



**CYPRESS COLLEGE  
CURRICULUM COMMITTEE**

Tuesday, September 24, 2019  
TLC) Teaching Learning Center in the LRC.  
3:00 p.m.

**AGENDA**

Thank you for being on time. The meeting starts at 3:00 pm in the Teaching Learning Center in the LRC. Your attendance is critical in helping to meet the curriculum needs of Cypress College. Remember, if you are unable to attend please find an alternate representative.

**Call to Order:**

**Silvie Grote, Chair**

1. **Establish Quorum and Acknowledge Alternates**
2. **Adoption of the Agenda**
3. **Approval of September 17, 2019 *minutes*: (attached)**
4. **Public Commentary (3 minutes per speaker)**
5. **Articulation Report: Jacky Rangel, Articulation Officer**
6. **Chair Report**
7. **Approval of curriculum**
8. **Curriculum review demonstration**

DELETE COURSES/CERTIFICATES		
COURSE ID	EFF DATE	JUSTIFICATION
AC/R 035 C	2020 Fall	The elements of this course are being added to the revised AC/R 215C. The course number is confusing with the course content which is advanced. When this cutting edge course was developed, there was no equivalent course reflecting its complexity. This course is a natural to become part of codes since the commissioning process is driven by building, mechanical and electrical codes.
AC/R 050 C	2020 Fall	This course no longer serves its purpose. With the acquisition of new equipment and program update, what was intended as advanced equipment study is incorporated in regular class content.
AC/R 125 C	2020 Fall	With the combining of the active courses AC/R115 Gas Heating & Carbon Monoxide and AC/R125 Boiler and Hydronic Heating into the proposed 3 unit AC/R115 Gas Heat Transfer Systems, this current course is no longer relevant. Courses combined since both overlapped with combustion and gas fired burners.
AC/R 225 C	2020 Fall	Sustainability and energy efficiency has been incorporated into AC/R 205 and AC/R 210. Course has not been recently offered. This course number is being used updated AC/R 145C.
AC/R 240 C	2020 Fall	Sustainability and energy efficiency has been incorporated into AC/R 205 and AC/R 210. Course has not been recently offered.

REVISED COURSES					
COURSE ID	ACTION TAKEN	CLASS SIZE	CLASS SIZE JUSTIFICATION	EFF DATE	JUSTIFICATION
AC/R 036 C Refrigerant Certification Training Units: 1 Lecture: 1 Laboratory: 0	<ul style="list-style-type: none"> <li>*Outline Update</li> <li>*Prerequisite revalidated</li> <li>*Title change from Refrigerants, Charging and Recovery.</li> <li>*Class size from 20 to 45</li> <li>*Add Distance Education</li> <li>*Student contact hours from 36 to 18</li> <li>*Lab hours from 1.50 to 0</li> <li>*Catalog/Schedule Description Update</li> <li>*Student Learning Outcomes Update</li> <li>*Textbook Update</li> </ul>	45	The primary mode of instruction is lecture and may include discussion and/or group learning. Class size increased due to lecture hours and removal of lab hours	2020 Fall	Program Review Outline, title, catalog, schedule, lab hours, SLO's and textbooks updated to better reflect course content. Online Component requested to increase the distance education offerings at Cypress College, to increase student access and meet student demands.
AC/R 055 C Technician Customer Relations Units: 1 Lecture: 1 Laboratory: 0	<ul style="list-style-type: none"> <li>*Outline Update</li> <li>*Unit change from 2 to 1</li> <li>*Class size from 30 to 45</li> <li>* Add Distance Education</li> <li>*Lecture hours from 1.50 to 1</li> <li>*Lab hours from 1.50 to 0</li> <li>*Catalog Description update</li> <li>*Textbook Update</li> </ul>	45	The primary mode of instruction is lecture and may include discussion and/or group learning. Class size increased due to added lecture and removal of lab	2020 Fall	Outline, units, catalog, lec/lab hours and textbooks updated to better reflect course content. Online Component requested to increase the distance education offerings at Cypress College, to increase student access and meet student demands
AC/R 100 C Principles of Thermodynamics and Heat Transfer Units: 3 Lecture: 1.5 Laboratory: 4.5	<ul style="list-style-type: none"> <li>*Outline Update</li> <li>*Advisory revalidated</li> <li>*Student Learning Outcomes Update</li> <li>*Textbook Update</li> </ul>	20	HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. The Air Conditioning & Refrigeration Department is aligning itself to this standard. This standard is not only for the quality of education allowing for more individual instruction, but also takes into account safety and health reasons as this	2020 Fall	Program Review Outline, SLO's and textbooks updated to better reflect course content.

			industry is involved with the handling of hazardous materials such as refrigerants, oxygen and acetylene and oils. Also, the handling of electrical circuits at higher voltages demands more care. See the attached justification.		
AC/R 105 C Electricity for Air Conditioning and Refrigeration I Units: 3 Lecture: 1.5 Laboratory: 4.5	*Outline Update *Student Learning Outcomes Update *Textbook Update	20	HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. – <b>Please see AC/R 100 C for full class size justification</b>	2020 Fall	Program Review Outline, SLO’s and textbooks updated to better reflect course content.
AC/R 106 C Electricity for Air Conditioning and Refrigeration II Units: 3 Lecture: 1.5 Laboratory: 4.5	*Outline Update *Prerequisite revalidated *Catalog/Schedule Description Update *Student Learning Outcomes *Textbook Update	20	HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b>	2020 Fall	Program Review Outline, catalog, schedule, SLO’s and textbooks updated to better reflect course content.
AC/R 110 C Air Conditioning I Units: 2 Lecture: 1.5 Laboratory: 1.5	*Outline Update *Unit change from 3 to 2 *Student contact hours from 108 to 54 *Lab hours from 4 to 1.50 *Catalog/Schedule Description Update *Textbook Update	20	HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs	2020 Fall	Outline, units, catalog, schedule, lab hours, SLOs and textbooks updated to better reflect course content. Reduction of units from 3 to 2 unit to reflect industry advances in software applications that no longer require time consuming manual calculations.

			comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b>		
AC/R 120 C Piping Practice, Tools and Safety Units: 3 Lecture: 1.5 Laboratory: 4.5	*Outline Update *Units from 2 to 3 *Advisory revalidated *Student contact hours from 48 to 108 *Lab hours from 1 to 4.50 *Catalog/Schedule Description Update *Textbook Update	20	HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more than a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b>	2020 Fall	Outline, units, catalog, schedule, lab hours, textbook, and OSHA 10 training to better reflect course content.
AC/R 135 C Sustainability Design & Application Units: 2 Lecture: 1.5 Laboratory: 1.5	*Outline Update *Title change from Solar Energy for Heat and Cool *Catalog/Schedule Description Update *Student Learning Outcomes Update *Textbook Update	20	HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b>	2020 Fall	Program Review Outline, title, catalog, schedule, SLO’s, and textbook updated to better reflect course content.  Revise the course for sustainability in energy efficiency, energy conservation and high performance design.
AC/R 137 C Blueprints and Dimension Analysis Units: 2 Lecture: 1.5 Laboratory: 1.5	*Outline Update *Advisory revalidated *Catalog/Schedule Description Update	25	Most of the time students are engaged in practicing the skill(s) they are learning and the instructor gives each student individual instruction as the class proceeds. This class consist of hands-on in computer work.	2020 Fall	Outline, catalog and schedule updated to better reflect course content. This class consist of hands-on in computer work.

<p>AC/R 205 C Commercial Air Conditioning Units: 3 Lecture: 1.5 Laboratory: 4.5</p>	<p>*Outline Update *Prerequisite revalidated *Schedule Description Update *Student Learning Outcomes Update *Textbook Update</p>	<p>20</p>	<p>HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b></p>	<p>2020 Fall</p>	<p>Program Review Outline, schedule, SLO’s and textbook updated to better reflect course content.</p>
<p>AC/R 210 C Commercial Refrigeration Units: 3 Lecture: 1.5 Laboratory: 4.5</p>	<p>*Outline Update * Prerequisites revalidated *Catalog/Schedule Description Update *Textbook Update</p>	<p>20</p>	<p>HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b></p>	<p>2020 Fall</p>	<p>Program Review Outline, catalog, schedule and textbook updated to better reflect course content.</p>
<p>AC/R 215 C Codes and Commissioning Units: 3 Lecture: 1.5 Laboratory: 4.5</p>	<p>*Outline Update * Title change from Codes and Estimating for HVACR *Advisory revalidated *Advisory added: AC/R 100 C *Catalog/Schedule Description Update *Student Learning Outcomes Update *Textbook Update</p>	<p>20</p>	<p>HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b></p>	<p>2020 Fall</p>	<p>Program Review Outline, title, catalog, schedule, SLO’s and textbook updated to better reflect course content.</p>

<p>AC/R 230 C Heat Pumps Units: 2 Lecture: 1.5 Laboratory: 1.5</p>	<p>*Outline Update *Prerequisite revalidated *Catalog/Schedule Catalog Description *Student Learning Outcomes Update Schedule Description Update *Textbook Update</p>	<p>20</p>	<p>HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification.</b></p>	<p>2020 Fall</p>	<p>Program Review Outline, catalog, SLO’s and textbook updated to better reflect course content. Course addition of geothermal heat pumps section to reflect State mandate for Net Zero energy.</p>
<p>AC/R 235 C Air Conditioning Capstone Units: 2 Lecture: 1.5 Laboratory: 1.5</p>	<p>*Outline Update *Advisory revalidated *Advisory added: AC/R 125 C *Catalog/Schedule Description Update *Textbook Update</p>	<p>20</p>	<p>HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b></p>	<p>2020 Fall</p>	<p>Program Review Outline, catalog and textbook updated to better reflect course content.</p>
<p>AC/R 245 C Load Calculations for Heating and Cooling Units: 2 Lecture: 1.5 Laboratory: 1.5</p>	<p>*Outline Update *Course Number change from 145 *Prerequisite revalidated *Catalog/Schedule Description Update *Student Learning Outcome Update Program Review *Textbook Update</p>	<p>20</p>	<p>HVAC EXCELLENCE Standard 5.2 – Students per Instructor: The number of students per instructor shall be reasonable and allow for individual instruction. Classes should consist of no more that a maximum of 20 students per instructor. Open enrollment programs comprised of 15 or more students at multiple levels should be two instructor programs. <b>Please see AC/R 100 C for full class size justification</b></p>	<p>2020 Fall</p>	<p>Program Review Outline, catalog, schedule and textbook updated to better reflect course content. Revise course for update of content to include topics of sustainability and justification for 200 level course.</p>



AC/R 265 C Project Management Units: 3 Lecture: 3 Laboratory: 1	*Outline Update *Prerequisite Deletion *Catalog Description Update *Textbook Update	35	While the instructor does lecture, much of the class time focuses on discussion, group learning, and/or formal/informal student presentations.	2020 Fall	Program Review Outline, prerequisite removal, catalog and textbook updated to better reflect course content.
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MODIFY DEGREES/CERTIFICATES				
DEGREE			EFF DATE	JUSTIFICATION
Air Conditioning/Refrigeration	<b>AIR CONDITIONING AND REFRIGERATION CERTIFICATE</b>		2020 Fall	Course numbers and units changing to reflect program realignment, courses being de-activated in the program. AC/R 110 C unit change from 3 to 2. AC/R 120 C unit change from 2 to 3. Removed AC/R 035 C and AC/R 050 C. AC/R 215 C title change. AC/R 145 C number change to AC/R 245 C Add AC/R 235 C.  Total Units from 41.5-42 to 40
Required courses are listed in suggested sequence:				
		Units		
AC/R100 C	Principles of Thermodynamics and Heat Transfer	3		
AC/R110 C	Air Conditioning I	2		
AC/R120 C	Piping Practice, Tools and Safety	3		
AC/R137 C	Blueprints and Dimension Analysis	2		
AC/R036 C	Refrigerant Certification Training	1		
AC/R055 C	Technician Customer Relations	1		
AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3		
AC/R115 C	Gas Heat Transfer Systems	3		
AC/R135 C	Sustainability Design & Application	2		
AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3		
AC/R210 C	Commercial Refrigeration	3		
AC/R220 C	Intro. to Air Conditioning Controls	2		
AC/R230 C	Heat Pumps	2		
AC/R205 C	Commercial Air Conditioning	3		
AC/R215 C	Codes and Commissioning	3		
AC/R245 C	Load Calculations for Heating and Cooling	2		
AC/R235 C	Air Conditioning Capstone	2		
Total Units		40		

Air Conditioning/Refrigeration	<p><b>ASSOCIATE IN SCIENCE DEGREE AIR CONDITIONING AND REFRIGERATION</b></p> <p><b>Required courses are listed in suggested sequence:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 75%;"></th> <th style="width: 10%; text-align: center;">Units</th> </tr> </thead> <tbody> <tr><td>AC/R100 C</td><td>Principles of Thermodynamics and Heat Transfer</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R110 C</td><td>Air Conditioning I</td><td style="text-align: center;">2</td></tr> <tr><td>AC/R120 C</td><td>Piping Practice, Tools and Safety</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R137 C</td><td>Blueprints and Dimension Analysis</td><td style="text-align: center;">2</td></tr> <tr><td>AC/R036 C</td><td>Refrigerant Certification Training</td><td style="text-align: center;">1</td></tr> <tr><td>AC/R055 C</td><td>Technician Customer Relations</td><td style="text-align: center;">1</td></tr> <tr><td>AC/R105 C</td><td>Electricity for Air Conditioning and Refrigeration I</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R115 C</td><td>Gas Heat Transfer Systems</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R135 C</td><td>Sustainability Design &amp; Application</td><td style="text-align: center;">2</td></tr> <tr><td>AC/R106 C</td><td>Electricity for Air Conditioning and Refrigeration II</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R210 C</td><td>Commercial Refrigeration</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R220 C</td><td>Intro. to Air Conditioning Controls</td><td style="text-align: center;">2</td></tr> <tr><td>AC/R230 C</td><td>Heat Pumps</td><td style="text-align: center;">2</td></tr> <tr><td>AC/R205 C</td><td>Commercial Air Conditioning</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R215 C</td><td>Codes and Estimating for HVACR</td><td style="text-align: center;">3</td></tr> <tr><td>AC/R245 C</td><td>Load Calculations for Heating and Cooling</td><td style="text-align: center;">2</td></tr> <tr><td>AC/R235 C</td><td>Air Conditioning Capstone</td><td style="text-align: center;">2</td></tr> <tr><td colspan="2">Total Units</td><td style="text-align: center;">40</td></tr> </tbody> </table>			Units	AC/R100 C	Principles of Thermodynamics and Heat Transfer	3	AC/R110 C	Air Conditioning I	2	AC/R120 C	Piping Practice, Tools and Safety	3	AC/R137 C	Blueprints and Dimension Analysis	2	AC/R036 C	Refrigerant Certification Training	1	AC/R055 C	Technician Customer Relations	1	AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3	AC/R115 C	Gas Heat Transfer Systems	3	AC/R135 C	Sustainability Design & Application	2	AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3	AC/R210 C	Commercial Refrigeration	3	AC/R220 C	Intro. to Air Conditioning Controls	2	AC/R230 C	Heat Pumps	2	AC/R205 C	Commercial Air Conditioning	3	AC/R215 C	Codes and Estimating for HVACR	3	AC/R245 C	Load Calculations for Heating and Cooling	2	AC/R235 C	Air Conditioning Capstone	2	Total Units		40	2020 Fall	AC/R 110 C unit change from 3 to 2. AC/R 120 C unit change from 2 to 3. AC/R 220 C title change. AC/R 215 C title change. AC/R 145 C number change to AC/R 245 C  Total Units from 41.5-42 to 40
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Air Conditioning/Refrigeration	<p><b>Commercial Air Conditioning Certificate</b></p> <p>Required courses are listed in suggested sequence:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 75%;"></th> <th style="width: 10%; text-align: center;">Units</th> </tr> </thead> <tbody> <tr> <td>AC/R100 C</td> <td>Principles of Thermodynamics and Heat Transfer</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R110 C</td> <td>Air Conditioning I</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R120 C</td> <td>Piping Practice, Tools and Safety</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R105 C</td> <td>Electricity for Air Conditioning and Refrigeration I</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R115 C</td> <td>Gas Heat Transfer Systems</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R106 C</td> <td>Electricity for Air Conditioning and Refrigeration II</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R205 C</td> <td>Commercial Air Conditioning</td> <td style="text-align: center;">3</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black;">Total Units</td> <td style="text-align: center; border-top: 1px solid black;">20</td> </tr> </tbody> </table>			Units	AC/R100 C	Principles of Thermodynamics and Heat Transfer	3	AC/R110 C	Air Conditioning I	2	AC/R120 C	Piping Practice, Tools and Safety	3	AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3	AC/R115 C	Gas Heat Transfer Systems	3	AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3	AC/R205 C	Commercial Air Conditioning	3	Total Units		20	2020 Fall	<p>Updating Certificate for revised Fall 2020 courses. AC/R 110 C units from 3 to 2. AC/R 120 C units from 2 to 3. Remove AC/R 137 C and AC/R 145 C. Total Units from 24 to 20.</p>			
		Units																															
AC/R100 C	Principles of Thermodynamics and Heat Transfer	3																															
AC/R110 C	Air Conditioning I	2																															
AC/R120 C	Piping Practice, Tools and Safety	3																															
AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3																															
AC/R115 C	Gas Heat Transfer Systems	3																															
AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3																															
AC/R205 C	Commercial Air Conditioning	3																															
Total Units		20																															

Air Conditioning/Refrigeration	<p><b>Commercial Refrigeration Certificate</b></p> <p><b>Required courses are listed in suggested sequence:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 75%;"></th> <th style="width: 10%; text-align: center;">Units</th> </tr> </thead> <tbody> <tr> <td>AC/R100 C</td> <td>Principles of Thermodynamics and Heat Transfer</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R120 C</td> <td>Piping Practice, Tools and Safety</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R137 C</td> <td>Blueprints and Dimension Analysis</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R036 C</td> <td>Refrigerant Certification Training</td> <td style="text-align: center;">1</td> </tr> <tr> <td>AC/R105 C</td> <td>Electricity for Air Conditioning and Refrigeration I</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R106 C</td> <td>Electricity for Air Conditioning and Refrigeration II</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R210 C</td> <td>Commercial Refrigeration</td> <td style="text-align: center;">3</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black;">Total Units</td> <td style="text-align: center; border-top: 1px solid black;">18</td> </tr> </tbody> </table>			Units	AC/R100 C	Principles of Thermodynamics and Heat Transfer	3	AC/R120 C	Piping Practice, Tools and Safety	3	AC/R137 C	Blueprints and Dimension Analysis	2	AC/R036 C	Refrigerant Certification Training	1	AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3	AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3	AC/R210 C	Commercial Refrigeration	3	Total Units		18	2020 Fall	<p>This certificate is being sought to align our certificates with the industry certifying organization, HVAC Excellence and with the course revisions for Fall 2020.</p> <p>Remove AC/R 135 C AC/R 120 C unit change from 2 to 3. Total units from 19 to 18.</p>			
		Units																															
AC/R100 C	Principles of Thermodynamics and Heat Transfer	3																															
AC/R120 C	Piping Practice, Tools and Safety	3																															
AC/R137 C	Blueprints and Dimension Analysis	2																															
AC/R036 C	Refrigerant Certification Training	1																															
AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3																															
AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3																															
AC/R210 C	Commercial Refrigeration	3																															
Total Units		18																															
Air Conditioning/Refrigeration	<p><b>HVAC Automated Environmental Controls Certificate</b></p> <p><b>Required courses are listed in suggested sequence:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 75%;"></th> <th style="width: 10%; text-align: center;">Units</th> </tr> </thead> <tbody> <tr> <td>AC/R100 C</td> <td>Principles of Thermodynamics and Heat Transfer</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R110 C</td> <td>Air Conditioning I</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R105 C</td> <td>Electricity for Air Conditioning and Refrigeration I</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R106 C</td> <td>Electricity for Air Conditioning and Refrigeration II</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R115 C</td> <td>Gas Heat Transfer Systems</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R135 C</td> <td>Sustainability Design &amp; Application</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R205 C</td> <td>Commercial Air Conditioning</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R220 C</td> <td>Intro. to Air Conditioning Controls</td> <td style="text-align: center;">2</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black;">Total Units</td> <td style="text-align: center; border-top: 1px solid black;">21</td> </tr> </tbody> </table>			Units	AC/R100 C	Principles of Thermodynamics and Heat Transfer	3	AC/R110 C	Air Conditioning I	2	AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3	AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3	AC/R115 C	Gas Heat Transfer Systems	3	AC/R135 C	Sustainability Design & Application	2	AC/R205 C	Commercial Air Conditioning	3	AC/R220 C	Intro. to Air Conditioning Controls	2	Total Units		21	2020 Fall	<p>Changed certificate title from Air Conditioning Environmental Controls to HVAC Automated Environmental Controls. Courses updated to Fall 2020 course revisions. Remove AC/R 137 C Add AC/R 205 C Total units 21</p>
		Units																															
AC/R100 C	Principles of Thermodynamics and Heat Transfer	3																															
AC/R110 C	Air Conditioning I	2																															
AC/R105 C	Electricity for Air Conditioning and Refrigeration I	3																															
AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3																															
AC/R115 C	Gas Heat Transfer Systems	3																															
AC/R135 C	Sustainability Design & Application	2																															
AC/R205 C	Commercial Air Conditioning	3																															
AC/R220 C	Intro. to Air Conditioning Controls	2																															
Total Units		21																															

Air Conditioning/Refrigeration	<p><b>HVAC Building Commissioning Certificate</b></p> <p><b>Required courses are listed in suggested sequence:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 75%;"></th> <th style="width: 10%; text-align: center;">Units</th> </tr> </thead> <tbody> <tr> <td>AC/R100 C</td> <td>Principles of Thermodynamics and Heat Transfer</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R110 C</td> <td>Air Conditioning I</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R120 C</td> <td>Piping Practice, Tools and Safety</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R115 C</td> <td>Gas Heat Transfer Systems</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R106 C</td> <td>Electricity for Air Conditioning and Refrigeration II</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R205 C</td> <td>Commercial Air Conditioning</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R215 C</td> <td>Codes and Commissioning</td> <td style="text-align: center;">3</td> </tr> <tr> <td colspan="2"> </td> <td> </td> </tr> <tr> <td colspan="2">Total Units</td> <td style="text-align: center;">20</td> </tr> </tbody> </table>			Units	AC/R100 C	Principles of Thermodynamics and Heat Transfer	3	AC/R110 C	Air Conditioning I	2	AC/R120 C	Piping Practice, Tools and Safety	3	AC/R115 C	Gas Heat Transfer Systems	3	AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3	AC/R205 C	Commercial Air Conditioning	3	AC/R215 C	Codes and Commissioning	3				Total Units		20	2020 Fall	Change certificate title from Air Conditioning Building Commissioning and update courses to Fall 2020 revised courses. Remove AC/R 036, AC/R 137, AC/R 105, AC/R 135 C, AC/R 145 C, and AC/R 035 AC/R 110 C units change from 3 to 2. AC/R 120 C units change from 2 to 3 Total units from 23 to 20.			
		Units																																		
AC/R100 C	Principles of Thermodynamics and Heat Transfer	3																																		
AC/R110 C	Air Conditioning I	2																																		
AC/R120 C	Piping Practice, Tools and Safety	3																																		
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AC/R106 C	Electricity for Air Conditioning and Refrigeration II	3																																		
AC/R205 C	Commercial Air Conditioning	3																																		
AC/R215 C	Codes and Commissioning	3																																		
Total Units		20																																		
Air Conditioning/Refrigeration	<p><b>HVAC Codes and Estimating Certificate</b></p> <p><b>Required courses are listed in suggested sequence:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 75%;"></th> <th style="width: 10%; text-align: center;">Units</th> </tr> </thead> <tbody> <tr> <td>AC/R100 C</td> <td>Principles of Thermodynamics and Heat Transfer</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R110 C</td> <td>Air Conditioning I</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R137 C</td> <td>Blueprints and Dimension Analysis</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R115 C</td> <td>Gas Heat Transfer Systems</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R135 C</td> <td>Sustainability Design &amp; Application</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R215 C</td> <td>Codes and Commissioning</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R245 C</td> <td>Load Calculations for Heating and Cooling</td> <td style="text-align: center;">2</td> </tr> <tr> <td colspan="2"> </td> <td> </td> </tr> <tr> <td colspan="2">Total Units</td> <td style="text-align: center;">17</td> </tr> </tbody> </table>			Units	AC/R100 C	Principles of Thermodynamics and Heat Transfer	3	AC/R110 C	Air Conditioning I	2	AC/R137 C	Blueprints and Dimension Analysis	2	AC/R115 C	Gas Heat Transfer Systems	3	AC/R135 C	Sustainability Design & Application	2	AC/R215 C	Codes and Commissioning	3	AC/R245 C	Load Calculations for Heating and Cooling	2				Total Units		17	2020 Fall	Change certificate title from Air Conditioning Codes and Estimating and update courses to revised Fall 2020. Remove AC/R 105 C AC/R 110 C units change from 3 to 2. AC/R 145 C number change to AC/R 245 C Total units from 21 to 17			
		Units																																		
AC/R100 C	Principles of Thermodynamics and Heat Transfer	3																																		
AC/R110 C	Air Conditioning I	2																																		
AC/R137 C	Blueprints and Dimension Analysis	2																																		
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AC/R245 C	Load Calculations for Heating and Cooling	2																																		
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		Units																																		
AC/R100 C	Principles of Thermodynamics and Heat Transfer	3																																		
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Total Units		19																																		

DELETE DEGREES/CERTIFICATES																			
DEGREE		EFF DATE	JUSTIFICATION																
Air Conditioning/Refrigeration	<p><b>Mechanical Systems Core Certificate</b></p> <p>Required course are listed in suggested sequence</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 20%; text-align: center;">Units</th> </tr> </thead> <tbody> <tr> <td>AC/R035 C Building Commissioning</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R100 C Principles of Thermodynamics and Heat Transfer</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R110 C Air Conditioning I</td> <td style="text-align: center;">3</td> </tr> <tr> <td>AC/R120 C Piping Practice, Tools and Safety</td> <td style="text-align: center;">2</td> </tr> <tr> <td>AC/R137 C Blueprints and Dimension Analysis</td> <td style="text-align: center;">2</td> </tr> <tr> <td colspan="2" style="padding: 5px;">Total Units</td> </tr> <tr> <td style="text-align: right; padding: 5px;">12</td> <td></td> </tr> </tbody> </table>		Units	AC/R035 C Building Commissioning	2	AC/R100 C Principles of Thermodynamics and Heat Transfer	3	AC/R110 C Air Conditioning I	3	AC/R120 C Piping Practice, Tools and Safety	2	AC/R137 C Blueprints and Dimension Analysis	2	Total Units		12		2020 Fall	This certificate no longer meets with the overall goals and needs of the program.
	Units																		
AC/R035 C Building Commissioning	2																		
AC/R100 C Principles of Thermodynamics and Heat Transfer	3																		
AC/R110 C Air Conditioning I	3																		
AC/R120 C Piping Practice, Tools and Safety	2																		
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12																			