

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

**ACADEMIC AFFAIRS**

Course Number: ENGY 340 Department: Energy Systems Technology

Course Title: Fund. of Air Conditioning Semester: Spring Year: 1999

**Objectives/Competencies**

<b>Course Objective</b>	<b>Competencies</b>
1. Define Comfort as it pertains to Air Conditioning.	1. Recognize the four factors involved in comfort. 2. Explain the relationship of body temperature to room temperature. 3. Describe why one person is comfortable and another is not.
2. Define Psychrometrics.	1. Describe humidity. 2. Define dew point temperature. 3. Define wet bulb and dry bulb temperatures. 4. Plot air conditions on a psychrometric chart.
3. Relate Refrigeration as it is applied to Air Conditioning.	1. Explain three ways in which heat transfers into a structure. 2. State two ways that air is conditioned for cooling. 3. Recall sensible and latent heat.
4. Define the components that make up the Air Conditioning Cooling System.	1. Describe an evaporator. 2. Describe compressor types. 3. Describe condenser types.

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5. Label the physical design of an Air Conditioning system.	4. Describe an Air Conditioning metering device.
6. Define Air Distribution and Balance.	<ol style="list-style-type: none"> <li>1. Describe split system.</li> <li>2. Describe packaged system.</li> <li>3. Recognize standard and high efficiency equipment.</li> </ol>
7. Describe the air pressures involved in moving air.	<ol style="list-style-type: none"> <li>1. Describe the prime over of air.</li> <li>2. Describe characteristics of the propeller and centrifugal blowers.</li> <li>3. Describe the common types of motors and drives.</li> </ol>
8. Describe Air Distribution Systems.	<ol style="list-style-type: none"> <li>1. Take basic air pressure measurements.</li> <li>2. Measure air quantities</li> <li>3. List the different types of air measuring devices.</li> </ol>
9. Understand basics of equipment installation.	<ol style="list-style-type: none"> <li>1. Explain what constitutes good air flow.</li> <li>2. Describe a return air system.</li> <li>3. Plot air flow conditions on the air friction chart.</li> <li>4. Calculate duct sizes according to air flow.</li> </ol>
10. Define the basics of control systems for Air Conditioning.	<ol style="list-style-type: none"> <li>1. Recognize good installation practices.</li> <li>2. Recognize correct refrigerant piping practices.</li> <li>3. Identify types of duct system installations.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Describe the control sequence for an Air Conditioning System.</li> <li>2. Explain the function of a 24-volt control voltage.</li> </ol>

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<p>11. Describe the typical operating conditions of Air Conditioning.</p>	<ol style="list-style-type: none"> <li>3. Describe the space thermostat.</li> <li>4. Identify operating and safety controls.</li> </ol>
<p>12. Describe efficiency and design conditions for Air Conditioning equipment.</p>	<ol style="list-style-type: none"> <li>1. Explain what conditions will vary the evaporator pressures and temperatures.</li> <li>2. Define how the various conditions in the evaporator and ambient air affect condenser performance.</li> <li>3. State the relationship of the evaporator to the rest of the system.</li> <li>4. Describe the relationship of the condenser to the total system performance.</li> </ol>
<p>13. Define humidification.</p>	<ol style="list-style-type: none"> <li>1. Compare high efficiency and standard efficiency equipment.</li> <li>2. Calculate energy efficiency ratings of air conditioning equipment.</li> <li>3. Establish reference points when working on unfamiliar equipment.</li> <li>4. Explain methods that manufacturers use to make air conditioning equipment more efficient.</li> </ol>
<p>14. Define Air Filtration and Purification.</p>	<ol style="list-style-type: none"> <li>1. Explain relative humidity.</li> <li>2. List reasons for providing humidification in winter.</li> <li>3. Discuss the differences between evaporative and atomizing humidifiers.</li> <li>4. Explain humidification system design and control</li> </ol>

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15. Describe individual room Air Conditioning.	<ol style="list-style-type: none"> <li>1. Explain why cleaning air in buildings is necessary.</li> <li>2. List five types of filtering/purification materials or devices</li> <li>3. Relate indoor air quality to indoor pollution.</li> </ol>
16. Describe service procedures for room Air Conditioning systems.	<ol style="list-style-type: none"> <li>1. Discuss the variations in the designs of window and through the wall units.</li> <li>2. Describe the various methods of installing window air conditioning systems</li> <li>3. List the major components in the refrigeration cycle of a window cooling unit.</li> </ol>
17. Describe a typical residential Air Conditioning system.	<ol style="list-style-type: none"> <li>1. Recognize the controls for room air conditioning systems.</li> <li>2. State the components that may require electrical service.</li> <li>3. State the proper procedures for changing a room air conditioner.</li> </ol>
18. Describe year round air conditioning.	<ol style="list-style-type: none"> <li>1. List general procedures and design considerations used in residential air conditioning.</li> <li>2. Perform a heat gain/heat loss calculation on a typical residential structure for sizing heat/cool equipment.</li> <li>3. Identify system layout and components used in residential applications.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Discuss the three typical year round air conditioning systems.</li> <li>2. List five ways to condition air.</li> <li>3. Describe why a heating system normally uses less air than</li> </ol>

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<p>19. Describe a heat pump system.</p>	<p>a cooling system.</p> <p>4. Explain two methods used to vary the air flow in the heating season from that in the cooling season.</p> <p>1. Define a reverse cycle heat pump.                  2. List the components of a heat pump.                  3. Explain a four-way valve.</p>
<p>20. Define auxiliary heat and heat pump operation.</p>	<p>1. State the various heat sources for heat pumps.                  2. Compare electric heat to heat with a heat pump.                  3. State how heat pump efficiency is rated.</p>
<p>21. Define different types of chilled-water Air Conditioning systems.</p>	<p>1. Describe how chilled-water air conditioning systems operate.                  2. Relate the differences and similarities between high and low pressure chilled-water systems.                  3. Identify the components on both low and high pressure systems.</p>
<p>22. Relate the use of unique terminology used with chilled-water systems.</p>	<p>1. Explain what is meant by approach temperature in a water cooled condenser.                  2. Explain subcooling and superheating.                  3. Explain what a purge system is.                  4. Explain the difference between direct expansion and flooded type evaporators.</p>
<p>23. Define the basics of chemical cooling with an absorption chiller.</p>	<p>1. State the refrigerant generally used in absorption chillers.</p>

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<p>24. Describe cooling towers and cooling tower pumps.</p>	<ol style="list-style-type: none"> <li>2. State the compound normally used in salt solutions in large absorption chillers.</li> <li>3. Explain absorption and rejection methods used in large systems.</li> <li>1. Understand the purpose of cooling towers.</li> <li>2. State the means by which a cooling tower reduces water temperature.</li> <li>3. Describe the two types of cooling towers.</li> </ol>
<p>25. Define the requirements of section 608 of the clean air act.</p>	<ol style="list-style-type: none"> <li>1. Understand the basics of the antiventing law.</li> <li>2. Recognize service procedures following EPA rules.</li> <li>3. Relate to the safe handling of refrigerants and refrigerant recovery.</li> </ol>