1. Assessment Plan - Four Column

PIE - Technology & Health: Air Conditioning & Refrigeration Unit

Narrative Reporting Year

2018-19

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Program Planning Dialog: The department has meetings ongoing that has faculty and staff meet up to three times per month to discuss department strategies in the areas of curriculum, equipment needs, staffing needs, necessary technology, as well as lab project modifications. We also reach out to our industry partners and advisers on an ongoing basis to solicit feedback for program improvement and relevance. We continually monitor and discuss student progress to aid in student success.
In addition, the department has a monthly meeting to inform all staff and faculty on campus issues and division needs.
External Conditions, Trends, or Impacts: 1. LMS data suggests a higher than average retirement from the sector and thereby requires a larger skilled labor force be ready to enter the workforce sooner and more quickly than in past years. This has been substantiated by the increased demand directly from industry partners seeking personnel to fill vacant positions from retirees. A re-evaluation of our certificate process will take place through our advisory board to see if a reduction in units and core courses will still provide industry with the entry level skills they seek thereby allowing completers to enter the workforce faster yet still have a solid foundation of knowledge to have a successful career in the industry.

2. The HVAC & R industry has stratified skill requirements. New control technologies in the building automation and energy management sector of the HVAC industry require approximately 20% of program completers enter the industry with a foundation in digital controls, network architecture, and programming. The other 80% require the skills necessary to work in the physically demanding roles of construction, installation, service and repair as mechanical, installation ,and electrical technicians . This results in a stratification of technical skill level that the AIRC and BAS programs must adjust to.

3. College affiliates participating with the BEST (Building Efficiency for a Sustainable Tomorrow) Center through Laney College report low enrollments in their building automation programs. Low enrollment in community college building automation programs is being reported by all BEST Center members and participants. The BEST Center is the only organization representing building automation educators. Recruitment methods are a significant part of the BEST workshops and meetings.

4. Workplace safety based on OSHA standards is changing the operation of many HVAC and BAS businesses. This program needs to infuse OSHA standard safety into the AIRC and BAS curriculum.

5. Air conditioning systems utilizing inverter controlled compressors for Variable Refrigerant Volume (key term) are being specified more in new construction and new installations. The equipment saves energy by eliminating the use of duct work . For this technology to be included in the program's curriculum, faculty members will have to participate in significant training and professional development. In addition, the mechanical and electrical labs with need to be modified over a period of + or- 3 years.

6. HCFC refrigerants have had very negative effects on ozone depletion and climate change. As a result, in 2012 the EPA reduced the amount of HCFC refrigerants available in the US market by 45%. This caused the price of refrigerants required in the AIRC mechanical lab to rise by more than 300%. Since the EPA has sequentially reduced

production of HCFC refrigerants resulting in a 600% price increase over 2012 levels. In other words, new equipment is needed to replace aging systems in the mechanical lab.

Internal Conditions, Trends, or Impacts : 1. Low enrollment in the BAS Program has continued since the DOL grant ended. From Fall 2013 to Summer 2015, eight (8) BAS courses were offered. during that time period, three out of eight course offerings were dropped because of low enrollment. Of the courses that ran, enrollment averaged 83% fill at census and 67% fill at the end of the session. Although enrollment has increased slightly there is still an opportunity to increase with marketing intervention and consistent subject matter expert representation, enrollment in the BAS program may continue to fall. Streamlining the certificate and degree requirements should also aid success in enrollment and completion numbers.

2. Faculty members in the AIRC department need to participate in significant training and professional development to learn and infuse Variable Refrigerant Volume (VRV) technology and VRV systems into the classroom and the curriculum.

3. Many of the Air Conditioning and Refrigeration systems used as lab trainers in the AIRC mechanical lab date back to the 1970's and 1980's. These trainers have always served the department's instructional needs because the systems are durable and the components are clearly visible. The refrigerants these older systems use, however, have been phased out because their destructive environmental properties. It has become prohibitively expensive to maintain the lab trainers that use HCFC refrigerants. It is more cost effective to replace existing older systems with newer, more efficient, and environmentally compatible equipment that use HFC and HFO refrigerants.

4. The electrical lab has used the same components for the last 25+ years. These various electrical components have exceeded their life expectancy and quite cost intensive to maintain. These components also are quite dated and are not aligned with current technology found in the newer equipment installed today. The lab could significantly benefit from much needed new components and carry the department forward into the next decade.

5. The mechanical lab space suffers from proper and adequate efficient lighting. The lighting in this space suffers from continuous bulb failure, low and dim lighting conditions and expensive bulb replacement to the college. Converting to high bay fluorescent or LED lighting fixtures would enable the shop to have a better lighted environment as well as a safer area for students to work on their projects.

6. Photovoltaic systems are becoming more prevalent in the residential and commercial sectors of industry. This has created a need for faculty training and equipment in this area to better serve student's understanding of this technology when they encounter it in the workplace. If students do not comprehend the impact and designs of such systems they will not have the confidence to properly engage with these types of systems and thus hinder their troubleshooting and assessment capabilities. Faculty require ongoing professional development with this technology as it is ever evolving and becoming a more integral part of the power distribution systems within and outside of the facilities serviced by HVAC, Refrigeration, or Building Automation technicians.

7. Lack of instructional space has become a factor in stifling department growth as well as limiting alternative instructional methods. Virtual reality training is being adapted in the training sector and has been adopted within the department however, inadequate space for utilizing this technology has limited the number of students who can access it at the same time to only a few at any given time. Lack of classroom and lab space is also hindering the departments ability to increase the number of sections offered at any time as most classroom and lab space areas are required at the same time for a single class.

8. The request to offer more sections, as the college has been growing, is impacting the annual budget of the department and shortfalls for consumable material costs are evident. The departments budget needs to grow commensurate to the rising costs of consumable materials required to remain a top tier instructional facility.
Critical Decisions Made by Unit: Weekend courses are being offered since the department has no room to grow courses during the regular week due to space availability. However, time is till a limiting factor of the number of courses that can be added on the weekends.

Due to the erratic nature of the fast track schedule, created last year, and the negative impact it has on staff and faculty we have removed the linked requirement for enrollment. As we feel strongly that the fast track option is till a viable means for students to earn their certificate in the most efficient way possible we are changing to a

counseling strategy rather than linked courses to encourage students to progress through in a one year time frame.
Notable Achievements for Theme A: To Advance Academic Excellence and Student Achievement: 1. The department is involved in marketing strategies for the BAS courses and in such participated in a video promotion through Doing What Matters. This video was added to the AIRC home page and includes Mt SAC faculty in interviews.

2. The HVAC/R program has been awarded the Gold Star rating through strong workforce for meeting three metrics in wage earner increase, job placement in similar field of study, and attainment of regional living wage.

Notable Achievements for Theme B: To Support Student Access and Success: 1.Virtual reality equipment has been secured through Strong Workforce dollars to supplement instruction in troubleshooting procedures. Now we just need the space to fully implement this project to be able to serve multiple students at a time through more instructional space.
Notable Achievements for Theme C: Secure Human, Technological, & Financial Resources: 1. Through Strong Workforce dollars the department has been able to secure:
a) Virtual Reality equipment to supplement instruction in mechanical and electrical air conditioning troubleshooting.
b) New high efficiency furnaces to demonstrate and instruct on new energy efficient technology that is becoming more commonplace in the state of California.
c) A Commercial Air Handler and Variable Air Volume units for an existing chiller to demonstrate and aid in the instruction of energy efficiency achievements in the commercial HVAC industry.
Notable Achievements for Theme D: To Foster an Atmosphere of Cooperation and Collaboration: 1. The department is engaged in ongoing collaborative efforts with LA Trade Tech, El Camino College, and Compton College to meet industry needs for a qualified workforce.

2. The department is collaborating with the BEST Center (Building Efficiency for a Sustainable Tomorrow) in providing instruction for High Performance Building Operations Professionals.

3. The department is working with Citrus college as they shutter their Air Conditioning program in providing a pathway for their students to achieve their goals and complete their certificate requirements.
Contributors to the Report: Lanny Richardson -AIRC
Fred Kobzoff - AIRC
David Hering - AIRC

Unit Goals	*Resources Needed*	*Where We Make an Impact: Closing the Loop on Goals and Plans*
Support BAS Program - BAS enrollment will need to be improved and marketing efforts will be undertaken in the Fall of 2017 to evaluate what measures should be taken to meet this criteria. **Status:** Active **Goal Year(s):** 2016-17, 2017-18, 2018-19 **Date Goal Entered (Optional):** 03/08/2018	**Request - No Funding Requested -** Develop more effective courses that will allow students to earn their certificate faster and enter the workforce more rapidly while not diminishing and diluting course content. **Describe Plans & Activities Supported (Justification of Need):** Through the recommendation of our advisory committee, we have	**Reporting Year:** 2018-19 **% Completed:** 100 The advisory committee has met and has provided direction for the department. The curriculum and certificate/degree have been modified and sent forward to the educational design committee for approval. The courses and certificate have received approval from Ed Design. (05/14/2019)

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	modified the certificate/degree to fewer units while still maintaining all relevant content. Modifications included embedding document, spreadsheet, and presentation software directly into the AIRC 61 class. This will allow the department to target these subject matters utilizing air conditioning and building automation subject matter more relevant to the students. **Lead:** Richardson/ Kobzoff **What would success look like and how would you measure it?:** Increased enrollment and completers **Type of Request:** MARKETING: Requests for services in the areas of graphic design, news, and photography, posting information, communication and social media. **Planning Unit Priority:** Medium **Documentation Attached?:** No	
	Request - Full Funding Requested - Photo-voltaic grid-tie system with battery storage. **Describe Plans & Activities Supported (Justification of Need):** The photo-voltaic system will be used to provide power to a newly installed VRV system which will be used for instruction on grid-tied systems that are becoming more commonplace in industry. Additionally, the system will be used for future instruction on micro-grid technology. The application of the system will be incorporated into the electrical courses as well as building automation systems courses. **Lead:** Richardson/Kobzoff	**Reporting Year:** 2018-19 **% Completed:** 25 Alternative energy project was placed on hold due to a moratorium on photo-voltaic installations on campus. This is no longer the case and the department is going to move forward on this. The projects current anticipated completion has been postponed until Summer of 2020 at the earliest. (05/14/2019) **Reporting Year:** 2018-19 **% Completed:** 25 A number of VRV systems have been installed and will become operational in the 2017-2018 school year. There is another system currently in the process of being installed which also will incorporate Photo-voltaic (solar panels) to power the system so students can get exposure to this new technology when working within this environment. The college is no longer under a moratorium on photo-voltaic systems on campus and so the department is resuming the

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	What would success look like and how would you measure it?: Success would be to develop a more well informed and employable student that meets the needs of industry and an ever evolving energy efficient society. It would be measured through the more diverse areas of job placement and HVAC Excellence Employment Readiness Exams. **Type of Request:** INSTRUCTIONAL SUPPORT PROGRAM FUNDING (INSTRUCTIONAL EQUIPMENT): Equipment, library material, or technology for classroom instruction, student instruction or demonstration, or in preparation of learning materials in an instructional program, equal or over $500. **Planning Unit Priority:** Medium **Documentation Attached?:** No **One-Time Funding Requested (if applicable):** 45000	process and installation of this project. The VRV units have been placed on the North-West exterior of Building 69 to foster exposure and marketing opportunities of the Air Conditioning department. A fence has been erected by Mt SAC facilities to ensure safety and security of the units. (05/09/2019)
Full time faculty hire - A recent retirement of a tenured faculty has created an opening for a new faculty hire. The recruitment process is currently under way. **Status:** Active **Goal Year(s):** 2016-17, 2017-18, 2018-19 **Date Goal Entered (Optional):** 09/01/2016	**Report directly on Goal**	**Reporting Year:** 2018-19 **% Completed:** 25 The department is currently going through the hiring process but has not, as of yet, committed to a new faculty. (05/14/2019)
	Request - Full Funding Requested - Hiring of a new tenure track faculty to replace retired tenured faculty member **Describe Plans & Activities Supported (Justification of Need):** The department is currently in the process of hiring a new full time faculty. **Lead:** Richardson, Lanny **What would success look like and**	

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	how would you measure it?: Certificate degree awards, more sections offered **Type of Request:** STAFFING: Requests for permanent employee positions or temporary/hourly employees. **Planning Unit Priority:** High **Documentation Attached?:** No **On-Going Funding Requested (if applicable):** 100000	
Support BAS Program 2 - Acquire equipment and controls to support the BAS program on an ongoing basis to meet the technological advances occurring in industry **Status:** Active **Goal Year(s):** 2016-17, 2017-18, 2018-19 **Date Goal Entered (Optional):** 03/08/2018	**Request - No Funding Requested -** Industry support and advisory **Describe Plans & Activities Supported (Justification of Need):** To ensure that the department has the relevant technology to meet current industry practices as well as professional development to implement current and new technologies the department will seek grant funding for activities. **Lead:** Richardson, Lanny **What would success look like and how would you measure it?:** Relevant technology to lead towards a higher placement rate within industry. **Type of Request:** INSTRUCTIONAL SUPPORT PROGRAM FUNDING (INSTRUCTIONAL EQUIPMENT): Equipment, library material, or technology for classroom instruction, student instruction or demonstration, or in preparation of learning materials in an instructional program, equal or over $500. **Planning Unit Priority:** Medium **Documentation Attached?:** No	**Reporting Year:** 2018-19 **% Completed:** 50 The department has secured some additional equipment to support the Building Automation Program. These new items will allow the department to maintain relevancy and currency. It has also strengthened the relationship between a major manufacturer, Automated Logic Corporation, and the BAS program at Mt SAC. The equipment has been received and the installation process is ongoing. Faculty will need additional training to fully realize the systems. (05/14/2019)

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Technological relevance - Provide students relevant mechanical equipment that is current with industry standards as well as technological standards. **Status:** Active **Goal Year(s):** 2016-17, 2017-18, 2018-19 **Date Goal Entered (Optional):** 07/13/2017	**Report directly on Goal** **Request - Full Funding Requested -** Replacement package units and furnaces **Describe Plans & Activities Supported (Justification of Need):** Many of the Air Conditioning and Refrigeration systems used as lab trainers in the AIRC mechanical lab date back to the 1970's and 1980's. These trainers have always served the department's instructional needs because the systems are durable and the components are clearly visible. The refrigerants these older systems use, however, have been phased out because their destructive environmental properties. It has become prohibitively expensive to maintain the lab trainers that use HCFC refrigerants. It is more cost effective to replace existing older systems with newer, more efficient, and environmentally compatible equipment that use HFC and HFO refrigerants. **Lead:** Richardson, Lanny Kobzoff, Fred **What would success look like and how would you measure it?:** Students gaining experience on current relevant technology to provide greater opportunities in the industry.	**Reporting Year:** 2018-19 **% Completed:** 50 The department has received the new efficient furnaces and has installed them. They are ready for student use. The department is till in the process of installing the energy monitoring equipment. (05/14/2019)

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	Type of Request: INSTRUCTIONAL SUPPORT PROGRAM FUNDING (INSTRUCTIONAL EQUIPMENT): Equipment, library material, or technology for classroom instruction, student instruction or demonstration, or in preparation of learning materials in an instructional program, equal or over $500. **Planning Unit Priority:** High **Documentation Attached?:** No **One-Time Funding Requested (if applicable):** 50000	
Support Electrical Instruction - Replace electrical components used in the Basic and Advanced Electrical course offerings **Status:** Active **Goal Year(s):** 2016-17, 2017-18, 2018-19 **Date Goal Entered (Optional):** 07/13/2017	**Report directly on Goal** **Request - Full Funding Requested -** Replacement components for electrical Lab space **Describe Plans & Activities Supported (Justification of Need):** The electrical lab has used the same components for the last 25+ years. These various electrical components have exceeded their life expectancy and quite cost intensive to maintain. These components also are quite dated and are not aligned with current technology found in the newer equipment installed today. The lab could significantly benefit from much needed new components and carry the department forward into the next decade. **Lead:** Richardson, Lanny **What would success look like and**	**Reporting Year:** 2018-19 **% Completed:** 0 The department is still seeking and awaiting funding to replace and update the electrical lab with new and relevant components. (05/14/2019)

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	how would you measure it?: Students having access to equipment that is aligned with today's' technology and maintaining relevance in the industry. **Type of Request:** SUPPLIES AND MATERIALS: Instructional supplies and materials are items to be used by students, faculty and other personnel in connection with an instructional program, less than $500. **Planning Unit Priority:** High **Documentation Attached?:** No **One-Time Funding Requested (if applicable):** 20000		
Empower student success - Create or continue efforts to aid student employment opportunities. **Status:** Active **Goal Year(s):** 2016-17, 2017-18, 2018-19 **Date Goal Entered (Optional):** 07/13/2017	**Request - Full Funding Requested -** Part time employee to investigate best practices for internship and placement opportunities. **Describe Plans & Activities Supported (Justification of Need):** The department currently hosts an annual open house/student exhibition that industry partners attend and either off er students an internship opportunity or employment. We would like to take this process to the next level so that we can place every completer in the workforce. **Lead:** Lanny Richardson Fred Kobzoff **What would success look like and how would you measure it?:** Criteria will be based on the number of students securing an internship or employment within industry. Create a tracking metric.	**Reporting Year:** 2018-19 **% Completed:** 25 To date, the Air Conditioning program has a 95% placement success rate. An average of 21 industry partners have participated annually over the last two years. The interview process has been ongoing since 2012 with smaller numbers but has grown substantially over the years. The department will be providing interview opportunities, for students, in June of 2019 to further maintain our employment numbers., (05/14/2019)	**:** This effort will be continued as long as industry supports it and we see no cause for slowing down in the foreseeable future. (08/21/2017)

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	Type of Request: STAFFING: Requests for permanent employee positions or temporary/hourly employees. **Planning Unit Priority:** High **Documentation Attached?:** No **One-Time Funding Requested (if applicable):** 45000	
Marketing - Participate or implement marketing efforts to promote the Air Conditioning and Building Automation programs. **Status:** Active **Goal Year(s):** 2016-17, 2017-18, 2018-19 **Date Goal Entered (Optional):** 08/21/2017	**Report directly on Goal**	**Reporting Year:** 2018-19 **% Completed:** 50 The department has created a number of posters for internal marketing purposes and is in the process of furthering our marketing efforts to industry. The department has also acquired clothing that reflects a more professional look to industry, employers, as well as potential future students. (05/14/2019)
	Request - Full Funding Requested - To create marketing videos/posters/literature that can be used internally as well as externally to promote our programs. **Describe Plans & Activities Supported (Justification of Need):** To participate in marketing efforts that highlight the need for qualified technicians graduating from Mt SAC. **Lead:** Lanny Richardson **What would success look like and how would you measure it?:** Industry feedback **Type of Request:** MARKETING: Requests for services in the areas of graphic design, news, and photography, posting information, communication and social media. **Planning Unit Priority:** Medium **Documentation Attached?:** No **One-Time Funding Requested (if applicable):** 15000 **On-Going Funding Requested (if**	

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	applicable): 2500 **Related Documents:** ZNE means job Opportunities	
Facilities - The mechanical lab space requires upgrading the lighting in this space to improve the quality and efficiency of lighting to provide students with a safe environment. Lighting issues result in the use of portable lighting necessities to ensure students can work on their project in a safe and comfortable manor. **Status:** Active **Goal Year(s):** 2017-18, 2018-19 **Date Goal Entered (Optional):** 05/31/2018	**Report directly on Goal** **Request - Full Funding Requested -** Lighting retrofit to high bay fluorescent or LED lighting **Describe Plans & Activities Supported (Justification of Need):** Current lighting in shop area is inadequate and creates excessive dark areas and shadows that are not conducive to a proper learning environment. The request is to either replace existing lighting with fluorescent or LED lighting or support existing lighting with additional fluorescent or LED lighting. **Lead:** Lanny Richardson **What would success look like and how would you measure it?:** Improved student performance measured by improved project score results. **Type of Request:** FACILITIES: This section includes minor building improvement projects and alterations to specific rooms or operational areas. **Planning Unit Priority:** High **Documentation Attached?:** No	**Reporting Year:** 2018-19 **% Completed:** 0 This issue has been listed on our PIE report since prior to 2017 but was removed. It has since been on our PIE report and is currently still waiting for approval and implementation. (05/14/2019)
IT support - Increase the support	**Request - Full Funding Requested -**	

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from IT staff serving the Technology and Health Division. **Status:** Active **Goal Year(s):** 2018-19 **Date Goal Entered (Optional):** 05/14/2019	Request additional personnel hiring to support full time IT staff serving Technology and Health facilities and classrooms. **Describe Plans & Activities Supported (Justification of Need):** The division currently has one full time IT staff member who serves a large population on campus. A part-time employee is currently in a supporting role and should be made full time as the needs of technology and support continue to grow within the division. **Lead:** Lanny Richardson **What would success look like and how would you measure it?:** Ability to offer far greater support to a growing division. **Type of Request:** STAFFING: Requests for permanent employee positions or temporary/hourly employees. **Planning Unit Priority:** Medium **Documentation Attached?:** No	
Support Program Instruction - Consumables and welding gas supplies for AC classes **Status:** Active **Goal Year(s):** 2018-19	**Request - Full Funding Requested -** Ongoing funding for supplies needed to support growth and additional sections in Welding for Air Conditioning and Refrigeration class (AIRC 11). **Describe Plans & Activities Supported (Justification of Need):** The industry is hitting a shortfall of qualified entry level employees. The department has increased its offerings with additional sections of the welding for air conditioning and refrigeration class (AIRC 11) to allow more students to complete the	

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	program faster. However, the course requires substantial resources in consumable materials and gases that can not be sustained by the department without additional funding added to the department budget. **Lead:** Lanny Richardson **What would success look like and how would you measure it?:** Meet supply and demand of industry needs by allowing more students to achieve their certificate in a more timely manner and enter the workforce sooner. **Type of Request:** SUPPLIES AND MATERIALS: Instructional supplies and materials are items to be used by students, faculty and other personnel in connection with an instructional program, less than $500. **Planning Unit Priority:** High **On-Going Funding Requested (if applicable):** 5000	