

**REPORT
PROGRAM REVIEW**

CAREER AND TECHNICAL EDUCATION

**Diesel Technology
Electrical System Technology
Instrumentation
Industrial Millwright Technology
Welding Technology**

Presented by the Program Review Committee

To

**Academic Vice-President
Great Basin College**

CONTENTS

Executive Summary	3
Preliminary Report	4
Program Review Policy	4
Program Information	5
Faculty	5
Student Enrollment	9
Completers/Graduates	9
Facilities & Equipment	9
Measures of Student Satisfaction & Success	10
How the programs supports the college mission	10
How the program integrates with other departments and programs at GBC	14
Recruitment Approaches	14
Curriculum/competencies/learning outcomes & syllabi	16
Strengths and weaknesses of the programs	16
Needs-equipment, instructional resources	20
Planning	20
Discussion & Reviews	
Program Review Committee Meeting Notes, April 8, 2016	20
External Evaluator Written Report, Ivan Bullock	23
Commendations & Recommendations	28
Preliminary Report Appendices	
Appendix A: CTE Mission Statements	29
Appendix B: Strategic Plan Goals and Objectives	30
Appendix C: Student Learning Outcomes	32

Executive Summary

This review of Great Basin College's five mainstay CTE programs—diesel, electrical, industrial millwright, instrumentation, and welding—shows programs that have come of age, buoyed by excellent instructors and administration, remarkably able students in the 2015-16 class, and a supportive gold mining industry..

The gold mining industry's overall support continues with program sponsors donating equipment as well as support for additional faculty positions which were later funded by the college. The partnership of companies as demonstrated by the Industry Skills Training Program and Great Basin College has enabled increased employee skills and maturation of the college's training capabilities.

The CTE program is the recipient of several grants. The Perkins Grant is long-standing, but the Trade Adjustment Assistance Community College and Career Training (TAACCT) grant was awarded first in 2012. This grant has allowed the CTE program to develop more intensive individual instruction in areas such as math as well as hiring additional faculty.

The last four years have seen associates and certificates increase 110 in 2010-2011 to 161 in 2014-15. There are 13 full-time instructors. Courses have been added in Winnemucca, and the CTE College Credit program provides important early connections with local high schools.

The recommendations (p. 32) represent judgments by the program review coordinator of priorities based on the preliminary study, the program review committee meeting, and the external evaluator's written report. Administration and individual departments may use these recommendations to set their own priorities for improvement.

The review shows the passion and commitment of the CTE instructors, administration, and staff and their focus on students.

Preliminary Report

Program Review Policy

The purpose of the program review is “to assure academic quality, and to determine if need, student demand, and available resources support their continuation.” (NSHE Title 4, Chapter 14, Section 5)

The periodic program review provides an opportunity for the college to reflect on the quality of instruction within programs, to develop tools to measure program effectiveness, to ensure the viability of degrees and certificates with regard to our graduates' employment opportunities and transferability to other institutions, and to enhance our graduates' ability to be productive and discerning citizens of their communities.

The information gained can inform the college about which programs are serving the constituency well in their present form, which programs need moderate or minor changes regarding structure, instruction, curricula, and/or format, and which programs need to be changed drastically or eliminated altogether. These decisions can be difficult, and the program review process provides GBC with the most current and sound data to influence making such determinations.

PROGRAM INFORMATION

Faculty Summary Career and Technical Education Faculty, 2015-2016				
Instructor	Years Work Experience in Field	Degree/Training	Years at GBC	Total Years Teaching Experience
Diesel Technology Faculty				
Joseph Jensen	16 years	Advanced Certificate, Idaho State University	4	4
Earl Owen	17	AAS, Ricks College BS, Idaho State University	5	13
Whitehead, Michael	28	Certificate, ASAF Tech School	3	17
Electrical Technology Faculty				
Byram, Robert	18	Extensive military and industrial training	20	20
Elbert, Mike	15	BS, University of Alaska	2.5	2.5
Garcia, Steve	15	AS, Dixie College BS, MVE Northern AZ	22	23
Kelly, Clint	20	AA, Idaho State University	3	23
Industrial Millwright Technology Faculty				
Bruns, Tom	18	AAS, Industrial Millwright Technology, GBC	3	3
Whittaker, Norm	18	B.S., Industrial Technology, Southern Utah U.	5	5
Instrumentation Faculty				
Rod Sidwell		B.S., Colorado School		

	13	of Mines MME, University of Idaho PhD, Colorado School of Mines	2	3
Stugelmayer, James	27	JM Perry Technical Institute	3.5	3.5
Welding Technology Faculty				
Scilacci, Steven	8	AAS Great Basin College	5	5
Nichols, Matthew	13	AAS Great Basin College	1	4 (3 years part- time at GBC)
Electrical Technology Part-Time Faculty				
Addenbrooke, Bernard	2	AAS Great Basin College – Electrical & Diesel	3	1
Blattman, James	2		25+ (part-time)	40
Welding Technology Part-Time Faculty				
Ritz, Josh	12		1	1
Woodworking Technology Part-Time Faculty				
Maynard, Ken	35+		22	22
Dean of Business and Technology				
Murphy, Bret	29+ (PT)	BT, N. Montana MEd, UNR	32	22

Further Information on Staff

Tom Bruns, Millwright Contract Training – Tom went through the GBC millwright program in 1994-95 but never received his degree, until last December. Has 15 years of hands-on experience.

Bob Byram, Electrical – Bob’s education background includes the Navy and electrical/electronics classes. Bob worked on a satellite tracking system in the Navy. His first job in Elko was at Newmont and then at Great Basin College for the last 20 years. Bob is also a National Center for Construction Education and Research (NCCER) craft trainer.

Mike Elbert – Mike began work as an electrician, then he moved into an engineering position which led him to managing commercial building energy upgrade projects. As the first electrical instructor at GBC’s Winnemucca Center, Mike found a lab and classroom as well as built lab equipment. He has also worked with community and industry leaders to develop the program according to local needs.

Steve Garcia, Electrical – Steve, who has taught for GBC for 22 years, started out working as a manager for an electrical company. He has a bachelor’s degree in construction management and a Masters in education from Northern Arizona University. Steve came into the program two years after it was started by Lou Tempel. Classes were held in a 3-bay garage. The program has been in the new DCIT facility for the last eight years, which has increased the strength of the program. Steve is an NCCER master trainer and holds a Nevada Electrical Contractor’s license.

Clint Kelly, Electrical – Clint, who has taught at GBC for three years, came to the college with over 20 years previous teaching experience with MSHA, mining companies and other private companies.

Joe Jensen – Joe worked at Caterpillar for a number of years before coming to GBC. His work experience with Cat included training from that company. He came to the college with 16 years of experience in the field of diesel mechanics.

Christine Marshall—Chris has been the Administrative Assistant IV for the CTE programs since May 2001. Prior to coming to GBC, she worked for Yellowstone National Park in concession management. She says the best part of her job at GBC is working with students.

Bret Murphy—Bret taught all aspects of the Diesel Technology program at GBC for 22 years. He started the Skills USA club on campus in 1984. He holds a Bachelor’s degree in Diesel Technology from Montana State Northern and a Master’s degree in Educational Leadership from UNR. His current title is Dean of Business and Technology and oversees the CTE programs, the Business and Computer Technology programs. This position was created in April 2004 due to the growth in student enrollments and increased faculty.

Matt Nichols – Matt worked as a welder at Round Mountain Gold for five years, then at Joy Global for seven years. He taught as a part-time instructor in the welding program for several years before he was hired as a fulltime instructor.

Earl Owen – Earl’s degree is in vocational education and corporate training. He taught high school for eight years and in the diesel industry for 17 years before being hired as a fulltime diesel instructor at GBC.

Steve Scilacci, Welding—Steve worked as a welder for P&H MinePro and other similar industries for eight years before being hired as a fulltime welding instructor at GBC.

Rod Sidwell – Rod is more an engineer than an instrumentation person, but he has worked extensively with instrumentation during his career. Areas include Industrial, pilot-scale, and laboratory-bench instrumentation.

Heather Steel, CTE College Credit Coordinator – Heather graduated from GBC in 2007 and started working at GBC in 2009 as the Tech Prep Coordinator. Heather earned a Masters in Agriculture from Colorado State University in May 2014. Tech Prep (now referred to as CTE College Credit) is part of the federally funded Perkins Grants. Its main purpose is to expand and improve the transition from high school CTE programs to college CTE programs.

Jim Stugelmayer, Instrumentation Technology – Jim graduated from J.M. Perry Technical Institute and has been teaching instrumentation theory to electricians and engineers for the past 25 years. He has taught at GBC for 3 ½ years.

Mike Whitehead – Mike has worked in the diesel industry for 28 year, working as a diesel trainer for Fiat Powertrans, Navistar, and other companies. He was hired as a diesel instructor at GBC in 2013.

Norm Whittaker, Industrial Millwright Technology – Norm worked for GBC for five years; prior to that he worked for Barrick for 18 years. He holds a Bachelor degree in Industrial Technology from Southern Utah University. Norm was also involved in the start-up of the RPL (Recognition of Prior Learning).

Student Enrollment

Annualized FTE, Career Technical Education					
	2010-11	2011-12	2012-13	2013-14	2014-15
Diesel	69.9	54.5	49.9	61.5	52.9
Electrical	52	43.5	64.1	78.5	71.3
Industrial Mill	40.6	40	31.4	34	31
Instrumentation	13.3	14.9	11.5	16.2	27
Welding	64.4	57.2	53.8	56.1	50.7
Totals	240.2	210.0	210.7	246.3	232.9

Completers & Graduates

Career Technical Education (CTE) Degrees/Certificates					
	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
AAS Diesel Technology	11.5	14	12	19	19
CRT Diesel/Technical Arts	24	25	31	38	28
AAS Electrical Technology	16	18	29	33	16
CRT Electrical Technology	24	22	32	39	30
AAS Industrial Millwright	5	5	7	4	6
CRT Industrial Millwright	11	14	13	14	14
CRT Instrumentation Technology	7	12	9	20	23
BAS Instrumentation	0	2	2	6	5
AAS Welding Technology	3	5	5	10	9
CRT Welding Technology	9	14	15	18	16
Totals by Year	110	131	155	201	166

Facilities & Equipment

The 36,400 square foot Diekhans Center for Industrial Technology (DCIT) was completed in 2008 on the Elko campus. It houses classrooms and labs for electrical, instrumentation and industrial millwright as well as general classrooms, faculty offices, and the college tutoring center. Diesel Technology remains in the Greenhaw Technical Arts (GTA) and welding in the annex to Lundberg Hall. Recognition of Prior Learning (RPL) assessments takes place in the Art Annex.

The National Guard Armory is no longer available for use by the CTE program, but hydraulics training which was formerly held in the armory has been consolidated so that the office, shop and classroom are now in one building. One room in GTA has been converted into a hydraulics lab that offers more room for ease of instruction.

In Winnemucca, the Electrical Technology program is housed in a modular that was already on campus. A large upgrade project brought 3 phase power to one of the classrooms which made possible its conversion into a lab area. Because of space limitations, all lab equipment is designed to be modular and can be moved in and out as needed. Lab components are identical to the equipment found at the Elko site.

The Welding Department has a long-standing request for additional training space which so far remains unfulfilled.

There is a competitive process for all programs at GBC to apply for equipment money. CTE has been generously rewarded in this process.

Measures of Student Satisfaction & Success

What is contained in the following table, **Follow-up Data**, is a sample of several years' survey results.

Follow-up Data

Follow-Up Status, CTE Graduates Telephone Survey	
Employed	102
Employment is Degree Related	36
Continuing Education at GBC	12
Employed & Continuing Ed. At GBC	34
Transferred	6
Employed & Transferred	10
Military	1
No Answer	79

How the program supports the mission of the college

"The mission of Great Basin College is to provide superior, student-centered, post-secondary education in rural Nevada." Career and technical education is one of the five major types of education offered by GBC and has been a major element of the college program from the beginnings of the college nearly 40 years ago. The career and technical studies are developed to meet the demands of the local economy. There is no better example than the MTC Program:

MTC

GBC approached local mining companies in the late 1980s and promptly formed a partnership with Newmont Gold called the Skills Improvement Program, which trained 200 Newmont employees in the late 1980s and early 1990s. With the success of this program, it became evident that other mining companies and companies that support mining could benefit from a workforce training program, and thus began the Manpower Training Cooperative (now called the Maintenance Training Cooperative (MTC). The MTC is made up of mining industry representatives, businesses and college personnel. This

cooperative controls the awarding of the MTC scholarship which provides scholarships to students who are interested in GBC's CTE programs. Initially the scholarship amount was \$3,000 and students would have the opportunity to work at the sponsoring company's worksite. Currently, the MTC scholarship has increased to \$5,000 and students are required to work for their sponsoring company. The number of scholarships per year has varied, but most years there are about 80 scholarships awarded. To date there have been over 1100 scholarships awarded worth over 4 million dollars.

Sponsors of the MTC program have donated more than \$5 million in equipment and support. The mining industry funded 6 annual teaching contracts until these positions were funded through the college. The program has expanded and now includes diesel, electrical, instrumentation, industrial millwright and welding technologies with 13 full-time instructors.

Industry Skills Training

In 2006 Newmont Gold Corporation and GBC partnered to develop a skills standard assessment that would establish a baseline skill level for mobile maintenance personnel. The initiative took six months to set up and the first employee was assessed in December of 2006. The assessment is called the *Recognition of Prior Learning* (RPL), and is currently being used to assess industrial millwright technicians. Newmont Gold Corp. and Barrick GoldStrike have assessed over 1200 employees using this model. Once an employee has been assessed, a customized training plan is developed outlining the skills/classes that employee needs to improve their skills. Prior to this, employees were taking classes they didn't need because the company didn't know what skills the employee had or what skills they needed.

The RPL program was designed to gauge the training needed by mine employees, but most of the training over the past five years has been mostly in the Millwright area. The contract trainer for Millwright completed 20 RPLs in 2015. However, tight funding caused Barrick to request that GBC not advertise for a diesel contract trainer. The CTE department schedules any requested contract classes.

The Industry Skills Training program and MTC are exemplary in the partnership of companies and Great Basin College—enabling steady increases in employee skills and further maturing of the college's training capabilities.

Workforce Training (WT)

The WT is a hybrid online electrical training program that takes employees four years to complete. Steve Garcia and Bob Byram developed this program per Round Mountain Gold's request. Students/employees receive online electrical theory training based on GBC's AAS Electrical Systems Technology program. Once a month students attend class at GBC to take tests and receive hands-on instruction.

GBC electrical instructors coordinate with Round Mountain Gold supervisors to monitor student's progress and to outline on-the-job learning outcomes. RMG supervisors provide learning and job

opportunities related to the electrical curriculum. This relationship between RMG supervisors and GBC instructors reinforces the online and hands-on training for the students.

The Workforce Training program (WT) is offered to any mine that is interested. Since the time of the last Program Review, the electrical training program has added Barrick Goldstrike to the program.

Perkins Grants

GBC receives Carl Perkins CTE grant funding from the federal government through the Nevada Department of Education. These funds have been used to help start several CTE programs here at GBC. These include programs in Agriculture, Radiology, High School Diesel program in Battle Mountain and Broadcast Technology. Funding in 2015 helped with the startup of the new Paramedic Program. The Carl Perkins grant also supports the CTE College Credit coordinator's position and over the years purchased several thousands of dollars for technical equipment. It has also provided professional development funds for the CTE program faculty.

TAACCCT grant

GBC applied for and received 2 TAACCCT (Trade Adjustment Assistance Community College and Career Training) grants for our CTE areas. The first was FY 2012 and totaled \$350,000 over four years. The programs involved were Diesel (yrs. 1-4), Welding (yr. 1), Electrical (yrs. 2, 3, 4). With TAACCCT funding, the CTE program hired a second Millwright instructor and an intensive/intrusive adviser to assist with getting all program area students an individual learning plan if faculty felt they were falling behind in courses. This funding also provided an embedded math instructor in all the above programs except electrical. The math instructor developed challenge exams for each program area. If a student passed, she or he was able to waive Math 116. Students in the electrical program had access to and took the challenge exam without needing math instruction.

In addition, TAACCCT grant funds allowed the Instrumentation program to develop a hybrid online program.

Other Funds

Barrick Goldstrike provided funding that supports a third electrical instructor in Elko and a fourth electrical instructor based in Winnemucca. Barrick and Newmont Gold together donated \$292,000 to fund instrumentation equipment contingent on GBC finding funding for a second instructor. When GBC obtained funding for the second instructor from the Department of Employment and Training (DETR), the \$292,000 was released for equipment.

Two area high schools are able to offer dual credit electrical courses with funding provided by Barrick Goldstrike (Lowery High School in Winnemucca) and Pattern Energy (White Pine High School in Ely).

Online Education

Two areas of CTE – instrumentation and electrical – offer online hybrid programs. Typically, students do course work online, then meet with instructors at scheduled times in live settings for testing and hands-on instruction. The online Electrical program is accredited by the National Center for Construction Education Research (NCCER).

Support for GBC Students:

JOIN, Nevada Job Connect, Vocational Rehabilitation

GBC has worked with Job Opportunities in Nevada (JOIN) to help train displaced workers. JOIN has sponsored many students in GBC's Commercial Driver's License (CDL) program. Nevada Job Connect and Vocational Rehabilitation have also sponsored students through the CDL program and through our CTE programs. In recent years there has been an emphasis on short term programs, so more students have been sponsored through the CDL program than the CTE programs. The CDL program was in hiatus for several years, but an instructor was hired in Spring 2015. He taught five sessions with four students each. All twenty students completed the program.

Bachelor of Applied Science (BAS)

However, there is one item worth noting in regard to helping students with technical degrees and transitioning to a four year college. GBC recognized the need for their CTE graduates to continue their education. In 1997 GBC established a Bachelors of Applied Science (BAS) degree program. In the beginning the BAS program had one emphasis, Management in Technology, this was created specifically for Associate of Applied Science students who were either in management or were considering management careers. This BAS was very popular, and because of this popularity five emphasis areas were created. However, only Instrumentation, land surveying, digital information and management in technology remain. Agriculture was placed on the inactive list due to budget cuts and low enrollments. In 2014, a program review committee recommended that the GBC administration eliminate the associate degree in Agriculture. That degree is no longer offered.

Intercollegiate Skills Competition

GBC has had a SkillsUSA club since 1984, and it continues to thrive today. The SkillsUSA club is made up of students from GBC's technical areas and typically has 30 or more students competing each year. A delegation from GBC has gone to the national competition just about every year since the club's inception. In 1988, one student won the second place national medal in Diesel Equipment Mechanics. In 2014, GBC students placed sixth in Extemporaneous Speaking and eighth in Electrical Motor Control. In 2015, GBC took eighth in Welding Singles and placed in the top twenty in all other competitions.

In State competitions in 2014, GBC CTE students earned gold in Diesel, Electrical Motor Control and Extemporaneous Speaking. In 2015 State Competitions, students took gold in all welding categories and in Electrical Motor Control and Diesel.

How the program integrates with other departments and programs at GBC

A major point of interaction is with the English and mathematics departments, both of which offer programs in the basic skills required for the trained technician.

Because of the non-traditional course schedule (longer semesters, block scheduling of all CTE courses), cooperation with student services departments is essential.

On the other hand, integration of career/technical instructors with other faculty and departments is made difficult because of the non-traditional CTE course schedule. Usually CTE instructors are with students during times of faculty meetings, special presentations, etc.

An entrance criterion was applied to students in the fall of 2011. Students who apply for the CTE program must also take the Accuplacer test or submit SAT/ACT scores. Students register between May and July so that if developmental courses are required, students have the opportunity to take those courses in the summer so that they can move directly into ENG 107. Few students are able to take advantage of this, however, because of their work schedules. The English department has also created an ENG 103 class that meets the requirements of the certificate programs.

Recruitment Approaches

CTE College Credit

In Fall 2014, the Tech Prep program became CTE College Credit with articulation agreements throughout the state of Nevada. Students can earn up to 21 free college credits for select CTE courses taken in high school. GBC students have saved nearly \$81,000 in tuition from 2012-2014 by taking these courses and applying for the CTE College Credit. The transition from Tech Prep to CTE College Credit will be complete by summer 2016.

Funding from the TAACCCT grant and other sources in addition to funds from local mines have allowed the CTE program to add sections in electrical, diesel, millwright and instrumentation. This has further lessened recruitment constraints to such an extent that 196 applicants were considered for 190 openings in the CTE program.

CTE College Credit continues to partner with mining companies to expose high school and college students to careers and education related to the mining industry. The following are examples of these activities.

The CTE College Credit Coordinator spends time informing students within Great Basin College's Service area about the opportunities available to them in fields related to their Career and Technical Education classes. As part of the CTE College Credit presentation, the CTE College Credit Coordinator is accompanied by mining professionals for the purpose of providing the students with information about careers and education available for the mining industry. The CTE College Credit Coordinator in conjunction with the GBC Recruitment Coordinator schedules spring visits to all the service area high

schools, to talk to senior classes as well as targeted CTE classes including Agriculture Science, Welding, Drafting, Electronics, Automotive Technology, Business and Computer Science.

CTE College Credit and area mines also sponsor “Mining Rocks” twice a year for high school students to learn about the various careers available in mining, in addition the students take a tour of an active mine site. CTE College Credit also sponsors “Career Launch” a half hour lunchtime presentation about different careers available in different CTE areas. CTE College Credit has also worked with many Career and Technical Student Organizations to host and participate in regional and state competitions. CTE College Credit also offers other activities for high school students to learn about education and careers as funding is available.

At GBC, students entering into the CTE programs can apply for Pell Grants by completing the Free Application for Federal Student Aid (FAFSA). Qualifying students who meet the income standards will receive aid to help them pay for their technical education. Other sources for low income CTE students are college scholarships, JOIN, MTC scholarships and Boys and Girls Club scholarships.

Great Basin College recognizes several high school programs state wide that lead to the five Career and Technical Education (CTE) programs mentioned earlier. Great Basin College actively recruits at all of the high schools within its 10-county service area. Some of our most successful students have come from remote high schools like, Round Mountain and Eureka High Schools. A number of high school programs feed into GBC’s technical programs. These programs are Agriculture, Ag Mechanics, Welding and Auto Shop. These high school programs do not fit our technical programs perfectly; however at the entry level they are compatible with GBC’s first year classes.

There are several ways in which high school students can receive college credit for high school classes. The first of these is CTE College Credit. CTE College Credit is a collaborative effort between college instructors and high school instructors where both agree that the class taught in high school is equivalent to the college level. There is a ten dollar fee the student pays to get a GBC transcript with the CTE College Credit class posted on it. Classes that qualify for CTE College Credit are available at 27 high schools in the GBC service area.

In FY 2015, 550 students from nine counties earned 814 CTE college credits.

The second way in which high school students can earn college credit is through Dual Credit classes. Dual credit is given when a high school student takes a high school class that is taught by a GBC instructor. This class counts towards the student’s high school credits, and because it is a GBC class it also counts towards GBC credit. Although English and math classes have been taught as dual credit classes for a number of years, CTE classes in electrical technology are now offered at White Pine High School in Ely and at Lowry High School in Winnemucca.

Curriculum/competencies/learning outcomes & syllabi

The content of this report's three appendices reveal CTE's curricular approaches. Appendix A—Career Technology Education Mission Statements—has two common threads: meeting industry needs for trained workers and providing challenging and rewarding careers for students.

Please see Appendix B for Student Learning Outcomes in each of the five disciplines and Appendix C for learning outcomes from a sample of CTE syllabi.

The outcomes, whether at the program/discipline level or individual syllabi, possess the following characteristics:

1. Attention to the conceptual background (textbook knowledge).
2. Emphasis on hands-on skills and documented achievement of these skills.
3. Trouble-shooting as an essential skill.
4. Consistent and constant emphasis on safety

Less universal are:

Stated criteria for successful task achievement, such as demonstrated in the statements:

1. Align shafts to ***within + or - 0.001"*** using three different methods of alignment.
2. Wire a reversing AC motor control and ***run a motor***.

Strengths and Weaknesses of the Program

Introduction

The instructors, generally consider themselves qualified and experienced with more than adequate experience in their field, though in some cases there is a felt need for improving teacher training skills. With some exceptions the instructional space and equipment are excellent, though there is an ongoing need for more and up-to-date equipment in these rapidly changing fields and for updated curriculum, including on-line course development. There is often a frustration in not having enough time to help students to learn everything that would help them in their employment.

Diesel Technology

Strengths

- **We have a lot of years of experience doing what we teach.** In this "hands on" business a good portion of it can only be learned by doing and experiencing what it takes to get the job done. We know what it's going to take for the student to succeed.
- **We are constantly trying to better ourselves and do a better job teaching.** We are not content to just get by. We know that to do a good job teaching it takes dedication and hard work. You have to care about the success of those you teach.

Weaknesses

- **Neither one of us has been trained to be teachers.** I believe to be an effective teacher it takes training. We both have had experience in supervision. A part of our job supervising included training others. I feel I did a good job at this and I feel I do a good job teaching adults. But these young students seem to lack the desire to put an effort forth to learn. They want everything instantaneous and easy. If it takes effort they don't want to do it. There is always a few in each class that do care and try hard. For those few it's easy to put the effort forth to teach them. But I don't believe we can be content with that. We need to find ways to reach the majority and not just a few. The College has done a great job in providing training for us, but I know in my case I find it hard to apply a lot of that in the class. I feel it would be great if we had mentors with more experience teaching to help us to do a better job.
- **Lack of current up to date equipment and training items.** I have visited other schools that have business sponsors supplying equipment and training items. It's great to have the support of the mines and the limited support from other businesses, but it would be even better if we had sponsors to supply us with up to date equipment and diagnostic tooling. It could be engine companies like Cat, Cummins, Detroit Diesel, or trucking companies like International, Freightliner, Peterbilt, Kenworth, or equipment companies like Cat, Atlas Copco, and Sandvik. I have no idea how to accomplish this but I feel it needs to come from the parent companies and not dealerships. Possibly if we had a person here at the college who is a good salesperson, they could sell our program and get us that kind of support.
- **Our facilities lack a lot.**
- **The one year program limits us.** There is only so much that can be taught and understood in the short time we have to do it. Because we follow the college semester system this probably would never be considered but what if we had a one year program that was one year. The year would be made up of four, three month blocks or phases. Each phase could be a stand-alone course or in other words a student could start in any phase of the four and still keep up. Once the four fundamental phases are completed the student could graduate. Additional three month courses could be offered so the student could get more advanced or specialized training. Each instructor teaches three phases a year or more if they choose. Just a thought.

Electrical Systems Technology

Strengths

- Dedicated, innovative, well qualified faculty.
- Strong degree of student satisfaction and placement.
- Valid contribution to the local and state economy.
- Industry approval and support.
- Excellent instructional facilities
- Addition of new equipment (upgraded motor control/PLC stations).
- Addition of new instructors, Mike Elbert in Winnemucca, Clint Kelly in Elko, and one fulltime lab assistant, Bernard Addenbrooke.

Areas for Program Improvement

- **Increase Program Budget** -The present operations budget is inadequate to sustain the present program, and does not provide for growth. The budget has not kept pace with enrollment. The amount of monies allocated has remained unchanged for several years. Additional funding is needed to meet advancements in technology.
- **Update Equipment** - There is an immediate need to construct state of art laboratory stations and update courses to include advancements in technology.
- **Additional Faculty**- The instructional work load, in conjunction with the programs accelerated schedule, makes it difficult for instructors to find time for fulfilling college responsibilities and updating and improving or expanding the program. By adding a qualified full or half-time lab assistant, the quality and efficiency of the program would improve dramatically.
- **Curriculum Development**- Many of the courses need further refinement and development due advancements in technology and the demand for online instruction.

Hydraulics

Strengths

- Ability to maintain focus on one subject
- Excellent Hydraulic Trainers for hydraulic fundamentals
- Dedicated shop to hydraulics class
- Dedicated classroom to hydraulics class
- Lots of used components donated by mines
- Library of current mining equipment schematics
- Automation studio is a powerful tool for instruction and print design
- Contract class students have experience in hydraulics
- Cut-A-Way components for teaching
- Library of hydraulic books and information
- Live equipment for hands on experience. One machine donated for use from Cashman Equipment each year for hydraulic training.
- Flow trainer for testing pumps.
- 226 Cat skidsteer for closed loop hydrostatic training.

Weaknesses

- Shop is too small
- Lack of new hydraulic components; new components are too expensive
- Classroom is limited to 12 students
- Components donated by mines are mismatched and very large
- Hydraulic trainers only capable of 1000 PSI at 1 GPM
- Need more live equipment for hands-on activities
- Need better load sensing trainers

- Hydraulic trainers have limited valving
- Need more gear, vane and piston pumps for disassemble/assemble activities

Instrumentation Technology

Strengths

- Courses taught can lead to job opportunities in most heavy industrial-manufacturing jobs. Most students find I/E jobs soon after graduating
- The 10 courses that are taught in Instrumentation Technology are sequentially progressive in learning requirements, using applications of previously learned principles.
- The instrumentation program is available to students that cannot attend live classes (WebCampus).
- Labs contain good equipment and trainers to have hands-on training of instrumentation as discussed in lecture.
- Increased lab and storage space
- Continuing education for both instructors (week-long training in PLC programming)

Weaknesses

- 30 credit hours of classroom expose students to only the basics of industrial control system applications.
- The technology is rapidly changing; there is a need for additional equipment.

Industrial Millwright Technology

Strengths:

- **Facility-** The new EIT building and shop have made great improvements to the program both in the classroom and in the lab area.
- **Graduate Employment Rate-** 98 % of students who have graduated from the program have found employment in the Millwright field in the past three years.
- **Instructor's Work Experience-** Both instructors have practical work experience to relate course material to the real life scenarios and applications students will be encountering in the future.
- **Equipment-** We have purchased two full NCCER rigging training sets and a full mobile crane virtual simulator. We have had two fully operational oil free rotary screw compressors donated from Newmont. We have also purchased the hand tools which are illustrated in the NCCER student manual and two new complete torch cutting sets with the new updated gauges.
- **Advisory Board-** The people from industry in our community agree with the instructors about what needs to be taught to help the students gain employment in the field after graduation.

Weaknesses:

- **Equipment-** While we have several good examples of equipment used in industry we are always looking for more to increase the learning for our classes.
- **Enrollment-** Although enrollment is up, we need to increase enrollment to 16 in both the morning and the afternoon sessions to fund an instructor position with state money. The position is currently funded with soft money.
- **Contract Companies Enrollment-** Sub-contractors are a resource that has not been fully explored. They present a good source for increased enrollment in the contract training program

because they employ millwrights, and there is room for about eight students in the contract training classes.

Welding Technology

Strengths

- The MTC scholarship program is continuing with more supervision from sponsors.
- Capping of class size has helped in teaching. A cap of 12 would be better than 16, but 16 is better to accommodate more students.
- The welding instructors at Great Basin College are seeking American Welding Society certification as welding inspectors and welding educators.

Weaknesses

- Facility size has become too small for the number of students, the amount of equipment and the improving curriculum offerings.
- Scheduling of classes has become very difficult because of MTC scholarships and work schedules.

Needs: Equipment, Instructional Resources

Both equipment and instructional resource needs are listed in the above strengths and weaknesses of the program. An examination of yearly equipment awards shows that the CTE program is often awarded the amounts it requests. For example, the FY 2015 equipment request awards show Electrical Technology being awarded \$108,500; Diesel Technology was awarded \$11,000; and Welding Technology was awarded \$12, 198.

Planning, Departmental

See Appendix A, Strategic Plan, Goals and Objectives for each department in CTE.

Discussion and Reviews

Program Review Meeting (April 8, 2016): Feedback for CTE Programs

Students (both current and former)

Shane Sylvester, Fausto Banuelos, Jacob Zamora, Dakota Hyde, Curtis Simon, Kurtis Peterson, Cason Salter, Zach Streeter, Luke Seippel, Austen Zaugg
Guest - Linda Uhlenkott

Welding

- More time would help, open labs on Fridays to practice.
- This is a good deal to get a degree, but a lot of classes to go through.

- Should stay at 1 year
- What would happen if we started in July? Many students need the summer to work and earn money. Three more responses that the accelerated programs good.
- Need to dedicate yourself to the program
- Program could be a couple of weeks longer.
- Able to retain more info with the accelerated program with just one class at a time.

Electrical

- Hands on great. Transfer of info to site work well. Math challenge test awesome. English Technical class was great.
- Technical and code good classes. Hands on lab is favorite thing. Seems to be tension between day/night instructors.
- Former student – all classes important – the student interns wait for someone to tell them what to do, too much time spent on the phone. They don't want to do the little things, sweep shot. Work ethic is most important.
- Excited to start projects.
- Very repetitive; wants more practical application
- Bookwork boring, but necessary. Has used everything he has learned.
- Burned out at nine months, ready to get out.

Diesel

- Need more troubleshooting and diagnostic. General ed ok.
- Book really bad -Medium/Heavy Duty. Need a good book
- More troubleshooting. Liked having all three instructors. Took chem instead of physics
- More real world application, had a backhoe
- Need a lot more diagnostics

Mill

- Embedded math was good – it had been a long time since student was in school and worked well for him. Good transition and lab time.
- Liked everything.
- Embedded math was good – it had been a long time since student was in school and the math worked well for him.

Mill/Weld

- There is a disconnect between shop & field, more projects like relining a dozer blade or bucket, extracting bolts, frozen pins, more field application.

Welding

- Facilities need upgrade. Great learning safety and applying to the field. Took gen ed courses online during the summer prior and helped a lot.

- Instructor and classes great. General ed classes, no complaints. On line classes are intense
- Very repetitive- wants more practical application
- Open lab times, more real world situations.

Ivan Bullock

Class should be 25% theory and 75% application. Employers will appreciate the soft skills (general ed) classes.

**GREAT BASIN COLLEGE
CAREER AND TECHNICAL EDUCATION DEPARTMENT
5 YEAR PROGRAM REVIEW
APRIL 8, 2016**

ASSIGNED REVIEWER:

Ivan Bullock – Retired, Idaho State University, Program Coordinator/ Instructor / Diesel Technology- On – Site Power Program Currently doing work for Idaho State University, Workforce Training teaching OSHA safety Classes and Industrial Maintenance course work.

As noted in the Great Basin College CTE Program Review – Preliminary Report, the purpose of the program review is to “assure academic quality, and to determine if need, student demand, and available resources support their continuation.” (NSHE Title 4, Chapter 14, section 5).

I have reviewed the **March 2016 CTE Program Review – Preliminary Report**, toured all CTE program classroom and lab areas and met with administration, faculty, staff, students, and advisory board members as outlined in the **CTE 5 Year Program Review Agenda**.

DETERMINATION AND RECOMMENDATIONS

I have found the March 2016 Preliminary CTE Program Review to be an accurate assessment of the strengths, weaknesses, and needs of the Great Basin College CTE Program.

I have found every CTE program area to be viable, strong programs that have good industry demand for student graduates.

Findings and results of interviews conducted and assessment of facilities have been included in the following areas to give an overall assessment of the Great Basin College community of administration, faculty, staff, students and advisory committee members.

FACILITIES AND EQUIPMENT

A tour of the Elko campus revealed that all program areas had adequate classroom space and for most programs, adequate lab and shop space, except the welding program need for an expanded facility. The newer Diekhans Center for Industrial Technology (DCIT) completed in 2008 has improved classroom and lab areas for the electrical, instrumentation and industrial millwright programs as well as faculty office space and student tutoring. A well designed and functional facility.

The Winnemucca Electrical Technology program modular training facilities has limited space. Faculty and administrators confirmed Mike Elbert has done a remarkable job putting together a strong program that has been effective even with limited space and resources.

ADMINISTRATION

Visits with Bret Murphy, Dean of CTE Programs and Rod Sidwell, CTE Department Chair provided valuable insight to where the CTE is going and future plans. Both Dean Murphy and Dr. Sidwell have technical backgrounds that give them a good perspective of the needs and challenges each CTE program have.

FACULTY

It is evident from our meeting with faculty members that GBC is very fortunate to have a dedicated and experienced group of faculty with years of experience in each program area of instruction. They all are passionate about their roles as instructors, mentors and as members of the GBC community. The faculty support the GBC Mission Statement to “provide superior, student-centered, post- secondary education in rural Nevada.”

STUDENTS

11 current and former students representing the various programs met as a group with Dean Murphy and Program reviewer. All were very supportive of the school and felt that they had received and were currently receiving quality educations.

A discussion was held about the accelerated degree program which allows the students to get their AAS degree in a one school year time frame. All students agreed that it was a challenge to complete their General Education academic course work while doing their technical program studies. Most all agreed that more time would be better, especially more open lab time, but the students felt that there would be more program dropouts in the two- year schedule. Many are going to school on limited resources, or have families to support on part-time jobs that would put added burden to have to go for two years. There was a considerable amount of discussion about the challenges of completing the General Education classes within the one-year time frame. Most all agreed that the students needed to be dedicated and focused to accomplish the course work. While some students do not complete their programs of study within the one-year time, the majority of the students who stayed focused did.

The students also appreciated the General Education faculty approach of making sure their academic classes supported the technical course work by using imbedded math, English writing, and communication classes that related to their program areas of study. It takes a dedicated Gen Ed faculty to put in extra effort to make assignments that support the student’s technical needs. My experience also supports these efforts. If the students can see how their math, English, and communication classes are important to their careers, they will make the effort to complete those classes.

ADVISORY COMMITTEE MEMBERS

GBC is very fortunate to have strong group of advisory members. Many of GBC programs could not function without the generous support of advisory members.

The Maintenance Training Cooperative (MTC) is a good example of how industry can support the college and students. MTC currently award \$5000.00 scholarships to around 80 students per year. MTC sponsors have donated equipment, funded teaching contracts and employment opportunities for students and graduates.

The general consensus from advisory people in attendance at our program review meeting was that this kind of support will continue. The demand for student graduates in all program areas is high and with an increase in workplace retirements, these needs will not be met anytime soon.

Newmont Gold and Barrick GoldStrike have been major partners with cooperative agreements and training partnerships with GBC.

PROGRAMS

DIESEL TECHNOLOGY PROGRAM

Diesel program facilities appear adequate with good training aides and equipment to train on.

Students were satisfied with program and faculty. Several students commented that they thought the program would benefit from having more diagnostics and troubleshooting.

Local diesel equipment employment is strong with the mining industry and trucking industry being the most significant local employment opportunities. The Occupational Outlook Handbook (OOH)2014-2024 shows a projected 10-year growth rate of 5% for Heavy Equipment technicians and a 12% growth rate for Highway Truck technicians.

Diesel program goals are reasonable goals for a successful program looking to keep up with changing technologies and industry demands.

ELECTRICAL PROGRAM

A very strong program that has good enrollment and good industry demand for graduate. The Workforce Training hybrid online training program partnerships that work with employers such as Round Mountain Gold to do an on-the-job four- year training program. Employees do all hands on training at job sights and take online GBC classes as well as attending periodic instruction at GBC.

The electrical program also has a high school partnership where students can earn some GBC credits that transfer to the GBC electrical program. This has been a good feeder program for GBC.

OOH 2014-2024 shows a projected 10-year growth rate of 14% for this profession. A projected strong demand.

Electrical program goals are looking to increase course offerings through distance learning, developing alternative energy course and acquiring additional laboratory equipment. Reasonable goals and achievable outcomes for a program with projected strong growth.

INDUSTRIAL MILLWRIGHT

The Millwright training program has strong local industry support, especially at the mines. The program has good enrollment and adequate training aides and equipment. The Occupational Outlook Handbook 2014-2024 employment projections show a 10-year growth rate 16% for this field of study. So a projected strong demand for future students.

Industrial Millwright goals of updating curriculum especially older than five years is a must. Five year reviews are done to encourage programs to seek ways to improve curriculum, keep equipment and training aides as up to date as possible. Looking for ways to increase enrollment in a field that is projecting high growth rates is good as long as resources are available to sustain increased enrollment.

INSTRUMENTATION

This program has a good demand as workplace electronics continue to grow to operate most plant processing equipment. The mines employ a large number of graduates. Recent purchase of high end training components will strengthen instrumentation program. Student numbers appear to be increasing in this course over prior years. OOH 2014-2024 employment projections show a 10-year growth rate of 1% for this profession. This is a national average and may not reflect local demand for student graduates because of area mining employment needs. Obtaining projections from local employers would clarify future employment needs.

Instrumentation program goals are quite extensive and will need to be implemented as resources are found to add classes and hire part-time faculty. Goal 2: maintaining curriculum to keep pace with advancing technologies in this field of study is a never – ending endeavor.

WELDING

The Welding program has had steady enrollment numbers the past four years. Industry demand in local area is good. Occupational Outlook Handbook 2014 – 2024 projections show a 10-year increase of 4 % in this profession which is slightly below average. The OOH data may not reflect regional demand for student graduates, so again surveying prospective employers would be good.

Welding facilities appear to be lacking space for project buildup and fabrication. Program could benefit with some more higher technology welding equipment.

The welding program's goals are important because of facility needs, and as always, increased enrollment improves chances for program upgrades in facilities and equipment.

OOH overall average 10-year growth for all occupations is 7%.

AREAS OF CONCERN

- Five members of CTE faculty are on “soft money grants” of which some grants are close to the end of their term. This is a worry to the faculty members involved and to the programs who are dependent on those funds to maintain program capacity.
- Welding program has outgrown its present facility and needs an expansion to allow for project builds and blueprint work.
- Winnemucca Electrical Technology Program is housed in a modular structure with limited space that requires lab equipment to be moved in and out as needed.

FINAL SUMMATION

The CTE Department has a long history of providing well-trained graduates at the college as verified by current advisory board members as we discussed the various CTE programs.

CTE has maintained good relationships with area high schools. Several dual credit agreements and articulation agreements have helped provide a good pipeline of prospective students that has allowed programs to grow and increase course offerings.

I would submit that the 2016 CTE Preliminary Report is an accurate representation of program activities, enrollment and graduation numbers. The administration, faculty and staff are dedicated to keeping the CTE department on a successful course to provide well-trained graduates and continuing valuable industry partnerships.

X Ivan R. Bullock 04/26/2016

Ivan R. Bullock

CTE Program reviewer

Education

BS DEGREE	IDAHO STATE UNIVERSITY	VOCATIONAL TEACHER ED./ HRTD
CERTIFICATE	DENVER AUTOMOTIVE/DIESEL COLLEGE	AUTOMOTIVE CERTIFICATE
CERTIFICATE	DENVER AUTOMOTIVE/ DIESEL COLLEGE	DIESEL TECHNOLOGY CERTIFICATE
CERTIFICATE	UTAH TECHNICAL COLLEGE	COMMERCIAL REFRIGERATION

Experience

DIESEL PROGRAM COORDINATOR/ INSTRUCTOR | IDAHO STATE UNIVERSITY | 1995 - 2014

- Program head over Diesel Technology program and On-Site Power Program.
- Taught classes, handled all program related budget issues, Instructor reviews, curriculum development and updates, student assessment, advisory committee correspondence.

WORKFORCE TRAINING INSTRUCTOR | IDAHO STATE UNIVERSITY | 1997 - PRESENT

- Have developed training courses and taught maintenance classes for both mobile maintenance and industrial maintenance classes.
- Some of clients have been State of Idaho teaching summer classes for school bus technicians and maintenance supervisors traveling around the state from 1997- 2000 putting on classes for over 140 bus technicians and supervisors.
- Heinz Food products, Weight Watchers, Virginia Transformer, Idaho Power,

AED FOUNDATION – ASSOCIATED EQUIPMENT DISTRIBUTORS | 2007 – PRESENT

- Member of AED Technical Standards Committee – This committee is comprised of Industry representatives such as Caterpillar, Komatsu, John Deere , Volvo, Case Construction and college representative members. The committee reviews the Technical Standards used by AED Accredited Schools. The standards are reviewed every three years.
- AED EVALUATION TEAM LEADER – reviews programs for accreditation and 5 year re-accreditation at AED Accredited technical colleges.

Commendations and Recommendations

Commendations

- I have found the March 2016 Preliminary CTE Program Review to be an accurate assessment of the strengths, weaknesses, and needs of the Great Basin College CTE Program.
- I have found every CTE program area to be viable, strong programs that have good industry demand for student graduates.

Recommendations (Areas of Concern)

- Five members of CTE faculty are on “soft money grants” of which some grants are close to the end of their term. This is a worry to the faculty members involved and to the programs who are dependent on those funds to maintain program capacity.
- Welding program has outgrown its present facility and needs an expansion to allow for project builds and blueprint work.
- Winnemucca Electrical Technology Program is housed in a modular structure with limited space that requires lab equipment to be moved in and out as needed.

Appendix A

CTE Mission Statements

Diesel Technology: Providing industry of the future with an outstanding diesel technologies program, endorsed by industry and professional organizations alike. Teaching quality skills and knowledge to the entry level job seeker, along with journeyman level technicians.

Electrical Systems Technology: The mission of the Electrical Systems Technology program is to prepare graduates with the technical skills—the theoretical and applied foundation, for rewarding careers in the electrical system technology field through a learning environment that supports intellectual curiosity, academic achievement and personal growth.

Industrial Millwright Technology: Provide a training program in Industrial Millwright Technology that is recognized by industry and professional organizations such as National Center for Construction and Educational Research (NCCER) as state-of-the-art and that is sought after by students of all ages.

CTE Instrumentation Technology: To provide a training program in Industrial Instrumentation and Automation Technology that is recognized by industry and professional organizations as comprehensive and state-of-the-art. The result of this is a sought after career for students and also those in need of a new career. Instrumentation offers variety, job security, stable employment and excellent salaries.

Welding Technology: Great Basin College is dedicated to welding training and education excellence. Our mission is to provide students with the training necessary for entry-level and continuing education to prepare them to meet the career, citizenship and lifelong learning challenges that they will face in the ever-changing global society and economy.

Appendix B

Strategic Plan Goals & Objectives For CTE Programs, 2015-2016

The following CTE department goals and objectives are taken from GBC's Strategic Plan for 2009-2016, which may be viewed on line at <http://gbcnv.edu/planning/public.cgi>

Diesel Technology

- Goal 1: To have Great Basin College recognized as a leader in training for heavy equipment technology
Objective 1.1: Develop a professional relationship with industry to promote interest from within and outside our immediate area.
- Goal 2: Maintain a curriculum that is aligned with a rapidly changing industry.
- Goal 3: Maximize hands on training for students
Objective 3.1: Standardize training aids to streamline workstations

Electrical System Technology

- Goal 1: Maintain an effective and up-to-date curriculum.
Objective 1.1: Enhance curriculum and instructional delivery.
[Includes studying the effectiveness, e.g., of a.m. vs. p.m. classes, different ratios of classroom to laboratory as well as relevance of curriculum.]
Objective 1.2: Investigate feasibility of enhanced distance delivery offerings.
- Goal 2: Maintain quality program
Objective 2.1: Secure National Center for Construction Education and Research. (NCCER) accreditation. (This objective has been realized.)
- Goal 3: Respond to the training needs of the community and region.
Objective 3.1: Develop an alternative energy program.
- Goal 4: Maintain resources for a successful program.
Objective 4.1: Acquire funding for additional laboratory equipment, including advanced labs.

Industrial Millwright Technology

- Goal 1: Continually improve curriculum so students can achieve their certificate and/or associate degree and NCCER certification.
Objective 1.1: Update teaching materials. [Update any teaching material that is older than five years.]
- Goal 2: Increase GBC's Industrial Millwright Technology enrollment to an optimum size.
Objective 2.1: Increase enrollment in millwright program through recruitment
Objective 2.2: Add new contract classes so students can obtain their Associate's Degree.
Increase classes for associates degree not paid for by the mines.
Objective 2.3: Develop contract training with other companies in industry.

Instrumentation

Goal 1: Have Great Basin College recognized as a leader in training for Instrumentation Technology.

Objective 1.1: Obtain professional accreditation with the Instrument Society of America (ISA) to promote interest from outside our immediate area.

Objective 1.2: Develop an instrumentation program that focuses on technology being used across the instrumentation industry worldwide.

Objective 1.3: Create a training platform that is adaptable for technicians at local mines via IAV and/or internet.

Objective 1.4: Create new classes in AutoCad technology.

Objective 1.5: Hire part-time faculty members to provide necessary classes for remote site-specific training as well as teach standard curriculum requirements

Objective 1.6: Track success of graduates.

Goal 2: Maintain a teaching curriculum that keeps pace with the rapidly evolving field in instrumentation.

Welding Technology

Goal 1: New Welding Facility for GBC's Elko Campus.

Objective 1.1: Obtain and develop new welding shop facilities.

Goal 2: Increase enrollments in the GBC Welding Department.

Goal 3: Keep curriculum and equipment in line with current technologies.

APPENDIX C

Student Learning Outcomes For CTE Programs

Diesel Technology

Diesel Technology is a complex field and demands highly skilled technicians. Completion of the program prepares students with specialized training in the repairing, maintaining, troubleshooting, reconditioning, and rebuilding of diesel vehicles and equipment. GBC's program includes extensive classroom lecture and laboratory training on state-of-the-art equipment, as well as training in customer service and report writing.

Graduates of the AAS in Diesel Technology Program will have the knowledge and skills to:

- Analyze and solve problems related to heavy equipment operation.
- Identify diesel engine design and maintain, repair, and troubleshoot them.
- Demonstrate proper use of tools related to the repair and maintenance of heavy equipment. Identify, repair, and maintain mobile equipment with hydraulic systems.
- Perform safely in the work environment, meeting and obeying all workplace safety requirements.

Electrical Systems

This program prepares graduates to work in diverse industries including mining, manufacturing, power plants, power distribution, construction, sales, machine control, water resource management, and gaming.

Graduates of the Electrical Systems Technology AAS degree program will have the knowledge and skills to:

- Analyze and interpret graphical information found on schematics, blueprints, and diagrams.
- Identify, use, and maintain motor and computer-based control systems.
- Have a firm understanding of theories that apply to the electrical trade.
- Interpret and apply the National Electrical Code to electrical installations.
- Demonstrate the proper use of tools used in the electrical field and industry.
- Design, construct, and troubleshoot various electrical systems used in commercial and industrial settings.
- Perform safely in the work environment, meeting and obeying all workplace safety requirements.

Instrumentation

The knowledge and skills taught in the Instrumentation Technology Certificate of Achievement Program were developed through a study of industry requirements for the trade, particularly with the association, Instrumentation Systems and Process Automation. Additional input was given by the advisory board, and members of local industries, mines, and government agencies.

Graduates of the Instrumentation Certificate Program will have the knowledge and skills to:

- Understand the role of measurement and control in industrial processes.
- Interpret measurement and control terminology.
- Compare the methods of devices used in temperature, pressure, level, flow, and analytical measurement.
- Understand the operation and components of a feedback control loop.
- Apply ISA standards to interpret symbols and documentation.

- Connect, calibrate, and operate various measurement and testing devices.
- Interpret manufacturer's instructions to correctly install and maintain pneumatic instruments.
- Build and tune a feedback control loop and apply the concepts of PID control.
- Calibrate and align pressure and temperature transmitters, calculating span and range values for various applications.
- Perform safely in the work environment, meeting and obeying all workplace safety requirements.

Industrial Millwright

Graduates of the Industrial Millwright Technology Program will have the knowledge and skills to:

- Read and interpret standard blueprints and drawings of industrial equipment.
- Align shafts using laser and dial indicator methods of alignment.
- Identify and correct cavitation in fluid handling pumps.
- Set up a preventative maintenance schedule for industrial equipment.
- Rebuild and replace components in fluid and air handling systems.
- Replace bearings and seals in a non-destructive manner.
- Take electrical measurements on single- and three-phase power equipment.
- Replace defective components in a fluid power system.
- Identify failure causes in industrial equipment using vibration analysis and the root cause analysis tree.
- Identify and correct unbalance in rotating equipment.
- Rebuild industrial gear trains.
- Remove and replace standard industrial couplings.
- Identify metals according to standard hardness test.
- Complete precision hole location using hand layout and DRO methods.
- Perform safely in the work environment, meeting and obeying all workplace safety requirements.

Welding

Graduates of the Welding Technology Associate of Applied Science Degree Program will have the knowledge and skills to:

- Make satisfactory welds in all positions using the following welding processes:
 - Shielded Metal Arc Welding (SMAW)
 - Gas Metal Arc Welding (GMAW)
 - Flux Cored Arc Welding (FCAW)
 - Gas Tungsten Arc Welding (GTAW)
- Make satisfactory cuts with the following processes:
 - Oxygen Fuel Cutting (OFC)
 - Plasma Arc Cutting (PAC)
 - Air Carbon Arc Cutting (ACC)
- Interpret welding blueprints and welding symbols.
- Perform pipe layouts.
- Utilize basic welding metallurgy.

- Perform safely in the work environment, meeting and obeying all workplace safety requirements.