UNIVERSITY OF ALASKA FAIRBANKS

TANANA VALLEY CAMPUS (TVC)

PROSPECTUS—CERTIFICATE IN POWER GENERATION

**A. MISSION AND GOALS:**

**Mission:** The mission of the Power Generation Certificate program is to provide necessary preparation for entry-level power generation operators who wish to advance their professional knowledge and career opportunities with specialized study in operating, monitoring, calibration, and maintenance of industrial power generation systems and related working environments.

Importantly, this new certificate builds on an existing UAF power generation curriculum; until now the subject matter was listed as a “concentration” under another degree. The enhanced certificate program provides updated curriculum and greater visibility for high-demand job training. It is a direct outgrowth of employer demand in Interior Alaska and across the state. Total employment in the Utilities sector of Alaska’s economy is expected to grow by 22.2% in the coming decade (Alaska Department of Labor and Workforce Development 2006). Graduates are expected to find employment throughout the state of Alaska and on a national level. The primary goal of the program is to deliver training to entry-level power generation operators/technicians in a certificate format while also providing avenues for those interested in additional education and training in the AAS program in Process Technology.

**Delivery Method:** The program will be offered through flexible course delivery methods to students living in the greater Fairbanks region of Interior Alaska. This program offers courses consistent with the curriculum delivered through, and the standards associated with, the Operating Engineers Local 302 Gas Turbine Operators and Maintenance Technician apprenticeship program. It is also consistent with nationally accepted curriculum sponsored through the Center for the Advancement of Process Technology based at the University of the Mainland in Texas.

**B. AUTHORIZATION:**

**1) How does the program relate to the Education Mission of the University of Alaska?**

UAF’s mission statement:

“The University of Alaska Fairbanks, as the nation's northernmost Land, Sea, and Space Grant university and international research center, advances and disseminates knowledge through creative teaching, research, and public service with an emphasis on Alaska, the North and their diverse peoples.”

The Certificate in Power Generation fulfills the University’s mission through advancing and disseminating knowledge of commercial and industrial type power generation techniques and practices in service to Alaska’s communities and peoples. It helps the university meet its obligations to workforce development and serving the needs of Alaska’s geographically-dispersed and culturally-diverse populations. Specifically, courses would be coordinated across multiple MAUs and offered through a variety of instructional methods consistent with current accredited teaching and delivery methodologies, practices and standards. The content of the courses is relevant to the power generation field and consistent with current national standards as reviewed by the CAPT and Alaska Process Industry Career Consortium (APICC) with core content building towards the Operating Engineers Journeyman rating.

**2) The following UAF 2006 Strategic Plan Goals are met through the Power Generation Program:**

* Provide high quality undergraduate education for traditional and non-traditional students
* Form active collaborations with communities, organizations, businesses and government to meet identified state, national, and global needs
* Serve as a premiere higher educational center for Alaska Natives and all Alaska residents
* Serve as a model to demonstrate how gender, race, and cultural diversity strengthen a university and society.

**3) Needs of Alaskans being met by this program**

Alaska Department of Labor and Workforce Development anticipates 22.2% growth in Utilities employment in the next ten years. Jobs in this category include several considered to be “focus jobs”—those with best employment potential and above-average wages. Local employers of power generation technicians point to a current shortage of qualified applicants; employers routinely have to recruit outside of Alaska to find qualified employees. At the same time, employers anticipate expanding retirements from a ‘graying’ workforce. These same employers are actively encouraging UAF to play a role in expanding the pool of qualified technicians who can move into these emerging job opportunities.

The instrumentation industry is regulated by industry-recognized professional organizations including the Center for Advancement of Process Technology (CAPT), funded in part through the National Science Foundation. The most accepted standard or norm for power generation technicians are the CAPT curriculum standards and those established by the Operating Engineers union. These organizations require all certification and monitoring of all business and industry to comply with national power generation standards.

It is vital for Alaska’s power generation industries to have qualified employees who can maintain safe automated technologies and processes. The quality of safe automated working environments is directly linked to the education of the skilled technician as the individual responsible for calibration and set-up of highly technical, sensitive monitoring and control equipment. More automated systems are implemented daily throughout the state of Alaska and these automated industries and systems require highly trained and skilled individuals. Research has shown that education of power generation technicians reduces the level of equipment damage and injury as well as reducing the number accidents that occur in the workplace.

**C. EDUCATIONAL OFFERINGS:**

**Descriptive information of Certificate in Power Generation:**

1. Complete the general university degree requirements
2. Complete the certificate requirements
3. Complete the following program requirements:

PGEN 101 – Intro to Power Generation, Distribution & Alternative Energy (3 cr)

PGEN 102- Basic Electricity for Power Generation Operators (4 cr)

PGEN 103 – Introduction to Power Generation: Maintenance (4 cr)

PGEN 104 – Gas & Steam Turbines; Co-Generation and Combined Cycle Technologies (4 cr)

PRT 110 – Introduction to Occupational Safety, Health & Environmental Awareness (3 cr)

PRT 120 – Water Quality Management for Process Industries (4 cr)

PRT 140 – Industrial Process Instrumentation I (3 cr)

WMT 101 – Introduction to Welding (3 cr)

**Summary:**

General requirements: 9

Program requirements: 29

TOTAL CREDITS: 38

1. **COURSE DESCRIPTIONS**

**PGEN 101--Introduction to Power Generation, Distribution, & Alternative Energy (3 Credits)**

This course is designed for those interested in advancing their knowledge of the modern methods of commercial power generation and its distribution. This course will provide an overview of current trends toward the development of stable, sustainable, alternative energy production method(s) and terminology /concepts relative to modern industrial power generation.

**PGEN 102--Basic Electricity for Power Generation Operators (4 Credits)**

This course provides students with an introduction to basic electricity. Students are introduced to equipment, systems, and instrumentation utilized in the production and control of electricity. Students will gain an understanding of basic terminology, theory and concepts of working electrical units utilizing training materials appropriate to specific electrical applications.

**PGEN 103—Introduction to Power Generation: Maintenance (4 Credits)**

This course is designed for those interested in advancing their knowledge of the modern methods of maintenance relative to commercial power generation equipment. This course will include an overview of safe working practices, tools, and procedures

**PGEN 104—Gas & Steam Turbines, Co-Generation, Combined Cycle Technologies (4 credits)**

Capstone course designed to solidify knowledge regarding the mechanical details of modern turbine design and application

**PRT 110—Introduction to Health, Safety, and Environmental Awareness (3 credits)**

Introduction to the field of safety, health, and environment within the process industry. Overview includes plant hazards, safety, environmental systems and equipment, and applicable governmental regulations and industry standards.

**PRT 120—Water Quality Management for Process Industries (4 Credits)**

Designed to provide students with an overview of the chemistry, biology, hydraulics and hydrology related to water management in industries. Water distribution systems, water processing, operation of water works, wastewater processing, advanced wastewater treatment and water reuse.

**PRT 140—Industrial Process Instrumentation I (3 Credits)**

Covers physics of pressure, temperature, level and flow measurement; mechanical and electrical aspects of instruments used to control dynamics of processes. Dynamics of automatic control including proportional control, automatic reset, derivative action and integral timing.

**WMT 101—Introduction to Welding (3 credits)**

Introduction and orientation to the processes and procedures involved in the welding field with a ‘hands-on’ approach.

**D. PLANNING**

**Job opportunities now and for the future:** Alaska has high potential for workforce expansion. According to the Alaska State Department of Labor, there are nearly 10,000 new jobs in industry settings being developed with known projected projects in the state. All of these industries will require qualified technicians to monitor and regulate the instrumentation and equipment associated with industrial and commercial power generation.

With the trends in the profession for the last 30 years, the new automation systems within industry identified by industry and the Department of Labor indicate a well established need now, and for the foreseeable future, for trained power generation operators and power generation maintenance technicians.

With the aging workforce and projected industry growth and development the need for additional trained power generation operators has never been more urgent.

**How positions have been filled to date:** The vacant positions have been filled by graduates from outside Alaska and by those with inadequate training and education when no qualified candidates were available. Lack of qualified personnel has caused industry to seek qualified power generation professionals from outside the state. Inadequately prepared power generation operators and power generation maintenance technicians could be a major factor contributing to many injuries costing thousands of dollars in damaged equipment and lost time accidents.

**E. BUDGET**

The process technology program will fund the additional cost of course delivery, in cooperation with local business and industry. This program has already been awarded start up funding in grants and in-kind industry support. Part of the TVC’s Project Northern Workforce for Alaska’s Vocational Employers (WAVE) grant is to be allocated to this project. Tuition, fees, and partnerships with local industry and business agencies will subsidize the costs of local course delivery and both have committed to long term support for this vital program.

The Process Technology Program has an annual budget of $193,907.00. Of this, $96,954 is allocated to the Process Technology Program needs, $48,477 is allocated to the Safety, Health, and Environmental Awareness Certificate Program, and $48,477 is allocated to the Instrumentation Certificate Program. These funds cover the costs of hiring adjuncts for 2 semesters. Students are accessed fees in certain courses which cover the costs of materials for those courses.

1. **STUDENT SERVICES**

Local students will access student assistance at UAF and TVC campuses. Students will have access to tutors and mentors as feasible and allowable within university limitations. Employers are eager for this program and many have expressed an informal willingness to provide support for employees who are students in this program. Some funds may be available to assist students with tuition or fees through the assistance of these resources.

**G. PHYSICAL FACILITIES**

This proposal anticipates a small number of local students who can be served in present TVC classroom and lab facilities at Hutchison Institute of Technology. No new facilities are anticipated.

**H. LIBRARY AND INFORMATION RESOURCES:**

There are adequate library services for this degree. Many items are available electronically and can therefore be utilized by the students in most locations, since the majority of them now have access to the internet.

**I. FACULTY AND STAFF**

Process Technology faculty and the adjunct corps will meet the current need for delivery of the Power Generation program. Additional funding could be available through grant resources to support hiring a term funded faculty member.

The process technology program coordinator facilitates finances, scheduling, professional development and other program issues. The “academic lead” (PRT/Instrumentation, Program Coordinator) functions as a department coordinator for development of power generation curriculum, adjunct recruitment and all academic issues.

Process Technology Program Coordinator/Academic Lead:

Jonathan M. Prater, Associate Professor Process Technology designed this program. However, he has since left the university and we are in the process of searching for his replacement. A similarly qualified person will be hired.

* His Qualifications
  + M.Ed. Curriculum and Instruction
  + Twenty Plus years Oil & Gas, Mining Automated Industry Experience
  + Member Industrial Instrumentation & Controls Technology Alliance (IICTA)
  + Member Instrumentation and Automation Society of America (ISA)
  + Member American Society of Safety Engineers (ASSE)
  + 2004-2005 Recipient of The (ASSE), Safety Professional of the Year Award
  + North Slope Training Cooperative (NSTC) Certified Safety Instructor
  + PRT 140 Instrumentation I Instructor

Instrumentation Faculty:

Eric Spencer Assistant Professor Process Technology (Term Funded)

* Qualifications
  + Member American Society of Safety Engineers (ASSE)
  + North Slope Training Cooperative (NSTC) Certified Safety Instructor
  + Member Industrial Instrumentation & Controls Technology Alliance (IICTA)
  + Member Instrumentation and Automation Society of America (ISA)
  + Twenty-plus years food processing industry, Industrial Food Processing Automation
  + First Aide CPR trained
  + Adjunct instructor PRT/DRT programs five years
  + PRT 140 Instrumentation I Instructor
  + PRT 144 Instrumentation II Instructor
  + PRT 248 Valve Maintenance & Instrumentation

Power Generation Adjunct Faculty:

Lead Adjunct Faculty

James Bowling

* Qualifications
  + Member Industrial Instrumentation & Controls Technology Alliance (IICTA)
  + Member Instrumentation and Automation Society of America (ISA)
  + Electronic Industrial Process Controls Mechanic   
    • Maintain all Coal fire Power Plant Advanced Electrical, Electronic Controls and Instrumentation Systems.   
    • Upgrade and Design and install Distributed UPS and Computerized UPS monitoring System.   
    • Modified current controls systems to meet plant needs and conditions.   
    • Design, upgrade and install new motor control centers for stand-alone systems.   
    • Upgraded 4,160, 12,470, 480 VAC Switchgear as needed and program specific safety relays and smarts meters.   
    • Maintain, Trouble shoot, Inspect and repaired various process controls and instrumentation systems for plant systems and sub systems.
  + Train and Instruct Operators on newly installed or updated equipment.
  + Member TVC Instrumentation Advisory Committee
  + PRT 140 Instrumentation I Instructor
  + PRT 144 Instrumentation II Instructor
  + PRT 248 Valve Maintenance & Instrumentation
  + ELT 101 & 102 Instructor

Instrumentation Adjunct Faculty:

Gabe Acker

* Qualifications
  + Crew Chief Turbine Maintenance USAF
  + Current Control Room Operator Clear AFB Power Generation Facility
  + Member Instrumentation and Automation Society of America (ISA)
  + First-Aide/CPR trained
  + Member TVC Power Generation Advisory Committee
  + PRT 101 Introduction to Process Technology Instructor
  + PRT 120 Water Quality Management for Process IndustriesInstructor