

CERTIFICATE PROGRAM:
POWER GENERATION

Prepared by: Jonathan Prater, Associate Professor of Process Technology and Program Coordinator

Statement of Proposed Program:

The power generation program will help students develop entry-level skills needed in industrial and commercial electrical power generation and maintenance. Courses combine the technical know-how and hands-on experience necessary to develop entry level workers in a variety of power generation and industrial fields. In the classroom students will become familiar with the operation and maintenance of the standard equipment encountered in the power generation industry.

_____ Date _____
Head, Program/Department of Process Technology

_____ Date _____
Director, Tanana Valley Campus

_____ Date _____
Chair, College/School Curriculum Council for _____

_____ Date _____
Dean, College/School of _____

_____ Date _____
President, UAF Faculty Senate

_____ Date _____
Chancellor, UAF

_____ Date _____
President, UA System

_____ Date _____
Board of Regents, UA System

CERTIFICATE PROGRAM FOR: POWER GENERATION

Credential Level: Certificate (38 credits required)

Admissions requirement: General university admission requirements for associate's or certificate programs, Page 24 University catalog.

Course Descriptions:

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

This course is designed for those interested in gaining 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. (3+0)

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

The purpose of this course is to provide students with an introduction to theory and to hands-on training for basic electricity. Within this course, students are introduced to equipment, systems, and instrumentation utilized in the production and control of basic electricity. (3+2)

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

This course is designed for those interested in advancing their knowledge of maintenance relative to the commercial power industry. This course will include an overview of power generation equipment and the routine maintenance required to keep the equipment. This course will also provide an overview of safe working practices, tools, procedures, drawings, Piping and Instrumentation Diagrams (P&ID's) and Process Safety Management (PSM). (3+2)

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

This course introduces basic information associated with modern gas and steam turbines, and the systems in which they are used to produce electrical power and/or steam for heating. (4+0)

PRT 110 Introduction to Occupational Safety, Health, & 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 government regulations and industry standards. (3+0)

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, and operation of water works, wastewater processing, advanced wastewater treatment and water reuse. (3+3)

PRT 140 Industrial Process Instrumentation I (3 Credits)

Physics of pressure, temperature, level and flow measurement; mechanical and electrical aspects of instruments used to control dynamics of processes. Includes the dynamics of automatic control: proportional control, automatic reset, derivative action and integral timing. (2+2)

WMT 101 Introduction to Welding (4 Credits)

Introduction and orientation to the processes and procedures involved in the welding field including safe operational procedures for Shielded Metal Arc Welding (SMAW) (Stick), Mixed Inert Gas (MIG), Tungsten Inert Gas (TIG) and Oxy-Acetylene welding; in addition to the appropriate Personal Protective Equipment (PPE) and terminology related to the welding industry, with a "hands-on" approach. (2+4)

Computation (3 Credits)

Students can select from the list of University approved courses.

Human Relations (3 Credits)

Students can select from the list of University approved courses.

Communications (3 Credits)

Students can select from the list of University approved courses.

Recommended Course Sequence

<p>Semester I</p> <p>PGEN 101 Intro to Power Generation, Distribution & Alternative Energy PGEN 102 Basic Electricity for Power Generation Operators PRT 140 Industrial Process Instrumentation I Computation Class</p>	<p>Semester II</p> <p>PGEN 103 Introduction to Power Generation: Maintenance PRT 110 Introduction to Occupational Safety, Health, & Environmental Awareness WMT 101 Introduction to Welding Communication Class</p>
<p>Semester III</p> <p>PGEN 104 Gas & Steam Turbines, Co-Generation, Combined Cycle Technologies PRT 120 Water Quality Management for Process Industries Human Relations Class</p>	<p>Semester IV</p>

Proposed General Catalog Layout

Certificate Program Power Generation

1. Complete the general university degree requirements (page 80)
2. Complete the certificate requirements (page 82)
3. Complete the following program requirements:
 - PGEN 101 – Intro to Power Generation, Distribution & Alternative Energy ...3
 - PGEN 102- Basic Electricity for Power Generation Operators 4
 - PGEN 103 – Introduction to Power Generation: Maintenance.....4
 - PGEN 104 – Gas & Steam Turbines; Co-Generation and Combined Cycle Technologies...4
 - PRT 110 – Introduction to Occupational Safety, Health and Environmental Awareness.....3
 - PRT 120 – Water Quality Management for Process Industries.4
 - PRT 140 – Industrial Process Instrumentation I.3
 - WMT 101 – Introduction to Welding4
4. Minimum credits required 38

Program Goals:

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

The power generation program will meet the educational mission of the University of Alaska and Tanana Valley Campus (TVC) by providing a quality industrial power generation program that prepares Alaskans with the skills needed to fill entry-level industry positions. Power generation has long been a program concentration at TVC, situated under the former Maintenance Technology degree. This proposal allows power generation to stand alone as a certificate as requested by regional employers.

Describe the State needs being met by this program.

Industry partners have identified needs in the energy industries in terms of providing qualified operators and maintenance technicians in this period of a rapidly growing state economy. The move toward expanding systems and operations within the state requires new entry-level employees. Currently, many positions are being filled from outside the State of Alaska; this program will help eliminate the need to look outside of the state for qualified entry level workforce.

What are the student opportunities and outcomes? The enrollment projections?

Students who successfully complete the Power Generation Certificate will be given the opportunity (by means of an articulation agreement) to compete for positions in the Alaska Operating Engineers Local 302 Apprenticeship Training Program. Anticipated enrollment will come from students enrolled in the Process Technology Program and from industry partners whose workforces need incumbent training.

Relationship of courses to the program objectives:

Courses are designed to introduce students to the basic skills required for entry level positions in the power generation industries, successful graduates will receive University Certification. The Certificate was designed with Industry Partner subject matter experts (SME's) to provide entry-level safety personnel to fill occupational safety jobs in the state of Alaska.

Personnel Directly Involved with Program

Faculty: Jonathan Prater, Associate Professor of Process Technology, M.Ed. Curriculum and Instruction and B.S. Occupational Education

2.5 FTE adjunct instructors

Term Funded Faculty: Eric Spencer, Assistant Professor of Process Technology

Administrator: Richard Caulfield, Director, Tanana Valley Campus, College of Rural and Community Development

Classified: Laura Lee Potrikus, Administrative Assistant for the Fast Track Training Program and Process Technology (including Drafting, Safety, Instrumentation)

Enrollment Information

Projected enrollment is approximately 9 to 15 students per rotation; current enrollment is approximately 7. Survey of current process technology student population and regional industry partners supports projected numbers. Minimum enrollment to maintain the program: 12 per rotation. Maximum enrollment will be 20 students per rotation. No special restrictions on enrollment anticipated.

Need for Program

Required for other programs. In what way? How has this requirement been met to date?

Certificate will supplement AAS degree in process technology. Students meet current requirements by taking correspondence courses out-of-state.

Employment Market Needs:

Industry partners have identified needs in providing power generation professionals as rapidly growing process technology industries move toward expanding operations and systems; current trends supported by GVEA data indicate long term growth in the power generation industry. Coupled with an aging workforce this growth demands additional skilled workers to fill current positions as well as projected openings created as an aging workforce retires. Currently many positions are being filled from outside the state of Alaska; this program will help eliminate the need to look outside the state for qualified power generation technicians and maintenance personnel. As the process industries expand and automate the need for qualified technicians in all related fields increases. This need is currently being addressed by the Operators Engineers Training Trust and on the job training. TVC and the Process Technology Program have entered into an articulation agreement with this national organization.

Resource Impact

By adding the certificate in Power Generation we project that we will need approximately \$9,000 for additional classroom instructional materials, \$10,300 in equipment for instructional purposes, i.e., control panels & synchronization switch gear, digital multi meters, additional signage, air and water testing kits, etc., \$39,600 for adjunct salaries, and \$15,000 for computer and networking, and \$5,000 for professional development for faculty and adjuncts.

Relation of Program to other Programs within the System

Anticipated collaboration with TVC's Welding program and Process Technology program will be required to successfully run the Power Generation certificate program. Courses from both the Process Technology and Welding programs will be utilized as part of the Power Generation certificate program. The WMT and PRT programs both indicate that they welcome the opportunity to support the additional class offering demands placed on their programs.

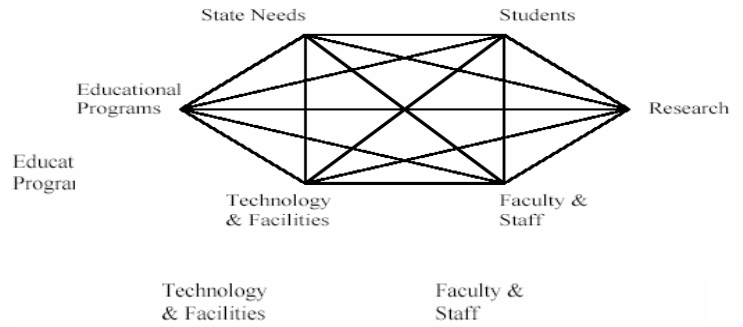
No relation to research activities.

Implementation/Termination

- Power Generation program has been a concentration at TVC for many years; it currently is part of TVC's "Fast Track Training" DOL grant program. This proposal creates a formal certificate in power generation.
- Student recruitment will come from regional industry partners, new and existing municipal utilities corporations and the current PRT student body.
- Termination date not anticipated.
- Program will be assessed with current process technology program. After completing its first in-house program audit the Process Technology program received high marks from industry partners involved with the audit. Complete audit packet available from PRT program coordinator.
- National standards for student outcomes assessment is a current topic and under review and development at the Center for the Advancement of Process Technology (CAPTS). TVC and Process Technology Program are working members of this national organization.

University of Alaska Board of Regents
Program Approval Summary Form

MAU: UAF – TVC/CRA
Title: Power Generation
Target admission date: Fall 2007



How does the program relate to the **Education** mission of the University of Alaska and the MAU?

TVC has long had a concentration in power generation under the former Maintenance Technology degree. In addressing emerging needs in Fairbanks and Interior Alaska, TVC's Process Technology advisory committee and academic leadership identified the need to expand this to a certificate program meeting high-growth, high-demand job requirements. The advisory committee is comprised of representatives from the various industries and businesses within the Interior who work closely with the Process Technology program to identify the needs for this program. In surveying these members, it became clear that the practice for filling vacant power generation positions within Alaska was to hire from Outside. By offering this program locally, in conjunction with a current articulation agreement with the Operators Local Union #302, industry partners will no longer need to go outside the State of Alaska to fill these positions and we will be meeting our mission of training Alaskans for Alaska's jobs.

The proposed 38-credit Certificate in Power Generation will enable the University to fulfill its mission through advancing and disseminating knowledge of commercial and industrial type power generation practices by creative teaching to diverse people. Specifically, courses will 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 Center for the Advancement of Process Technology (CAPT) and Alaska Process Industry Careers Consortium, with core content building towards the Operating Engineers Journeyman rating.

Currently, there will be no impact on existing programs and units across MAU and system, including GERs.

What **State Needs** met by this program.

It is important for Alaska business and industry to provide safe automated working environments for all workers in Alaska. This provision creates less injury in the workplace which in turn equates to quality life experiences, as it reduces insurance costs and costs in remedial education retraining and costly social services later in life. The quality and existence of the safe automated working environment 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.

It is in the best fiscal interests of the state to have high quality programs and training in power generation, maintenance, calibration and set-up of fully automated industrial power generation systems.

There is currently a shortage of qualified power generation operators and maintenance technicians and managers in the state of Alaska. Industry growth and natural resource development in the state increases the number of working environments which will in turn increase demand and employment opportunities, for qualified power generation operators and power generation maintenance technicians.

What are the **Student** opportunities and outcomes? **Enrollment** projections?

The UAF certificate in power generation was requested by the industries in the interior region. The initial promotion of the program was proposed by the Golden Valley Electric Association (GVEA) and the Operating Engineers Local 302. Many of the current students of the proposed certificate want greater knowledge in this field, and in many cases it is required for their jobs. Since there is no relevant degree or certificate/training program available here, they go to Valdez or out of state, seek a less satisfying degree or training or change careers completely, or leave the university with unfulfilled career aspirations unprepared for the more challenging positions in the power generation profession.

Based on current needs, industry growth and projections Alaska will continue to suffer shortages in the workforce in all sectors including power generation technicians and related positions. National surveys provided by CAPT indicate shortages in power generation operators and power generation maintenance professionals in all industries on a national scale. Operating Engineers Local 302 has also indicated that training individuals in conjunction with UAF to enter their ranks as a means of meeting the needs of industry, by addressing both attrition and industry expansion.

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 power generation maintenance technicians to monitor, regulate, and calibrate and automated systems for Alaska's power generation industries.

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.

Describe **Research** opportunities:

N/A

Describe Fiscal Plan for development and implementation:

Three year funding for the project is coming from the USDOL Project Northern Wave Grant (Fast Track Training). By developing this program over the 3 year grant period we will be building capacity. We anticipate the program to be self-sustaining through student tuition, industry partner support and general fund money through the Process Technology Program, which shares courses and adjuncts with the Power Generation Program.

Resource Commitment to the Proposed Degree Program

Resources	Existing		New		Total
	College/School	College/School	College/School	Others (USDOL Project Northern Wave Grant)	
Regular Faculty (FTE's & dollars)	0			FTE .50 \$30,000 Includes benefits	\$30,000
Adjunct Faculty (FTE's & dollars)	0			FTE .75 (adjuncts will teach about 18 credits) \$21,780 Includes 10% adjunct benefit	\$21,780
Teaching Assistants (Headcount)	0				
Instructional Facilities (in dollars and/or sq. footage)	520 sq ft				
Office Space (Sq. footage)	310 sq ft				
Lab Space (Sq. Footage)	1820 sq ft				
Computer & Networking (in dollars)	0	\$15,000 *			\$15,000
Research/instructional/office Equipment (in dollars)	\$3,000			\$10,500 control panels & synchronization switch gear	\$13,500
Support Staff (FTE's & dollars)	\$15,000				\$15,000
Supplies (in dollars)	\$5,000			\$4,000	\$9,000
Travel (in dollars)	0				

* TVC will identify funds to support this one-time expenditure.

Signature _____

Dean of College/School Proposing
the New Degree Program

_____ Date