# AUTOMOTIVE SPECIALIZATION (Air Conditioning and Heating)

## STUDENT GRADE RECORD

**Career & Technical Education**  
**WINDHAM SCHOOL DISTRICT**

<table>
<thead>
<tr>
<th>Student Name</th>
<th>TDCJ #</th>
<th>Instructor Name</th>
<th>Unit</th>
</tr>
</thead>
</table>

I attest that all of the information reported on this form is true.

### Course Outline Modules

<table>
<thead>
<tr>
<th>Course Outline Modules</th>
<th>Windham Module Test</th>
<th>Module Competency Rating</th>
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<tbody>
<tr>
<td>1. CTE Orientation</td>
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<tr>
<td>2. Introduction to Automotive Heating, Air Conditioning, and Ventilation</td>
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<td>3. Shop Safety and Environmental Protection</td>
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<td>4. HVAC Tools, Equipment, and Service Information</td>
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<td>5. HVAC Electrical and Electronic Fundamentals</td>
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<tr>
<td>6. Principles of Refrigeration</td>
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<td>7. Refrigerants, Refrigerant Oils, and Related Chemicals</td>
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<td>8. Hoses, Lines, Fittings, and Seals</td>
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<td>9. Compressors, Clutches, and Drives</td>
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<td>10. Evaporators, Condensers, Accumulators, and Receiver-Driers</td>
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<td>11. Control Valves and Switches</td>
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<td>12. Engine Cooling Systems and Vehicle Heaters</td>
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<td>13. Air Delivery Systems</td>
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<td>14. Manual HVAC Controls</td>
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<td>15. Automatic Temperature Control Systems</td>
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<td>16. Refrigeration System Diagnosis and Leak Detection</td>
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<td>25. ASE Certification</td>
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<td>26. Career Preparation</td>
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</tbody>
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### Windham Module Test Average

\[
\text{Windham Module Test Average} = x_1 \times 0.75 + x_2 \times 0.25 \\
\text{Completer} = a \\
\text{Complementor} = b
\]

### Windham End of Course Exam

\[
\text{Windham End of Course Exam} = x_3 \\
\text{Completer} = a \\
\text{Complementor} = b
\]

### Windham Module Score

\[
\text{Windham Module Score} = (a + b) \\
\text{Completer} = 70+ \\
\text{Complementor} = 70+
\]

### % Competencies Completed

\[
\text{% Competencies Completed} = 70+
\]

### Module Competency Rating

\[
\text{Module Competency Rating} = 2.7+
\]

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## RECORDING DIRECTIONS

**SKILL RATING:** Post the student’s competency rating for each skill performed.

**MODULE TEST SCORE:** Enter the student’s test score for the module.

**MODULE RATING:** Use the following scale to determine module rating:
- **[4] Skilled:** Can perform competencies independently with no supervision.
- **[3] Moderately Skilled:** Can perform competencies with limited supervision.
- **[2] Limited Skill:** Requires instruction and close supervision to perform competencies.
- **[1] Unskilled:** Exposed to concept, but no hands-on experience.

**Note:** When evaluating a student’s module rating, skill performance should be given priority.

### 1. CTE Orientation

<table>
<thead>
<tr>
<th>Teacher Initial</th>
<th>Student Initial</th>
</tr>
</thead>
</table>

1. Identify employment opportunities related to the course.
2. Identify the number of classroom hours a student must attend to be considered as a completer.
3. Identify the industry-recognized certification.
4. Identify course expectations including:
   - Working conditions
   - Attendance expectations
   - Instructor’s expectations

### 2. Introduction to Automotive Heating, Air Conditioning, and Ventilation

**Module Test Score** ________

**Module Rating (4, 3, 2, 1)** ________

1. Identify the components of a vehicle air conditioning system and state their purpose.
2. Name the two major types of refrigerant used in automotive air conditioning.
3. Identify the components of a vehicle heating system and state their purpose.
4. Identify the components of a vehicle ventilating system and state their purpose.

### 3. Shop Safety and Environmental Protection

**Module Test Score** ________

**Minimum 100% Required** ________

**Module Rating (4, 3, 2, 1)** ________

1. List ways to maintain a safe workplace.
2. List safe work procedures.
3. List refrigerant safety precautions.
4. Identify and explain refrigerant first aid procedures.
5. Identify types of environmental damage caused by improper shop practices.
6. Identify ways to prevent environmental damage.

### 4. HVAC Tools, Equipment, and Service Information

**Module Test Score** ________

**Module Rating (4, 3, 2, 1)** ________

1. Identify HVAC system diagnostic and test equipment.
2. Identify types of refrigeration system service equipment.
3. Identify engine cooling system test and service tools and equipment.
4. Identify HVAC control system service tools.
5. Identify HVAC and cooling system service information.

### 5. HVAC Electrical and Electronic Fundamentals

**Module Test Score** ________

**Module Rating (4, 3, 2, 1)** ________

1. Identify basic vehicle electrical circuits.
2. Identify basic electrical measurements.
3. Identify and explain the purpose of common vehicle electrical devices.
4. Identify the major parts of vehicle computers.
### Principles of Refrigeration

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify common refrigeration system components and the purpose of each.</td>
</tr>
</tbody>
</table>

### Refrigerants, Refrigerant Oils, and Related Chemicals

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify current refrigerants and identify systems where they are used.</td>
</tr>
<tr>
<td>2. Identify modern refrigerant oils and the refrigerants they are used with.</td>
</tr>
<tr>
<td>3. Identify refrigeration system flushing compounds and explain why some are no longer used.</td>
</tr>
</tbody>
</table>

### Hoses, Lines, Fittings, and Seals

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
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<tbody>
<tr>
<td>1. Identify types of refrigeration system fittings.</td>
</tr>
<tr>
<td>2. Identify types of refrigeration system seals.</td>
</tr>
</tbody>
</table>

### Compressors, Clutches, and Drives

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
</tr>
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<tbody>
<tr>
<td>1. Identify the major parts of radial and axial piston compressors.</td>
</tr>
<tr>
<td>2. Identify the major parts and explain the operation of rotary vane compressors.</td>
</tr>
<tr>
<td>3. Identify the major parts and explain the operation of scroll compressors.</td>
</tr>
<tr>
<td>4. Identify the major parts of a compressor clutch.</td>
</tr>
</tbody>
</table>

### Evaporators, Condensers, Accumulators, and Receiver-Driers

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify the major types of evaporators.</td>
</tr>
<tr>
<td>2. Explain the purpose of the condenser.</td>
</tr>
<tr>
<td>3. Explain the purpose of the accumulator.</td>
</tr>
<tr>
<td>4. Explain the purpose of the receiver-drier.</td>
</tr>
</tbody>
</table>

### Control Valves and Switches

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
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<tbody>
<tr>
<td>1. Identify the major types of evaporator pressure control devices.</td>
</tr>
<tr>
<td>2. Identify the major types of compressor clutch control devices.</td>
</tr>
</tbody>
</table>

### Engine Cooling Systems and Vehicle Heaters

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
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</thead>
<tbody>
<tr>
<td>1. Identify the major parts of liquid cooling systems.</td>
</tr>
<tr>
<td>2. Identify the major parts of air cooling systems.</td>
</tr>
<tr>
<td>3. Identify the major parts of heating systems on vehicles with a liquid cooling system.</td>
</tr>
<tr>
<td>4. Identify the major parts of heating systems on vehicles with an air cooling system.</td>
</tr>
</tbody>
</table>

### Air Delivery Systems

**Module Test Score**

<table>
<thead>
<tr>
<th>Module Rating (4, 3, 2, 1)</th>
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<tbody>
<tr>
<td>1. Identify the major parts of an HVAC system blower and motor.</td>
</tr>
<tr>
<td>2. Identify the purpose of HVAC system air ducts.</td>
</tr>
<tr>
<td>3. Identify the types and purposes of HVAC system air doors.</td>
</tr>
<tr>
<td>4. Identify and explain HVAC system air door operating devices.</td>
</tr>
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</table>

### Manual HVAC Controls

**Module Test Score**

<table>
<thead>
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<th>Module Rating (4, 3, 2, 1)</th>
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<tbody>
<tr>
<td>1. List and describe common HVAC control system modes.</td>
</tr>
<tr>
<td>2. Identify the major parts of a manual HVAC control system.</td>
</tr>
</tbody>
</table>

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Student Name: ___________________________  
TDCJ Number: ___________________________  

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15. Automatic Temperature Control Systems

Module Test Score _______

Module Rating (4, 3, 2, 1)

1. Identify the major parts of electronic automatic temperature control systems.
2. Identify the components of mechanical automatic temperature control systems.
3. Identify the components of electromechanical automatic temperature control systems.

16. Refrigeration System Diagnosis and Leak Detection

Module Test Score _______

Module Rating (4, 3, 2, 1)

1. Make a refrigeration system and HVAC system performance check.
2. Correctly attach gauges to a refrigeration system.
3. Determine the type of refrigerant in a refrigeration system.
4. Locate refrigeration system leaks.

17. Refrigerant Recovery, Recycling, and Handling

Module Test Score _______

Module Rating (4, 3, 2, 1)

1. Add refrigerant to an operating refrigeration system.
2. Discharge a refrigeration system and recover refrigerant.
3. Evacuate a refrigeration system.
4. Flush a refrigeration system.
5. Check oil level and add oil to a refrigeration system.
6. Vacuum leak test a refrigeration system.
7. Pressure leak test a refrigeration system.
8. Recharge a refrigeration system with new or recycled refrigerant.
9. Purge a refrigeration system.
10. Install an inline system filter.

18. Hose, Line, Fitting, and O-ring Service

Module Test Score _______

Module Rating (4, 3, 2, 1)

1. Remove and replace a compression fitting.
2. Remove and replace a spring lock coupling.
3. Remove and replace refrigeration system O-rings and gaskets.
4. Remove and replace a refrigeration system hose.
5. Make a new hose from stock hose lengths.
6. Install a crimp fitting on a hose.
7. Remove and replace a refrigeration system line.

19. Compressor and Clutch Service

Module Test Score _______

Module Rating (4, 3, 2, 1)

1. Remove and replace a compressor clutch.
2. Remove and replace a compressor clutch electromagnet.
3. Remove and replace a compressor shaft seal.
4. Remove and replace compressor gaskets and O-rings.
5. Remove and replace a compressor valve plate and valve assembly.
6. Remove and replace a compressor capacity control valve.

20. Valve, Evaporator, Condenser, and Related Parts Service

Module Test Score _______

Module Rating (4, 3, 2, 1)

1. Remove and replace expansion valves and orifice tubes.
2. Remove and replace evaporator pressure control valves.
3. Remove and replace compressor cycling switches.
4. Remove and replace evaporators and condensers.
5. Remove and replace accumulators and receiver-driers.
21. Heater and Engine Cooling System Service

Module Test Score ______

Module Rating (4, 3, 2, 1)

_____ 1. Check coolant level and freezing point.

_____ 2. Remove and replace heater cores and heater hoses.

_____ 3. Remove and replace heater shutoff valves.

_____ 4. Check and replace cooling system belts and hoses.

_____ 5. Flush cooling system and heater core.

_____ 6. Remove and replace coolant pumps.

_____ 7. Remove and replace cooling system thermostats.

_____ 8. Remove and replace cooling fans, fan clutches, and fan motors.

_____ 9. Remove and replace radiators.

22. Air Delivery and Manual HVAC Control Service

Module Test Score ______

Module Rating (4, 3, 2, 1)

_____ 1. Remove and replace blower motors and related parts.

_____ 2. Service air control doors and controls.

_____ 3. Remove and replace control system components.

23. Automatic Temperature Control System Service

Module Test Score ______

Module Rating (4, 3, 2, 1)

_____ 1. Retrieve electronic temperature control system trouble codes.

_____ 2. Remove and replace control system components.

24. Air Conditioning System Installation and Retrofitting

Module Test Score ______

25. ASE Certification

Module Test Score ______

Module Rating (4, 3, 2, 1)

_____ 1. Explain why technician certification is beneficial to technicians and vehicle owners.

_____ 2. Discuss certification programs for refrigerant recovery and recycling.

26. Career Preparation

Module Test Score ______

Module Rating (4, 3, 2, 1)

_____ 1. Identify three classifications of automotive technicians.

_____ 2. Identify the major sources of employment in the automotive industry.

Module Test Score

Number of Skills Completed +

98

Number of Skills on SPR =

% of Skills Completed

Conference

Date: _______________ Hours in class: ______

Comments:

Teacher initial: _______ Student initial: _______