Program Evaluation

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Programs Evaluated:

The following programs below were evaluated to determine program effectiveness and see what can be done to improve current program offerings. These programs are:

A. Certificate of Achievement in Construction Electricity
B. Associate of Applied Science Degree in Building Technology Major-Electrical

A. Program Goals:

Certificate of Achievement in Construction Electricity

Program Description:

Students will be introduced to basic technical skills and prepare the students for positions in the electrical industry.

Program Learning Outcomes:

1. Practice safety and occupational health procedures in the workplace.
2. Use electrical hand and power tools competently.
3. Test Electrical Equipment.
4. Interpret schematic wiring diagrams and waveforms.
5. Determine the amount of load per circuit.
6. Install residential wiring circuits according to given specification and plan.

Associate of Applied Science Degree in Building Technology Major-Construction Electricity

Program Description:

This program is designed to develop technical skills and practical experience to prepare the students for positions as electrician in this field. Students will be introduced to theory, installation and practices in troubleshooting residential and industrial circuits.

Program Learning Outcomes:

1. Practice safety and occupational health procedures in the workplace.

2. Use electrical hand and power tools competently.
3. Test Electrical Equipment.
4. Interpret schematic wiring diagrams and waveforms.
5. Determine the amount of load per circuit.
6. Install residential wiring circuits according to given specification and plan.
7. Identify and interpret basic solid state (electronics) symbols and circuit schematics commonly found in the electrical industry.
8. Analyze circuit operations on basic motors.
9. Perform basic troubleshooting on basic motors.
10. Install and perform basic maintenance on air-conditioning units.
11. Interpret and install circuits according to rules and regulations of the National Electrical Code book.
12. Install and analyze basic motor control circuits.

B. Program History

This program of Certificate in Construction Electricity was approved in 1998 giving the vocational division full authority to implement the said program. Then in 2003, the Applied Associate Degree in Building Technology major in Construction Electricity was approved giving students in the certificate level the opportunity to further their education in the electrical field.

Milestones:

- 1998 – Certificate of Achievement for Construction Electricity was approved for implementation.
- 2000 – Initial course was offered with 3 full time students.
- 2002 – Hired 1st local instructor to teach full time due to an increase number of students registering in the program.
- 2003 – Associate of Applied Science degree programs in Building Technology was approved by WASC.
- 2005 – Full time instructor was hired to teach and assist in developing/updating courseware and program assessment.
- 2006 – Course modification to upgrade contents of VEM 240 and VBM 102 was submitted and approved by Curriculum Committee.

  - Teaching Assistant was hired to assist full time instructor due to an increase in enrollment and after 3 years TA was reclassified to full time instructor to attend the demands of increasing number of students.
- 2007 – Electrical Shop was transferred to Auto-mechanic shop to provide students more space and suitable for learning skills environment.
  - Computer-Lab was constructed for Basic and Advance courses.
  - 14 computers provided for NIDA lessons & Simutech Troubleshooting Skills Series (Industrial Wiring/Motor Control).
- 2008 – Currently working on course modifications to improve quality and course delivery based on recommendations from program/course assessment.

Since its full implementation of the two programs, students enrolled in these courses were trained and develop their theoretical, analytical and practical/hands-on skills. They've been involved in doing electrical maintenance work in school rooms and buildings. Numbers of graduates are now working at PUC and other electrical related establishments and some pursue their higher education to colleges and universities outside FSM.

Significant milestones / current activities:

Since its implementation to date, students in the construction electricity program were involved in various activities such as repairs and maintenance services of electrical fixtures of the college (Pohnpei Campus – T&T Division) classrooms and workshops, provides installation services for Mechanics-Welding machines power outlets and complete wiring of RAC student activity room. They also help construct circuit board/trainers that were shown during the Technology & Trade Exhibit in 2007 and 2008.

C. Program Description

Associate of Applied Science Degree in Building Technology – Major in Electrical

The building technology major in construction electricity offers academic coursework, technical skills training and practical experience to prepare the students for positions as Electrician in this field. They are introduced to theory, installation and practical troubleshooting residential circuits, motor control circuits and control circuits. Embedded

within the program are three separate exit points, Certificate of Achievement in Construction Electricity, Advance Certificate in Construction Electricity and Associate of Applied Science in Building Technology Major in Electrical.

Figure 1, show the entry and exit points for Building Technology program.

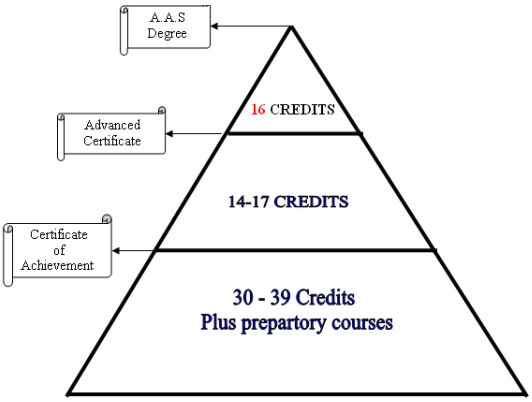

Figure 1. Building Technology program entry and exit points
Source: COM-FSM General catalog

D. Program Admission Requirements

High school graduate or GED certificate holder. Applicants pursuing AAS degree must take and pass the COM-FSM Entrance Test (COMET) and be accepted by the Admissions Board. Acceptance by the Admissions Board is based on the applicant's score on the COMET and other criteria as defined by the Admissions Board.

Students who want to continue to AAS degree must complete all required courses in certificate and advance program.

E. Program Certificate and AAS Degree Requirements

Certificate of Achievement in Construction Electricity

Program requirements:

General Education Requirements ……. (17 credits)

BU 097 Intro to Entrepreneurship	(3)
ESL 050 Technical English	(3)
MS 104 Technical Math	(4)
MS 106 Technical Math	(4)
CA 100 Computer Literacy	(3)

Technical Requirements …… (21 credits)

VEM 102 Electrical Drawing and Sketching (1.5)
VEM 103 Basic Electricity I (4)
VEM 104 Basic Electricity II (5)
VEM 110 Workshop Fabrication/Hand and Power Tool Skills (3)
VEM 111 Electrical Wiring I (3)
VEM 112 Electrical Wiring II (3)
VSP 121 Industrial Safety Electrical/Electronic (1.5)

Total credit requirements ……..38 credits

Associate of Applied Science Degree in Building Technology Major in Construction Electricity

Completion of Certificate in Construction Electricity

Transfer of allowable credits (32 credits)

Completion of Advance Certificate in BT major in Construction Electricity (48 credits)

Program Requirements:

General Education Requirements …… (10 credits)

EN 123 Technical Communications (3)
SC 130 Physical Science with Lab (4)
or any natural science w/lab
Humanities (any course in art, music, history
,culture, literature, philosophy or language) (3)

Major Requirements …… (6 credits)

VEE 110 Discrete Devices I (3)
VEE 266 Rotating Machinery (3)

AAS Degree in Building Technology Major – Construction Electricity

Program Requirements:

General Education Requirements …… (1 credit)

Exercise Sports Science (1)

Major Requirements …….. (17 credits)

VEE 222 Discrete Devices II (3)
VEM 105 Basic Electricity for AC (3)
VEM 113 Basic Refrigeration I (4)
VEM 212 National Electrical Code (3)

VEM 240 Industrial Wiring (4)

Graduation Requirements…… 65 credits

Source: COM-FSM General Catalog

F. Program Courses and Enrollment

Certificate and Degree program course requirements are listed in the table below.

Technical Requirements	**General Education Requirements**
VSP121 Industrial Safety	ESL 050 Technical English or SS 100 World of Work
VEM110 Workshop Fabrication	EN123 Technical Communication
VEM 102 Electrical Drawing & Sketching	MS104 Technical Math I
VEM 103 Basic Electricity I	MS106 Technical Math II
VEM 104 Basic Electricity II	CA100 Computer Literacy
VEM 111 Electrical Wiring I	Humanities
VEM 112 Electrical Wiring II	Science with lab
VEE 110 Discrete Devices I	Physical Education
VEE 222 Discrete Devices II	
VEE 266 Rotating Machinery	
VEM 212 National Electrical Code (NEC)	
VEM 240 Industrial Wiring	
VEM 105 Basic Electricity for AC	
VEM 113 Basic Refrigeration I	

Table 1. Building technology major in Electrical program courses
Source: COM-FSM General Catalog

Below shown table 2 from Fall 2008 to Spring 2011 program enrollment figures. In the 100s' courses, there are instances the classes are divided in two sections to meet the classroom size, equipment availability and safety concerns however in the 200s' courses the number of enrolled student decreases because degree bound student started to take major technical courses/major of specialization. Furthermore students who have not passed the COMET are no longer allowed to take 200's courses. Also same thing happen on the student who have not pass the prerequisite of the 200s' courses.

Course	***Sp 08***	***Fall 08***	***Spring 09***	***Fall 09***	***Spring 10***	***Fall 10***	***Spring 11***
VSP 121		*41(divided in two sections)*		*31(divided in two sections)*		*62 (divided in two sections)*	
VEM 102		*16*		*15*			
VEM 103		*22(divided in two sections)*		*23 (divided in two sections)*		*30 (divided in two sections)*	
VEM 104	*7*		*18*		*20 (divided in two sections)*		*26(divided in two sections)*
VEM 110		*48 (divided in two sections)*	*7*	*22 (divided in two sections)*			
VEM 111	*13*	*9*	*25*		*26 (divided in two*		*44 (divided in three*

					sections)		*sections)*
VEM 112	*9*		*17*		*19 (divided in two sections)*		*24 (divided in two sections)*
VEM 105			*9*	*27 (divided in two sections)*			
VEM 113	*6*	*5*					
VEM 212			*8*		*10*	*2 (Independent Study)*	*11*
VEM 240	*6*		*9*	*3*	*10*	*4 (Independent Study)*	*10*
VEE 110	*17*	*11*	*22*	*16*	*21 (divided in two sections)*	*15*	*37 (divided in two sections)*
VEE 222	*7*	*15*	*10*	*5*	*9*		*10*
VEE 266		*8*		*14*		*10*	

Table 2. Course enrollment rate by semester

Source: COM-FSM Student Information System Record Spring 2008 – Spring 2011

G. Program Faculty

Full-time Faculty

1. Cirilo B. Recana - Professor
   B.S. Industrial Education major in Electrical Technology
   MIST, Philippines
   Master of Arts (M.A.) in Teaching major in Electricity
   MIST, Philippines

2. Romino Victor - Assistant Professor
   AAS in Building Technology major in Electrical
   USDOL, Journeyman Certificate in Electrical
   COM-FSM, Micronesia, Federates States of

Part-time Faculty

1. Grilly Jack - Vocational Director
   USDOL, Journeyman Certificate in Electrical
   U.S. Marine Corps Journeyman Certificate in Electrical

2. Dennis Poll - PICS Faculty

H. Program Outcome Analysis

1. Program Enrollment

Table below indicates the enrollment data for the programs.

Semester	*COA CE*	*AAS BT*	*Total*
Spring 2008	*11*	*10*	*21*
Fall 2008	*22*	*25*	*47*
Spring 2009	*16*	*27*	*43*
Fall 2009	*23*	*24*	*47*
Spring 2010	*21*	*22*	*43*
Fall 2010	*22*	*29*	*51*
Spring 2011	*18*	*34*	*52*
Fall 2011	*29*	*36*	*65*
Total	*162*	*207*	*369*

Table 3. CA in Construction Electricity and AAS in BT major in Electrical program enrollment per semester.

Source: OAR Pohnpei campus

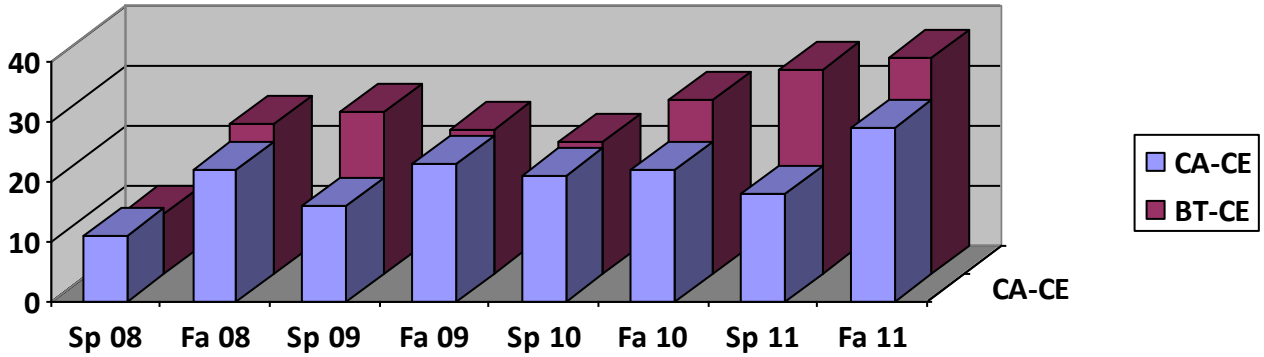

Figure 2. Graphical distribution of Construction Electricity and Building Technology program enrollment per semester.

2. Graduation Rate

Table 4. Show the number of graduates from Spring 2008 to Spring 2011. Despite of the figures shown in table 5, the graduate turn out for both program (CA in Construction Electricity and AAS in Building Technology) is low.

Programs	*Sp08*	*Su08*	*Fa08*	*Sp09*	*Su09*	*Fa09*	*Sp10*	*Fa10*	*Sp11*	*Total*
CA in Construction Electricity	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	***1***
AAS in Building Technology	*5*	*1*	*2*	*3*	*0*	*4*	*2*	*5*	*5*	***27***

Table 4. Construction Electricity and Building Technology program graduation rate
Source: OAR Pohnpei Campus and IRPO data COM-FSM website.

3. Average Class Size

For Technology and Trade Division, class size for lab/workshops are from 12 to maximum of 15 students in order to accommodate them and attend to their instructional needs.

4. Students' Seat Cost

No data collected on student seat cost.

5. Course Completion Rate for the Programs

Course	Fa 08	Sp 08	Fa 09	Sp 09	Fa 10	Sp 10	Fa 11	Sp 11	**Mean Percentile**
VSP 121	12 out of 19, 63%		16 out of 17, 94%		50 out of 62, 83%				**80.0%**
VEM 102	12 out of 16, 75%		11 out of 15, 73%		27 out 30, 90%				**79.3%**
VEM 103	20 out of 22, 90%		18 out of 20, 90%		22 out of 25, 88%		23 out of 28, 82%		**87.5%**
VEM 104		16 out of 18, 89%		14 out of 18, 78%		19 out of 20, 95%		20 out of 30, 67%	**82.5%**
VEM 105			23 out of 27, 85%						**85.0%**
VEM 110	20 out of 22, 90%		12 out of 12,100%		26 out of 30, 87%				**92.3%**
VEM 111		12 out of 13, 92%				22 out of 26, 85%		20 out of 30, 67%	**81.3**
VEM 112		9 out of 9, 100%				16 out of 19, 84%		21 out of 27, 78%	
VEM 113	9 out of 9, 100%		13 out of 13,100%						**100%**
VEM 212		8 out of 8, 100%		7 out of 8, 88%	2 out of 2, 100% (indpt)	10 out of 10,100%		8 out of 12, 67%	**91.0%**
VEM 240		6 out of 9, 67%	2 out of 2,100% (indpt)	7 out of 8, 88%	3 out of 3,100% (indpt)	10 out of 10,100%	12 out of 13, 92%	5 out of 9, 56%	**86.14%**
VEE 110	10 out of 11, 90%		16 out of 16,100%		11 out of 11,100%		33 out of 35, 94%		**96.0%**
VEE 222	15 out of 15,100%	7 out of 7, 100%	5 out of 5, 100%					8 out of 10, 80%	**95.0%**
VEE 266	8 out of 8, 100%		13 out of 14, 93%		9 out of 9, 100%		12 out of 14, 86%		**94.75%**

Table 5. Course completion rate by semester
Source: Program instructors class record book.

6. Students' Satisfaction Rate

Students' satisfaction rate was based on the Student Evaluation record which students filled up and commented every semester. The result of this student's satisfaction rate can be checked with the office of Instructional Coordinator.

The data collected and shown below in random semesters are summary of students' evaluation for course instructor. Sample of questions below showed how students were asked to comment or rate the Instructor and course delivery on a five-point scale: **1** = Never; **2** = Rarely; **3** = Sometimes; **4** = Usually; **5** = Always, from the following criteria:

Student evaluation criteria for course instructor	**VSP 121 Fa 08**	**VEM 102 Fa 08**	**VEM 103 Fa 08**
Keeps regular schedule every class day.	5	5	5
Shows interest in the subject.	5	4.9	5
Gives individual help as needed.	5	4.9	4.9
Avails himself/herself for student conference.	5	5	5
Welcomes questions, suggestions and discussion from students.	5	4.8	5
Shows interest and respect for students.	5	4.9	5
Helps the students in meeting individual learning needs.	5	5	5
Uses classroom lab fully.	5	5	5
Provides clear directions for assignment and instruction.	5	5	5
Grades fairly and frequently.	5	5	5
Makes the purpose of the course clear.	5	4.9	5
Talks clearly at an easy-to-follow speed.	5	5	5
Lessons are well paced with activity as well as lecture.	5	5	5
Makes the course interesting.	5	4.9	5
Textbooks were appropriate and helpful.	5	5	4.9
General Weighted Average	**5.0**	**4.95**	**4.98**
Number of students evaluator	**41**	**16**	**22**

Student evaluation criteria for course instructor	**VEM 104 Sp 09**	**VEM 105 Sp 09**	**VEM 110 Fa 10**
Keeps regular schedule every class day.	5	5	5
Shows interest in the subject.	5	5	5
Gives individual help as needed.	5	5	5
Avails himself/herself for student conference.	5	5	5

Welcomes questions, suggestions and discussion from students.	5	5	4.9
Shows interest and respect for students.	5	5	5
Helps the students in meeting individual learning needs.	5	5	5
Uses classroom lab fully.	5	5	4.9
Provides clear directions for assignment and instruction.	5	5	4.9
Grades fairly and frequently.	5	5	5
Makes the purpose of the course clear.	5	5	5
Talks clearly at an easy-to-follow speed.	5	5	5
Lessons are well paced with activity as well as lecture.	5	5	5
Makes the course interesting.	5	5	5
Textbooks were appropriate and helpful.	4.9	5	4.8
General Weighted Average	**4.99**	**5.0**	**4.96**
Number of students evaluator	**18**	**9**	**42**

Student evaluation criteria for course instructor	**VEM 111 Sp 10**	**VEM 112 Sp 10**	**VEM 113 Fa 08**
Keeps regular schedule every class day.	5	5	5
Shows interest in the subject.	5	5	5
Gives individual help as needed.	4.9	5	5
Avails himself/herself for student conference.	5	5	5
Welcomes questions, suggestions and discussion from students.	5	5	5
Shows interest and respect for students.	5	5	5
Helps the students in meeting individual learning needs.	4.9	5	5
Uses classroom lab fully.	5	5	5
Provides clear directions for assignment and instruction.	4.9	5	5
Grades fairly and frequently.	5	5	5
Makes the purpose of the course clear.	5	5	5
Talks clearly at an easy-to-follow speed.	5	5	5
Lessons are well paced with activity as well as lecture.	4.9	5	5
Makes the course interesting.	5	5	5
Textbooks were appropriate and helpful.	4.8	5	5
General Weighted Average	**4.96**	**5.0**	**5.0**
Number of students evaluator	**26**	**19**	**5**

Student evaluation criteria for course instructor	**VEM 212 Sp 10**	**VEM 240 Sp 10**	**VEE 110 Sp 10**
Keeps regular schedule every class day.	5	5	5
Shows interest in the subject.	5	5	5
Gives individual help as needed.	5	5	4.9
Avails himself/herself for student conference.	5	5	5
Welcomes questions, suggestions and discussion from students.	4.9	5	5
Shows interest and respect for students.	5	5	5
Helps the students in meeting individual learning needs.	4.9	5	4.9
Uses classroom lab fully.	5	5	5
Provides clear directions for assignment and instruction.	5	5	5
Grades fairly and frequently.	5	5	5
Makes the purpose of the course clear.	5	5	5
Talks clearly at an easy-to-follow speed.	5	5	5
Lessons are well paced with activity as well as lecture.	4.8	5	5
Makes the course interesting.	4.9	5	5
Textbooks were appropriate and helpful.	4.7	5	4.9
General Weighted Average	**4.94**	**5.0**	**4.98**
Number of students evaluator	**10**	**10**	**21**

Student evaluation criteria for course instructor	**VEE 222 Fa 09**	**VEE 266 Fa 09**	
Keeps regular schedule every class day.	5	5	
Shows interest in the subject.	5	5	
Gives individual help as needed.	5	5	
Avails himself/herself for student conference.	5	5	
Welcomes questions, suggestions and discussion from students.	5	5	
Shows interest and respect for students.	5	5	
Helps the students in meeting individual learning needs.	5	5	
Uses classroom lab fully.	5	5	
Provides clear directions for assignment and instruction.	5	5	
Grades fairly and frequently.	5	5	
Makes the purpose of the course clear.	5	5	
Talks clearly at an easy-to-follow speed.	5	5	
Lessons are well paced with activity as well as lecture.	5	5	
Makes the course interesting.	5	5	
Textbooks were appropriate and helpful.	5	4.9	
General Weighted Average	**5.0**	**4.99**	
Number of students evaluator	**5**	**14**	

Note:

Satisfaction rate for the general education courses can also be checked with the Instructional Coordinator's Office.

7. Employment Data

Note: Data taken are accounted graduates of the programs which land a job or profession at present. Some unaccounted newly graduates and self-employed are not shown in the table.

Name	Degree	Current Employment
1. Raynard Martin	AAS - BT	Surveyor
2. Kenny Silbanuz	AAS – BT	High School Teacher
3. Augustine Augustine	AAS – BT	Maintenance
4. Romino Victor	AAS – BT	Vocational Teacher, COM-PNI
5. Edward Johnny	AAS – BT	Technician
6. Mark Lawrence	AAS – BT	Surveyor
7. Jeff Olter	AAS – BT	Chef, US mainland
8. Eugene Albert	AAS – BT	US Armed Forces
9. Weiner Hinga	AAS – BT	Maintenance
10. Wendolin Lainos	AAS – BT	Self-employed
11. Sendis Edward	AAS – BT	Supervisor, Construction
12. Terry Rosario	AAS – BT	Chef, US mainland
13. Nelsiro George	AAS – BT	Maintenance, COM-National
14. Lancelot Lebehn	AAS – BT	US Armed Forces
15. Regson Andon	AAS – BT	Electrician
16. Kenny Dadius	AAS – BT	Bank clerk, BOG
17. Sidney Kilmete	AAS – BT	Maintenance, PUC
18. Eddie Pelep	AAS – BT	Maintenance, PNI Sewerage Plant

Table 6. Graduated students list in Applied Associate Science in Building Technology major in Construction Electricity and current employer
Source: Graduate Tracer conducted by private entity for T&T division.

8. Transfer Rate

At present, no data collected as to how many students graduated from the degree program that pursues their higher education. Instead, table shows the number of students/percentage that continues from certificate to degree program.

Certificate of Achievement in Construction Electricity	Building Technology Major in Construction Electricity
Out of 162 students that registered in this program from Spring 2008 to Fall 2011, an average of 80% were able to pursue/continue to AAS degree after passing their COMET.	Out of 207 students registered in this program from Spring 2008 to Fall 2011, an average of 13% (27 students) completed their course requirements for and graduated successfully with a degree of AAS in Building Technology major in Construction Electricity.

Table 7. Transfer rate of students from CA to AAS (Construction Electricity)

Source: OAR Pohnpei Campus

9. Program's Student Learning Outcomes

Certificate of Achievement in Construction Electricity	Advance Certificate in Building Technology Major in CE	AAS Degree in Building Technology Major in CE
Program Learning Outcomes: 1. Practice safety and occupational health procedures in the workplace. 2. Use electrical hand and power tools competently. 3. Test Electrical Equipment. 4. Interpret schematic wiring diagrams and waveforms. 5. Determine the amount of load per circuit. 6. Install residential wiring circuits according to given specification and plan.	Program Learning Outcomes: 1. Practice safety and occupational health procedures in the workplace. 2. Use electrical hand and power tools competently. 3. Test Electrical Equipment. 4. Interpret schematic wiring diagrams and waveforms. 5. Determine the amount of load per circuit. 6. Install residential wiring circuits according to given specification and plan. 7. Identify and interpret basic solid state (electronics) symbols and circuit	Program Learning Outcomes: 1. Practice safety and occupational health procedures in the workplace. 2. Use electrical hand and power tools competently. 3. Test Electrical Equipment. 4. Interpret schematic wiring diagrams and waveforms. 5. Determine the amount of load per circuit. 6. Install residential wiring circuits according to given specification and plan. 7. Identify and interpret basic

	schematics commonly found in the electrical industry.	solid state (electronics) symbols and circuit schematics commonly found in the electrical industry. 8. Analyze circuit operations on basic motors. 9. Perform basic troubleshooting on basic motors. 10. Install and perform basic maintenance on air-conditioning units. 11. Interpret and install circuits according to rules and regulations of the National Electrical Code book. 12. Install and analyze basic motor control circuits.

10. Students' Learning Outcomes for Program Courses

Certificate of Achievement in Construction Electricity

VEM 102 Electrical Drawing and Sketching

1. Recognize and describe a variety of construction drawings, plans and supporting documents.
2. Identify symbols and their functions, explain abbreviations and extract basic information from plans.
3. Demonstrate the use of drawing equipment and procedure drawings according to instructions.

VEM 103 Basic Electricity I

1. Describe the basic concept of voltage and current and the behavior of these parameters in simple electrical circuits.
2. Explain the purpose and identify the various types of resistors and their symbols. Identify the value, power rating and tolerance of resistors using various types of industry codes.

3. Describe the purpose and types of switches, fuses and circuit breakers and identify their schematic symbols.
4. Define magnetism and electromagnetism and their characteristics; describe how these characteristics are utilized in the operation of the relay, magnetic circuit breaker and meter.
5. Describe the function of the multimeter and its controls. Safely and accurately use a multimeter to measure the circuit quantities of resistance, voltage, and current.
6. Using Ohm's Law to define the relationship between resistance, voltage, current, and power in an electrical circuit. By experimentation prove Ohm's Law.
7. Identify the following circuits, calculate and measure the circuit parameters of voltage, resistance, and current. Troubleshoot the series, parallel and series-parallel circuits.
    a. Series Circuit
    b. Parallel Circuit
    c. Series and Parallel Circuit
    d. Voltage Divider Circuit
    e. Bridge Circuit
8. Simplify and analyze complex circuits using the following methods:
    a. Kirchoff's Laws
    b. Thevenin's Theorem
    c. Norton's Theorem
9. Use Bread boarding techniques to construct and analyze series and parallel circuits.

VEM 110 Workshop Fabrication Hand and Power Tools

1. Identify and classify basic hand tools
2 Select the right tool for the right task
4. Apply hand tools correctly and safely
5. Maintain hand tools
6. Identify basic portable power tools
7. Select the right portable tool for the right task
8. Apply portable power tools correctly and safely
9. Maintain power tools
10. Demonstrate the above skills in the fabrication of small projects

VSP 121 Industrial Safety Electrical/Electronics

1. Describe how a person can receive an electrical shock and the effects of electrical shocks.
2. Know how to prevent electrical shocks and how to provide treatment for electrical shocks.
3. Know how to suppress electrical fires.
4. Recognize and identify safety colors.
5. Describe and follow hand and electrical tool precautions.

VEM 104 Basic Electricity II

1. Describe the basic principles of alternating current and analyze various ac waveforms (such as sine-wave, square-wave, saw tooth-wave, etc…) by determining their frequency/cycle in Hertz, period (Time), and other parameters, such as voltage & current values (as in peak, peak-to-peak, average, and RMS), phase relationships, magnitude, and degree (angle).
2. Explain the operation of an AC generator and its characteristics.
3. Use Ohm's Law to calculate voltage, resistance, and current in an AC circuit and to discuss the relationship between the three quantities.
4. Describe the function of an oscilloscope and its controls. Also, students demonstrate how to accurately and safely set up an oscilloscope to measure voltage and frequency.
5. Describe the function of a function generator and its controls. Safely and accurately use a function generator to adjust and modulate various output signals.
6. Describe the function of a frequency counter and its controls. Students demonstrate how a frequency counter is set up for normal operation to perform calibration, other measurements, and how to compare frequency and period measurements using a frequency counter and an oscilloscope.
7. Describe the purpose of an inductor, its current opposing characteristics, and applications and identify various types of inductors, unit of measurement, and its schematic symbol.
8. Analyze the following circuits by calculating total inductance, total reactance, and total impedance; by measuring phase relationship between voltage & current and phase difference between inductive & resistive branches in an RL circuit; and by performing troubleshooting practices to identify faults in an RL circuit.
    a. RL Series Circuits
    b. RL Parallel Circuits
9. Describe an RL Filter circuits and its circuit characteristics, and by experimentation, compare the calculated and measured values in an RL Filter circuit.
10. Describe the construction, normal operation, measurement, and the characteristics of charge & discharge of a capacitor and identify the various types of capacitors, schematics symbols, and capacitance & voltage values.
11. Analyze the following circuits by calculating total capacitance, total reactance, and impedance. Measure voltage & current phase relationship of an RC Series & Parallel circuits. Troubleshoot RC circuits for faults.
12. Describe an RC Filter Circuit and its characteristics. By experimentation, measure and calculate RC filter circuits.
13. Describe and measure circuit values on RC Time Constant operations. Analyze and troubleshoot RC Circuit Transient.
14. Identify and describe RCL/LCR circuits. Analyze and troubleshoot an LCR series & parallel circuits by experimentation.
15. Describe the operation and the effects of a Series/Parallel Resonant circuits. Troubleshoot series/parallel resonant circuits by experimentation.
16. Describe the purpose, operation, and characteristics of a transformer. Calculate and measure primary & secondary parameters of a transformer. Troubleshoot a transformer to determine faults.
17. Describe the purpose & operation, basic construction, and troubleshooting procedures of the various types of relays switches commonly used in the field. Troubleshoot relays and switches by experimentation.

18. Discuss the operation of an electrical circuit, trace & measure AC and DC values in an electrical circuit, and troubleshoot an electrical circuit to identify faults in an electrical circuit.
19. Use Breadboarding techniques to construct and analyze AC series & parallel circuits.

VEM 111 Electrical Wiring I

1. Understand the electrical system and demonstrate the various installation methods.
2. Explain and identify electrical symbols and conductors.
3. Design an electrical wiring schematic.
4. Identify and install electrical boxes, switches and recessed lighting.
5. Recognize electrical interrupters and suppressors.
6. Understand ballast.
7. Describe branch circuit.
8. Identify various conductor sizes.
9. Identify and demonstrate bedroom, master bedroom and bathroom circuit.
10. Identify and demonstrate hallway, front porch and entry circuit.
11. Identify and demonstrate kitchen and dining room and living room circuit.
12. Understand and demonstrate laundry circuit.
13. Identify and demonstrate study, rear entry and family room circuit.
14. Design garage and basement circuit.
15. Explain workshop circuit and demonstrate the installation method.
16. Demonstrate water pump and water heater circuit.
17. Identify and perform stove and oven circuit installation.
18. Identify and explain food disposer and dishwasher circuit.
19. Understand and install vent fan circuit.
20. Understand and demonstrate electric heating and air conditioning circuit.
21. Recognize and demonstrate heat and smoke detector circuit.

VEM 112 Electrical Wiring II

1. Describe safety and the importance of grounding during installation.
2. Demonstrate box and conductor installation.
3. Demonstrate how to properly wire electrical devices.
4. Describe how to plan branch circuit.
5. Demonstrate blue print reading skills and wire various residential circuits.
6. Demonstrate electrical circuit troubleshooting skills.

VEE 110 Discrete Devices I

1 Explain the construction, principle of operation and testing method of semiconductor diodes.
2. Describe the operation and troubleshoot semiconductor diode limiter (clipper) and clamper circuits.
3. Identify BJT schematic symbols and the base, emitter and collector leads. The student will also be able to describe transistor DC bias, transistor cutoff and saturation, and the parameters of Alpha and Beta.

4. Describe the purpose of an amplifier, the classes of operation and identify the three main BJT configurations.
5. Describe the operating characteristics and measure the circuit parameters of the following amplifier types:
    - Common Emitter
    - Common Collector
    - Common Base
6. Recognize FET schematic symbols, describe the construction and operating characteristics of FETs and identify basic FET amplifiers.
7. Describe the operation of common source Junction FET (JFET) amplifiers and verify normal operation through measurement of circuit parameters.
8. Describe typical FET amplifier faults, recognize when a FET amplifier is faulted and identify the faulted component.
9. Recognize Metal Oxide Silicon FET (MOSFET) schematic symbols and describe the construction and operation of Depletion and Enhancement mode MOSFET's.
10. Describe the operation of the following types of rectification
    - Half wave
    - Full wave
    - Bridge
11. Describe the operation of various RC and RL filter circuits.
12. Describe the operation of zener diodes and basic zener voltage regulators.
13. Identify voltage regulator circuits and explain their operation.
14. Describe the purpose and operation of an I.C. Regulator.
15. Explain the operation and advantages of Half and Full Wave Voltage Doublers.

VEE 266 Rotating Machinery

1. Describe the various devices that are called rotating machinery.
2. Describe the operation of DC Motors and Generators
3. Describe the characteristics of DC Motors and Generators.
4. Describe the Stepper Motor.
5. Describe the characteristics of a Stepper Motor.
6. Describe the Stepper Motor driver
7. Observe the operation of the stepper motor
8. Trouble shoots the stepper motor.

VEE 222 Discrete Devices II

1. Describe the purpose and operation characteristics of UJTs and SCRs.
2. Describe UJT oscillator operation.
3. Describe SCR trigger control operation.
4. Describe SCR power control operation.
5. Describe SCR circuit troubleshooting.
6. Describe the relationship between Triacs and SCRs, and Diacs and four-layer devices. Observe the effect of DC and AC voltages on Triac operation.
7. Describe the construction, operation and applications of PUT devices.

VEM 212 National Electrical Code

1. Describe the purpose of the National Electrical Code.
2. Describe the structure of the National Electrical Code Book
3. Define NEC definitions.
4. Describe the organization of the NEC Book.
5. Demonstrate navigating through the NEC book.
6. Identify the roles of other Organizations.

VEM 240 Industrial Wiring

1. State the purpose and general principles of control components and circuits.
2. Identify pilot devices both physically and schematically and describe their operating principles.
3. Interpret motor control wiring, connection, and ladder diagrams.
4. Select and size contactors, relays and overload relays both physically and schematically and describe their operating principles.
5. Select timing relays for use in specific electrical motor control systems.
6. Connect motor controllers for specific applications with emphasis on safety practices and in accordance with National Electrical Code (NEC) requirements.
7. Troubleshoot control and motor control circuit for basic to intermediate level faults.

I.a Discussion of Findings

The above program evaluation has resulted in the following findings:

1. Table 1 shows the technical and general education requirements for certificate and degree students. This shows that gen ed. courses must meet pre-requisite courses before they can take their required courses which makes the students stays longer in their academic classes.

2. Table 2 and 3 course enrolment rate shows an increase of freshmen enrolling in the certificate level, class size is not suitable to accommodate 20 or more students in one class or group. This could lead to overcrowding in the classroom and workshop that the instructor can no longer attend to the individual needs of the students.

3. Student satisfaction rate for course instructor shows a high degree of satisfaction rate of the students taking the courses as identified in this program review.

3. Employment data must be collected by IRPO in order for the college to determine the employability of our students based on the real and present needs of the community.

4. Most of the program courses are not clearly stated in SLO format.

5. Students exiting certificate level normally pursues to degree course to further their knowledge and skills in electrical; this showed a limited accomplished competency that the students learn to get them an employable job.

I.b Recommendations

In congruence to some findings in this program review, the following are suggested recommendations in improving the quality of education we provide for our clients (students) for them to become competitive.

1. General Academic courses required for vocational students like math, science and English can just directly taken as per required in their program. This will avoid prolonging the time spent by the students in repeating those classes and causing them to hold some classes in their technical and major courses.
2. To accommodate increasing number of freshmen taking our courses, and focusing to the individual learning needs of the student, classes can be split into groups or section to create good environment for learning.
3. Start making a survey through the office of IRPO in the community to track the employability of our graduates not only electrical programs but all programs of the division so we can check and balance the effectiveness of our programs.
4. Modify/Revise some courses into SLO format to become more achievable.
5. Modify/Revise course program and add courses that provides needed knowledge and skills required in their field such as;
    a. combining discrete devices course to make it into one (3 credit) course
    b. combine refrigeration course into one course for electrical students.
    b. creating small appliance repair course that enhances the students skills in servicing and maintenance.
    c. updating rotating machinery course into a more productive course that deals with AC motors rewinding and troubleshooting rather than DC motors.
    d. create solar energy course to promote the creation of green collar jobs.
    e. increase number of lab hours for electrical wiring so students have more time to gain skills in wiring installation.
    f. provide industry immersion so students can apply learned skills in the classroom settings to an actual worksite.