

**Wyoming Community College Commission**  
**Request for**  
**New, Pilot or Revised Degree or Certificate**

**A. College:** Laramie County Community College

**B. Date** submitted to WCCC: \_\_\_\_\_

**C. Program**

1. Request for:

New Program     Pilot Program     Revised Program

2. Program Title: Process Technology

3. Degree or Certificate to be awarded:

Degree:     AA     AS     AAS     Other

Certificate

4. Educational Pathway:

Energy     Construction     Hospitality     Technology     Health Care  
 other

5. Total number of credit hours: 19

5. Suggested CIP (Classification of Instructional Program) code (6-digit):

41.0303

6. Planned semester/year new program will begin: Fall 2015

7. Will any part of this program be provided by non-accredited vendor(s)?

YES (Provide details)                       NO

**D. Program description** as it will be included in college catalog:

The Process Technology Program of Study is designed to provide students with the skills and conceptual knowledge needed to enter careers as Process Technicians/Operators in the petrochemical and related industries. Students develop awareness of the work environment and systems used. Process Technology is an accelerated program designed to be completed in one, 16 week semester.

1. Expected Student learning outcomes from completion of the program:  
Students will be able to:

Demonstrate up-to-date understanding of the technical aspects of process technology, be able to read process drawings, including piping and instrumentation diagram, demonstrate appropriate use of common equipment and tools applied in process technology industry, and be aware of safety procedures, hazards and housekeeping.

2. Program Layout by Semester

| <b>Course Number</b> | <b>Course Title</b>                     | <b>Credit Hours</b> |
|----------------------|---|---------------------|
| PTEC 1500            | Introduction to Process Technology      | 2                   |
| PTEC 1510            | Safety, Health and the Environment      | 4                   |
| PTEC 1550            | Foundations of Quality                  | 1                   |
| PTEC 1600            | Process Technology I: Equipment         | 4                   |
| PTEC 1605            | Process Technology II: Systems          | 4                   |
| IST 1730             | Introduction to Electrical Fundamentals | 2                   |
| IST 1830             | Introduction to Mechanical Fundamentals | 2                   |
| Total                |   | 19                  |

3. Will all or part of this program be available to students via online or other distance education technologies? No

     At the start of the program?      Within three years of the start of the program?

**E. New course prefixes:**

1. Recommended Level of Instruction if the community college is using a new course prefix:

         No new prefixes

3 Suggested level of instruction

2. New Course prefixes, numbers and titles have been coordinated:  
with UW (transfer)            \_\_\_ Yes    \_\_\_ No    \_\_\_ Not Applicable  
or WCCC (career technical)  Yes    \_\_\_ No    \_\_\_ Not Applicable

**F. New course descriptions:**

The following are course descriptions for each new course in the program (include prefix, course number, title, credit hours and description):

**PTEC 1500: Introduction to Process Technology, 2 credits**

Students explore the field of Process Operations at an introductory level and examine the roles and responsibilities of Process Technicians. Students discover the work environment, the equipment and systems operated, and practice fundamental workforce success skills. Instructor consent required.

**PTEC 1510: Safety, Health and the Environment, 4 credits**

Students explore the history of industrial accidents and other impactful incidences. Students complete content required to receive an OSHA 10 certification and receive training in H2S, Confined Space and Lock Out Tag Out. Students also examine safety, health, and environmental issues and analyze the skills needed for communication of good safety habits and safe work practices. Instructor consent required.

**PTEC 1550: Foundations of Quality, 1 credit**

Students define quality improvement and trace the re-emergence of quality in the United States. Students examine several philosophies of quality including Deming's, Juran's, Crosby's, and other models that positively affect workplace effectiveness. Students explain the purpose, benefits, policies, and procedures that must be in place to receive ISO 9000 certification. Prerequisite PTEC 1500. Instructor consent required.

**PTEC 1600: Process Technology I: Equipment, 4 credits**

Students explore Process Industry equipment and its related functionality. Students examine and analyze the equipment's purpose, components, operation, and the Process Technician's role in operating and troubleshooting various types of equipment. Prerequisite: PTEC 1500. Instructor consent required.

**PTEC 1605: Process Technology II: Systems, 4 credits**

Students examine various water and gas systems, material storage and blending, refrigeration systems, extraction, distillation, dehydration, filtration, and control systems. Prerequisite: PTEC 1500. Instructor consent required.

**IST 1730: Introduction to Electrical Fundamentals, 2 credits**

Students examine direct current theories and those to the electrical system and related equipment. Students also explore basic DC circuit calculations. They cover basic alternating current theories and apply those theories to electrical systems and related equipment. Students demonstrate various methods of producing a voltage and study essential generator and motor design, construction and operating principles.

**IST 1830: Introduction to Mechanical Fundamentals, 2 credits**

Students explore the mechanical concepts commonly found in a plant setting and examine piping systems including dimensions, connections, blinding, and other concepts. Students operate common hand tools and define terminology found in many plants. Students examine steam traps, strainers and their applications, and are also introduced to common pumps and drivers, compressors and fans, and heat exchangers. Instructor consent required.

**G. Can this program be delivered by current faculty?** If not, what are the plans, budget and timeline for bringing on needed instructors?

Yes

**H. Summary of input from and coordination with citizens, business and industry or k-12 education:**

In addition to LCCC, Casper College and Western Wyoming Community College, the Process Technology Program of study and its related curriculum was developed in collaboration with the statewide Process Technology safety group comprised of industry experts including: Wyoming OSHA, Holly Frontier Refining, Dyno-Nobel and Tulsa Community College and utilizing curriculum components designed by industry experts for the Center for the Advancement of Process Technology (CAPT).

CAPT supports the development of a highly skilled, educated and diverse process technician workforce for the chemical manufacturing, refining, oil and gas production and pharmaceutical manufacturing industry sectors.

- I. Resources required** to start and sustain the program and the current plan to meet those resource needs through college or other external funds:

This program is based on the standard components set forth by Center for Advanced Process Technology with input from Wyoming industry experts. To launch this program, the Integrated Systems Technology lab along with other content specific equipment will be required. Industry has committed to providing “boneyard” equipment for program delivery along with site utilization for possible job shadowing, internships, tours and other training requirements.

- J. Projected demand in Wyoming and Nation** for five years from the proposed implementation date (career technical programs):

While nationally, the trend for Process Technicians/Operators is declining, the need in Wyoming and surrounding areas is increasing. Industry representatives are estimating new hire targets of a conservative 53 in 2014, 54 in 2015 and 53 in 2016 in Wyoming.

1. State and National Trends

| United States  | Employment |        | Percent Change | Job Openings |
|--|------------|--------|----------------|--------------|
|  | 2010       | 2020   |                |              |
| Petroleum Pump System Operators, Refinery Operators, and Gaugers | 44,200     | 38,000 | -14%           | 1,440        |
| Wyoming  | Employment |        | Percent Change | Job Openings |
|  | 2008       | 2018   |                |              |
| Petroleum Pump System Operators, Refinery Operators, and Gaugers | 570        | 600    | +6%            | 20           |

**Source:**

Source: Occupational Information Network (O\*NET OnLine), <http://online.onetcenter.org>

Other trend information that would assist the Commission:

The information provided for demand are modest estimates and do not take into account existing employees taking this program of study for professional development and/or recertification purposes and students coming from in from out of state.

## 2. State and National Wages

| Location      | Pay Period | 2011     |          |          |          |          |
|---------------|------------|----------|----------|----------|----------|----------|
|               |            | 10%      | 25%      | Median   | 75%      | 90%      |
| United States | Hourly     | \$18.50  | \$23.73  | \$29.45  | \$34.29  | \$39.19  |
|               | Yearly     | \$38,500 | \$49,400 | \$61,300 | \$71,300 | \$81,500 |
| Wyoming       | Hourly     | \$21.41  | \$24.56  | \$28.36  | \$32.84  | \$35.69  |
|               | Yearly     | \$44,500 | \$51,100 | \$59,00  | \$68,300 | \$74,200 |

**Source:** Bureau of Labor Statistics, Occupational Employment Statistics Survey

Source: Occupational Information Network (O\*NET OnLine), <http://online.onetcenter.org>

Other wage information or comments that would assist the Commission:

Students possessing a Process Technology certificate are positioning themselves for career pathways in the Process Technology and related industries, thus increasing salaries.

## 3. Primary student audience identified for this program:

For LCCC, we anticipate targeting several different groups within the community, including incumbent workers who are currently in the process technology field and want to or are required to expand their knowledge; those that are seeking advancement opportunities; displaced workers desiring retraining; poverty-to-self-sufficiency training programs; and high school graduates who are interested in technical fields.

## 4. Anticipated enrollment in the three academic years after WCCC approval (unduplicated headcount) with the basis for the estimate:

17 Year One    17 Year Two    30 Year Three

**K. Student recruitment and program marketing strategies to attract the broadest range of individuals for this particular program:**

The community colleges will utilize industry contacts in process technology to identify and recruit students currently in the workforce who need to update their skills. Industry partners are very supportive and have committed to referring students to the community colleges. We plan to market to Department of Workforce Services, high school counselors and students, veterans and transitioning military personnel, poverty to self-sufficiency programs and other displaced workers.

In addition, a full marketing campaign if needed, will be designed for this program that would include: Website, Facebook, and other social media venues, college marketing venues such as television stations, press releases, radio interviews and other areas as identified by the respective public relations departments.

**L. Identification of similar programs at Wyoming Community Colleges and an overview of results of discussions with faculty and administrators at the relevant colleges regarding curriculum and possible joint projects:**

There are no other similar programs in Wyoming. However, the goal would be to have the same curriculum at any community college that supports a refinery with appropriate hiring demand in their respective area. Utilizing a national curriculum model makes the curriculum consistent not only statewide but across many of the programs throughout the country.

| <b>Wyoming Community College Programs<br/>(Identify title, degree/certificate and number of credit hours)</b> |                                |                                |   |                          |  |  |
|---|--------------------------------|--------------------------------|---|--------------------------|--|--|
| <b>Casper College</b>   | <b>Central Wyoming College</b> | <b>Eastern Wyoming College</b> | <b>Laramie County Community College</b> | <b>Northwest College</b> | <b>Northern Wyoming Community College District</b> | <b>Western Wyoming Community College</b> |
| N/A   | N/A                            | N/A                            | N/A                                     | N/A                      | N/A  | N/A                                      |

**M. Note available program and course articulations** with other likely transfer institutions in the region, particularly for transfer AA and AS programs. (Note regional Bachelor of Applied Science transfer options in addition to UW.)

This program is not designed for transfer.

**N. When appropriate, note partnerships with business, industry, associations or agencies** that have contributed to the design of the proposed program and/or who will contribute to the delivery of the program.

LCCC, Casper College and WWCC have met with employees from Holly-Frontier, Sinclair, and Wyoming OSHA and have also participated in conference calls with the Process Technology safety group in Wyoming where representatives from Sinclair, Holly Frontier, DynoNobel, Wyoming Refining, Antelope Refining and Silver Eagle were present. These professionals have provided input for content needed within this program, feel there is a need in our state, and have offered to be guest speakers and/or instructors for topics throughout the program.

**O. Assessment of student learning and completer follow-up per performance indicators.** How will the assessment outcomes be used to assure student learning and improve the program?

Students will be able to:

The competencies will be assessed by subject matter experts/faculty utilizing classroom discussion, quizzes, exams, hands-on exercises, and workplace application projects. Results of these assessments will be analyzed and evaluated by faculty and an advisory committee and used towards program improvement.

In addition, a post-placement evaluation tool will be designed to analyze the effectiveness of the training once students enter the workplace. This tool will help ensure continuous quality improvement.

**P. Other program information or comments** that would assist the commission in making a decision using the Guidelines for Use of this Evaluation Tool found in Appendix A of the 2010 WCCC Statewide Strategic Plan.



This program addresses Wyoming and regional interests in the following ways:

**EDUCATED CITIZENRY** – Through this accelerated program students may earn a Process Technology Certificate, thus increasing the number of post-secondary education certificates in Wyoming. In addition, the program supports high demand and high pay occupations, which improves the quality of life for our students and the clients who will be served by their skills.

**DIVERSIFIED ECONOMY** – This program helps build the technical skills required to support the changing skills required for energy related industries. Many of the fundamental skills developed through the electrical, mechanical and safety courses are relevant across industry.

**WORKFORCE DEVELOPMENT** – According to statewide industry representatives the demand for workers will increase by approximately 60 per year (initially delivered through two community colleges.) In addition, Wyoming is already second in the nation for the highest concentration of workers requiring these skill sets.

**EFFICIENT SYSTEMS** – Currently there are no other programs in Wyoming. By grounding this program in content developed through the Center for Process Technology and based on their national curriculum, this program is positioned for roll-out to other community colleges based in nationally identified industry criteria.

**ACCOUNTABILITY and IMPROVEMENT** – Course assessment data and course evaluations will be compiled by the program coordinator. This data will be evaluated and analyzed by the advisory committee to help ensure continuous improvement. In addition, the college will utilize our Institutional Research Office to develop and deliver a post-job placement survey to both employers and students to identify skill gaps needed that may not have been included in the program. This information will help ensure the program is kept up to date and is meeting industry needs.

#### **OTHER CRITERIA-**

- **Labor Needs** – As noted by industry experts throughout Wyoming, the demand for workers is estimated at a minimum

of 50 - 54 per year for new hires. This does not include existing employees seeking professional development or recertification requirements.

- **Curriculum Development** – The curriculum provided was based on the Center for the Advancement of Process Technology model and content and in partnership with industry professionals. Subject matter experts from process technology industries and Wyoming OSHA were consulted in the development of the curriculum and the program design itself.
- **Pathways** – The Process Technology program supports multiple career clusters including Energy and Technology. Its accelerated program design ensures opportunities to meet the needs of non-traditional students. In addition, the community colleges anticipate documenting a career pathway for the Process Technology program within three months of its approval. This career pathway template (roadmap) provides a tangible tool that will help reach into our secondary schools and create awareness of and prepare interested secondary students in this high demand, high growth occupation.
- **Faculty Support** – At LCCC, because of the strong industry support provided, instruction will be provided by faculty who are already working professionals or retirees in the community. Faculty would be required to have a minimum of a bachelor's degree in this designated field and/or the appropriate certifications/job experiences.
- **Recruitment Strategies** – Discussions have been held with key personnel from Holly-Frontier and other Process Technology companies in Wyoming. Because of the existing high demand and anticipated occupational growth, recruitment strategies would center on job attainment and professional growth. This has historically proven a strong recruiting tool for other programs such as Wind Energy Technology and Emergency Medical Services.
- **Resource Needs** – A traditional classroom will be required for most of the educational experience. Classes for the southeast region will be held in the LCCC Career and Technical Building. In addition, computer lab usage will be required.

## SIGNATURE PAGE

Submitted by V. P. for  
Academic Affairs\*

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Signature

Date

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Printed Name

Title

Approved by the WCC Academic  
Affairs Council

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Signature

Date

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Printed Name

Title

Approved by Program  
Review Committee

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Signature

Date

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Printed Name

Title

\*Signature by the Community College Vice President for Academic Affairs verifies that institutional curriculum approval processes have been completed and that the Community College Board of Trustees has approved this program request as per institutional policy.