

"We Guarantee Quality and Excellence"

Palau Community College is an accessible public educational institution helping to meet the technical, academic, cultural, social, and economic needs of students and communities by promoting learning opportunities and developing personal excellence.

Academic Program Three Year Review

Instructional Program

Air Conditioning and Refrigeration

Period of Three Year Review

Fall 2009 to Summer 2013

Program/Department Chair:	ROBERT RAMARUI	Date:	01/20/15
Ikoffice :	01/20/2015 UCNYA SARA day	-	

Program Review Narrative Summary

The narrative summary should include the following:

- Summary of the academic program purpose

The Air Conditioning & Refrigeration Program is designed to provide students with technical knowledge, skills and proper work habits/attitudes necessary for employment in the field of Air Conditioning & Refrigeration. The program prepares the students to work and advance in their careers as air conditioning and refrigeration technicians, trouble -shooters, parts counter salespersons or operators of their own air conditioning & refrigeration service and repair shops.

- The relationship of program to the college Mission Statement

The technical skills and development and training institution for occupational programs, Air Conditioning & Refrigeration courses are designed to meet all the required competencies for future employment of students. The program is to give students some idea of what it is like to own and operate an Air Conditioning & Refrigeration service. Students will have opportunity to learn about the kinds of activities and decisions an Air Conditioning & Refrigeration service owner is involved in every day.

- Summary of Program Data

	Fa 2009	Sp 2010	Su 2010	Fa 2010	Sp 2011	Su 2011	Fa 2011	Sp 2012	Su 2012	Fa 2012	Sp 2013	Su 2013	Fa 2013
Enrollment	18	13	2	10	20	3	10	12	0	8	16	0	7
Pass/Credit	18	13	2	10	16	3	8	12	0	6	12	0	7
Fail/No Credit	0	0	0	0	4	0	0	0	0	2	4	0	0
Audit	0	0	0	0	0	0	0	0	0	0	0	0	0
Withdraw	0	0	0	0	0	0	2	0	0	0	0	0	0

a. Figure 1 – Student Status

b. Figure 2 – Number of Graduates

	Fa 09	Sp 2010	Su 2010	Fa 2010	Sp 2011	Su 2011	Fa 2011	Sp 2012	Su 2012	Fa 2012	Sp 2013	Su 2013	Fa 2013
AS/AA	0	0	0	0	0	0	0	0	0	0	0	0	0
AAS	0	1	1	1	1	2	1	0	0	0	0	0	0
CA	0	0	0	0	0	0	0	0	0	0	0	0	0

c. Figure 3 – Class Information

	Fa 2009	Sp 2010	Su 2010	Fa 2010	Sp 2011	Su 2011	Fa 2011	Sp 2012	Su 2012	Fa 2012	Sp 2013	Su 2013	Fa2013
Under 10 Students	4	5	1	4	6	1	4	3	0	4	5	0	4
10 – 19 Students	0	0	0	0	0	0	0	0	0	0	0	0	0
20 – 29 Students	0	0	0	0	0	0	0	0	0	0	0	0	0
30 or more Students	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CLASSES	4	5	1	4	6	1	4	3	0	4	5	0	4

d. Figure 4 – Class Offering Information

	Fa 2009	Sp 2010	Su 2010	Fa 2010	Sp 2011	Su 2011	Fa 2011	Sp 2012	Su 2012	Fa 2012	Sp 2013	Su 2013	Fa 2013
Total Prog/Dept Classes Taught	4	5	1	4	6	1	4	3	0	4	5	0	4
Total Lecture ONLY Classes	1	2	0	1	2	0	1	0	0	1	2	0	1
Total Lab ONLY Classes	0	1	1	0	1	1	1	0	0	0	0	0	0
Total Lecture and Lab Classes	3	2	0	3	3	0	2	3	0	3	3	0	3
Total Online Classes	0	0	0	0	0	0	0	0	0	0	0	0	0

e. Figure 5 – Faculty Information

	Fa 2009	Sp 2010	Su 2010	Fa 2010	Sp 2011	Su 2011	Fa 2011	Sp 2012	Su 2012	Fa 2012	Sp 2013	Su 2013	Fa 2013
Full Time Faculty	1	1	0	1	1	0	1	1	0	1	1	0	1
Part Time Faculty	0	1	1	0	2	1	0	1	0	0	1	0	0
TOTAL FACULTY	1	2	1	1	3	1	1	2	0	1	2	0	1

f. Table 1 – Faculty to Class Size Ratio Information

Ratio	Fa 2009	Sp 2010	Su 2010	Fa 2010	Sp 2011	Su 2011	Fa 2011	Sp 2012	Su 2012	Fa 2012	Sp 2013	Su 2013	Fa 2013
Full Time Faculty (F : S)	1:18	1:12	0:0	1:10	1:10	0:0	1:10	1:4	0:0	1:8	1:8	0:0	1:7
Part Time Faculty (F : S)	0:0	1:1	1:2	0:0	1:10	1:3	0:0	1:8	0:0	0:0	1:8	0:0	0:0

- Summary of Student Learning and Curriculum

All AC CLO's are tied-up to program PLO's. The relationships between each CLO and PLO have provided direct links to achieve its effectiveness in meeting the learning objectives. The course assessments have provided an accurate means to evaluate student progress and weaknesses. It provides measures towards improvements to meet the expected learning outcomes.

The assessment of program learning outcomes has provided improvements in achieving its objectives. Tied up in ILO's it has provided guidance and gives added challenge to students to attain satisfactory completion of their degrees.

- Summary of Course Assessment Data

a. How has assessment of course-level student learning outcomes led to improvement in program-level student learning?

Currently AC program has 3 PLO's. The 3 PLO's cover the area of plant maintenance, installing and maintaining of air condition and refrigeration for residential, and commercial, industrial buildings and occupancy. Below were the initial PLO's of the program:

- 1. To prepare students to work as a sales technician or manufacturer's representative.
- 2. To be employed as air conditioning and refrigeration service technician in both government and private businesses.
- 3. To prepare students to manage and operate own air conditioning and refrigeration service and repair shops.

b. How has assessment of program-level student learning outcomes led to certificate/degree program improvements?

Even though the AC program has set its PLOs, the PLOs themselves are not assessed independently. The program's PLOs identify the focus or goals of the program whereas such learning outcomes are assessed at the course level.

• Summary of Evaluation of Previous Goals/Activities from Previous Cycle (Figure 5)

1. List actions identified in your last program review or any other related plan(s).

- The shop/classroom and laboratory should be renovated wash facilities should be replaced with new ones. Status: ongoing
- Train the faculty for any air conditioning & refrigeration trainings to update the instructor's skills. Status: ongoing
- Obtain visual and audio teaching aids like power point presentations, instructional DVD to enhance existing teaching style. Status: ongoing

2. What measurable outcomes were achieved due to the actions completed?

Most of the action plans from the last review was not achieved and have resulted to below proficiency levels of CLO's.

The last action plan, which is to purchase airconditioning units was the only one achieved

3. Evaluate the success of the completed actions. Did the completed actions lead to improvement of student learning?

Purchased latest air conditioning and refrigeration units for students to practice have improved their efficiency in accurate diagnosis and trouble shooting.

4. What modifications do you plan to make to the program in the future to improve student learning?

The plans that needs to take place to ensure continuous support of student learning includes:

- Periodic reviews and update course outlines and CLO's. This plan ensures that all course outlines are up to date and that they are aligned with the CLO's, PLO's, and ILO's.
- Continuous course assessments This plan ensures that all program documentations are to update including the PLO's, CLO's and make sure that they are aligned with the ILO's.
- Support professional development for AC faculty. This plan ensures that AC faculty is up to date with the latest development in the field of air conditioning and refrigeration technology, and in turn, students are exposed to such knowledge and skills.
- Upgrade AC laboratory and classroom. Convert the shop laboratory into a real repair shop and allow the students to bring their own units to service and repair, and charge the owner small amount of money to be deposited in AC Club account. The money earned will be used to buy additional supplies and materials needed for the shop.
- Advisor/Councilor should closely monitor students that are reffered to them regarding their absenteeism and low performance.

5. Update major changes/accomplishments since the last review.

- Have assessed 100% of AC courses
- Enriched students' skills through exposures in AC repairs within the college, and PCC hatchery and RnD Station.
- Students knowledge and skills in diagnostic and trouble shooting of AC units are greatly improved as they repair and modified damage AC units within the college

• Summary of Program Major Strengths

- Has qualified instructors to teach the courses of the program
- Produces graduates that can work AC technicians
- The program has provided the students concepts and efficient approaches to environment protection through refrigerant recovery method.
- Students are trained to be self- reliant and have learned to maximize the utilization of available resources.

• Recommendations for Improvements

- Some improvements in the facilities need immediate attention by personnel concerned. These facilities are used to support the learning process of students.
- Assistant instructor needs to be evaluated also to determine his efficiency in working with instructors and students.

• Summary of Action Plans

- Update air-conditioning and refrigeration simulator program through OMI P
- Furnish the shop and classroom with working tables, lavatories, and improved ventilation system
- Request computer and its accessories (printer, scanner, projector, video cam)
- Request new models of air-conditioning and refrigeration training units to replace the old ones to update the knowledge of students
- Summary of Resource Request (if any)

a. What ILO, PLO and/or CLO does this resource request address?

- Office supplies

This resource request addresses all AC program courses CLOs, PLOs and ILOs

Acquire laboratory and classroom software
This resource request addresses all AC program courses CLO's PLO's and ILO's.

Training (Professional development and training in AC related topics)
This resource request addresses all AC program courses CLO's PLO's and ILO's.

b. What will be the anticipated outcome if resource request is granted?

- Office Supplies

Faculties are equipped with the necessary office supplies to effectively teach and perform other teaching related activities.

- Software (Simulation software)

Needed software must be available for students and faculty teaching AC courses. Simulation software will help students in troubleshooting complicated circuits.

- Training (Professional development and training in AC related topics)
 - AC faculty needs to be update with the latest technology and in turn, students are exposed to such knowledge and skills.

c. Describe the resource request in detail.

- Office Supplies

These supplies such as pens, staplers, scotch tape, markers, and other office supplies are necessary to support faculty teaching. Such resources ensure that faculty is equipped to teach and deliver course contents effectively.

- Software (Upgrade laboratory classroom software)

Simulation software for air conditioning and refrigeration will enable students to troubleshoot electrical and electronic circuit board through simulation.

- Training (Professional development and training in air conditioning and refrigeration technology)

The college needs to continuously support and encourage AC faculty and assistant instructor to participate in professional development and training in AC related topics. This is necessary to ensure that AC faculty and assistant instructor are up to date with the fast paced and constantly changing technological world.

Appendix A: Department Review Assessment Data

1.0 Program Data



Figure 1. Number of Students Enrolled, Pass/Credit, Fail/No Credit, Audit and Withdraw





Revised 11/09; 12/17/12

8



Figure 3. Number of Classes Based on Student Enrollment

Figure 4. Class Offering





Figure 5. Faculty Head Count

NOTE: Full Time Faculty refers to full time faculty in the program/department. A Part Time Faculty includes adjuncts as well as Full Time Faculty that are teaching courses not within their program/department. These Full Time Faculty are assisting other programs outside of their own, therefore, are considered Part Time Faculty.

Table 1. Faculty to Class Size Ratio (program headcount).

Ratio	Fa 2009	Sp 2010	Su 2010	Fa 2010	Sp 2011	Su 2011	Fa 2011	Sp 2012	Su 2012	Fa 2012	Sp 2013	Su 2013	Fa 2013
Full Time Faculty (F : S)	1:18	1:12	0:0	1:10	1:10	0:0	1:10	1:4	0:0	1:8	1:8	0:0	1:7
Part Time Faculty (F : S)	0:0	1:1	1:2	0:0	1:10	1:3	0:0	1:8	0:0	0:0	1:8	0:0	0:0

How many	% of courses	% of course outlines	% of courses whose	% of PLOs
program courses	with Identified	updated	Textbooks are	aligned with ILOs
are there? (refer	CLOs		updated (outline	
to catalog)			reflects change)	
9	100%	100%	100%	100%
There are a total	All AC courses	Note: All AC	Outline updates	All CLOs have
of 9 AC courses	have CLOs.	outlines were	containing changes	been aligned with
	Such CLOs are	updated and	to textbooks and	PLOs and all
	currently being	submitted to CPC.	other resources	PLOs have been
	used to assess		were submitted to	aligned with
	the courses.		CPC in January 13.	ILOs.
				Refer to appendix
				C.

2.0 Student Learning and Curriculum

3.0 Course Assessment Data

Year 1: School Year 2009-2010 (FA09 - SU10)

Semester Assessed	Course Assessed	CLO - PLO Alignment	Results of Assessments
	AC 111	CLO 1,4,5 – PLO1 CLO 4,5 - PLO2 CLO 4 - PLO3	No record assessment made to this course during that time
Eall 2000	AC 112	CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
Fan 2009	AC 211	CLO 1,3,4 - PLO1 CLO 1,2,3,4,5 - PLO2 CLO 1,2,3,4,5 - PLO3	No record assessment made to this course during that time
	AC 212	CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
	AC 121	CLO 1,2,3,4 – PLO1 CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
Spring 2010	AC 122	CLO 2,3,4 – PLO1 CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
	AC 213	CLO 1,2,3,4 – PLO1 CLO 1,2,3,4 – PLO2 CLO 1,2,3,4 – PLO3	No record assessment made to this course during that time
	AC 221	CLO 1,2,3,4 – PLO1	No record assessment made to this course

	AC223	CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO 3 CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	during that time Note: All AC223: Internship assessment documentations are maintained by the Internship coordinator.
Summer 2010			

Year 2: <u>School Year 2010-2011(Fa10 –Su11)</u>

Semester	Course	CLO - PLO Alignment	Results of Assessments
13505500	13363564	CLO 1.4.5 – PLO1	
	AC 111	CLO 4.5 - PLO2	No record assessment made to this course
	ne m	CLO 4 - PLO3	during that time
		CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
E 11 2010	AC 112	CLO 1,2,3,4,5 – PLO3	during that time
Fall 2010		CLO 1,3,4 - PLO1	
	AC 211	CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
		CLO 1,2,3,4,5 – PLO3	during that time
	1 C 212	CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
	AC 212	CLO 1,2,3,4,5 – PLO3	during that time
		CLO 1,2,3,4 – PLO1	
	AC 121	CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
		CLO 1,2,3,4,5 – PLO3	during that time
		CLO 2,3,4 – PLO1	
	AC 122	CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
		CLO 1,2,3,4,5 – PLO3	during that time
0 : 2011		CLO 1,2,3,4 – PLO1	
Spring 2011	AC 213	CLO 1,2,3,4 – PLO2	No record assessment made to this course
		CLO 1,2,3,4 – PLO3	during that time
		CLO 1,2,3,4 – PLO1	No record assessment made to this course
	AC 221	CLO 1,2,3,4,5 – PLO2	during that time
		CLO 1,2,3,4,5 – PLO 3	Note: All AC 222: Internation accomment
	AC 223	CLO 1,2,3,4,5 – PLO2	documentations are maintained by the
	AC 223	CLO 1,2,3,4,5 – PLO3	Internship Coordinator.
Summer 2011			

Semester Assessed	Course Assessed	CLO - PLO Alignment	Results of Assessments
	AC 111	CLO 1,4,5 – PLO1 CLO 4,5 – PLO2 CLO 4 – PLO3	No record assessment made to this course during that time
E-11 2011	AC 112	CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
Fall 2011	AC 211	CLO 1,3,4 - PLO1 CLO 1,2,3,4,5 - PLO2 CLO 1,2,3,4,5 - PLO3	No record assessment made to this course during that time
	AC 212	CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
Spring 2012	AC 121	CLO 1,2,3,4 – PLO1 CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
	AC 122	CLO 2,3,4 – PLO1 CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
	AC 213	CLO 1,2,3,4 – PLO1 CLO 1,2,3,4 – PLO2 CLO 1,2,3,4 – PLO3	No record assessment made to this course during that time
	AC 221	CLO 1,2,3,4 – PLO1 CLO 1,2,3,4,5 – PLO2	No record assessment made to this course during that time
	AC 223	CLO 1,2,3,4,5 – PLO 3 CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	Note: All AC223: Internship assessment documentations are maintained by the Internship Coordinator.
Summer 2012			

Year 3: School Year 2011-2012 (Fa11-Su12)

Year 4: School Year 2012-2013 (Fa12-Su13)

Semester Assessed	Course Assessed	CLO - PLO Alignment	Results of Assessments
	AC 111	CLO 1,4,5 – PLO1 CLO 4,5 - PLO2 CLO 4 - PLO3	No record assessment made to this course during that time
Fall 2012	AC 112	CLO 1,2,3,4,5 – PLO2 CLO 1,2,3,4,5 – PLO3	No record assessment made to this course during that time
	AC 211	CLO 1,3,4 - PLO1 CLO 1,2,3,4,5 - PLO2 CLO 1,2,3,4,5 - PLO3	No record assessment made to this course during that time

	AC 212	CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
	AC 212	CLO 1,2,3,4,5 – PLO3	during that time
		CLO 1,2,3,4 – PLO1	
	AC 121	CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
		CLO 1,2,3,4,5 – PLO3	during that time
		CLO 2,3,4 – PLO1	
	AC 122	CLO 1,2,3,4,5 – PLO2	No record assessment made to this course
		CLO 1,2,3,4,5 – PLO3	during that time
Spring 2013	AC 213	CLO 1,2,3,4 – PLO1	
		CLO 1,2,3,4 – PLO2	No record assessment made to this course
		CLO 1,2,3,4 – PLO3	during that time
	AC 221	CLO 1,2,3,4 – PLO1	No record assessment made to this course
		CLO 1,2,3,4,5 – PLO2	during that time
	AC 223	CLO 1,2,3,4,5 – PLO 3	Note: All AC222: Intermship accessment
		CLO 1,2,3,4,5 – PLO2	documentations are maintained by the
		CLO 1,2,3,4,5 – PLO3	Internship coordinator.
Summer 2013			

4.0 Program Learning Outcomes (PLOs) Assessment

List PLOs	Proficiency Level	Results of Assessments
	AC111-CLO 1,4,5	
	AC121-CLO 1,2,3,4	
	AC122-CLO 2,3,4	
AC PLOI	AC211-CLO 1,3,4	
	AC213-CLO 1,2,3,4	
	AC221-CLO 1,2,3,4	
	AC111-CLO 4,5	
	AC112-CLO 1,2,3,4,5	
	AC121-CLO 1,2,3,4,5	
	AC122-CLO 1,2,3,4,5	Note: All AC223: Internship assessment
AC PLO2	AC211-CLO 1,2,3,4,5	documentations are maintained by the Internship
	AC212-CLO 1,2,3,4,5	Coordinator.
	AC213-CLO 1,2,3,4	
	AC221-CLO 1,2,3,4,5	
	AC223-CLO 1,2,3,4,5	
AC PLO3	AC111-CLO 4	
	AC112-CLO 1,2,3,4,5	Note: All AC223: Internship assessment
	AC121-CLO 1,2,3,4,5	documentations are maintained by the Internship
	AC122-CLO 1,2,3,4,5	Coordinator.

AC211-CLO 1,2,3,4,5
AC212-CLO 1,2,3,4,5
AC213-CLO 1,2,3,4
AC221-CLO 1,2,3,4,5
AC223-CLO 1,2,3,4,5

5.0 Evaluation of Previous Program Review Action Plans

Indicate the status of the previous program review action plans

Action Plan	Status	Domorka
Activity/Objectives	Complete/Ongoing/Incomplete	Remarks
Establish online class		
using the air		
conditioning and		
refrigeration simulator		
program.Where the	Ongoing	Pushing it through on this cycle
students can learn		
their skills in trouble-		
shooting and repair		
online.		
Send instructor to		
attend the HVAC	Ongoing	Pushing it through on this cycle
National Educator and		
Trainers Conference		
Upgrade AC shop		
with the latest tools	Ongoing	Pushing it through on this cycle
and equipment.		
Purchase air		
conditioning and		
retrigeration units for	Complete	
students		
practical/laboratory		

6.0 Action Plans

Based on this program review results, describe the program action plan for the next three (3) academic years. Include necessary resources.

Action Plan Activity/Objectives	How will this action plan improve student learning outcomes? (CLO, PLO, ILO)	Needed Resources (if any)	Timeline
Established online class using the air conditioning and refrigeration simulator program.where the students can learn their skills in trouble- shooting and repair online.	Students can analyze the unit they will be repairing and sit infront of the computer and look for the symptoms listed.	Software	Fall 2015

Review and update course outlines, CLO's and other documentations	This plan ensures that all course outlines are up to date and that they are aligned with the CLO's, PLO's and ILO's.	None	Spring 2013 & ongoing
To have one computer room for students use in their research/activity work	This plan ensures that the student research through internet on educational websites can provide a good source of accurate and detailed information to support their knowledge.	Funding	Fall 2015
Purchase air conditioning and refrigeration units for students' practical lessons.	This plan ensures student learning by providing them real life experience through installing air condition	Funding	Fall 2015
Construct mock-up trainer to enhance teaching strategies and provide more hands-on training for the students.	Learning by doing activities on the mock-up trainer.	Supplies and materials	Fall 2015
Train faculty in the use of technology as a support media to enhance lectures and content of the course.	This plan ensures that the faculty is well equipped with appropriate media and technology in delivering lectures.	Funding	Fall 2015

7.0 Resource Requests

Type of Resource	Description	Estimated Amount Requested	Justification
Facilities	Room 46 AC lab. Room 46 AC classroom working tables Room 46 AC lavatories	\$10,000	Lab. needs ventilations, repainting Classroom needs ventilations, ceiling replacement & repainting lavatories needs replacement
	Leak detector	\$344.66	Used in advance infrared sensor
Equipment	AC system flusher	\$1,745.44	It makes flushing of lines, evap. & condenser fast and easy
	Ultra temp Dual Laser thermometer	\$169.99	Compact design is simple to use and easy to store
Software	Computers	\$1,500	Used in advanced learning, research work of students
Total		\$13,760.09	

Appendix B: Provide Program Learning Outcomes (PLOs)

Palau Community College Air conditioning & Refrigeration Program Program Learning Outcome

During the program experience, the Program Learning Outcomes (PLO's) will be assessed through the use of signature assignments of course learning outcomes which are aligned with the PLO's. A rating scale will be used to determine the student's proficiency level of each PLO using specifically aligned assignments. The numerical ratings of 4, 3, 2 and 1 are not intended to represent the traditional school grading system of A, B, C, D and F. The descriptions associated with each of the numbers focus on the level of student performance for each of the course learning outcomes listed below.

Rating Scale: 5------ Excellent 4 ------ Above Average 3 ------ Average 2 ------ Below Average 1 ------ Unacceptable

PLO # 1 To enable student to work as sales technician or manufacturer's representation	ive.
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Numerical Value	Performance Criteria
5	The student is able to work as sales technician or manufacturer's representative
	without any supervision and instruction
4	The student is able to work as sales technician or manufacturer's representative with
	limited supervision but no instruction
3	The student is able to work as sales technician or manufacturer's representative with
	limited supervision and limited instruction
2	The student is able to work as sales technician or manufacturer's representative
	requires considerable supervision and instruction
1	The student is unable to work as sales technician or manufacturer's representative

PLO # 2 To prepare the students to be employed as air conditioning and refrigeration service technician in both government and private businesses.

Numerical Value	Performance Criteria
5	To prepare the students to be employed as air conditioning and refrigeration service
	technician in both government and private businesses without any supervision and
	instruction
4	To prepare the students to be employed as air conditioning and refrigeration service
	technician in both government and private businesses with limited supervision but
	no instruction
3	To prepare the students to be employed as air conditioning and refrigeration service
	technician in both government and private businesses with limited supervision and
	limited instruction
2	To prepare the students to be employed as air conditioning and refrigeration service
	technician in both government and private businesses requires considerable
	supervision and instruction
1	The students is unable to employed as air conditioning and refrigeration service
	technician in both government and private businesses

PLO # 3 To prepare the students to be able to manage and operate own air conditioning and refrigeration service shops.

Numerical Value	Performance Criteria		
5	The students is able to manage and operate own air conditioning and refrigeration		
	service shops without any supervision and instruction		
4	The students is able to manage and operate own air conditioning and refrigeration		
	service shops with limited supervision but no instruction		
3	The students is able to manage and operate own air conditioning and refrigeration		
	service shops with limited supervision and limited instruction		
2	The students is able to manage and operate own air conditioning and refrigeration		
	service shops requires considerable supervision and instruction		
1	The students is unable to manage and operate own air conditioning and refrigeration		
	service shops.		

Course	PLO 1: Work as sales technician or manufacturer's representative.	PLO 2: Be employed as air conditioning and refrigeration service technician in both government and private business.	PLO 3: Manage and operate own air conditioning and refrigeration service shops.	Institutional Learning Outcomes (ILOs)
AC 111	CLO 1,4, 5	CLO 4, 5	CLO 4	ILO 1, 2, 3, 4
AC 112		CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	ILO 1, 2, 3
AC 121	CLO 1, 2, 3, 4	CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	ILO 1, 2
AC 122	CLO 2, 3, 4,	CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	ILO 1, 2
AC 211	CLO 1,2, 3, 4, 5	CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	ILO 1, 2
AC 212		CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	ILO 1, 2
AC 213	CLO 1, 2, 3, 4	CLO 1, 2, 3, 4,	CLO 1, 2, 3, 4,	ILO 1, 2
AC 221	CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	ILO 1, 2
AC 223		CLO 1, 2, 3, 4, 5	CLO 1, 2, 3, 4, 5	ILO 1, 2

AIR CONDITIONING & REFRIGERATION PROGRAM MAP

Course Number	Course Title	Semester Credit	Signature Assignments
AC 111	Fundamentals of Refrigeration	3	Midterm Exam (CLO 1, 4) Final Exam (CLO 5)
AC 112	Refrigeration Tools & Equipment	3	Project-based Assessment (CLO 1 & 2) Final Exam (3 & 4)
AC 121	Compressor System and Refrigerant Controls	3	Midterm Exam (CLO 1,4) Project-based Assessment (CLO 5)
AC 122	Electric Motors, Electrical Circuits and Controls	3	Project-based Assessment 1 (CLO 1) Project-based Assessment 2 (CLO 2,5)
AC 211	Refrigerants, Domestic Refrigerators & Freezers	3	Project-based Assessment 1 (CLO 1,2) Project-based Assessment 2 (CLO 3,4,5)
AC 212	Air Conditioning Systems, Cooling & Dehumidifying	3	Midterm exam (CLO 3,4) Project-based Assessment (CLO 1,2,5)
AC 213	Psychrometry & Cooling Load	3	Midterm Exam (CLO 1,2) Final Exam (CLO 3,5)
AC 221	Refrigerant Recovery, Reclaiming & Recycling	3	Midterm Exam (CLO 1,2) Project-based Assessment (3,5)
AC 223	Internship	4	Interview

Appendix D: Provide signature assignment form