AP Full Official	Certificate of Achievement in Refrigeration and Air Conditioning Program		
Campus	Pohnpei Campus	AP Review Submission Date	March 2014
Completed by	Bertoldo B. Esteban Jr.	AR Review Cycle	2011-13

Program Mission

A. Program Mission

To develop a skilled manpower and a globally competitive human resources of the Federated States of Micronesia in the field of refrigeration and air conditioning industry.

Program Goals

Program goals are broad statements concerning knowledge, skills, or values that the faculty members expect the graduating students to achieve.

B. Program Goal:

Its primary purpose is to provide students with marketable entry-level skills in the refrigeration and air conditioning industry or any related field/career. It is designed to qualify students to take external licensure, vendor-based, or skill standards examinations in the field. If standardized external exams are not available in the field of study, the program prepares students at skill levels expected of employees in an occupation found in the local economy.

Program Learning Outcomes:

1. Identify safety and occupational health requirements in the Refrigeration and Air Conditioning industry.
2. Use specified hand and power tools for Refrigeration and Air Conditioning.
3. Perform basic hand skills in maintaining Refrigeration and Air Conditioning system to a given specifications.
4. Read and interpret basic electrical drawing and symbols related to Refrigeration and Air Conditioning.
5. Perform basic troubleshooting and repair of domestic refrigeration and air conditioning units.
6. Participate in the Air Conditioning and Refrigeration profession.

Program History

This section describes the history of the program. This includes the date and reason of implementation, significant milestones in the development of the program, and significant current activities.

C. Program History

The program was created by recommendations of Pohnpei Campus Advisory Council to offer a certificate of achievement (COA) in refrigeration and air conditioning to train local students to acquire skills in installing, maintaining and repairing of the stated equipment and devices which was a needed skill in the community and the local workforce.

Milestones:

2005 - One full time instructor was recruited to assist in designing curriculum and offered courses. Modification of the existing program was also done. In the same year, the first batch of refrigeration and air conditioning major students are composed of twelve (12) new students.

2006 – The students have been involved in building instructional material projects such as

fan motor, compressor motor trainer, refrigeration cycle trainer and split type air conditioning installation trainer.

2007 – The students are actively involved in the first yearly Technology and Trade Exhibit event of the college. Some students are assigned to work in the maintenance department of the college Pohnpei state campus, under the work-study program to perform preventive maintenance of classrooms and offices air conditioning units.

2008 – The college purchased some modern refrigeration and air conditioning instrument and equipment used for instructional purposes to improve the program offerings. Students registered in this program are also in-charge in the installation, repair and maintenance of all air conditioning units at the Technology and Trade Division classrooms and offices.

2010 – The program had one graduate student to be able to enter the apprenticeship-training program under the USDOL, FSM education department and the college.

2011 - Refrigeration and Air Conditioning Students Club (RACSC) was established with a mission of creating an open environment for refrigeration students to engage in professional and personal growth.

2012 – The Pacific Regional Director of United Nation Environment Protection (UNEP) with the personnel of the Office of Environment and Emergency Management (OEEM) of the FSM national government had an informal visit into the college RAC workshop and discussed the possible collaboration between COM-FSM and the OEEM for the implementation of the Montreal Protocol here in the Federated States of Micronesia.

2013 – October 21-23, the Office of Environment and Emergency Management (OEEM) of the FSM national government and COM-FSM Pohnpei Campus hosted the first "Good Practices in Refrigeration and Air Conditioning" Train the Trainers program in the Federated States of Micronesia. Mr. Michael Moller, Refrigeration and Air Conditioning trainer from Australia-Pacific Technical College (APTC) conducted the three days workshop session. This was sponsored by the United Nation Environment Protection (UNEP) as part of the implementation of the Montreal Protocol here in the FSM.

2013 – November 11-12, I was indorsed by the OEEM to join the Pacific Regional Ozone2Climate Technologies Symposium in Apia, Samoa. On November 13 & 14, I also joined the Pacific Island Train the Trainer Regional Workshop in Good Refrigeration Practices.

2013 – December 18-20, the OEEM requested to the college to allow me to conduct the first Workshop in Good Refrigeration Practices in the Island of Yap with the Yap Refrigeration Association officers and members as participants in the training.

2014 – 2nd week of January, the first RAC under apprenticeship program completed his 9,000 hours of training in the field. He is now employed as a refrigeration and air conditioning technician of the True Value Store here in Kolonia, Pohnpei.

Program Description

The program description describes the program, including its organization, relationship to other programs in the system, program design, degree(s) offered, and other significant features of the program, such as elements/resources for forward-looking new program contributions to the state's economy, or specialized program accreditation.

D. Program Description

This program is design to teach the students the principles of refrigeration and air conditioning. It is design to train students in installing, servicing and maintaining domestic and small commercial refrigeration systems. Several courses compliment other programs like BT PLO10 and BMR.

Program Admission Requirements

This section describes the requirements for admission into the program and other requisites.

E. Program Admission Requirements

A student must be a high school graduate or GED certificate holder. Applicants must take 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.

Program Certificate/Degree Requirements

This section specifies the requirements for obtaining a certificate/degree in the program, including specific courses,, sequencing of courses, total credits, internships, practical, etc.

F. Program Certificate Requirements

Program requirements:

General Education Requirements:----------14 credits

MS 104 Technical Math I (4)
MS 106 Technical Math II (4)
ESL 050 Technical English (3) or SS 100 World of Work (3)
CA 095 Basic Computer Application (3)

Technical Requirements:----------21 credits

VEM 105 Basic Electricity for A/C (3)
VEM 110 Workshop Fabrication (3)
VEM 111 Electrical Wiring I (3)
VEM 113 Refrigeration I (4)
VEM 114 Refrigeration II (4)
VWE 115 General Welding (4)
Total credits requirements: 35 credits

Suggested Schedule

Fall Semester ---------- 17 credits
ESL 050 Technical English ---------- 3
MS 104 Technical Math ---------- 4
VEM 105 Basic Electricity for AC Mechanics -------- 3
VEM 110 Workshop Fabrication ----------3
VEM 113 Refrigeration I ---------- 4

Spring Semester ---------- 15 credits
MS 106 Technical Math ---------- 4
VEM 114 Refrigeration II ---------- 4
VEM III Electrical Wiring I ---------- 3
VWE 115 General Welding ---------- 4

Program Courses and Enrollment

This section lists courses offered in the program, including number of sections, course enrollment, section fill rates, and redundancy of courses across the institution.

G. Program Courses and Enrollment

Below are tables showing the program courses and enrollment figures:

Table 1: Fall Semesters (2011 – 2013)

Courses number & Description	2011	2012	2013
Technical Requirements			
VEM 105 Basic Electricity for A/C	14 RAC Esteban	13 RAC Esteban	9 RAC 4 BT Esteban
VEM 110 Workshop Fabrication	15 RAC Esteban	13 RAC Esteban	11 RAC 4 CE Esteban
VEM 113 Refrigeration I	14 RAC Esteban	15 RAC Esteban	9 RAC 6 BT Esteban

Table 2: Spring Semesters (2012 - 2014)

Courses number & Description	2012	2013	2014
VEM 111/P2 Electrical Wiring I	1 RAC Victor		
VEM 114 /P1 Refrigeration II	7 RAC Esteban	10 RAC Esteban	4 RAC Esteban
VWE 115/P1 General Welding	7 RAC 4 BM Esteban	10 RAC 1 BM Esteban	6 RAC 1 BM Mangubat
VEM 105/P1 Basic Electricity for AC	13CE and BT Esteban	6 RAC 6 BT Esteban	5 RAC 7 CE/BT Esteban

Notes

- The cohort scheme is seriously causing a low enrollment in the program specifically during Spring Semester.

Source: COM-FSM Student Information System Record and Instructor Class Record from Fall 2011-Spring 2013

Program Faculty

This section reports the faculty of the program, including full-time and part-time faculty. The degrees held and rank are provided for the full-time and part-time faculty. Finally, provide the faculty student ratio for the program.

H. Program Faculty

Full Time Faculty

Bertoldo Esteban Jr. – Associate Professor/RAC
Bachelor of Science in Industrial Education
major in Refrigeration and Air Conditioning Technology
Marikina Institute of Science and Technology, Philippines

Master of Arts in Teaching (MAT) major in Electrical Technology, Marikina Institute of Science and Technology, Philippines

Supporting Faculty

Romino Victor –------ Instructor/Electrical Technology
Associate in Applied Science
College of Micronesia-FSM
Kolonia, Pohnpei States 96941

Nestor Mangubat –-- Instructor/Automotive Technology
Bachelor of Science in Industrial Education
Batangas State University

Program Students and Faculty Ratio – 40:1
Source: COM-FSM Personnel Listing

Program Indicators

This section provides the data for analyzing the extent to which the program has achieved the established outcomes and criteria. This is the most important part of the program review. The data that will be collected and evaluated are the following:

Assessment of course student learning outcomes of program courses	Data regarding course student learning outcomes are available in the RAC program at the college Wiki website and TRACDAT
Assessment of program student learning outcomes	Data regarding course student learning outcomes are available in the RAC program at the college Wiki website and TRACDAT or please refer to the appendix A of this report.

Program enrollment (historical enrollment patterns, student credits by major)

Table 1: Enrollment by Major

TERM	STUDENTS
Fall 2011	12
Fall 2012	24
Fall 2013	22
Spring 2011	20
Spring 2012	17
Spring 2013	23

Table 2: Students Credits by Major

TERM	CREDITS
Fall 2011	108.5
Fall 2012	228
Fall 2013	242.5
Spring 2011	223.5
Spring 2012	174
Spring 2013	223

Source: IRPO Program Data Sheet for 2013

Average class size

Table 3: Program Sections, Enrollment Ratio and Average Class Size

Term	Section	Enroll Max	Enrollment	EnrollRatio	AvgClass Size
Fall 2011	3	45	41	91.1%	13.7
Fall 2012	4	61	57	93.4%	14.3
Fall 2013	3	45	35	77.8%	11.7
Spring 2011	3	47	43	91.5%	14.3
Spring 2012	3	45	31	68.9%	10.3
Spring 2013	3	45	33	73.3%	11.0

Source: IRPO Program Data Sheet for 2013

Course completion rate

Table 4: Course Completion & Withdrawals Rate (Major)

Term	Students	ABCorP%	ABCDorP%	W%
Fall 2011	65	69.2	78.5	6.2
Fall 2012	32	81.3	90.6	0.0
Fall 2013	75	78.7	90.0	8.0
Spring	68	77.9	86.8	4.4

2011				
Spring 2012	49	42.9	57.1	32.7
Spring 2013	64	76.6	78.1	14.1

Table 5: Course Completion & Withdrawals Rate (Program)

Term	Students	ABCorP%	ABCDorP%	W%
Fall 2011	44	81.8	86.4	6.8
Fall 2012	60	76.7	88.3	5.0
Fall 2013	37	89.2	94.6	5.4
Spring 2011	46	91.3	91.3	6.5
Spring 2012	40	70.0	75.0	20.0
Spring 2013	38	84.2	86.8	13.2

Source: IRPO Program Data Sheet for 2013

Student persistence rate (semester to semester)

Table 6: Persistence rate (new full time students)

New Students FT 2011_3	Students 2012_1	Students 2012_3	Persistence Spring 2012	Retention Fall 2012
1	5	2	500.0%	200.0%

Source: IRPO Program Data Sheet for 2013

Student retention rate (Fall-to-Fall for two-year programs; Fall-to-Spring for one-year programs)

Table 7: Retention Rate (new full time students)

New FT Fall 2012	Persisted Spring 2013	Retained Fall 2013	Persistence Spring 2013	Retention Fall 2013
9	9	7	100.0%	77.8%

Source: IRPO Program Data Sheet for 2013

Success rates on licensing or certification exams (CTE, TP, Nursing, etc)

There is no certification exam for our graduates develop, however with our collaboration with the OEEM, we are discussing the possibility of giving a licensure examination to all the refrigeration and air conditioning mechanics/technicians in the country to show support to the implementation of Montreal Protocol. RAC program prepares students to pass State and National licensure exams.

Graduation rate based on yearly number

Table 8: Graduation Rate

AY2010/11	AY2011/12	AY2012/13	AY2013_1
	1		1

<table>
<tr><td></td><td>Notes: Some students did not apply for graduation.

Source: IRPO Program Data Sheet for 2013</td></tr>
<tr><td>Students seat cost</td><td>TBD</td></tr>
<tr><td>Cost of duplicate or redundant courses, programs or services</td><td>TBD</td></tr>
<tr><td>Students' satisfaction rate</td><td>The data collected and shown are the student evaluation for course instructor. The office of instructional coordinator at Pohnpei campus gathered it. The data show course code and semester, evaluation criteria, general weighted average, number of student evaluator and the legend that describe the degree of rated points.

Legend:
1 = Never 2 = Rarely 3 = Sometimes 4 = Usually 5 = Always

Fall 2011
<table>
<tr><th>Course code & section</th><th>No. of student evaluator</th><th>General score average</th></tr>
<tr><td>VEM 105/P1</td><td>10</td><td>4.8</td></tr>
<tr><td>VEM 110/P3</td><td>11</td><td>4.4</td></tr>
<tr><td>VEM 113/P1</td><td>12</td><td>4.9</td></tr>
<tr><td>VWE 115/P1</td><td>11</td><td>4.9</td></tr>
</table>
Fall 2012
<table>
<tr><th>Course code & section</th><th>No. of student evaluator</th><th>General score average</th></tr>
<tr><td>VEM 105/P1</td><td>8</td><td>3.8</td></tr>
<tr><td>VEM 110/P3</td><td>4</td><td>2.8</td></tr>
<tr><td>VEM 113/P1</td><td>9</td><td>3.2</td></tr>
<tr><td>VEM 113/P2</td><td>11</td><td>3.7</td></tr>
<tr><td>VWE 115/P1</td><td>12</td><td>3.1</td></tr>
</table>
Fall 2013
<table>
<tr><th>Course code & section</th><th>No. of student evaluator</th><th>General score average</th></tr>
<tr><td>VEM 105/P1</td><td>8</td><td>4.8</td></tr>
<tr><td>VEM 110/P3</td><td>10</td><td>4.9</td></tr>
<tr><td>VEM 113/P1</td><td>9</td><td>4.9</td></tr>
</table>
Spring 2013
<table>
<tr><th>Course code</th><th>No. of student evaluator</th><th>General score average</th></tr>
</table></td></tr>
</table>

	<table><tr><td>VEM 105/P1</td><td>10</td><td>4.95</td></tr><tr><td>VBM 103/P1</td><td>8</td><td>4.2</td></tr><tr><td>VEM 114/P1</td><td>7</td><td>4.9</td></tr><tr><td>VWE 115</td><td>7</td><td>4.9</td></tr></table>
Alumni data	Degree: Certificate of Achievement in Refrigeration and Air Conditioning <table><tr><td>Name/Graduates</td><td>Employer</td><td>Position</td></tr><tr><td>1. Prenston Ioanis</td><td>4TY Store, Kolonia, Pohnpei</td><td>RAC technician</td></tr><tr><td>2. Augustine Augustine</td><td>College of Micronesia-FSM, Pohnpei Campus, Kolonia, Pohnpei</td><td>RAC maintenance</td></tr><tr><td>3. Jimmy Silbanuz</td><td>True Value Store, Kolonia, Pohnpei</td><td>RAC technician</td></tr><tr><td>4. Wendolin Lainos</td><td>Palm Terrace Store Kolonia, Pohnpei</td><td>Store helper</td></tr><tr><td>5. Wiener Hinga</td><td>DJ Transport service</td><td>Taxi driver</td></tr><tr><td>6. Michael Leo Francisco</td><td></td><td></td></tr><tr><td>7. Santrickson Ludrick</td><td>INS Store Kolonia, Pohnpei</td><td>Delivery man</td></tr><tr><td>8. Mills Poll</td><td></td><td></td></tr><tr><td>9. Jeffry Joseph</td><td></td><td></td></tr></table> Notes: • Some of the students listed above are not in the official list of the college graduates because they did not apply nor attend the graduation ceremony.
Employment data and employer feedback (employer survey)	Same as above data except there is no employer's survey
Program added or cancelled at nearby regional institutions (PCC, GCC, Hawaii schools, UOG, CMI, NMC)	The intention of the information below is to compare our refrigeration program into the other school offering the same program. **Honolulu Community College** **Refrigeration & Air Conditioning Technology RAC** **Degree That Can Be Earned:** Certificate of Achievement (CA) Associate in Applied Science (AAS) **Brief Program Description/Goals:** Students will gain both the technical knowledge and the hands-on skills necessary to

	becoming an efficient and successful refrigeration and air conditioning technician. Students are prepared to pass the (Environmental Protection Agency) EPA Refrigerant Handling Certification. This certification is necessary for work in the field. **What Is Unique About The Program:** • Honolulu CC serves as the State of Hawai'i's exclusive provider of college level training in Refrigeration and Air Conditioning Technology. **Itemized Estimate of Educational Costs:** • Tuition based on total number of credits taken. • Books and tools approximately $800. **Program Prerequisites or Co-requisite:** • ENG 19 and/or ENG 21, OR "C" or higher in ESL 11 &13 & 14, OR Placement in ENG 22/60 or ESL 23 • MATH 9, OR Placement in MATH 50.
Transfer rate	As of AY2011 -AY2013 there is no one who completed the program transferred to AAS degree or any other school.
Analysis	
Findings This section provides discussion of information discovered as a result of the evaluation such as problems or concerns with the program and what part of the program is working well and meeting expectation.	• Based in the completion rate by major (Table 4) and by program (Table 5) from our IRPO records it shows that high percentage of our students are passing their technical courses requirements but we still have a very low graduation rates as indicated in Table 8. Therefore, the main reasons why we have a very low graduation rates are the academic courses requirement of the program. Most students are losing interest or failing in these courses, specifically the Technical Math 104 and 106 that makes them decide to discontinue their program. • I also noticed that the suggested class schedules in the college catalog were not followed. • Cohorts scheme is affecting badly the enrollment of new students in the program as shown in Table 1 and 2. • Lack of instructional materials. To support this finding you may check the CLA for the refrigeration program.
Recommendations This section provides recommendations from the program on what to do to improve or enhance the quality of program and course learning outcomes as well as program goals and objectives. This section should also include suggestions that describe how the program might be able to create opportunities for a better program in the future. Some examples are exploring alternate delivery mechanisms, forming external partnerships, or realigning with other	• Due to the changes in the refrigeration and air conditioning industry as mandated by the Montreal Protocol that every member nations must follow the regulations regarding the use and disposal of ozone depleting substances, I strongly recommend the modification of the program to meet the new standards in the refrigeration industry. • I recommend that we must adapt the curriculum used by the

programs.	Honolulu Community College for their Refrigeration and Air Conditioning Technology program to improve the quality of our program and to assure our local employers that our graduates are capable to work in their field of specialization. • More skills training for the program instructor to cope-up with the rapid changes in the refrigeration industry due to the ozone protection and global warming issues. • Open an Associate of Applied Science Degree in Building Technology major in Refrigeration and Air Conditioning to provide higher level of training and services. Give opportunity to the community members to have a degree in this field of specialization. • Allot an institutionalized budget for the Trade and Technology division. • Consider to charge students tuition fee by course contact hours not by course credits to compensate with the program operation cost. • Add more hours for the laboratory practices and lessen the number of lecture hours. • Stop the cohort scheme in the certificate program • Remove some MS 104 and 106 as a Math requirement of the program and used MS 094 instead. • Make a specific number coding for all the RAC major courses. • Follow the suggested class schedules in the college catalog.

Form is newly revised. Previous Program Reviews are available at
http://wiki.comfsm.fm/Academic_Programs
Micronesian Studies is a very good example. Program review checklist is on the next page.

Appendix A. Assessment of Program Student Learning Outcomes

Unit Assessment Report - Four Column

College of Micronesia - FSM

B - instruction - Refrigeration and Air Condition (CA)

Mission Statement: To develop a skilled manpower and a globally competitive human resources of the Federated States of Micronesia in the field of refrigeration and air conditioning industry.

Program Student Learning Outcomes	Assessment Strategies & Target / Tasks	Results	Improvement & Follow-Up
B - instruction - Refrigeration and Air Condition (CA) - PSLO3 - Perform basic hand skills in maintaining refrigeration and air conditioning systems to a given specifications. **PSLO Assessment Cycle:** 2013 - 2014 **Start Date:** 08/19/2012 **Inactive Date:** 05/20/2013 **PSLO Status:** Inactive	**Assessment Strategy:** Given an air conditioning unit, hand tools and supplies, the students will perform general cleaning of the unit. **Assessment Type:** Presentation/Performance **Target:** 70% of all the students registered in this program must get a grade of "C" or better	12/20/2012 - 11 out of 15 students or 73% students got 'C' or better as their final grade in VEM 113 Refrigeration I course. **Target Met:** Yes **Reporting Period:** 2012 - 2013	05/20/2013 - Need more training materials to fulfill PSLO3 effectively.
B - instruction - Refrigeration and Air Condition (CA) - PSLO4 - Read and interpret basic electrical drawing & symbols related to refrigeration and air conditioning systems. **PSLO Assessment Cycle:** 2013 - 2014 **Start Date:** 08/19/2012 **Inactive Date:** 05/20/2013 **PSLO Status:** Inactive	**Assessment Strategy:** Given a refrigerator, room air conditioner, multi-meter and electrical components, the student will rewire the units as specified in the schematic diagram. **Assessment Type:** Presentation/Performance **Target:** 70% of all the students registered in this program must get a grade of "C" or better	05/20/2013 - 10 out of 13 students or 77% students got "C" or better as their final grade in VEM 105 Basic Electricity for AC and Refrigeration Mechanic course. **Target Met:** Yes **Reporting Period:** 2012 - 2013	05/20/2013 - Need more training materials to fulfill PSLO4 effectively.
B - instruction - Refrigeration and Air Condition (CA) - PSLO5 - Perform basic trouble shooting and repair to residential air conditioning units and refrigerators. **PSLO Assessment Cycle:** 2013 - 2014 **Start Date:** 08/19/2013	**Assessment Strategy:** Given a defective room air conditioner, refrigerator, recovery machine, vacuum pump, system analyzer and supplies, the students will diagnose the defects and repair it with workmanship. **Assessment Type:** Presentation/Performance	03/20/2014 - 15 out of 15 or 100% students got "C" or better as their final grade in VEM 113 **Target Met:** Yes **Reporting Period:** 2013 - 2014 03/20/2014 - 15 out of 15 or 100% students got "C" or better as their final grade in VEM 110	

Program Student Learning Outcomes	Assessment Strategies & Target / Tasks	Results	Improvement & Follow-Up
Inactive Date: 05/20/2014 **PSLO Status:** Active	**Target:** 70% of all the students registered in this program must get a grade of "C" or better	**Target Met:** Yes **Reporting Period:** 2013 - 2014	
		03/20/2014 - 11 out of 13 or 85% students got "C" or better as their final grade in VEM 105 **Target Met:** Yes **Reporting Period:** 2013 - 2014	
B - instruction - Refrigeration and Air Condition (CA) - PLSO6 - Participate in the air conditioning and refrigeration profession. **PSLO Assessment Cycle:** 2013 - 2014 **Start Date:** 08/19/2013 **Inactive Date:** 05/20/2014 **PSLO Status:** Active	**Assessment Strategy:** The students will be group by two's and assign to do refrigeration and air conditioning services into the community. **Assessment Type:** Project-Group **Target:** 70% of all the students registered in this program must get a grade of "C" or better	03/20/2014 - 11 out of 13 or 85% students got "C" or better as their final grade in VEM 105 **Target Met:** Yes **Reporting Period:** 2013 - 2014	
		03/20/2014 - 15 out of 15 or 100% students got "C" or better as their final grade in VEM 113 **Target Met:** Yes **Reporting Period:** 2013 - 2014	