industry, SER and CEPS anticipate a program at UW would be attractive to current and future students. Additionally, the inclusion of coursework focused on policy, regulatory, and social matters in the certificates proposed here is relatively rare among current nuclear programs (Figure 2) and will provide students with a well-rounded view of the field, the value of which has been emphasized by UW collaborators and potential employers in the field.

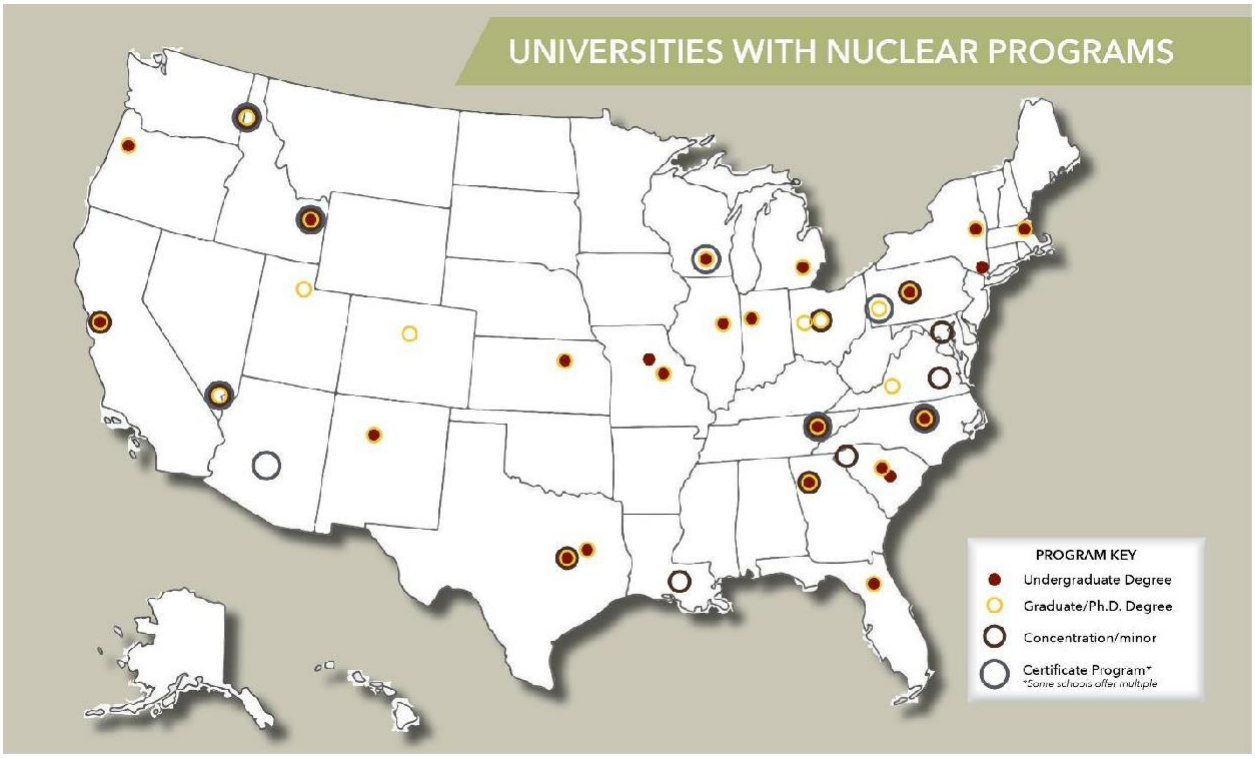


Figure 1: Geographical distribution of nuclear programs at universities across the U.S.

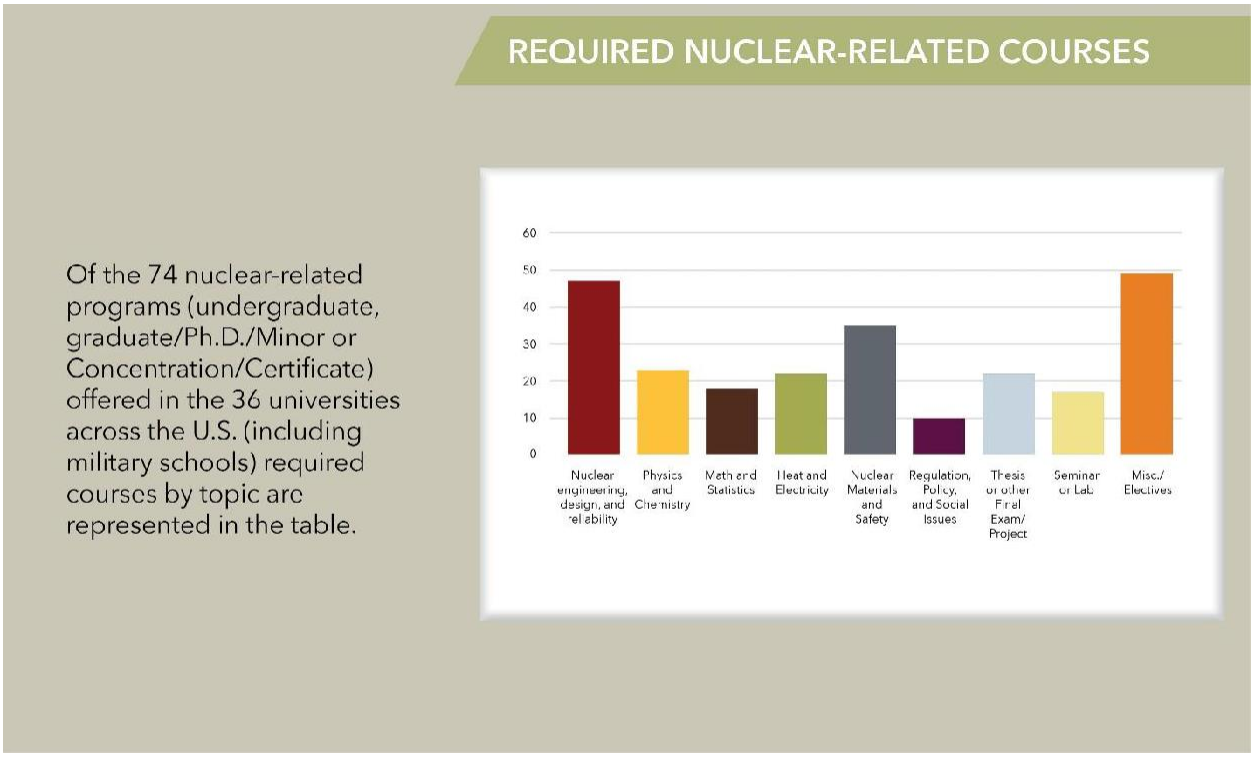


Figure 2: Course requirements in surveyed nuclear programs by topic.

References

[1] U.S. Bureau of Labor Statistics, "May 2023 National Industry-Specific Occupational Employment and Wage Estimates - Nuclear Electric Power Generation," [Online]. Available: https://www.bls.gov/oes/2023/may/naics5_221113.htm#17-0000.

[2] Department of Energy Office of Energy Jobs, "United States Energy & Employment Report 2023," 2023.

[3] U.S. Bureau of Labor Statistics, "Occupational Outlook Handbook".

Appendix A: LETTERS OF SUPPORT

May 1, 2024

Submitted Electronically

Subject: TerraPower, LLC Letter of Support
University of Wyoming, Nuclear Energy Science Certificate Proposals

Dear UW Board of Trustees:

TerraPower, LLC (TerraPower) is pleased to provide this letter in support for the School of Energy Resources (SER) and the College of Engineering and Physical Sciences (CEPS) for their Undergraduate and Graduate Nuclear Energy Science Certificate Proposals. The certificates contain curriculum and/or research crossover with SER's area of expertise.

TerraPower considers that this interdisciplinary approach is essential in addressing the ever-evolving challenges in the fields of nuclear energy and will make UW graduates more competitive in the job market upon graduation. It is evident that this program aligns well with our mutual objectives of innovation, holistic education, and for economic benefits in Wyoming, and beyond.

TerraPower is a leading nuclear innovation company that strives to improve the world through nuclear energy and science. Since it was founded by Bill Gates and a group of like-minded visionaries, we have emerged as an incubator and developer of ideas and technologies that offer energy independence, environmental sustainability, medical advancement and other cutting-edge opportunities. In 2021, Kemmerer, Wyoming was selected as the preferred site for the Natrium™ Reactor Demonstration Project, creating a unique alignment for Wyoming, university research capacity, natural resource/mineral resource availability, advanced energy workforce pipeline and supply chain capacity.

We at TerraPower are excited about this potential degree program and what it can offer to UW students. The cross-pollination of ideas, perspectives, and expertise from SER/CEPS will undoubtedly produce graduates who are well-rounded, adaptive, and prepared to tackle the complex issues surrounding nuclear energy resources in today's rapidly changing world. Furthermore, the skills and knowledge imparted through this program will empower graduates

to make meaningful contributions to the energy sectors, thereby addressing societal needs and global challenges.

TerraPower supports the development and implementation of this program; likewise, we plan to continue our summer intern program and invite interested students to apply. We otherwise remain interested in collaborating with other schools/colleges at UW, and these proposed Nuclear Energy Science certificates bring this to fruition.

In connection with TerraPower's commitment of support, understand that TerraPower will not, as part of its participation, disclose or provide, nor agree to disclose or provide, any intellectual property of TerraPower or any rights whatsoever in any of TerraPower's confidential or proprietary information.

We are pleased to support the Nuclear Energy Science Certificate Proposals as discussed herein.

Sincerely,

J.M. Cruse

Jonathan Cruse
Senior Director, Contracts
TerraPower, LLC

cc: Tara Neider, Senior Vice President and Project Director of Natrium
Craighton Goeppele, General Counsel

Idaho National Laboratory

April 24, 2024

UW Board of Trustees
Via Email

SUBJECT: Nuclear Energy Science New Certificates, Final Review

To Whom it May Concern:

I am writing to express my support for the School of Energy Resources (SER) and the College of Engineering and Physical Sciences (CEPS) for their Undergraduate and Graduate Nuclear Energy Science Certificate Proposals. The certificates contain curriculum and/or research crossover with SER's area of expertise.

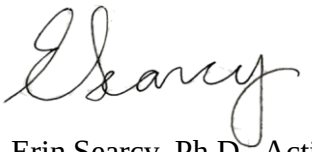
I and my colleagues at Idaho National Lab believe that this interdisciplinary approach is needed in addressing the ever-evolving challenges in the field of nuclear energy.

We at Idaho National Lab are excited about this potential degree program and what it can offer to UW students. The cross-pollination of ideas, perspectives, and expertise from SER/CEPS will produce graduates who are well-rounded, adaptive, and prepared to tackle the complex issues surrounding nuclear energy resources in today's rapidly changing world. Furthermore, the skills and knowledge imparted through this program will empower graduates to make meaningful contributions to the energy sectors, thereby addressing societal needs and global challenges.

We are always looking for opportunities to collaborate with UW, and these proposed Nuclear Energy Science certificates will help enable this.

Please do not hesitate to reach out if you need any further information or have any questions. We are enthusiastic about the prospect of working together on this endeavor.

Sincerely,



Erin Searcy, Ph.D., Acting Deputy Laboratory Director
Science & Technology and Chief Research Officer
Idaho National Laboratory

August 1, 2024

UW Board of Trustees,
RE: Nuclear Energy Science New Certificates, Final Review

I am writing to express my enthusiastic support for the School of Energy Resources (SER) and the College of Engineering and Physical Sciences (CEPS) for their Undergraduate and Graduate Nuclear Energy Science Certificate Proposals. The certificates contain curriculum and/or research crossover with SER's area of expertise.

My colleagues and I at Western Wyoming Community College (Western) believe that this interdisciplinary approach is essential in addressing the ever-evolving challenges in the fields of nuclear energy and will make UW graduates more competitive in the job market upon graduation. It is evident that this program aligns well with our mutual objectives of innovation, holistic education, and for economic benefits in Wyoming, and beyond.

We at Western are excited about this potential degree program and what it can offer to UW students. The cross-pollination of ideas, perspectives, and expertise from SER/CEPS will undoubtedly produce graduates who are well-rounded, adaptive, and prepared to tackle the complex issues surrounding nuclear energy resources in today's rapidly changing world. Furthermore, the skills and knowledge imparted through this program will empower graduates to make meaningful contributions to the energy sectors, thereby addressing societal needs and global challenges.

Western pledges its full support for the development and implementation of this program, including working to have an articulation agreement with programs at Western into this pathway. We are always looking forward to collaborating with other schools/colleges at UW, and these proposed Nuclear Energy Science certificates bring this to fruition.

Please do not hesitate to reach out if you need any further information or have any questions. We are enthusiastic about the prospect of working together on this endeavor.

Respectfully,

Dr. Kirk Young
President
(307) 382-1601
kyoung@westernwyoming.edu

UNIVERSITY OF WYOMING

Professor Brian Leonard
Department of Chemistry
University of Wyoming
Laramie, WY 82071
Phone: (307) 766-4137
Fax: (307)766-2807
Bleonar5@uwyo.edu

July 31, 2024

To Whom It May Concern:

I am writing to express my emphatic support for the proposed undergraduate and graduate certificate programs in nuclear energy science. A number of students and faculty in the Department of Chemistry carry out research (supported by substantial external funding from the Department of Energy) in chemical separations and materials science which have direct applications in the development of advanced nuclear fuel cycles and high-performance materials for nuclear applications. The proposed certificate programs will support these efforts by establishing relevant coursework which will better prepare students for this ongoing work at UW and help make them more competitive for jobs in the nuclear sector with national laboratories or companies developing advanced nuclear technologies. In short, the proposed certificate programs have the full support of the Department of Chemistry.

Sincerely,

Brian Leonard
Professor and Head
Department of Chemistry
University of Wyoming

UNIVERSITY OF WYOMING | College of Engineering and Physical Sciences

RAY S. FERTIG III, PH.D., P.E.
PROFESSOR AND HEAD
DEPT. OF MECHANICAL ENGINEERING
1000 E. UNIVERSITY AVE.
LARAMIE, WY 82071
PHONE: (307) 766-3647
EMAIL: RFERTIG@UWYO.EDU

August 5, 2024

RE: Letter of Support for Proposed Nuclear Certificate Programs

To Whom It May Concern:

I am pleased to provide a letter of support for the proposed certificate programs in nuclear energy science under development by SER and CEPS. Opportunities in the nuclear sector are particularly relevant for undergraduate and graduate students in the Department of Mechanical Engineering, and the proposed certificate programs will establish more formal coursework in this area which will greatly benefit students interested in engaging with the state's growing nuclear sector. Our department is committed to supporting the development and implementation of the proposed certificate programs by serving as the departmental home for the core series of courses in nuclear engineering as described in the feasibility studies. I believe that this initiative will not only benefit our students but also support the continued development of nuclear industries within the state.

Sincerely,

Ray S. Fertig III, P.E.
Department Head
Professor of Mechanical Engineering

Faculty Senate Resolution 473 **Introduced by Executive Committee**

Resolution in Support of the Undergraduate Nuclear Energy Science Certificate

---

WHEREAS, the School of Energy Resources has proposed the addition of an undergraduate Nuclear Energy Science Certificate, as outlined in the attached proposal and feasibility study; and

WHEREAS, the Faculty Senate's Academic Planning Committee (APC) has reviewed the proposal, as shown in the attached report from APC; and

WHEREAS, the APC has recommended conditional approval of the degree program, as shown in the attached report from the APC;

THEREFORE, BE IT RESOLVED by the Faculty Senate of the University of Wyoming that Faculty Senate supports the recommendation of the APC as specified in the report attached hereto as applied solely to the undergraduate Certificate contained in the proposal

AUTHENTICATION: The foregoing Faculty Senate Resolution 473, duly adopted by the Faculty Senate of the University of Wyoming under date of November 4, 2024, is hereby transmitted to the President of the University of Wyoming for review in accordance with UW Regulations.

Treva E Sprout Ahrenholtz

Treva E Sprout Ahrenholtz
Secretary, Faculty Senate
Dated: November 5, 2024

Passed 21-0-0

SENATE RESOLUTION #3009

TITLE: ASUW Supports the Creation of an Undergraduate Nuclear Energy Science Certificate

DATE INTRODUCED: 10/22/2024

AUTHOR: Senator Morales

SPONSORS: President Murfitt, Chief of Staff Hennigar, Chief of Legislative Affairs Bouma, Senators Harper, Jackim, Langford, Keasling, Rzeszut, and Shosh

1. WHEREAS, the purpose of the Associated Students of the University of Wyoming
2. (ASUW) is to serve our fellow students in the best manner possible; and,
3. WHEREAS, the Undergraduate Nuclear Energy Science Certificate gives students
4. who want to pursue careers in nuclear fields the chance to earn a credential requiring a
5. strong technical background in nuclear energy science and technology; and,
6. WHEREAS, there are currently no undergraduate or graduate minors, majors, or
7. certificates based on nuclear sciences; and,
8. WHEREAS, there are increasing opportunities in the state and region dealing with
9. nuclear energy and science; and,
10. WHEREAS, TerraPower is building a new advanced nuclear reactor in Southwest
11. Wyoming that is fueling excitement about nuclear energy in the state of Wyoming; and,
12. WHEREAS, adding an Undergraduate Nuclear Energy Science Certificate will make the
13. University of Wyoming more competitive; and,
14. WHEREAS, the certificate will be a two-year program that will require 15 credit hours
15. consisting of 9 required core courses and 6 elective courses which are listed in
16. Addendum A; and,
17. WHEREAS, the program follows a general track outlined by the Feasibility Study in

18. Addendum A; and,

19. WHEREAS, the program will have a launch date of Fall 2025; and,

20. WHEREAS, there is a demand for this type of program based on the Undergraduate

21. Nuclear Energy Science Certificate Feasibility Study document, found in Addendum A;

22. and,

23. WHEREAS, there is a lot of support for this program both within and outside of the

24. University as outlined in Addendum A and Addendum B; and,

25. WHEREAS, the program requires minimal new resources are required facilities are

26. already under construction and the program will fall under the School of Engineering

27. and Physical Sciences.

28. THEREFORE, be it resolved by the Associated Students of the University of Wyoming

29. (ASUW) Student Government that ASUW supports the implementation of an

30. Undergraduate Nuclear Energy Science Certificate; and,

31. THEREFORE, be it further resolved that this resolution be circulated to the student

32. body through ASUW channels; and,

33. THEREFORE, be it further resolved that this resolution be sent to the Board of Trustees

34. and all corresponding departments immediately upon its passage.

Referred to: All Standing Committees

Date of Passage: October 29th, 2024 Signed**:** _____

(ASUW Chairperson)

"Being enacted on October 29th, 2024 **, I do hereby sign my name hereto and approve this Senate action."** _____

ASUW President

University of Wyoming
School of Energy Resources
College of Engineering and Physical Sciences
Graduate Nuclear Energy Science Certificate Feasibility Study

Table of Contents

Executive Summary

Degree or Certificate Title: **Nuclear Energy Science**

Level of Degree or Certificate: **Graduate**

Delivery Mode(s): **Traditional, Face-to-Face in Laramie, WY**

Estimated Startup Cost of Degree: **Up to $52,000/yr for supplemental instruction and advising (includes proposed undergraduate and graduate certificates and will be covered by SER)**

Anticipated Launch Date: **Fall 2025**

Description: **Students in this certificate program would complete 15 credit hours of coursework within a 2-year span. The coursework will consist of a 2-course core series in nuclear energy science fundamentals and reactor design, supplemented by 3 elective courses covering different topical areas relevant to nuclear energy. The core series will expand upon the "Fundamentals of Nuclear Energy" course, which was successfully launched by the School of Energy Resources (SER) in Fall 2023 and Fall 2024. The electives will include new nuclear-relevant course offerings across several departments within UW. The certificate will be offered in person with hybrid options explored at instruction discretion. This certificate program will create new opportunities to compete for employment in the field of nuclear energy for UW students pursuing relevant technical degrees. These certificates are built in collaboration between SER and the College of Engineering and Physical Sciences (CEPS).**

Overview and Description of Degree or Certificate, Purpose, Strategic Plan

Certificate's Objectives

The objective of this certificate program is to provide UW students interested in pursuing careers in nuclear fields the opportunity to earn a credential requiring a strong technical background in nuclear energy science and technology.

Fit

There are currently no nuclear-focused certificate, minor, or major degree programs at UW. However, there are an increasing number of opportunities within the state and region for students graduating with currently offered degrees (e.g., Mechanical Engineering, Chemical Engineering, Civil Engineering, etc.) to engage with the nuclear energy industry upon graduation. The proposed nuclear-focused graduate certificate program will leverage current faculty, new hires, and temporary lecturers, through generous philanthropic support, to make UW graduates more competitive for these opportunities.

Context and Rationale

TerraPower's recent decision to build an advanced nuclear reactor in Wyoming has created a great deal of excitement surrounding nuclear energy within the state. It has also generated interest and excitement from UW students. Unfortunately, UW currently offers little in the way of nuclear-energy focused coursework to prepare our students to engage with the state's burgeoning nuclear industry upon graduation. In fact, beyond geologic research on uranium resources, nuclear energy has not been a strong focus at UW in recent years. For many reasons, an increased emphasis on nuclear energy scholarship, outreach, and instruction is emerging at UW.

To support the development of a 'nuclear energy collaboration and training program', the Wyoming legislature appropriated $2 million to the School of Energy Resources in the 2022 legislative session. Using some of this financial support, the School of Energy Resources (SER) launched the Nuclear Energy Research Center (NERC) via a competitive RFP to select faculty co-directors. Caleb Hill, Associate Professor in Chemistry and JE Warren Chair in Energy and Environmental Policies and a Neilson Faculty Fellow, and Tara Righetti, SER Professor of Law and Occidental Chair in Energy and Environmental Policies, were selected as the inaugural co-directors of NERC, recognizing the need for a multi-disciplinary approach to nuclear energy instruction and scholarship. NERC is focused on increasing the capacity around nuclear energy at UW.

In addition to growing research capabilities, creating a shared laboratory space, hosting conferences to increase network and collaboration with nuclear energy leaders, NERC has been leading discussions on the educational and instructional needs surrounding nuclear energy in Wyoming. These discussions have included engagement with industry partners including TerraPower and BWXT, elected Wyoming officials, mining industry representatives, academic leaders in nuclear energy and more. In discussions with these partners, a few key themes have emerged:

1. **A majority of the potential job opportunities for UW graduates do not require a degree in nuclear engineering.** The key distinction between nuclear power and more traditional forms of thermal power generation (e.g., coal or gas) is in how heat, which may be converted to electricity or utilized directly, is produced. Rather than burning fuel, heat is generated within the core of a nuclear reactor. While reactor core design is the realm of nuclear engineers, all other technical aspects of nuclear power generation are addressed by other disciplines. Both TerraPower and BWXT have emphasized that a majority of the university graduates they hire are *not* nuclear engineers, but instead come from disciplines covered by existing degree programs at UW (mechanical engineering, chemical engineering, physics, etc.).
2. **A credential which demonstrates nuclear literacy would help make UW graduates more competitive.** While there may be ample nuclear energy related employment opportunities for students in currently offered UW degree programs, UW students will

be at a disadvantage to those that have a demonstrated an educational background in nuclear energy. Providing UW students with a modest amount of relevant nuclear coursework would greatly improve the competitiveness of their applications, based on conversations with our industry partners.

The first step taken to increase nuclear-specific coursework at UW has been through the 'Fundamentals of Nuclear Energy' course, which is being taught by an SER adjunct faculty member and funded by Idaho National Laboratory. The initial offering of this course had 24 students enrolled, demonstrating interest in nuclear-focused coursework among our student body, especially given the difficulty of this course. While this course represents an improvement, without additional instructional options, UW students remain at a disadvantage (based on conversations between SER/CEPS and industry) for securing positions with nuclear-focused companies and national labs without equal or substantial coursework offered. Establishing a nuclear-focused certificate to supplement existing undergraduate and graduate degree programs at UW would be an effective approach to serve UW students interested in employment within the nuclear energy field and increase the competitiveness of UW students for careers in the nuclear energy sector in Wyoming and beyond. The potential value for UW students has been emphasized in accompanying letters, see Appendix A of support from both Idaho National Laboratory and TerraPower, both of which are heavily invested in the development of advanced nuclear systems within Wyoming.

SER and CEPS anticipate this graduate certificate will be of interest to current and future students at UW. In an internal survey of undergraduate and graduate students at UW, 39% of undergraduates and 24% of graduate student participants indicated they were at least "Somewhat Likely" to pursue a nuclear-focused certificate program if offered. Students interested in this graduate certificate would largely be expected to be pursuing highly technical graduate degrees in CEPS. There are considerable opportunities in the nuclear industry for chemical, civil, mechanical, and electrical engineers, chemists, computational sciences and other highly relevant disciplines. [1] SER, CEPS, and NERC will work to expand the list of available courses through discussions with relevant departments (mechanical and chemical engineering, chemistry, physics, School of Computing, etc.) and weight future faculty hires with nuclear interests. With this approach, expansion to include 6-8 electives may be achievable within a few academic years. With this number of available course options, students should be able to complete the graduate certificate requirements within 2 years. SER and CEPS will encourage all courses to be dual listed/crosslisted at the undergraduate and graduate levels so that the certificate can serve both undergraduate and graduate students at UW, although expectations and requirements will be different (as defined in UW Regulation 2-100).

Strategic Plan

How the degree will support UW's Strategic Plan, the relevant college's strategic plan, and the unit's strategic plan.

UW students have limited access to formal coursework in nuclear science, engineering, and policy. This undoubtedly puts UW students at a disadvantage for securing positions with nuclear-focused companies and national labs. Establishing a nuclear-focused graduate certificate to supplement existing graduate degree programs would be a timely, low-cost and effective approach to better serve UW students interested in employment within the nuclear field, making UW students and graduates more competitive for careers in the nuclear energy sector in Wyoming and beyond.

This proposed certificate aligns with every aspect of the UW Mission, "We honor our heritage as the state's flagship and land-grant university by providing accessible and affordable higher education of the highest quality; rigorous scholarship; the communication and application of knowledge; economic and community development; and responsible stewardship of our cultural, historical and natural resources." This graduate certificate is being developed due to growing opportunities in the state and region, would increase research in a field important to Wyoming, and address topics already impacting Wyoming's economy and communities.

This proposed certificate also aligns with the UW Strategic Plan by providing the resources UW students need to find success in the nuclear field upon graduation (Enhancing Student Success) and by establishing a program which can directly engage with the growing nuclear sector in Wyoming (Engage with and Serve the State of Wyoming).

Learning Outcomes

The Nuclear Energy Science Graduate Certificate is intended to prepare students to engage with the nuclear energy sector through the following learning outcomes:

1. **Fundamentals of Nuclear Physics.** Students will demonstrate a strong fundamental understanding of basic physical principles relevant to nuclear energy production through the analysis of industrially relevant decay chains and fuel energy densities.
2. **Conventional and Emerging Reactor Designs**. Students will describe the basic operating principles of traditional light water reactors and emerging designs for grid-scale generation and remote deployment, highlighting the relative advantages of each with respect to safety, construction/operating costs, and fuel requirements.
3. **Economics of Nuclear Energy Production.** Students will build simple techno-economic models capable of analyzing the costs of nuclear energy projects.
4. **Public Engagement.** Students will demonstrate the ability to communicate, in simple terms, the execution of nuclear energy projects and the technical and environmental risks associated with nuclear energy generation.

Curriculum Map and Program Structure (with course descriptions)

Students in the Graduate Nuclear Energy Science Certificate program would complete the coursework in a two-year cycle. Courses will be offered on a set rotation to accommodate completion in two years. Courses can be completed in any order, which allows a student to enter the program at any time. Due to alignment with existing technical degree offerings

already at UW, it is highly likely students would already meet any pre-requisites from courses in their primary major for required courses. If the courses become popular and start meeting capacity with full waitlists, SER and CEPS may look to expand the frequency in which the courses are offered. The list of optional coursework would accommodate students in a variety of CEPS majors.

Admission into the graduate certificate program will require a bachelor's degree or equivalent from a regionally accredited institution and at least a 3.000 cumulative GPA on undergraduate coursework (scale of 4.000). In addition, an applicant's undergraduate coursework must satisfy the prerequisites for the below core series (PHYS 1220 or equivalent).

The graduate certificate program would require students to take five 3-credit hour courses (15 total credits = 6 required credits, and 9 elective credits). These courses will need to be created upon approval of the certificate program (which is why many have *** as a course number has yet to be identified).

There will be a core two-course series that encapsulates nuclear science and reactor engineering and is required of all students:

- *ERS/ME 4***/ERS/ME 5*** Nuclear Energy Physics (NEP)* - Nuclear physics, radioactive decay, nuclear fission and fusion, neutron transport, criticality conditions, reactor kinetics.
    - *Prerequisites: PHYS 1220*
- *ERS/ME 4***/ERS/ME 5*** Nuclear Power Systems (NPS)* - Analysis of current and emerging reactor designs, plant configurations, thermal hydraulics, reactor operation, and fuel cycle management.
    - *Prerequisites: PHYS 1220*

Students would complement this core series with 3 relevant electives (9 credits) offered by a variety of departments across campus. Offerings would include (but are not limited to):

- *ERS/CHEM 4***/ERS/CHEM 5*** Nuclear Fuel Cycles* (NFC) - Overview of processes employed in nuclear fuel cycles including mining, milling, conversion, enrichment, fuel fabrication, interim storage, reprocessing, and disposal.
    - *Prerequisites: CHEM 1030*
- *ERS/ME 4***/ERS/ME 5*** Nuclear Materials* (NM) - An overview of materials commonly employed in nuclear systems and their interactions with radiation.
    - *Prerequisites: CHEM 1030*
- *ERS 5*** Law and Nuclear Technology (LNT)* - This class explores legal and policy frameworks applicable to development and deployment of nuclear technologies, including international law, state and federal regulations, and the role of nuclear in a net-zero economy.
    - *Prerequisites*: COM2 and/or Junior Standing

- *ERS/CHEM 4***/ERS/CHEM 5*** Nuclear Forensics* - Overview of analytical techniques commonly employed in the characterization of nuclear materials.
    - *Prerequisites: CHEM 1030*
- *ERS 5*** - Advanced Energy Project Outreach and Communication*- 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.
    - *Prerequisites: Admission to Graduate Nuclear Energy Science Certificate*

Course	FA25	SP26	FA26	SP27	FA27	SP28	FA28
ERS/ME 4/ERS/ME 5****Nuclear Energy Physics							
ERS/ME 4/ERS/ME 5**** Nuclear Power Systems							
ERS/CHEM 4/ERS/CHEM 5**** Nuclear Fuel Cycles							
ERS/ME 4/ERS/ME 5**** Nuclear Materials							
ERS 4*/5***** Law and Nuclear Technology							
ERS/CHEM 4/ERS/CHEM 5**** Nuclear Forensics							
ERS 5*** Advanced Energy Project Outreach and Communication							

Curriculum Map

Graduate Program Name: **Nuclear Energy Science**	Date Submitted: August 2024
Type of Map: Overview Map	

Student Learning Outcomes (SLOs)	***ERS/ME 4***/ERS/ME 5***** *Nuclear Energy Physics (NEP)*	***ERS/ME 4***/ERS/ME 5****** *Nuclear Power Systems (NPS)*	***ERS/CHEM 4***/ERS/CHEM 5****** *Nuclear Fuel Cycles* (NFC)	***ERS/ME 4***/ERS/ME 5****** *Nuclear Materials* (NM)	**ERS 4***/5***** *Law and Nuclear Technology (LNT)*	***ERS/CHEM 4***/ERS/CHEM 5****** *Nuclear Forensics*	***ERS 5****** *Advanced Energy Project Outreach and Communication*
Fundamentals of Nuclear Physics.	X					X	
Conventional and Emerging Reactor Designs.		X	X	X			
Economics of Nuclear Energy Production.		X					
Public Engagement.			X		X	X	X

Notes: If you choose to use overview map, please use "X" to indicate where a specific SLO "occurs" within a course.

Assessment Plan

1. **Fundamentals of Nuclear Physics.** Students will demonstrate a strong fundamental understanding of basic physical principles relevant to nuclear energy production through the analysis of industrially relevant decay chains and fuel energy densities.
    a. *ERS/ME 4***/ERS/ME 5*** - Nuclear Energy Physics (NEP)*
        i. Students will demonstrate a firm qualitative and quantitative understanding of nuclear physics principles through a series of mid-term and final exams.
    b. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Forensics*

i. Students will describe techniques commonly employed in the analysis of nuclear material and apply fundamental nuclear physics concepts in forensic calculations in a series of mid-term exams and homework assignments.

2. **Conventional and Emerging Reactor Designs**. Students will describe the basic operating principles of traditional light water reactors and emerging designs for grid-scale generation and remote deployment, highlighting the relative advantages of each with respect to safety, construction/operating costs, and fuel requirements.
    a. *ERS/ME 4***/ERS/ME 5*** Nuclear Power Systems (NPS)*
        i. Students will demonstrate an understanding of conventional grid-scale reactor systems through a series of mid-term exams.
        ii. Students, working in small groups, will prepare and deliver a final presentation on an emerging reactor design which covers the basic principles of operation, fuel requirements, and economics.
    b. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Fuel Cycles* (NFC)
        i. Students will complete a series of projects focused on open/closed nuclear fuel cycles for different fuel types and enrichment levels.
    c. *ERS/ME 4***/ERS/ME 5*** - Nuclear Materials* (NM)
        i. Students will demonstrate familiarity with the physical and chemical requirements placed on materials in nuclear power systems and suitable material systems through a series of homework assignments and mid-term exams.
3. **Economics of Nuclear Energy Production.** Students will build simple techno-economic models capable of analyzing the costs of nuclear energy projects.
    a. *ERS/ME 4***/ERS/ME 5*** Nuclear Power Systems (NPS)*
        i. Students, working in small groups, will prepare and deliver a final presentation on an emerging reactor design which covers the basic principles of operation, fuel requirements, and economics.
4. **Public Engagement.** Students will demonstrate the ability to communicate, in simple terms, the execution of nuclear energy projects and the technical and environmental risks associated with nuclear energy generation.
    a. *ERS 4***/5*** Law and Nuclear Technology (LNT)*
        i. Students will research applicable laws to nuclear power in a jurisdiction of their choice
        ii. Students will write a "regulatory analysis" paper that would describe the applicable legal framework and identify strengths and weaknesses for potential projects
        iii. Students will present findings to the class in an oral presentation.
    b. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Forensics*
        i. Students will research technical safeguards employed to limit the unwanted proliferation of nuclear material
        ii. Students will write a paper detailing the environmental/political context and technical execution of a particular forensic analysis.
    c. *ERS/CHEM 4***/ERS/CHEM 5*** - Nuclear Fuel Cycles (NFC)*

i. Students will prepare a technical presentation detailing the potential benefits and technical challenges associated with adopting "closed" nuclear fuel cycles.

d. *ERS 5**** - Energy Project Outreach and Communication
   i. 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.

Degree Program Evaluation

Explain how the program will be evaluated. Will you use exit surveys of graduates, employer surveys, mid- or end-of-program feedback through focus groups or surveys, etc.? Remember that by policy, all new degree will be evaluated within 5 years of startup, so this will help you in gathering artifacts upon which that evaluation can be based.

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 graduate certificate. Analyzing these data will allow SER/CEPS/NERC 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 certificate.

SER 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 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.

New Resources Required

Describe new resources required, including:

- *Faculty and instructional staffing* – SER and CEPS anticipate this certificate could be well supported by one additional tenure-track faculty member, for which Academic Affairs has already committed a faculty line and also for which SER and a grant from the Nuclear Regulatory Commission will provide a competitive startup package. In addition,

incremental costs for advising, lecturers and/or additional courses from existing UW faculty are expected to total ~$52,000/yr or less. Initial funds to support the cost will come from one-time state funding to SER. This certificate will be financially supported over the long term by an endowment pledged by the John P. Ellbogen Foundation which created the John P. Ellbogen Foundation Nuclear Energy Research Center Fund.

- *Program administration and staff support* - Administration and curriculum development for the certificate is the responsibility of SER and CEPS and guided by the co-directors of the Nuclear Energy Research Center, which is already funded by SER.
- *Technology* - Several technical courses will be supported by a new nuclear laboratory facility currently under construction, supported through funds from SER and the Department of Energy Nuclear Energy Universities Program (NEUP). No further technology is needed outside of new catalog entries.
- *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.
- *Support* - No other support is needed outside of a website, catalog entry and marketing materials.

Substantive Change Determination

Higher Learning Commission (HLC), UW's regional accrediting agency, must approve all substantive changes to UW's offering. HLC considers substantive change as the addition of a program (degree or certificate/credential level) not previously included in the institution's accreditation, usually judged to be a program that is a significant departure from normal offerings, the addition of a program with 50%+ new coursework required, or the addition or change to an existing program which will be delivered 50%+ through alternative (hybrid, online) delivery. After submitting the HLC screening form, this graduate certificate is considered a substantive change and will require review. SER will work with Academic Affairs to prepare for and execute this review.

Relationship to Other Offerings/Demand

Other nuclear energy science and engineering-focused certificate programs exist in the U.S. However, given Wyoming's unique status as a host for a first advanced reactor nuclear power system and other emerging projects, it is critical that UW creates opportunities for its students in this field. By establishing nuclear-focused certificates (both at the undergraduate level and graduate level) at UW, the university can tailor the design and delivery of material to emphasize technologies slated for deployment in Wyoming and other opportunities surrounding the nuclear supply chain. An on-campus traditional/face-to-face nuclear program at UW will help drive student interest in the field and connect students with exciting opportunities in the state and beyond.

This graduate certificate feasibility study is being submitted concurrently with a study for a corresponding undergraduate nuclear energy science certificate. While the subject matter of these certificate programs will be similar and rely on the same selection of dual-listed/crosslisted courses, these programs will be differentiated by placing additional requirements on students pursuing the graduate certificate compared to their undergraduate counterparts. In each course, graduate students will be expected to complete additional assignments demonstrating the deeper level of understanding and rigor expected of students pursuing a degree at the masters/doctoral level and the capability to independently research topics in the field. These measurements could vary, but additional page length requirements on papers, additional minutes on oral presentations, an additional project/assignment, etc. are good examples of how 4000/5000 level courses typically differ.

Executive Summary of Demand Statistics

Nuclear power generation, nuclear fuels production, and related fields employed >66,000 workers across the U.S. in 2022 [2]. While this number is currently small in comparison to natural gas (>580,000) and petroleum (>740,000), strong growth in this field is expected in coming years due to increasing demands for carbon-free baseload power generation, the advent of advanced nuclear reactor systems with improved safety features, and small modular reactors/microreactors which can be more easily deployed. These developments have already led to a surge of activity within Wyoming, including the construction of the first 4th generation reactor in Kemmerer (TerraPower's Natrium^{TM}), strong engagement with other advanced nuclear companies such as BWXT, and improved prospects for the state's uranium mining industry. Strong growth in nuclear-related mining/extraction industries has already been observed across the U.S., with growth of 12.9% in 2021-2022 [2].

The proposed certificate in nuclear energy science at UW will be targeted towards graduate students pursuing degrees in technical disciplines relevant to nuclear energy, particularly mechanical engineering, chemical engineering, chemistry, physics, computing and geology. Projected job growth data for these fields is included in the table below, with all showing strong (>5%) projected growth through 2032 [3].

Profession	2023 Median Pay	Typical Entry-Level Education	Number of Jobs 2022	Job Outlook 2022-2032
Nuclear Engineer	$125,460	B.S.	13,800	1%
Mechanical Engineer	$99,510	B.S.	286,100	10%
Chemical Engineer	$112,100	B.S.	20,800	8%
Chemist	$87,180	B.S.	95,000	6%
Physicist	$149,530	Ph.D.	23,600	5%
Geologist	$92,580	B.S.	26,300	5%

All data obtained from the Bureau of Labor Statistics (https://data.bls.gov)

There are currently 74 nuclear-related major/minor/certificate programs offered at 36 universities across the U.S. (see Figure 1). Of these schools, < 10 offer nuclear-focused certificate programs which could be utilized by B.S.-graduates seeking additional focused training in nuclear or M.S./Ph.D. students pursuing degrees in closely related fields. Based on the geographic distribution of these programs and the regional developments in the nuclear industry, SER and CEPS anticipate a program at UW would be attractive to current and future students. Additionally, the inclusion of coursework focused on policy, regulatory, and social matters in the certificates proposed here is relatively rare among current nuclear programs (Figure 2) and will provide students with a well-rounded view of the field, the value of which has been emphasized by UW collaborators and potential employers in the field.

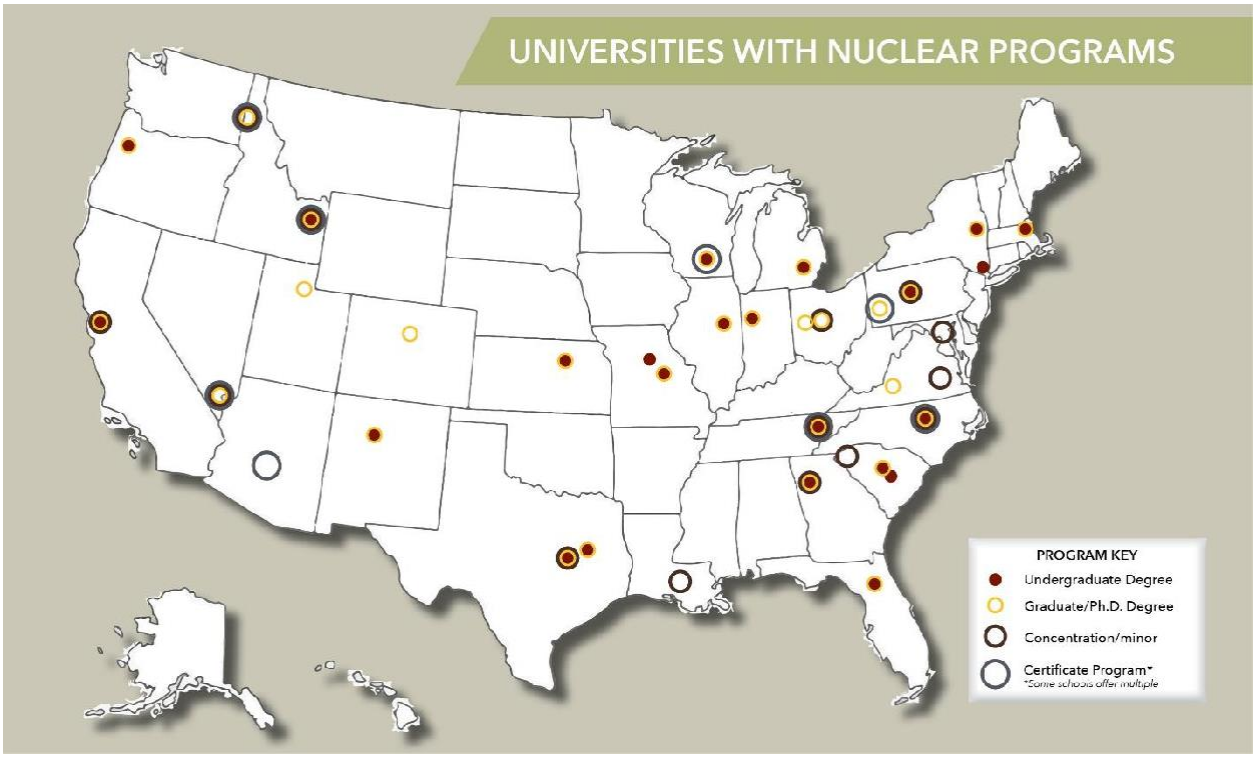


Figure 1: Geographical distribution of nuclear programs at universities across the U.S.

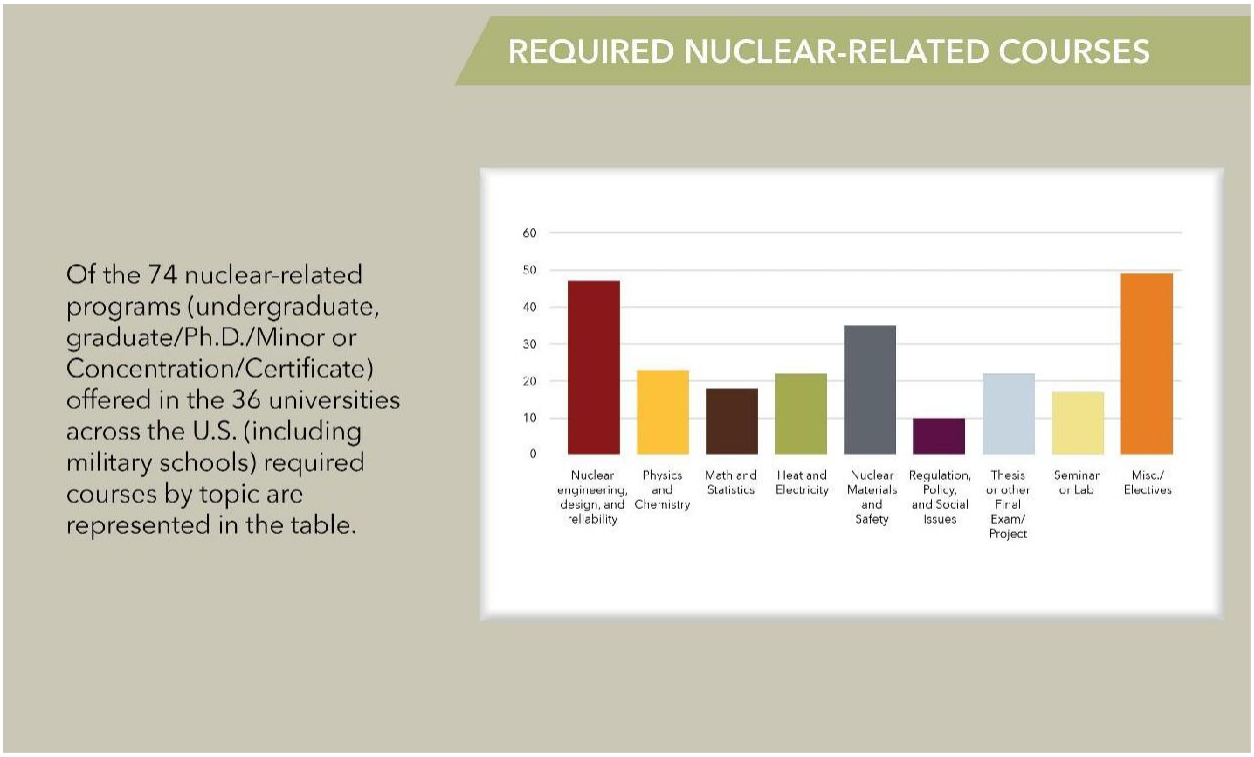


Figure 2: Course requirements in surveyed nuclear programs by topic.

References

[1] U.S. Bureau of Labor Statistics, "May 2023 National Industry-Specific Occupational Employment and Wage Estimates - Nuclear Electric Power Generation," [Online]. Available: https://www.bls.gov/oes/2023/may/naics5_221113.htm#17-0000.

[2] Department of Energy Office of Energy Jobs, "United States Energy & Employment Report 2023," 2023.

[3] U.S. Bureau of Labor Statistics, "Occupational Outlook Handbook".

Appendix A: LETTERS OF SUPPORT

May 1, 2024

Submitted Electronically

Subject: TerraPower, LLC Letter of Support
University of Wyoming, Nuclear Energy Science Certificate Proposals

Dear UW Board of Trustees:

TerraPower, LLC (TerraPower) is pleased to provide this letter in support for the School of Energy Resources (SER) and the College of Engineering and Physical Sciences (CEPS) for their Undergraduate and Graduate Nuclear Energy Science Certificate Proposals. The certificates contain curriculum and/or research crossover with SER's area of expertise.

TerraPower considers that this interdisciplinary approach is essential in addressing the ever-evolving challenges in the fields of nuclear energy and will make UW graduates more competitive in the job market upon graduation. It is evident that this program aligns well with our mutual objectives of innovation, holistic education, and for economic benefits in Wyoming, and beyond.

TerraPower is a leading nuclear innovation company that strives to improve the world through nuclear energy and science. Since it was founded by Bill Gates and a group of like-minded visionaries, we have emerged as an incubator and developer of ideas and technologies that offer energy independence, environmental sustainability, medical advancement and other cutting-edge opportunities. In 2021, Kemmerer, Wyoming was selected as the preferred site for the Natrium™ Reactor Demonstration Project, creating a unique alignment for Wyoming, university research capacity, natural resource/mineral resource availability, advanced energy workforce pipeline and supply chain capacity.

We at TerraPower are excited about this potential degree program and what it can offer to UW students. The cross-pollination of ideas, perspectives, and expertise from SER/CEPS will undoubtedly produce graduates who are well-rounded, adaptive, and prepared to tackle the complex issues surrounding nuclear energy resources in today's rapidly changing world. Furthermore, the skills and knowledge imparted through this program will empower graduates

to make meaningful contributions to the energy sectors, thereby addressing societal needs and global challenges.

TerraPower supports the development and implementation of this program; likewise, we plan to continue our summer intern program and invite interested students to apply. We otherwise remain interested in collaborating with other schools/colleges at UW, and these proposed Nuclear Energy Science certificates bring this to fruition.

In connection with TerraPower's commitment of support, understand that TerraPower will not, as part of its participation, disclose or provide, nor agree to disclose or provide, any intellectual property of TerraPower or any rights whatsoever in any of TerraPower's confidential or proprietary information.

We are pleased to support the Nuclear Energy Science Certificate Proposals as discussed herein.

Sincerely,

J.M. Cruse

Jonathan Cruse
Senior Director, Contracts
TerraPower, LLC

cc: Tara Neider, Senior Vice President and Project Director of Natrium
Craighton Goeppele, General Counsel

Idaho National Laboratory

April 24, 2024

UW Board of Trustees
Via Email

SUBJECT: Nuclear Energy Science New Certificates, Final Review

To Whom it May Concern:

I am writing to express my support for the School of Energy Resources (SER) and the College of Engineering and Physical Sciences (CEPS) for their Undergraduate and Graduate Nuclear Energy Science Certificate Proposals. The certificates contain curriculum and/or research crossover with SER's area of expertise.

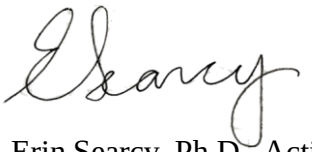
I and my colleagues at Idaho National Lab believe that this interdisciplinary approach is needed in addressing the ever-evolving challenges in the field of nuclear energy.

We at Idaho National Lab are excited about this potential degree program and what it can offer to UW students. The cross-pollination of ideas, perspectives, and expertise from SER/CEPS will produce graduates who are well-rounded, adaptive, and prepared to tackle the complex issues surrounding nuclear energy resources in today's rapidly changing world. Furthermore, the skills and knowledge imparted through this program will empower graduates to make meaningful contributions to the energy sectors, thereby addressing societal needs and global challenges.

We are always looking for opportunities to collaborate with UW, and these proposed Nuclear Energy Science certificates will help enable this.

Please do not hesitate to reach out if you need any further information or have any questions. We are enthusiastic about the prospect of working together on this endeavor.

Sincerely,



Erin Searcy, Ph.D., Acting Deputy Laboratory Director
Science & Technology and Chief Research Officer
Idaho National Laboratory

August 1, 2024

UW Board of Trustees,
RE: Nuclear Energy Science New Certificates, Final Review

I am writing to express my enthusiastic support for the School of Energy Resources (SER) and the College of Engineering and Physical Sciences (CEPS) for their Undergraduate and Graduate Nuclear Energy Science Certificate Proposals. The certificates contain curriculum and/or research crossover with SER's area of expertise.

My colleagues and I at Western Wyoming Community College (Western) believe that this interdisciplinary approach is essential in addressing the ever-evolving challenges in the fields of nuclear energy and will make UW graduates more competitive in the job market upon graduation. It is evident that this program aligns well with our mutual objectives of innovation, holistic education, and for economic benefits in Wyoming, and beyond.

We at Western are excited about this potential degree program and what it can offer to UW students. The cross-pollination of ideas, perspectives, and expertise from SER/CEPS will undoubtedly produce graduates who are well-rounded, adaptive, and prepared to tackle the complex issues surrounding nuclear energy resources in today's rapidly changing world. Furthermore, the skills and knowledge imparted through this program will empower graduates to make meaningful contributions to the energy sectors, thereby addressing societal needs and global challenges.

Western pledges its full support for the development and implementation of this program, including working to have an articulation agreement with programs at Western into this pathway. We are always looking forward to collaborating with other schools/colleges at UW, and these proposed Nuclear Energy Science certificates bring this to fruition.

Please do not hesitate to reach out if you need any further information or have any questions. We are enthusiastic about the prospect of working together on this endeavor.

Respectfully,

Kirk D. Young

Dr. Kirk Young
President
(307) 382-1601
kyoung@westernwyoming.edu

UNIVERSITY OF WYOMING | College of Engineering and Physical Sciences

RAY S. FERTIG III, PH.D., P.E.
PROFESSOR AND HEAD
DEPT. OF MECHANICAL ENGINEERING
1000 E. UNIVERSITY AVE.
LARAMIE, WY 82071
PHONE: (307) 766-3647
EMAIL: RFERTIG@UWYO.EDU

August 5, 2024

RE: Letter of Support for Proposed Nuclear Certificate Programs

To Whom It May Concern:

I am pleased to provide a letter of support for the proposed certificate programs in nuclear energy science under development by SER and CEPS. Opportunities in the nuclear sector are particularly relevant for undergraduate and graduate students in the Department of Mechanical Engineering, and the proposed certificate programs will establish more formal coursework in this area which will greatly benefit students interested in engaging with the state's growing nuclear sector. Our department is committed to supporting the development and implementation of the proposed certificate programs by serving as the departmental home for the core series of courses in nuclear engineering as described in the feasibility studies. I believe that this initiative will not only benefit our students but also support the continued development of nuclear industries within the state.

Sincerely,

Ray S. Fertig III, P.E.
Department Head
Professor of Mechanical Engineering

UNIVERSITY OF WYOMING

Professor Brian Leonard
Department of Chemistry
University of Wyoming
Laramie, WY 82071
Phone: (307) 766-4137
Fax: (307)766-2807
Bleonar5@uwyo.edu

July 31, 2024

To Whom It May Concern:

I am writing to express my emphatic support for the proposed undergraduate and graduate certificate programs in nuclear energy science. A number of students and faculty in the Department of Chemistry carry out research (supported by substantial external funding from the Department of Energy) in chemical separations and materials science which have direct applications in the development of advanced nuclear fuel cycles and high-performance materials for nuclear applications. The proposed certificate programs will support these efforts by establishing relevant coursework which will better prepare students for this ongoing work at UW and help make them more competitive for jobs in the nuclear sector with national laboratories or companies developing advanced nuclear technologies. In short, the proposed certificate programs have the full support of the Department of Chemistry.

Sincerely,

Brian Leonard
Professor and Head
Department of Chemistry
University of Wyoming

Faculty Senate Resolution 474 **Introduced by Executive Committee**

Resolution in Support of the Graduate Nuclear Energy Science Certificate

---

WHEREAS, the School of Energy Resources has proposed the addition of a graduate Nuclear Energy Science Certificate, as outlined in the attached proposal and feasibility study; and

WHEREAS, the Faculty Senate's Graduate Council (GC) has reviewed the proposal, as shown in the attached report from GC; and

WHEREAS, the GC has recommended approval of the degree program, as shown in the attached report from the GC;

THEREFORE, BE IT RESOLVED by the Faculty Senate of the University of Wyoming that Faculty Senate supports the recommendation of the GC as specified in the report attached hereto as applied solely to the graduate Certificate contained in the proposal.

AUTHENTICATION: The foregoing Faculty Senate Resolution 474, as amended, duly adopted by the Faculty Senate of the University of Wyoming under date of November 4, 2024, is hereby transmitted to the President of the University of Wyoming for review in accordance with UW Regulations.

Treva E Sprout Ahrenholtz

Treva E Sprout Ahrenholtz
Secretary, Faculty Senate
Dated: November 5, 2024

Passed 20-0-1

SENATE RESOLUTION #3008

TITLE: ASUW Supports the Creation of a Graduate Nuclear Energy Science Certificate

DATE INTRODUCED: 10/22/24

AUTHOR: Senator Morales

SPONSORS: President Murfitt, Chief of Legislative Affairs Bouma, Chief of Staff Hennigar, Senators Christensen, Harper, Jackim, Keasling, Langford, Rzeszut, and Shosh

1. WHEREAS, the purpose of the Associated Students of the University of Wyoming
2. (ASUW) is to serve our fellow students in the best manner possible; and,
3. WHEREAS, the Graduate Nuclear Energy Science Certificate gives students who
4. want to pursue careers in nuclear fields the chance to earn a credential requiring a strong
5. technical background in nuclear energy science and technology; and,
6. WHEREAS, there are currently no undergraduate or graduate minors, majors, or
7. certificates based on nuclear sciences; and,
8. WHEREAS, there are increasing opportunities in the state and region dealing with
9. nuclear energy and science; and,
10. WHEREAS, TerraPower is building a new advanced nuclear reactor in Southwest
11. Wyoming that is fueling excitement about nuclear energy in the state of Wyoming; and,
12. WHEREAS, adding a Graduate Nuclear Energy Science Certificate will make the
13. University of Wyoming more competitive; and,
14. WHEREAS, the certificate will be a two-year program that will require 15 credit hours
15. consisting of 6 required core courses and 9 elective courses which are listed in
16. Addendum A; and,
17. WHEREAS, the program follows a general track outlined by the Feasibility Study in

Passed 20-0-1

18. Addendum A; and,

19. WHEREAS, the program will have a launch date of Fall 2025; and,

20. WHEREAS, there is a demand for this type of program based on the Graduate Nuclear

21. Energy Science Certificate Feasibility Study document, found in Addendum A; and,

22. WHEREAS, there is a lot of support for this program both within and outside of the

23. University as outlined in Addendum A and Addendum B; and,

24. WHEREAS, the program requires minimal new resources, the required facilities are

25. already under construction, and the program will fall under the School of Engineering

26. and Physical Sciences.

27. THEREFORE, be it resolved by the Associated Students of the University of Wyoming

28. (ASUW) Student Government that we support the implementation of Graduate Nuclear

29. Energy Science Certificate; and,

30. THEREFORE, be it further resolved that this resolution be circulated to the student

31. body through ASUW channels; and,

32. THEREFORE, be it further resolved that this resolution be sent to the Board of Trustees

33. and all corresponding departments immediately upon passage.

Referred to: _____ All Standing Committees _____

Date of Passage: October 29th,2024 Signed**:** _____

(ASUW Chairperson)

"Being enacted on October 29th, 2024 **, I do hereby sign my name hereto and approve this**

Senate action." _____

ASUW President

This template is intended to be used as a basic guide to generate a projection of additional expenses and revenues at the University.

Cells in orange are variables which can be updated as needed. Please enter information in numerical tab order.

Cells in gray calculate automatically

Row		Fiscal Year 1	2	3	4	
	Revenue					
1	Cummulative Total NEW headcount enrollment	6	14	22	32	
2	NEW Resident enrollment (# of new students entering the program each year)	6	8	8	10	Based on other SER certificates
3	NEW Non Resident Enrollment (# of new students entering the program each year)					
4	*Resident (credit hours delivered outside of NEW Program)*	180	420	660	942	
5	Resident (credit hours delivered in NEW Program)	0	0	0	0	
6	*Non Resident (credit hours delivered outside of NEW Program)*	0	0	0	0	
7	Non Resident (credit hours delivered in NEW Program)	0	0	0	0	
8	**Total Resident credit hours generated****	180	420	660	942	
9	**Total Non Resident credit hours generated****	0	0	0	0	
10						
11	Per Credit Tuition*					
12	Resident (Posted Tuition Rate)	$173	$180	$187	$195	Resident undgrad rate as the most conservative approach
13	Nonresident (Posted Tuition Rate)	$1,006	$1,046	$1,088	$1,132	
14	Prior Year's Non Resident Discount Rate (updated annually by the budget office)	0%	0%	0%	0%	Reduced to zero as this is a certificate program
15	Estimated Actual Non Resident Per Credit Tuition	$1,006	$1,046	$1,088	$1,132	
16	*Total Resident Tuition generated outside of NEW Program*	$31,140	$75,566	$123,497	$183,315	
17	Total Resident Tuition in NEW Program	$0	$0	$0	$0	
18	*Total Non Resident Tuition outside of NEW Program*	$0	$0	$0	$0	
19	Total Non Resident Tuition in NEW Program	$0	$0	$0	$0	
20						
21	**Total Tuition from NEW Enrollment**	$31,140	$75,566	$123,497	$183,315	
22						
23	**Fees**					
24	Program Per Credit Hour	$0	$0	$0	$0	* note that this program does not have a college "home," and program fee will vary by focus area and accrue to the appropriate college. Thus, to simplify and keep the budget conserverative, the fee has been set to $0 for the pro forma
25	Program Fee Revenue	$0	$0	$0	$0	
26	*Advising Fee Per Credit Hour*	$6.00	$6.00	$6.00	$6.00	
27	*Advising Fee Revenue*	$1,080	$2,520	$3,960	$5,652	
28	*Mandatory Fee (Per Full Time Student)*	$883.00	$918.32	$955.05	$993.25	
29	*Mandatory Fee Revenue*	$5,298	$12,856	$21,011	$31,784	
30						
31	**Total New Revenue Generated Within New Program**	$0	$0	$0	$0	
32	***Total New Revenue Generated Outside of the Program***	$37,518	$90,943	$148,468	$220,751	
33	**Total New Revenue Generated**	$37,518	$90,943	$148,468	$220,751	
34						
35	**New Program Expense Assumptions**					
36	Compensation and benefits					
37	Faculty	$14,000	$42,000	$42,000	$42,000	Conservative assumption of using all lecturers at rate of $7,000 per 3 credit hours
38	Other administrative staff	10000				
39	Graduate Assistants					
41	Supplies					
42	Travel					
43	Marketing	$1,000	$1,000	$1,000	$1,000	Existing teams will market these proposed new certificates
44	Capital expense	0	0	0	0	
45	Other (specify)	0	0	0	0	
46						
47	**Projected Financial Results for New Program**	**FY1**	**FY2**	**FY3**	**FY4**	
48	Total Expenses	$25,000	$43,000	$43,000	$43,000	
49	Total New Revenues Remaining with Program	$0	$0	$0	$0	
50	**New Program's Total Surplus or Deficit**	**-$25,000**	**-$43,000**	**-$43,000**	**-$43,000**	SER will cover all costs using one-time state funds initially and long-term funding from the Ellbogen Foundation matched by the state of Wyoming to create a $2 million endowment generated approximately $80k/yr
51	Operating margin (surplus or deficit / revenues)	No Value	No Value	No Value	No Value	

* UW's Board of Trustees' current working policy is to raise tuition by 4% each year

Last updated 2/27/19

Enter Course of Study, Credit Hours, indicate if the course is new and if the course will be offered throug			
Freshman Fall	15	NEW Course	Distance Option
Course	3	☐ Yes	☐ Yes
Q	3	☐ Yes	☐ Yes
USP C1	3	☐ Yes	☐ Yes
USP FYS	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Freshman Spring	15		
USP PN	3	☐ Yes	☐ Yes
USP H	3	☐ Yes	☐ Yes
USP V	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Sophmore Fall	16		
USP PN	3	☐ Yes	☐ Yes
USP C2	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	4	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Sophmore Spring	15		
USP H	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Junior Fall	15		
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Junior Spring	15		
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Senior Fall	15		
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes

Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Senior Spring	15		
USP C3	3	☐ Yes	☑ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☐ Yes	☐ Yes
Course	3	☑ Yes	☐ Yes
Course	3		

Total Hours 120

			NEW CREDIT HOURS OFFERED BY ACADEMIC YEAR							
			1		2		3		4	
Freshman Fall	New Course	hours	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
Course	FALSE	3	0		0		0		0	
Q	FALSE	3	0		0		0		0	
USP C1	FALSE	3	0		0		0		0	
USP FYS	FALSE	3	0		0		0		0	
Course	FALSE	3	0		0		0		0	
Freshman Spring										
USP PN	FALSE	3		0		0		0		0
USP H	FALSE	3		0		0		0		0
USP V	FALSE	3		0		0		0		0
Course	FALSE	3		0		0		0		0
Course	FALSE	3		0		0		0		0
		30	0	0	0	0	0	0	0	0
Sophmore Fall					0		0		0	
USP PN	FALSE	3			0		0		0	
USP C2	FALSE	3			0		0		0	
Course	FALSE	3			0		0		0	
Course	FALSE	3			0		0		0	
Course	FALSE	3			0		0		0	
Sophmore Spring						0		0		0
USP H	FALSE	3				0		0		0
Course	FALSE	3				0		0		0
Course	FALSE	3				0		0		0
Course	FALSE	3				0		0		0
Course	FALSE	3				0		0		0
		30	0	0	0	0	0	0	0	0
Junior Fall										
Course	FALSE	3					0		0	
Course	FALSE	3					0		0	
Course	FALSE	3					0		0	
Course	FALSE	3					0		0	
Course	FALSE	3					0		0	
Junior Spring								0		0
Course	FALSE	3						0		0
Course	FALSE	3						0		0
Course	FALSE	3						0		0
Course	FALSE	3						0		0
Course	FALSE	3						0		0

		30	0	0	0	0	0	0	0	0	
Senior Fall										0	
Course	FALSE	3								0	
Course	FALSE	3								0	
Course	FALSE	3								0	
Course	FALSE	3								0	
Course	FALSE	3								0	
Senior Spring											0
USP C3	FALSE	3									0
Course	FALSE	3									0
Course	FALSE	3									0
Course	FALSE	3									0
		27	0	0	0	0	0	0	0	0	
Total Hours		117	0	0	0	0	0	0	0	0	

Teaching load	fall	spring								
faculty line 1	9	6	0	0	0	0	0	0	0	0
faculty line 2	9	6	0	0	0	0	0	0	0	0
faculty line 3	9	6	0	0	0	0	0	0	0	0
faculty line 4	9	6	0	0	0	0	0	0	0	0

		0.43							
Compensation	Salary	Benefits	1		2		3		4
faculty line 1		$0	0	$0			$0		$0
faculty line 2		$0	0	$0			$0		$0
faculty line 3		$0	0	$0			$0		$0
faculty line 4		$0	0	$0			$0		$0
			0		$0		$0		$0

For more specific salary and benefit data please contact the Budget Office at 766-9028

ACADEMIC AND STUDENT AFFAIRS

COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Low-Producing Programs 2-13 Recommendations**, Benham-Deal

☒ PUBLIC SESSION
☐ EXECUTIVE SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
☒ Yes
☐ No

FOR FULL BOARD CONSIDERATION:
☐ Yes
[Note: If yes, materials will also be included in the full UW Board of Trustee report.]
☒ No

☒ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY:
The Provost and Office of Academic Affairs are committed to systematically examining all data on academic enrollment, low-producing programs, and low-enrolled courses and making informed decisions based on policy, process, and strategic planning.

In July 2018, the newly drafted and approved Standard Administrative Policy and Procedure (SAP) on Academic Program Review stated that:

"On an annual basis, the Office of the Provost will review degree production for all academic programs. Those that are low producing, will be required to conduct an immediate review with a report on the status of the program due back to the Office of the Provost within six months. If in the judgement of the Office of the Provost, a compelling case has not been made for continuation, the program will be recommended for reorganization, consolidation, and reduction or discontinuance pursuant to UW Regulation 2-13."

Due to the COVID pandemic and administrative changes in Academic Affairs, the first annual review of low-producing programs was requested by the Provost in 2023. As a reminder, the first review process identified 58 programs (24 undergraduate and 34 graduate) as low producing. Out of those 58 identified programs, 7 undergraduate and 10 graduate programs were discontinued in March of 2024. In addition to the annual review of low-producing programs, as required by the SAP, the Provost has been working with Deans to review:

- Course scheduling efficiencies such as class offerings and frequency

- Low-enrollment classes
- Identifying high DWF (drop/withdrawal/fail) courses for department review

On April 29, 2024, the Provost requested this year's annual review by colleges and schools of 29 programs identified as low producing. Reports from the colleges and schools on these programs were due November 1, 2024. Following the Deans' recommendation, the Provost will provide a list of programs recommended for the UW Regulation 2-13 process. Of the 29 programs, 9 will be recommended for discontinuation, 10 will be recommended for consolidation, and 10 are recommended for continuing with justifications and next steps in future reviews.

College of Arts and Sciences:

- B.A. in Religious Studies – Continue one more year/consider merger with Philosophy
- B.A. in Art History – Discontinue after AY24-25
- B.A. in African and Diaspora Studies– Discontinue after AY24-25
- B.A. in Gender and Women's Studies– Discontinue after AY24-25
- M.A. in Political Science – Continue with increased attention on recruitment

College of Agriculture, Life Sciences and Natural Resources

- B.S. in Botany – Continue additional two years with recruitment efforts
- M.S. in Botany – Continue-program offers desired connections with federal partners
- M.S. in Entomology – Consolidate process in 2025
- M.S. in Soil Sciences – Consolidate process in 2025
- M.A. in Molecular Biology – Discontinue after AY24-25
- PhD in Botany – Discontinue after AY24-25
- PhD in Entomology – Consolidate process in 2025
- PhD in Soil Sciences – Consolidate process in 2025
- PhD in Molecular Biology – Continue with projected increased enrollment

College of Education

- MST in Physics – Consolidate process in 2025
- MST in Mathematics– Consolidate process in 2025
- MS in Natural Science – Consolidate process in 2025
- MS in Natural Science-Middle Level Math – Consolidate process in 2025
- MS in Natural Science-Middle Level Science – Consolidate process in 2025
- MS in Natural Science-Natural Science Education – Consolidate process in 2025
- MA in Educ-Educational Administration – Discontinue after AY24-25
- MS in Educ-Educational Administration – Discontinue after AY24-25
- MS in Educ-Educational Leadership – Continue for students offered both MA and MS
- MS in Educ-Special Education – Continue for students offered both MA and MS
- EdD in Educ-Educational Administration – Discontinue after AY24-25
- EdD in Educ-Curriculum & Instruction – Continue with the requested student demand
- PhD in Educ-Curriculum & Instruction – Discontinue after AY24-25

College of Engineering and Physical Sciences

- B.A. in Chemistry – Continue with increased attention on enrollment, review in three years
- B.A. in Physics – Continue with increased attention on enrollment, review in three years

WHY THIS ITEM IS BEFORE THE COMMITTEE:
University Policy on Review of Low-Producing Programs

ACTION REQUIRED AT THIS COMMITTEE MEETING:

PROPOSED MOTION:

UNIVERSITY OF WYOMING

College of Arts and Sciences
Office of the Dean
Dept. 3254• 1000 E. University Avenue• Room 114, A&S Building • Laramie, WY 82071
Phone (307) 766-4106 • fax (307) 766-2697 • e-mail: asdean@uwyo.edu • www.uwyo.edu/as

LOW COMPLETION PROGRAMS REPORT
August 26, 2024

B.A. IN RELIGIOUS STUDIES

RECOMENDATION- Continue 1 more year and if no improvement consider merger (see below)

RATIONALE-

- Reduced full-time faculty from 6.5 to 3.5 and fewer course offerings have driven lower demand for the degree. However, two recent hires have driven increased enrollment and enthusiasm for the degree.

COMMENTS-

- Work to move more students toward completion of the degree
- Increase the number of cross listed courses with other disciplines
- Assign seasoned instructors in 1000 and 2000 level courses
- Reconfigure the curriculum to attract a broader range of students
- Make better connections with student advisors
- Increase marketing and visibility
- *Consider possible merger of BA in Philosophy and BA in Religious Studies into one degree*

M.A. IN POLITICAL SCIENCE

RECOMENDATION- Continue

RATIONALE-

- The pandemic led to fewer enrolments and graduates. These students do qualitative research in the field and students elected to delay work toward the degree.
- Student enrollment and graduation numbers are trending upward to meet graduation requirements by Spring 2025.

COMMENTS-

- Department has taken steps in recruiting to enroll and graduate sufficient numbers that are yielding results

- New Quickstart 4+1 program has potential to accelerate graduations
- For additional data and detailed comments see included report from department

B.A. IN ART HISTORY

RECOMENDATION- Eliminate after AY24-25

COMMENTS-

- Eliminate the BA in Art History and move its curricula into a track with the successful BA in Studio Art.
- The department will engage in a curricular review in AY24-25 to implement this change next year.

B.A. IN AFRICAN AND DIASPORA STUDIES

RECOMENDATION- Eliminate after AY24-25

COMMENTS-

- Eliminate the BA in African and Diaspora Studies due to low enrolled and completion rates.
- The department will engage in a curricular review in AY24-25 to implement this change next year.

B.A. IN GENDER AND WOMEN'S STUDIES

RECOMENDATION- Eliminate after AY24-25

COMMENTS-

- Eliminate the BA in Gender and Women's Studies due to low enrolled and completion rates.
- The department will engage in a curricular review in AY24-25 to implement this change next year.

CALSNR Low Completion Programs
Review and Recommendations

October 25, 2024

In response to the call from the Provost's office to examine CALSNR's low completion rate programs, each affected department head was asked to discuss their identified programs with their faculty. Department heads then provided a recommendation to the college administrative team that reviewed the recommendations and provided feedback. The reviews and recommendations provided below represent a culmination of these discussions.

B.S. in Botany. Enrollment has increased in recent years, with 26 students enrolled as majors in Fall 2023. However, graduation rates have been trailing, averaging 2.2 over the last five years.

The increase in enrollment following the curriculum adjustments and increased marketing efforts in 2022 provide initial support for the success of these efforts (see summer 2023 low completion report). In the fall of 2021 the program had 16 students, which increased to 26 by 2022. The department would like to allow for another two years to determine the full effect of their efforts and make a more informed decision at that point, such as to include Botany as a concentration in the Biology B.S.

M.S. in Botany. Between AY 2018-2019 and AY 2022-2023, there have been a total of 19 students enrolled in the program, with the following outcomes for those students:

- 15 graduated with their M.S. in Botany (including those who were enrolled during this period and then graduated in AY 2023-2024)
- 2 moved to the Ph.D. in Ecology and Evolution
- 1 moved into the Ph.D. in Botany
- 1 student did not return

These statistics suggest that the program is desired, productive and students are either completing their degrees or moving into Ph.D. programs. In addition, the coursework required for the M.S. in Botany is also used by other departments and programs, including Ph.D. programs, and the courses are not underenrolled. Finally, M.S. degrees in Botany are important research connections with federal partners including the US Forest Service, Bureau of Land Management, and National Park Service.

Ph.D. in Botany. Of the 7 students enrolled in the Ph.D. program between AY 2018-2019 and AY 2022-2023, 1 completed their degree, 5 moved into the Ph.D. in Ecology and Evolution, and one moved down to the M.S. in Botany program.

It appears that the Ph.D. in Botany is often a gateway into the Ph.D. in Ecology and Evolution program. As the Ph.D. in Ecology and Evolution is an interdisciplinary degree with many students advised by Botany faculty, this makes sense. As of fall 2024, there are 18 students in the Ph.D. in Ecology and Evolution program whose primary advisor is faculty in Botany. Further, courses taught for the Ph.D. in Botany are not underenrolled (despite typically having on average 2 enrolled Ph.D. students over the last 5 years), as these courses are heavily used by the Program in Ecology and Evolution, the Program in Hydrologic Science, and graduate students from the departments of Zoology and Physiology, Ecosystem

Science and Management, Plant Sciences, Haub School, Civil Engineering, Geology and Geophysics, and Atmospheric Science.

Our recommendation is to eliminate the Botany Ph.D. and instead focus on the Ph.D. in Ecology and Evolution. As there are some students who enter the Ph.D. in Ecology and Evolution through the Botany Ph.D., we would ask for institutional support to increase marketing and recruitment of students into this program to ensure continued support of graduate education and faculty research in the Botany department.

There is one student currently enrolled in the Ph.D. in Botany, however since course offerings would not be affected by this change, this student should be able to complete their degree with minimal, if any, changes to their program of study.

M.S. and Ph.D. in Entomology and M.S. and Ph.D. in Soil Sciences. There have been no graduates in the entomology program over the past 5 years. The M.S. in Soil Science has an average enrollment of 3 with 1-2 graduates a year, and the Ph.D. has an average enrollment of 9 with 0-3 graduates per year.

As discussed in the summer 2023 low enrollment report, faculty loss in these two areas has dramatically impacted student numbers. Although there is still interest in and desire for these areas, both from the faculty and students, the ESM department agrees that at this time, offering these as stand-alone areas is currently not sustainable. The department would like to consolidate their graduate-level degree offerings into one degree with multiple concentration options (e.g., Entomology, Rangeland Ecology and Watershed Management, Soil Science). As this change requires multiple steps (determining the right name for the overall degree and the appropriate concentrations, completing and submitting the appropriate change forms and going through the formal review process, updating all catalog and website information, etc.), the anticipated timeline to have this new degree with concentrations in place and ready to accept students is Fall 2026. Spring 2025 would be used to determine the degree name, requirements and concentrations; the existing degree change forms would be submitted by Fall 2025 so that campus and Trustee approval would occur in time for the changes to take affect in the Fall 2026 catalog.

M.A. and Ph.D. in Molecular Biology. The M.A. has an average enrollment of 1-2 students a year, with only one graduate in the last year. The Ph.D. has seen increased enrollments, starting in the 2020-2021 academic year, however graduation rates have remained around 2-3 students on average.

Although graduation rates in the Ph.D. program have remained steady over the last 5 years, we would expect the larger class from 2020-2021 to start graduating in 2025-2026, and believe the enrollment increases will result in increased graduation rates in the next few years. We ask that the program be given time to demonstrate the results of these increased enrollment numbers.

However, the department acknowledges that the M.A. has a low enrollment that only serves a small number of students. The proposed M.S. in Preclinical Sciences will fill some of this void although students will have to take different course work and another department will administer the degree. In conclusion, we accept the elimination of the M.A. in Molecular Biology.

Program	Academic Year	Erl	Comp	AA Question or Comment	Response
MA in Educ-Educational Administration	2018-19	3	11	Dramatic drop in completions and no one enrolled.	We recommended this to be discontinued last year and stopped enrolling.
	2019-20	0	2		
	2020-21	1	0		
	2021-22	0	1		
	2022-23	0	0		
	Five YR Average	**0.8**	**2.8**		
MS in Educ- Educational Administration	2018-19	0	0	Only 1 completion in the past 5 years and nobody is enrolled.	We recommended this to be discontinued last year and stopped enrolling. Our last completer is finished.
	2019-20	0	0		
	2020-21	0	0		
	2021-22	0	0		
	2022-23	0	1		
	Five YR Average	**0**	**0.2**		
MS in Educ-Educational Leadership	2018-19	0	0	2 completions in last 5 years; no enrollment	Keep it open. MS degrees are needed since the registrar will not allow students with a MA degree in Education to earn another MA degree in Education.
	2019-20	0	0		
	2020-21	0	2		
	2021-22	0	0		
	2022-23	0	0		
	Five YR Average	**0**	**0.4**		
MS in Educ-Special Education	2018-19	0	0	1 completion in last 5 years; no enrollment.	Keep it open. MS degrees are needed since the registrar will not allow students with a MA degree in Education to earn another MA degree in Education.
	2019-20	0	0		
	2020-21	0	1		
	2021-22	0	0		
	2022-23	0	0		
	Five YR Average	**0**	**0.2**		
MS in Natural Science*[1]	2018-19	1	1		These enrollments were calculated for students with no "First Concentration". Have not offered this for several years, so enrollees are probably into a different program (probably Middle level). We need something that gives a non-formal education program instead. Faculty recommend lumping all MS degrees into one under 2-13.
	2019-20	1	0		
	2020-21	1	0		
	2021-22	1	0		
	2022-23	3	0		
	Five YR Average	**1.4**	**.02**		
MS in Natural Science-Middle Level Math*	2018-19	12	3		These enrollments were calculated for students with "Middle Level Math" first concentrations.
	2019-20	12	4		
	2020-21	11	1		
	2021-22	9	0		
	2022-23	8	4		

Program	Academic Year	Erl	Comp	AA Question or Comment	Response
	Five YR Average	**10.4**	**2.4**		Faculty recommend lumping all MS degrees into one under 2-13.
MS in Natural Science-Middle Level Science*	2018-19	15	4		These enrollments were calculated for students with "Middle Level Science" first concentrations. Faculty recommend lumping all MS degrees into one under 2-13.
	2019-20	14	1		
	2020-21	14	1		
	2021-22	13	1		
	2022-23	10	5		
	Five YR Average	**13.2**	**2.4**		
MS in Natural Science-Natural Science Education	2018-19	25	7	Can these (MS degrees) be combined into a single degree with concentrations (JA says they are in fact concentrations within a degree)?	These enrollments were calculated for students with "Middle Level Science Education" first concentrations. Faculty recommend lumping all MS degrees into one under 2-13.
	2019-20	24	3		
	2020-21	21	4		
	2021-22	22	6		
	2022-23	16	4		
	Five YR Average	21.6	**4.8**		
MST in Mathematics	2018-19	0	0	No enrollment for 5 years	Merge this program into the MST in Natural Science
	2019-20	0	0		
	2020-21	0	0		
	2021-22	0	0		
	2022-23	0	0		
	Five YR Average	**0**	**0**		
MST in Natural Science*	2018-19	1	0	What is the difference b/n the MS and MST in Natural Science?	The MST degrees were created to provide options for students who already held a masters degree in the target area, similar to the MS degree in Special Education. We recommend merging this program with the MST in Mathematics and the MST in Physics.
	2019-20	1	0		
	2020-21	1	0		
	2021-22	1	0		
	2022-23	1	1		
	Five YR Average	**1**	**0.2**		
MST in Physics	2018-19	0	0	No enrollment for 5 years	Merge this program into the MST in Natural Science
	2019-20	0	0		
	2020-21	0	0		
	2021-22	0	0		
	2022-23	0	0		
	Five YR Average	**0**	**0**		
EdD in Educ-Curriculum & Instruction	2018-19	10	5	Do we need both EdD and PhD? Enrollment trending positive.	We recommend keeping the Ed.D. program. Ed.D. degrees are different
	2019-20	8	2		
	2020-21	19	1		

Program	Academic Year	Erl	Comp	AA Question or Comment	Response
	2021-22	14	1		than PhD degrees as they target scholar practitioners. They address leaders in educational fields. They attract national students. They strengthen our relationship with Wyoming's higher education and K12 system. They generate a lot of demand.
	2022-23	18	3		
	Five YR Average	**13.8**	**2.4**		
EdD in Educ-Educational Administration	2018-19	0	8	3 completions in last 3 years; no enrollment	We recommended a teach-out in the last report. No longer accepting applicants. This is different from EdD in Educational Leadership.
	2019-20	0	2		
	2020-21	0	0		
	2021-22	0	3		
	2022-23	0	0		
	Five YR Average	**0**	**2.6**		
PhD in Educ-Curriculum & Instruction	2018-19	3	0	Do we need both EdD and PhD? 2 completions in last 5 years; no enrollment	We recommended a teach-out in the last report. No longer accepting applicants. However, we would like to revisit the scope and breadth of the PhD in Curr & Inst-Curriculum Studies to better suit more content area needs such as social studies, art, etc.
	2019-20	1	1		
	2020-21	0	0		
	2021-22	1	0		
	2022-23	0	1		
	Five YR Average	**1**	**0.4**		

*Indicates that enrollment numbers were taken from ODS and not on AA affairs report, [1]Indicates a slight correction from AA report given ODS SQL data extraction.

Summary Recommendations by Degree

1. **MA in Educational Administration**
    - **Issue**: Dramatic drop in completions; no enrollment.
    - **Recommendation**: Discontinue. Enrollment was stopped last year following a recommendation.
2. **MS in Educational Administration**
    - **Issue**: Only one completion in the last five years; no current enrollment.
    - **Recommendation**: Discontinue. Enrollment was stopped, and the last completer has finished.
3. **MS in Educational Leadership**
    - **Issue**: Only two completions in the last five years; no current enrollment.
    - **Recommendation**: Keep open. Needed to accommodate students who cannot pursue a second MA in Education.
4. **MS in Special Education**
    - **Issue**: One completion in the last five years; no current enrollment.
    - **Recommendation**: Keep open. Required to offer MS degrees to those unable to earn a second MA.
5. **MS in Natural Science**
    - **Issue**: Low enrollment; no formal offerings in recent years.
    - **Recommendation**: Consolidate all MS in Natural Science programs into a single degree structure (2-13).
6. **MS in Natural Science - Middle Level Math**
    - **Issue**: Steady enrollment but part of a fragmented degree structure.
    - **Recommendation**: Consolidate all MS in Natural Science programs into a single degree structure (2-13).
7. **MS in Natural Science - Middle Level Science**
    - **Issue**: Consistent enrollment but scattered degree pathways.
    - **Recommendation**: Consolidate all MS in Natural Science programs into a single degree structure (2-13).
8. **MS in Natural Science - Natural Science Education**
    - **Issue**: High enrollment but should be part of a more streamlined degree structure.
    - **Recommendation**: Consolidate all MS in Natural Science programs into a single degree structure (2-13).
9. **MST in Mathematics**
    - **Issue**: No enrollment for five years.
    - **Recommendation**: Merge this program into the MST in Natural Science. We will continue to review.
10. **MST in Natural Science**
    - **Issue**: Low but consistent enrollment; unclear differentiation from MS.
    - **Recommendation**: This degree comes from the Arts and Science college.
11. **MST in Physics**
    - **Issue**: No enrollment for five years.
    - **Recommendation**: Merge this program into the MST in Natural Science. We will continue to review.
12. **EdD in Curriculum & Instruction**
    - **Issue**: Enrollment is positive and trending upwards.
    - **Recommendation**: Retain. This program supports scholar-practitioners and maintains strong connections with local education systems and national students.
13. **EdD in Educational Administration**
    - **Issue**: Few completions; no current enrollment.
    - **Recommendation**: Discontinue. Implement teach-out plan. This program is distinct from EdD in Educational Leadership and EdD in Education Administration.
14. **PhD in Curriculum & Instruction**
    - **Issue**: Low completions; no current enrollment.
    - **Recommendation**: Discontinue with teach-out.

UNIVERSITY OF WYOMING
College of Engineering and Physical Sciences

WORKING FOR WYOMING & THE WORLD

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October 31, 2024

TO: Acting Provost Benham-Deal

SUBJ: CEPS low-producing programs

In response to Provost Carman's request of 29 April 2024 regarding low-producing degree programs in CEPS, with a due date of 1 November 2024, I tasked each associated Department Head to work with their faculty and provide a response/rationale for the programs you identified. To recap, you identified two degree programs in CEPS:

- B.A. in Chemistry, and
- B.A. in Physics.

I have reviewed the responses provided by the two departments regarding these programs, and provide these responses intact as files that accompany this memo, as they each provide more detail than would be appropriate here in this document. What follows here is a brief summary of my conclusions and recommendations regarding each of these two programs.

B.A. in Chemistry

- Conclusion: This program is very similar to the B.A. in Physics. It has reduced requirements in chemistry courses compared to the B.S. in Chemistry, and provides a pathway for more students to major in chemistry (i.e., as a second major to education, engineering, physics, mathematics, and liberal arts, for example). More importantly for the state of Wyoming is that it is needed for any chemistry education majors, for which the state currently has a shortage. All the College of Education's secondary science degree programs are, by design, dual programs, with the student earning a dual B.A. in both the College of Education and the college where the subject matter content is provided. Eliminating the chemistry B.A. would thus eliminate the possibility of the state of Wyoming producing qualified high school chemistry teachers. It is a "no-cost" program in that it does not cost the university additional money or any other resources to keep the program. No additional faculty lines are involved, and no additional courses or course sections are required of the program. Efforts are underway to increase enrollment.
- Recommendation: maintain the program, allow efforts to go forward to increase enrollment, and re-evaluate in 3 years.

B.A. in Physics

- Conclusion: This program has reduced requirements in math and physics compared to the B.S. in Physics, and provides a pathway for more students to major in physics (i.e., as a second major to education, engineering, chemistry, mathematics, and liberal arts, for example). More importantly for the state of Wyoming is that it is needed for any physics education majors, for which the state currently has a

shortage. All the College of Education's secondary science degree programs are, by design, dual programs, with the student earning a dual B.A. in both the College of Education and the college where the subject matter content is provided. Eliminating the physics B.A. would thus eliminate the possibility of the state of Wyoming producing qualified high school physics teachers. It is a "no-cost" program in that it does not cost the university additional money or any other resources to keep the program. No additional faculty lines are involved, and no additional courses or course sections are required of the program. Efforts are underway to increase enrollment. It's also pertinent to note that the UW Department of Physics and Astronomy was nationally recognized by the Physics Teacher Education Coalition for producing qualified high school physics teachers.

- Recommendation: maintain the program, allow efforts to go forward to increase enrollment, and re-evaluate in 3 years.

In summary, each of the two programs Provost Carman identified were examined by the faculty of the affected departments, and the responses they provided informed my conclusions and recommendations for each program. I recommend continuing both degree programs, with a plan to re-evaluate them in 3 years.

I note that both degree programs discussed above were also identified by Provost Carman in 2023, and the recommendation at that time was to maintain both programs but reevaluate them in 3 years. Provost Carman agreed at that time with the recommendation. That was one year ago, so I'm unsure why they are being reevaluated so soon; it may have been inadvertent. In any case, both programs appear to have merit, and work is already underway to increase student participation in both of the degree programs.

I hope that this memo, with the accompanying files, together provide the response that you sought. If you desire more details or further elaboration on my part, I will be happy to provide that.

Respectfully,

Cameron H. G. Wright
Carrell Family Dean
Professor of Electrical and Computer Engineering

Atch: 1. 2024 Low Completion program Chem BA justification.pdf
2. 2024 low completion program BA Physics response.pdf

COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Strategic Enrollment Update**, Benham-Deal, Moore

☒ PUBLIC SESSION
☐ EXECUTIVE SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
- ☐ Yes
- ☒ No

FOR FULL BOARD CONSIDERATION:
- ☐ Yes
  [Note: If yes, materials will also be included in the full UW Board of Trustee report.]
- ☒ No

☐ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY:
Following discussions with the Board of Trustees in July 2024 on UW's strategic enrollment planning process, UW Administration will provide the Trustees an update on recruiting, enrollment, and marketing strategies during the public session on Thursday, November 20. The intent of this agenda item during the Academic and Student Affairs committee will be to have a conversation on the content and strategy of the public presentation and to solicit feedback from the committee Trustees on further questions and processes to address.

WHY THIS ITEM IS BEFORE THE COMMITTEE:
Academic and Student Affairs Committee requested an update on Strategic Enrollment planning and activities.

ACTION REQUIRED AT THIS COMMITTEE MEETING:

PROPOSED MOTION:

COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Next Generation University Studies Program (USP)**, Benham-Deal

☒ PUBLIC SESSION
☐ EXECUTIVE SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
- ☒ Yes
- ☐ No

FOR FULL BOARD CONSIDERATION:
- ☐ Yes
  [Note: If yes, materials will also be included in the full UW Board of Trustee report.]
- ☒ No

☒ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY:
The Next Generation USP committee was initially charged in 2020 to redesign the University Studies Program, UW's core undergraduate general education curriculum. Various committees and subcommittees consisting of over 80 UW faculty and staff worked over the last four years to collect and synthesize data and best practices, facilitate listening sessions, and provide recommendations on a revised general education program. The Next Gen Executive Committee from spring submitted a report to the Office of the Provost in May 2024. From that report, the Next Generation USP 2026 has been released to campus with the fall 2024 semester dedicated to a robust review process.

The purpose of the Next Generation USP is to provide and expand on the three key foundations of learning for undergraduate students as required in UW Regulation 2-105, including (1) Knowledge of Human Culture, the Physical & Natural World, and the U.S. & Wyoming Constitutions, (2) Intellectual and Practical Skills, and (3) Personal & Social Responsibility. The USP provides learning experiences that help students develop skills necessary for full participation in a technologically, politically, and culturally complicated world.

These skills are developed through courses associated with the categories shown below:

Next Generation USP Categories and Credit Expectations:
1. Written Communication (W) - 3 credits
2. Oral Communication (O) - 3 credits
3. Advanced Communication (A) - 3 credits
4. Natural Sciences (N) – 6-8 credits
5. Quantitative Reasoning (Q) - 3 credits
6. Humanities and Fine Arts (H) - 3 credits
7. Social and Behavioral Sciences (S) - 3 credits

8. Constitutional and Civic Literacy (C) - 3 credits
9. Digital Literacy (D) - 3 credits
10. Experiential Learning (E) - 0-3 credits

The USP Review Working Group will be attending Q&A sessions, reviewing all feedback collected, and working to finalize recommendations for the incoming Interim Provost and Vice Provost for Undergraduate Education later this fall. A final Next Gen USP 2026 model will be presented to the Faculty Senate and the UW Board of Trustees in Spring 2025.

WHY THIS ITEM IS BEFORE THE COMMITTEE:
Academic and Student Affairs Committee requested an update. The last report to the board occurred in September 2023.

ACTION REQUIRED AT THIS COMMITTEE MEETING:

PROPOSED MOTION:

UNIVERSITY OF WYOMING

General Studies Program

The University of Wyoming (UW) University Studies Program (USP) was first instituted in 1991. Since its inception in 1991, the USP has been revised in 2003, 2015 and is currently undergoing this proposed "Next Generation" review for **launch in fall of 2026.**

The purpose of the Next Generation USP is to provide and expand on the three key foundations of learning for undergraduate students as required in UW Regulation 2-105, including: (1) Knowledge of Human Culture, the Physical & Natural World, and the U.S. & Wyoming Constitutions, (2) Intellectual and Practical Skills, and (3) Personal & Social Responsibility. USP provides learning experiences that help students to develop skills necessary for full participation in a technologically, politically, and culturally complicated world.

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6. Humanities and Fine Arts (H) - 3 credits
7. Social and Behavioral Sciences (S) - 3 credits
8. Constitutional and Civic Literacy (C) - 3 credits
9. Digital Literacy (D) - 3 credits
10. Experiential Learning (E) - 0-3 credits

Total credits: 30-35

To meet the learning outcomes of the Next Generation USP requirements, students can choose from a wide variety of courses that align with their personal interests and career aspirations. In many majors, courses meeting Next Generation USP requirements may simultaneously fulfill the requirements of the major.

The Next Generation USPs and Student Learning Outcomes

UW Next Generation USP 2026 is designed to prepare students to engage with a dynamic, global, and digital world that will nurture their individual potential. This general education program fosters essential skills, knowledge, and mindsets that equip students to succeed in whatever discipline they choose upon graduation. Effective holistic education – one that brings together skills, knowledge, and mindsets – readies students to pursue immediate career goals as well as to embrace significant personal, cultural, and workplace changes that are hallmarks of a dynamic society.

Thus, Next Generation USP 2026 is designed to:

1. Create a learning environment that values free expression, personal integrity, and mutual respect.
2. Provide learning opportunities to broaden students' horizons of knowledge to position them for success in future careers.
3. Introduce students to pathways of thinking and understanding across disciplines to become critical thinkers, successful problem solvers, and effective collaborators and leaders.
4. Promote the development of strong communication skills that will help students contribute to civic and personal success.
5. Develop essential skills that prepare them to be productive members of a complex world and that are of value to the workplace, their local, national, and global communities, and to them as individuals.
6. Prepare students to become life-long, self-aware learners.

Written Communication (W)

As students move into and beyond college, they will encounter a variety of contexts that require them to engage effectively through written communication. Producing effective texts across those varied settings requires a writer to extend their understanding of audience expectations and possibilities for structures, evidence, and tone. The process of becoming a more nimble and self-aware writer through Written Communication (W) courses should reveal the power of writing to deepen critical thinking and the understanding of others.

Written Communication student learning outcomes include:

1. Apply written communication principles within written assignments for multiple specific purposes, audiences, and situational contexts.
2. Employ strategies for exploring research topics and refining research questions; locate, select, evaluate, synthesize, and document sources; and incorporate outside facts, perspectives, and ideas in writing to extend ideas and support nuanced positions.
3. Demonstrate critical engagement with texts (e.g., through detailed annotation of a course reading, analysis of research sources, peer review, self-evaluation against a rubric or checklist, etc.).
4. Apply composition strategies by engaging in a process of inventing, investigating, drafting, revising, and editing to produce a range of written texts.
5. Demonstrate self-evaluation through reflection about writing products, processes, identity, and/or contexts.

Oral Communication (O)

Effective oral communication – developing, delivering, and verbally responding to messages – is invaluable in many civic and workplace contexts. Students who take Oral Communication (O) courses come away with skills in analyzing audiences, designing effective communication structures, selecting appropriate evidence, and strategically using verbal and non-verbal communication strategies and practices. Additionally, they are able to engage effectively with audiences through active listening and critically evaluating the messages of others.

Oral Communication student learning outcomes include:

1. Apply oral communication principles within spoken assignments for multiple specific purposes, audiences, and situational contexts, including multiple formal presentations and at least one interactive setting (e.g., discussion, collaborative project, meeting).

2. Compose messages for a variety of situations by determining the purpose of oral discourse; choosing topics according to purpose and audience; formulating clear focal purposes; providing adequate supporting material; and selecting suitable organization patterns.
3. Deliver messages using skills suitable to the topic, purpose, audience, and context, with attention to vocal variety in rate, pitch, intensity; articulate clearly, use appropriate language for audience; and use nonverbal behavior and visual materials in support of messages.
4. Listen and respond to messages and construct meaning from spoken and nonverbal messages; interpret the speaker's purpose and organization of ideas and information; engage with an open mind while also critically evaluating weaknesses of others' messages.
5. Demonstrate self-evaluation through reflection on communication performances, processes, identity, and/or contexts.

Advanced Communication (A)

Advanced Communication (A) courses are designed to engage students in developing and applying their rhetorical skills to communication tasks of increasing nuance and complexity. When taking Advanced Communication courses, students engage in learning designed to facilitate growth and mastery. They deliver a formal presentation complete with supporting visuals appropriate to the audience, and they produce at least one formal written project. Courses also incorporate informal writing and speaking-to-learn activities into the curriculum, providing ample opportunities for students to deepen their learning through communication tasks.

Advanced Communication student learning outcomes include:

1. Apply rhetorical knowledge, in substantial oral and written projects, in response to specific discipline, interdisciplinary, or professional settings, audiences, and purposes.
2. Use digital technology to support communication processes and products.
3. Demonstrate critical engagement with a text(s) for specific disciplinary, interdisciplinary, and/or professional use (e.g., through detailed annotation of a course reading, analysis of research sources, peer review, self-evaluation against a rubric or checklist, etc.).
4. Evaluate, synthesize, and document primary and/or secondary information to support conclusions or positions in accordance with disciplinary, interdisciplinary, or professional expectations.
5. Engage in multiple formative writing- and speaking-to-learn activities (e.g., in-class writing, note-taking, oral and written discussion, response journals, mind maps, exploratory freewriting, exit tickets).

Natural Sciences (N)

In Natural Sciences (N) courses, students encounter the fundamental concepts and methods of scientific inquiry, including the formulation and testing of hypotheses and the application of scientific principles to draw conclusions. These courses enable students to think critically about empirical claims, to understand the relevance of scientific and technological thought to contemporary society, and, potentially, to pursue further coursework in physical and natural sciences.

Natural Sciences student learning outcomes include:

1. Articulate the principles of the scientific method.
2. Formulate and test hypotheses by analyzing observations and data.
3. Apply scientific principles and reasoning to solve problems and draw conclusions.
4. Examine the impacts of technology on science and society.

Quantitative Reasoning (Q)

In Quantitative Reasoning (Q) courses, students examine problems from an array of contexts relevant to personal, civic, and professional life. Quantitative Reasoning encompasses logical, abstract, geometric, statistical, numerical, and algorithmic modes of understanding and analysis. All of these modes contribute to critical thinking capacities within students.

Quantitative Reasoning student learning outcomes include:

1. Formulate, analyze, and interpret quantitative arguments in a variety of personal, civic, and professional contexts.
2. Solve problems using different quantitative reasoning methods, such as logical, abstract, geometric, statistical, numerical, and algorithmic reasoning.
3. Communicate quantitative reasoning using words, tables, graphs, diagrams, and equations.

Humanities and Fine Arts (H)

Humanities and Fine Arts (H) courses support students in developing a critical understanding of human thought, arts, and culture. These courses explore questions of the human condition through philosophical, literary, religious, historical, artistic, and language-based perspectives. Awareness and understanding in the humanities and arts help students develop critical, creative, and interpretive skills needed to function in an increasingly diverse world and contribute to society as educated and culturally competent citizens.

Humanities and Fine Arts student learning outcomes include:

1. Describe the history, philosophy, arts, and/or literature of different traditions, cultures, and/or global regions.
2. Assess human values, ideas, and/or perspectives and their role in shaping human culture and society from a literary, religious, historical, artistic, philosophical, and/or language-based perspective.
3. Analyze the ways cultural meanings are depicted through different forms of expression (e.g., visual arts, performing arts).
4. Evaluate ethical, social, cultural, and/or political issues facing society from a literary, religious, historical, philosophical, artistic, and/or language-based perspective.
5. Identify and assess their own and others' values; identify the underlying premises in their own and others' arguments.

Social and Behavioral Sciences (S)

Social and Behavioral Sciences (S) courses introduce students to institutions, cultures, and behaviors through the study of local and global societies. The social and behavioral sciences help students think critically about human culture and society and encourage them to demonstrate their knowledge through applying skills and responsibilities to new settings and complex problems. Students will engage with a diversity of viewpoints and perspectives. Such courses acquaint students with fundamental concepts, theories, and methods of analysis used in the social and behavioral sciences.

Social and Behavioral Sciences student learning outcomes include:

1. Explain human ideas and experiences and how they influence societies, human behavior, and human-social interactions.
2. Compare different social and behavioral science methods and theories to interpret and explain human events, behaviors, and cultures.
3. Examine the dynamic interaction of one's self, other individuals, groups, and societies as they shape and are shaped by history, culture, institutions, and ideas.
4. Critically evaluate multiple points of view on social, cultural, and/or political issues as expressed in different historical or social contexts.
5. Acquire diverse information through focused research, active discussion, and collaboration with peers.

Constitutional and Civic Literacy (C)

In Constitutional and Civic Literacy/Wyoming Constitution (C) courses, students explore how American systems sustain society when individuals uphold social duties. They learn individuals secure personal success through informed, discerning participation that upholds constitutional ideals. This develops civic devotion in future generations, cementing the ethos that we must invest in society to reap shared success, and recognizes that progress

emerges from dedication to community duties alongside exercising individual rights. Courses focus on the constitutions to build knowledge central to participatory citizenship. Analyzing the principles and structures of checks, balances, equality, and representation fosters skills for the responsible exercise of freedoms of speech, expression, and decision-making beyond voting. Civic participation requires understanding how democratic institutions interconnect to sustain societal wellbeing.

Constitutional and Civic Literacy student learning outcomes include:

1. Demonstrate the ability to analyze and evaluate the formal and informal principles, processes, and structures of the U.S. and Wyoming constitutions and political systems.
2. Describe the historical development and cultural context of the U.S. and Wyoming constitutions and political systems.
3. Articulate the relationship between understanding the political institutions by which they are governed and their roles as responsible participants in a democratic system.
4. Evaluate information sources to establish informed opinions.
5. Critically analyze core political and economic concepts, principles, and processes that shape the United States and Wyoming systems of government.

Digital Literacy (D)

Digital literacy is the ability to ethically and critically use, understand, explore, evaluate, create, and apply information using a range of digital technologies. As the world continues to evolve into a digital landscape, Digital Literacy (D) courses encourage students to navigate a variety of tools, technologies, and skills to prepare them to be productive and inclusive members of a diverse world. Digital literacy encourages students to explore how digital technologies work and to consider the ethical, legal, and critical uses of these technologies, including the inequities of access to digital information and technologies. It also encourages students to evaluate how different digital technologies will be useful within their fields and the world. It allows students to create and apply digital information, technologies, and skills within their professional lives and work.

Digital Literacy student learning outcomes include:

1. Find, evaluate, and apply digital information to meet discipline specific needs.
2. Develop skills to apply and/or adopt digital technologies to create evidence and/or problem-based responses for needs in their respective fields.
3. Critically evaluate needs related to digital access in their fields.
4. Demonstrate ethical and/or appropriate use of digital information and technologies.

Experiential Learning (E)

Experiential Learning (E) involves students in ‘learning by doing’ through direct hands-on engagement in immersive real-world experiences. Students become active participants in applying knowledge and theoretical concepts gained in the classroom to practical problem-solving and to reflect on, integrate, and apply the new insights and skills gained to enrich and deepen their own learning and personal development and to position them for success in their ongoing studies and future careers. Experiential learning can take place through both curricular and co-curricular pathways as a complement to academic programs of study, including through volunteerism, service learning, leadership, public service, or other forms of community engagement at local, national, or international levels; internships, externships, or entrepreneurship opportunities with non-profit organizations, businesses, corporations, government, and non-governmental organizations; participation in international study abroad, place-based learning, or domestic study away programs; or through other significant experiential forms of undergraduate research, teaching, creative, or educational activities.

Experiential Learning student learning outcomes include:

1. Demonstrate initiative, ownership, and responsibility by being actively involved in designing their own experiences as intentional and engaged learners.

2. Apply existing knowledge and skills gained from prior classroom or practical experience to navigate new, unpredictable, and novel encounters that challenge and engage them intellectually, emotionally, socially, and/or physically.
3. Employ iterative critical questioning, investigation, and/or experimentation to resolve complex practical problems and have the opportunity to learn from real-world consequences, mistakes, and successes.
4. Engage in a substantive reflection process involving critical observation, analysis, and self-evaluation of the new knowledge, skills, relationships, insights, and/or meanings gained through their experience.
5. Demonstrate and clearly articulate an ability to integrate, synthesize, and transfer the new knowledge and skills gained through experience to inform their own ongoing studies, personal development, community engagement, and/or future careers.

Next Generation USP-Wide Policy Recommendations

Credits inside and outside the major:

- Background: In the current 2015 USP, some of the components require students to take the course outside of the major.
- Policy recommendation: No requirement that any Next Generation USP component must be fulfilled outside of the major.

"Double designation" on USP components:

- Background: Current policy requires only one USP designation per course.
- Recommendation: Courses can only fulfill one USP component. The exception is the Experiential Learning (E) component. As the Experiential Learning component can be fulfilled with 0 credits, a course can be approved to be both an Experiential Learning (E) course along with one other USP designation if that course meets all required SLOs for both components.

Upper/lower division restrictions or prerequisites:

- Background: Related University Regulation 2-105
- Recommendation: Individual course prerequisites/corequisites will guide course registration practices, not additional expectations set on specific USP categories. All Next Generation USPs can be delivered at lower/upper division except for the Advanced Communication (A) component which will continue to be designated and required at the upper division (3000-4000) level as outlined in UW Regulation 2-105.

Common policy on completing all student learning outcomes:

- Background: In the current 2015 USP, the H requirement allows for a range of SLO adoptions, which makes assessment challenging.
- Recommendation: For course approval and Next Generation USP designation, every Student Learning Outcome must be met for that component.

Minimum grade-level fulfillment:

- Background: Minimum grade expectations exist within some of the current 2015 USPs, but there is no consistency.
- Recommendation: The Next Generation USP must be completed with a letter grade of D or better, or with an S (Satisfactory).

Transfer Student Policy and Goals

For students transferring to UW, the Office of Transfer Relations works with Wyoming Community Colleges to maintain course-level articulation so students at these partner sites achieve adequate levels of performance to continue their education at UW. The goal of the Next Generation USPs is to be simple, flexible and transparent and align with our SAP: Undergraduate Transfer Policy

In terms of in-state articulation, responsibility for ongoing course- and program-level articulation with Wyoming community colleges resides with departments and is coordinated by the Office of Transfer Relations. Articulation with Wyoming community colleges in lower-level coursework occurs on an annual basis. UW's participation in the Western Interstate Commission for Higher Education (WICHE) and National Council for State Authorization Reciprocity Agreements (NC-SARA) provides affirmation that UW student learning outcomes and course delivery approaches are consistent with those offered by other schools regionally and nationally.

USP Assessment

UW has a robust system of continuous assessment and improvement for undergraduate and graduate programs. This includes 1) institutional analysis of individual program assessments that review the clarity, frequency, culture, labor, and educational improvement dimensions of a program and program review process; 2) a curriculum mapping process where departments submit curriculum maps for analysis; and 3) an assessment coordinators group which includes assistant and associate deans for all colleges and schools to promote a culture of institutional assessment back to individual departments.

UW plans to evolve beyond baseline accreditation expectations to address and improve upon something more ephemeral – student learning. To accomplish this, the next phase is to implement a comprehensive USP assessment plan including the development of standing USP Subcommittees that will focus on key issues of assessment, curricular review and approval, and faculty development for each Next Gen USP component. As part of their work, these USP Subcommittees will share their preferred plans for incremental and staggered analysis of the student learning outcomes of each USP, and a coordinating USP Executive Committee will review these plans with an eye toward consistency. These plans will then be implemented and collated into USP-wide annual assessment reports.

Coordinating and implementing a USP-wide assessment structure will also involve multiple groups on campus including Faculty Senate's University Studies Committee, the Office of Academic Affairs and the Ellbogen Center for Teaching and Learning. Our goal is to create an integrated workflow where 1) USP curriculum approval, 2) faculty and course development designed to assist faculty in reaching USP outcomes, and 3) USP assessment are accomplished in concert with one another and that involved leaders have exposure to all three aspects to ensure each phase is informing the other. This will require involvement from current participants and new representatives, new financial resources and incentives for participation, and an elevated focus on how courses are approved, faculty are equipped to educate students, and the university ensures its foundational learning model is preparing UW undergraduates for their lives after graduation.

Faculty Development and Training

To implement the model listed in the USP Assessment section, new financial resources will be necessary. Some existing funds may be redeployed to the efforts described in this document, but it is also likely these funds are not sufficient to support broader access to faculty development and the detailed effort to review, document, and recommend improvements to each USP category on an ongoing basis. Approximately $100,000 a year is currently used to implement program assessment and some elements of faculty training. Next, the university will review if these funds should be redeployed to support these new assessment efforts or remain as funding for current efforts while new funds are identified.

Ultimately, the new USP assessment structure, and the funds used to implement it, will allow UW to 1) understand what students are learning and how courses are having a meaningful impact on their education, and 2) implement

improvements on a consistent basis due to a stable USP assessment structure. Next, the university will gather current practices and associated costs and cross reference this with a new USP assessment model to determine the best use of current funds and any needed additional funds. Of note, the Experiential Learning (E) and Digital Literacy (D) USPs are new to the model and will require additional new investment and support structures. Suggestions on these support structures are listed below and those specific to Experiential Learning (E) are included in an Appendix.

While not a comprehensive list, faculty development and training opportunities under consideration include:

- Educator learning communities for sharing of knowledge, best practices, and interdisciplinary collaboration. These communities would also help programs and instructors understand the central features and expectations of the varying USPs.
- Workshops on how to assemble a successful approval packet for courses that will carry new USP designations.
- Workshops on how to reconfigure existing classes to ensure they meet new SLOs.
- Periodic meetings with faculty from various disciplines to discuss teaching approaches and share insights.
- A common resource bibliography that includes videos, links, and other resources to help achieve SLOs.
- Adoption of fully open-source resources by instructors to promote accessibility and reduce costs for students.
- An online community where new instructors can access resources, receive mentorship, and engage in discussions with experienced faculty will create a supportive environment that fosters continuous improvement.
- Assessment tool recommendations will help faculty effectively evaluate student learning outcomes and make data-driven decisions to refine their courses over time.
- Instructor access to digital technologies, licenses, and tools needed to incorporate technologies into courses.
- Shareable resources and templates in Canvas to incentivize best practices.
- Faculty/staff awards to recognize excellence in teaching USP courses, or managing USP efforts, at UW.
- Consideration of how USP contributions will be recognized within faculty and staff job descriptions and tenure and promotion to incentivize participation.

Development and Review/Revision Timeline and Process

PHASE I: Fall 2020-2023

Committee charge and preliminary work

PHASE II: Spring 2023-Fall 2023

Spring 2023

- Focused research and recommendations (Feb-May 2023)
- Submission of initial sub-committee reports (May 2023)

Summer 2023

- Committee chair retreats (May and June 2023) for development of initial program draft
- Submission of initial Next Gen USP draft to EVP Carman for review and feedback (August 2023)

Fall 2023

- Reconstituted executive committee works on policies and components
- Early review session with Board of Trustees Committee on Academic and Student Affairs

PHASE III: Spring 2024

Spring 2024

- Next Generation Education Fellows Chair Subcommittees on Next Gen USP Model
- Early Constituent Feedback

- Faculty Senate Executive Committee
- Deans and Directors
- Advising Managers
- Community College Academic Affairs Council
- SS&G Parent Committee
- DEI Staff

Summer 2024

- Provost review

August 2024

- Provost approves final draft and reviews with Spring 2024 Next Gen Executive Committee

PHASE IV: Fall 2024

Review Process with Campus and Constituents

October/November/December

- Next Gen USP 2026 Proposal released to campus and community colleges
- Review/Q&A Sessions
  - October 23 - Community College open session
  - October 24 - Community College open session
  - October 30 - UW Campus open session
  - November 8 - UW Campus open session
  - November 4 - Faculty Senate
  - December 2 – Faculty Senate
- Constituents for additional targeted review sessions:
  - Registrar
  - Admissions
  - ASUW
  - Staff Senate
  - University Studies Committee
  - President's Cabinet
  - Faculty/Departments (broadly)
  - Advisors/Advising Managers
  - Academic Forum (Deans/Directors)
  - Department Heads
  - Ellbogen Center for Teaching and Learning
  - Community colleges
  - Board of Trustees Committee on Academic and Student Affairs
  - UW Institutional Marketing

Appendix I: University of Wyoming Regulation and Accreditation Requirement for USP

University of Wyoming Regulation 2-105 governs the University Studies Program. The regulation is available at: http://www.uwyo.edu/regs-policies/_files/docs/regulations-2018/uw_reg_2-105_approved_7-12-18.pdf.

The University of Wyoming is regionally accredited by the Higher Learning Commission (HLC), which requires a clearly articulated general studies program. HLC is one of six regional U.S. organizations that accredit degree-granting, post-secondary educational institutions in the United States. Background information on the HLC can be found at www.hlcommission.org.

HLC publishes a set of criteria that UW must satisfy to maintain accreditation. UW completed a highly successful review in Fall 2019 and provided a follow-up report to HLC in June 2024. Below are the criteria related to the general education component. The full criteria are available for review at: https://www.hlcommission.org/Policies/criteria-and-core-components.html.

Criteria 1.C. The institution provides opportunities for civic engagement in a diverse, multicultural society and globally connected world, as appropriate within its mission and for the constituencies it serves.

1. The institution encourages curricular or cocurricular activities that prepare students for informed citizenship and workplace success.
2. The institution's processes and activities demonstrate inclusive and equitable treatment of diverse populations.
3. The institution fosters a climate of respect among all students, faculty, staff, and administrators from a range of diverse backgrounds, ideas, and perspectives.

Criteria 3.B. The institution offers programs that engage students in collecting, analyzing and communicating information; in mastering modes of intellectual inquiry or creative work; and in developing skills adaptable to changing environments.

1. The general education program is appropriate to the mission, educational offerings and degree levels of the institution. The institution articulates the purposes, content and intended learning outcomes of its undergraduate general education requirements.
2. The program of general education is grounded in a philosophy or framework developed by the institution or adopted from an established framework. It imparts broad knowledge and intellectual concepts to students and develops skills and attitudes that the institution believes every college-educated person should possess.
3. The education offered by the institution recognizes the human and cultural diversity and provides students with growth opportunities and lifelong skills to live and work in a multicultural world.
4. The faculty and students contribute to scholarship, creative work and the discovery of knowledge to the extent appropriate to their offerings and the institution's mission.

Appendix II: Additional Notes on the Experiential Learning (E) Component

Satisfaction of the Experiential Learning (E) component requirement of the USP can be completed through either curricular or co-curricular pathways. Students may complete an approved (E) designated course for 1 or more credit hours. Alternately, students may complete an approved co-curricular experiential learning activity supervised by university faculty or staff for zero credit hours.

All curricular or co-curricular pathways to satisfy the (E) component must meet all the required student learning outcomes and include a minimum of 40+ hours of direct student engagement in experiential learning activities, including planning, direct activity and engagement, reflection, and integration.

For co-curricular pathways to satisfy the (E) component, students must also complete an online 'portfolio' documenting iterative student reflection before, during, and after engagement in experiential learning and complete an integrative project that demonstrates a student's ability to synthesize, transfer, and apply knowledge gained through their experience to their own ongoing studies, personal development, and/or future careers.

A) Proposed Support Structures for the Experiential Learning Component (E)

It is anticipated that the introduction of the new Experiential Learning (E) component of the Next Generation USP will require additional institutional support. It is anticipated that this will include the creation of a proposed Office of Experiential Learning (OEL) that will serve as a centralized institutional 'hub' on campus to coordinate, support, enhance, and expand experiential learning opportunities for UW undergraduate students. Among other tasks, the anticipated work of the OEL would include:

- Overseeing the approval, renewal, and assessment of (E) designated courses and co-curricular activities
- Overseeing Faculty/Staff Development 'Seed Grants' to incentivize incorporation of significant E components and SLOs into new or existing courses
- Work with campus partners (including the ECTL and LAMP) to provide instructional design support for faculty and staff on 'best practices' in experiential learning, including both curricular integration, co-curricular mentorship, and the creation of a 'Portfolio' template on Canvas/Wyocourses that can be shared by faculty/staff overseeing co-curricular (E) pathways or adopted into curricular pathways
- Helping to connect students with curricular and co-curricular opportunities to satisfy the (E) requirement, including the creation of an online database and website that will serve as a main centralized 'portal' to connect students, advisors, faculty, and staff with opportunities offered across UW
- Coordinating with Office of the Registrar in capture of curricular and co-curricular pathways in official student transcripts and development of accompanying ePortfolios or 'visual transcript' to document student engagement in curricular and co-curricular experiential learning at UW
- Assisting in developing a cohesive and equitable system for recognition/compensation of faculty/staff time in supervising curricular and co-curricular experiential activities (Eg. 'On-load' course recognition or 'off-load' compensation, job descriptions, T&P process) to encourage and incentivize participation
- Serving as a central liaison point with Colleges, Units, and Advisors on experiential education at UW, including identifying opportunities for greater institutional coherence, alignment, 'best practices,' and new interdisciplinary program development
- Working with Colleges and Units to expand curricular and co-curricular offerings by building new local, state, national, and international external partnerships and serve as a key connection-point for external organizations looking to partner with UW students on new experiential opportunities
- Liasing directly with campus advisor networks to connect students with experiential opportunities
- Administering Faculty & Staff Recognition Awards to recognize excellence in experiential education
- Assist Colleges, UW Foundation, and Scholarships & Financial Aid on development of new targeted scholarships to encourage student access, participation, and equity in access to experiential learning

B) Potential Examples of Existing Experiential Learning (E) Courses at UW (Curricular Pathway)

Numerous courses currently exist across Colleges and Units at the University of Wyoming that would serve as potential 'exemplars' for curricular 'for-credit' experiential learning pathways (if adapted to meet designated SLOs), many of which include internships, study abroad, practicums, place-based learning, applied research, and field research. A number of these were identified in UW's earlier 'Carnegie Classification for Community Engagement' application. Identified UW hubs for existing curricular (E) component integration include the College of Arts and Sciences, the Haub School, College of Business, Health Sciences, School of Pharmacy, Engineering, and Honors College as well as Education Abroad, SLCE, and CSIL.

The below is a very small representative sample to highlight the breadth of existing curricular pathways:

ANSC 4250: Advanced Equine Production and Management
Art Education Student Teaching and Practicum ((Inc. ART 4810: Residency for Elementary, ART 4820: Residency for Secondary, ART 3550: Art Education Practicum)
CNSL 3010: Student Leadership Strategies
ENR 3700: Wyoming Conservation Corps Practicum
ENR 4010/4011/4012: Skills of the Winter Naturalist; Snowpack Dynamics and Snow Science; Wildlife and Plant Adaptations
ENR 4890/5890: Coastal Climate Resilience
ENTR 4700: Business Model Creation and Launch
HP 4155: Buddhism in Thailand [Study Abroad]
HP 4156: Capstones for Community Engagement
INST 4970/5970: Internship in International Studies
ME/ESE 4060/4070L: Senior Capstone Experience
MUSC 4700/4710: Elementary/Secondary Student Teaching
NURS 4695: Senior BASIC Professional nursing Care of Populations Practicum
POLS 4550: Internship in Government
PSYCH 4960: Service Learning in Psychology

C) Examples of Non-Credit Options for (E) Component (Co-Curricular Pathways)

Outside of curricular pathways to fulfill the (E) USP requirement embedded in 'for-credit' coursework at UW, students will also have the ability to fulfill this requirement through significant engagement in a broad array of co-curricular experiential learning activities.

This co-curricular pathway is designed to give students flexibility in fulfillment of the (E) USP requirement while also ensuring that their engagement with these co-curricular activities continues to fulfill the designated Student Learning Outcomes (transcripted at zero credit hours). It is anticipated this flexibility will be of particular importance to our transfer, distance, and online students. As noted in the proposed policies, these co-curricular pathways must be significant (40+ hr) engagements and accompanied by completion of a reflective online 'portfolio' and final integrative project that are to be overseen and evaluated by UW academic personnel (faculty or staff) working in conjunction with an on-campus or off-site supervisor, where appropriate.

There are a wealth of co-curricular opportunities that may be 'captured' to fulfill the (E) requirements both at UW and in our local, state, national, and international communities. A key area of development will be providing a central 'connection point' for UW students to engage in these activities and to further develop new external partnerships via the proposed OEL in partnership with existing UW Colleges, Units and Centers for student engagement and involvement in co-curricular activities. At UW and in the local community, current examples of

experiential learning opportunities that could fulfill the EL requirement through a co-curricular pathway include, among others:

- Internships with Wyoming businesses, industry partners, and entrepreneurs
- Involvement in Student Leadership at UW (ASUW, Non-Traditional Student Council, Leadership Academy, Cowboy Coaches, Residence Life, First-Year Institute Facilitator, Outdoor Programs, RSOs, Fraternity and Sorority Life, etc.) and/or other opportunities via CSIL
- Appropriate work-study, undergraduate research, or on-campus internship positions, including in student media, advertising, marketing, VA Work-study, etc.
- Volunteerism, Non-Profit, and Community Engagement Opportunities via SLCE or the Office of Engagement and Outreach
- Non-credit bearing engagement in professional and applied experiences for Outdoor Leadership, ENR, ESS, and ORTM students
- Local, State or National internships including via UW's 'Handshake' partners or other opportunities provided to students via ACES
- Involvement in Wyoming Conservation Corps/Americorps/ServeWyoming
- Internships, volunteerism, or other engagements with Wyoming Non-Profit Organizations, Wyoming Community, City of Laramie Community Partners, United Way of Albany County, Laramie Interfaith, Downtown Laramie, etc.

Appendix III: Additional Notes on the Digital Literacy (D) Component

A) Potential Examples of Existing Digital Literacy Courses at UW

Numerous courses exist across Colleges and Units at the University of Wyoming that would serve as potential 'exemplars' for the proposed Digital Literacy component. The below is a small representative sample to highlight the breadth of existing courses:

ACCT 3610: Accounting Information Systems
AGEC 2040: Excel Applications in Ag Business
ANTH 4155: Computer Programming for Archaeologists
ANTH 4160: GIS in Anthropology
ART 1115: Digital Media
ASTR 2310: General Astronomy I
ASTR 2320: General Astronomy II
BKCH 4021: Business Applications of Blockchain
CHE 4000: Environment, Technology and Society
COJO 3520: Communication Technology and Society
COJO 4040: Digital Video Production
COMP 2000: Guest Lecture in School of Computing
EDAG 4170: Principles of Agriculture Mechanics and Technology
EECS 2390: Digital Systems Design
EECS 3320: Signals & Systems
EECS 3331: Electronics II
ENGL 2005: Writing in Technology and the Sciences
GIST 2190: Introduction to Programming in Geospatial Information Science and Technology
HIST: 2050: Introduction to Public History
HIST 3020: Historical Methods
HIST 5055: Archival Research Methods
ITEC 2360: Teaching with Technology
ITEC 4340: Technology Integration in Teaching
MOLB 1050: Genetic Engineering and Synthetic Biology
MOLB 3320: Molecular Biological Methods
NURS 4055: App Evidence in Nursing Practice
NURS 4635: Community as Client
NURS 4695: Professional Nursing Populations Practicum
PHYS 1210: Engineering Physics 1
PHYS 3000: Methods of Physics
PHYS 4840: Math and Computational Physics
PLNT 4470: Weed Science and Technology
PETE 4820: Blockchain in Energy
PETE 2060: Computing and Data Mining
THEA 3850: Design and Technology Seminar

B) Potential Examples of Existing Digital Literacy Courses at Wyoming Community Colleges and others:

ACCT 2110 QuickBooks Accounting – Casper College, Northern Wyoming CC

AGRI 1020 GPS and GIS in Agriculture – Casper College
ART 2023 Collections Management – Casper College
ART 1115 Digital Media – Casper College
ART 2145 Digital Photography I – Casper College
ART 2325 – Digital Methods – Northern Wyoming CC
BADM 3020 – Data Analysis for Managers – Western Wyoming CC
BIOL 1390 – Introduction to Science Research I – Western Wyoming CC
CMAP 1200 – Computer Information Systems – Western Wyoming CC
COSC 1010 - Intro to Computer Science – Northern Wyoming CC
GIST 1080 - Introduction to GPS and Maps – Western Wyoming CC
HMDV 1025 – Introduction to Online Learning – Western Wyoming CC
INET 1000 – Intro to Web Design – Western Wyoming CC
ITEC 2360 – Teaching with Technology – Western Wyoming CC
LIBS 1000 - Library Research Methods – Eastern Wyoming CC

ACC 1025 – Computerized Accounting – Arapahoe Community College, Colorado
AEC 2220 – Architectural Design – Arapahoe Community College, Colorado
BUS 1010 – Introduction to e-commerce – Arapahoe Community College, Colorado

COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Student Affairs Update**, Sullivan, Benham-Deal, Courtney

☒ PUBLIC SESSION
☐ EXECUTIVE SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
- ☐ Yes
- ☒ No

FOR FULL BOARD CONSIDERATION:
- ☐ Yes
  [Note: If yes, materials will also be included in the full UW Board of Trustee report.]
- ☒ No

☐ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY:
The Academic and Student Affairs Committee and UW Administration will engage in a conversation on student success and the data and information needed to help make informed decisions on initiatives and policies. Discussion topics will include education, mental health and well-being and support structures for increased and continued support.

WHY THIS ITEM IS BEFORE THE COMMITTEE:
Academic and Student Affairs Committee requested an update on Student Affairs.

ACTION REQUIRED AT THIS COMMITTEE MEETING:

PROPOSED MOTION:

COMMITTEE MEETING MATERIALS

AGENDA ITEM TITLE: **Incoming Interim Provost Priorities**, Turpen

☒ PUBLIC SESSION
☐ EXECUTIVE SESSION

PREVIOUSLY DISCUSSED BY COMMITTEE:
☐ Yes
☒ No

FOR FULL BOARD CONSIDERATION:
☐ Yes
[Note: If yes, materials will also be included in the full UW Board of Trustee report.]
☒ No

☐ *Attachments/materials are provided in advance of the meeting.*

EXECUTIVE SUMMARY:
During the October Board of Trustees Conference call, Dr. Scott Turpen was appointed Interim Provost effective November 25, 2024. In this role, Dr. Turpen will provide direct leadership to the Division of Academic Affairs and the Division of Student Affairs. Dr. Turpen will provide a brief report to the Academic and Student Affairs Committee on the following Provost priorities:

- Enrollment
- Student Success Initiatives
- Next Gen USP
- UW Budget Model

WHY THIS ITEM IS BEFORE THE COMMITTEE:
Academic and Student Affairs Committee requested an update.

ACTION REQUIRED AT THIS COMMITTEE MEETING:

PROPOSED MOTION: