

**Course Title:** Residential Appliance and Refrigeration Repair 1  
**Course Number:** 8706010  
**Course Credit:** 1

**Course Description:** The Residential Applications and Refrigeration Repair 1 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study laboratory practices and electrical fundamentals.

| <b>CTE Standards and Benchmarks</b> |   |
|-------------------------------------|---|
| 04.0                                | Apply proper laboratory practices--The student will be able to:   |
| 04.01                               | Use industry accepted safety practices.   |
| 04.02                               | Explain appropriate first aid for electrical shock and potential shop accidents.  |
| 04.03                               | Perform appropriate record keeping functions.   |
| 04.04                               | Explain and demonstrate the proper use and care of hand tools.  |
| 04.05                               | Explain and demonstrate the proper use and care of meters and test equipment.   |
| 04.06                               | Explain and demonstrate the proper use and care of power tools.   |
| 05.0                                | Apply electrical fundamentals--The student will be able to:   |
| 05.01                               | Explain electron theory.  |
| 05.02                               | Identify circuits from schematics and diagrams using commonly accepted symbols.   |
| 05.03                               | Explain Ohm's Law.  |
| 05.04                               | Properly demonstrate how to set up and safely use analog and digital meters.  |
| 05.05                               | Explain the relationship between resistance and voltage readings at the component level and the correlation of the reading results as applied to Ohm's Law. |
| 05.06                               | Troubleshoot various circuits using both analog and digital meters.   |
| 05.07                               | Measure resistance.   |
| 05.08                               | Measure voltage.  |
| 05.09                               | Measure amperage.   |
| 05.10                               | Measure wattage.  |

**CTE Standards and Benchmarks**

05.11 Explain and construct series circuits.

05.12 Explain and construct parallel circuits.

05.13 Explain and construct combination circuits.

**Course Title:** Residential Appliance and Refrigeration Repair 2  
**Course Number:** 8706020  
**Course Credit:** 1

**Course Description:** The Residential Applications and Refrigeration Repair 2 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study advanced instruction in electrical practices.

| <b>CTE Standards and Benchmarks</b> |   |
|-------------------------------------|---|
| 05.0                                | Apply electrical fundamentals--The student will be able to:                 |
| 05.14                               | Explain inductance and magnetism and their relationship to electric motors. |
| 05.15                               | Describe how electric motors function.                                      |
| 05.16                               | Explain the function of capacitors and how to troubleshoot them.            |
| 05.17                               | Explain the function of relay and switches and how to troubleshoot them.    |
| 05.18                               | Explain the function of capacitors and transformers in major appliances.    |
| 05.19                               | Explain the concept and rationale of motor protection.                      |

**Course Title:** Residential Appliance and Refrigeration Repair 3  
**Course Number:** 8706030  
**Course Credit:** 1

**Course Description:** The Residential Applications and Refrigeration Repair 3 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study installing, troubleshooting and repairing clothes dryers as well as gas fundamentals.

| <b>CTE Standards and Benchmarks</b> |  |
|-------------------------------------|--|
| 09.0                                | Install, troubleshoot, and repair electric clothes dryer--The student will be able to: |
| 09.01                               | Install an electric dryer.   |
| 09.02                               | Explain the proper venting requirements  |
| 09.03                               | Explain proper airflow   |
| 09.04                               | Explain proper laundry room air circulation  |
| 09.05                               | Explain vent airflow measuring   |
| 09.06                               | Identify components and their function.  |
| 09.07                               | Troubleshoot timers and components.  |
| 09.08                               | Remove and replace manual timer, electronic controls or components.                    |
| 09.09                               | Troubleshoot drive motors and components.  |
| 09.10                               | Remove and replace drive motor or component.   |
| 09.11                               | Troubleshoot heating elements and components.  |
| 09.12                               | Remove and replace element or component.   |
| 09.13                               | Remove and replace thermostats.  |
| 09.14                               | Troubleshoot thermostats.  |
| 09.15                               | Troubleshoot bearings and components.  |
| 09.16                               | Remove and replace bearing or component.   |
| 09.17                               | Troubleshoot belts and pulleys.  |

## CTE Standards and Benchmarks

|       |  |
|-------|--|
| 09.18 | Remove and replace belt or pulley.                                 |
| 09.19 | Troubleshoot rollers and glides.                                   |
| 09.20 | Remove and replace roller or glides.                               |
| 09.21 | Troubleshoot filters.  |
| 09.22 | Remove and replace filter.   |
| 09.23 | Troubleshoot seals.  |
| 09.24 | Remove and replace seals.  |
| 09.25 | Troubleshoot push-to-start switch.                                 |
| 09.26 | Remove and replace push-to-start switch.                           |
| 09.27 | Troubleshoot door switches.  |
| 09.28 | Remove and replace door switches.                                  |
| 09.29 | Troubleshoot selector switches.                                    |
| 09.30 | Remove and replace selector switches.                              |
| 09.31 | Remove and replace sensor and electronic control.                  |
| 09.32 | Troubleshoot sensor and electronic control.                        |
| 09.33 | Perform operational check.   |
| 09.34 | Perform electronic diagnostic tests                                |
| 09.35 | Identify and understand error codes and troubleshooting procedures |
| 09.36 | Instruct consumer on use and care.                                 |
| 10.0  | Apply gas fundamentals--The student will be able to:               |
| 10.01 | Explain common use terms.  |
| 10.02 | Explain different types of gas.                                    |
| 10.03 | Explain acceptable CO levels                                       |

## CTE Standards and Benchmarks

|       |   |
|-------|---|
| 10.04 | Explain required equipment to measure carbon monoxide                             |
| 10.05 | Perform Carbon Monoxide Testing   |
| 10.06 | Explain specific gravity.   |
| 10.07 | Diagram and explain basic components of a gas burner.                             |
| 10.08 | Explain requirements for burning.   |
| 10.09 | Perform pressure tests on gas systems.  |
| 10.10 | Identify Gas Fittings and connections.  |
| 10.11 | Identify and test procedures for leak testing.                                    |
| 10.12 | Identify procedures for converting appliances between different gases.            |
| 11.0  | Install, troubleshoot and repair gas clothes dryers--The student will be able to: |
| 11.01 | Install a gas dryer.  |
| 11.02 | Identify components and their function.   |
| 11.03 | Read and interpret schematics and diagrams.                                       |
| 11.04 | Explain acceptable CO levels  |
| 11.05 | Explain required equipment to measure carbon monoxide                             |
| 11.06 | Perform Carbon Monoxide Testing   |
| 11.07 | Troubleshoot electric ignition components.  |
| 11.08 | Remove and replace electric ignition components.                                  |
| 11.09 | Troubleshoot gas burner.  |
| 11.10 | Remove and replace gas burner.  |

**Course Title:** Residential Appliance and Refrigeration Repair 4  
**Course Number:** 8706040  
**Course Credit:** 1

**Course Description:** The Residential Applications and Refrigeration Repair 4 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study advanced instruction in installing, troubleshooting and repairing clothes dryers as well as washers.

| <b>CTE Standards and Benchmarks</b> |   |
|-------------------------------------|---|
| 11.0                                | Install, troubleshoot and repair gas clothes dryers--The student will be able to: |
| 11.11                               | Troubleshoot thermostats.   |
| 11.12                               | Remove and replace thermostat.  |
| 11.13                               | Troubleshoot gas valves.  |
| 11.14                               | Remove and replace gas valve.   |
| 11.15                               | Troubleshoot thermocouples.   |
| 11.16                               | Remove and replace thermocouple.  |
| 11.17                               | Troubleshoot flame switch.  |
| 11.18                               | Remove and replace flame switch.  |
| 11.19                               | Perform operational check.  |
| 11.20                               | Instruct consumer on use and care.  |
| 12.0                                | Install, troubleshoot and repair clothes washers--The student will be able to:    |
| 12.01                               | Install a clothes washer.   |
| 12.02                               | Identify components and their function.   |
| 12.03                               | Read and interpret schematics and diagrams.                                       |
| 12.04                               | Troubleshoot manual timers, electronic controls and components.                   |
| 12.05                               | Remove and replace timer or component.  |
| 12.06                               | Troubleshoot selector switches.   |

## CTE Standards and Benchmarks

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|-------|---|
| 12.07 | Remove and replace selector switch.                       |
| 12.08 | Troubleshoot water level switches and components.         |
| 12.09 | Remove and replace water level switch or component.       |
| 12.10 | Troubleshoot water inlet valves and components.           |
| 12.11 | Remove and replace water inlet valve or component.        |
| 12.12 | Troubleshoot hoses.                                       |
| 12.13 | Remove and replace hoses.                                 |
| 12.14 | Troubleshoot water pumps and components.                  |
| 12.15 | Remove and replace water pump or component.               |
| 12.16 | Troubleshoot filters to include front load washers.       |
| 12.17 | Remove and replace filters to include front load washers. |
| 12.18 | Troubleshoot drive motors and components.                 |
| 12.19 | Remove and replace drive motor or component.              |
| 12.20 | Troubleshoot belts and pulleys.                           |
| 12.21 | Remove and replace belt or pulley.                        |
| 12.22 | Troubleshoot transmissions and components.                |
| 12.23 | Remove and replace transmission or component.             |
| 12.24 | Troubleshoot bearings.                                    |
| 12.25 | Remove and replace bearings.                              |
| 12.26 | Troubleshoot water and oil seals.                         |
| 12.27 | Remove and replace water and oil seals.                   |
| 12.28 | Troubleshoot clutches.                                    |
| 12.29 | Remove and replace clutch.                                |



## CTE Standards and Benchmarks

12.30 Troubleshoot brakes.

12.31 Remove and replace brake.

12.32 Troubleshoot lid switches and components.

12.33 Remove and replace lid switch or component.

12.34 Perform operational check.

12.35 Perform electronic diagnostic tests

12.36 Identify and understand error codes and troubleshooting procedures

12.37 Instruct consumer on use and care.

**Course Title:** Residential Appliance and Refrigeration Repair 5  
**Course Number:** 8706050  
**Course Credit:** 1

**Course Description:** The Residential Applications and Refrigeration Repair 5 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study installing, troubleshooting and repairing electric ranges.

| <b>CTE Standards and Benchmarks</b> |  |
|-------------------------------------|--|
| 13.0                                | Install, troubleshoot, and repair electric ranges--The student will be able to:          |
| 13.01                               | Install an electric range.   |
| 13.02                               | Describe the operation and application of components.                                    |
| 13.03                               | Read and interpret schematics and diagrams.  |
| 13.04                               | Troubleshoot clocks/timers.  |
| 13.05                               | Remove and replace clocks/timers.  |
| 13.06                               | Troubleshoot surface unit switches and components.                                       |
| 13.07                               | Remove and replace surface switches or components.                                       |
| 13.08                               | Troubleshoot surface units and components including induction cook-tops and ranges.      |
| 13.09                               | Remove and replace surface units or components including induction cook-tops and ranges. |
| 13.10                               | Troubleshoot bake and broil elements.  |
| 13.11                               | Remove and replace bake and broil elements.  |
| 13.12                               | Troubleshoot electronic controls.  |
| 13.13                               | Remove and replace electronic controls.  |
| 13.14                               | Troubleshoot time delay relays.  |
| 13.15                               | Remove and replace time delay relay.   |
| 13.16                               | Troubleshoot oven sensors and components.  |
| 13.17                               | Remove and replace oven sensor or component.   |

## CTE Standards and Benchmarks

13.18 Troubleshoot door locks and components.

13.19 Remove and replace door lock or component.

13.20 Troubleshoot fans.

13.21 Remove and replace fan.

13.22 Troubleshoot gaskets and seals.

13.23 Remove and replace gasket or seals.

13.24 Perform operational check.

13.25 Perform electronic diagnostic tests

13.26 Identify and understand error codes and troubleshooting procedures

13.27 Instruct consumer on use and care.

**Course Title:** Residential Appliance and Refrigeration Repair 6  
**Course Number:** 8706060  
**Course Credit:** 1

**Course Description:** The Residential Applications and Refrigeration Repair 6 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study installing, troubleshooting and repairing gas ranges as well as microwave ovens.

| <b>CTE Standards and Benchmarks</b> |  |
|-------------------------------------|--|
| 14.0                                | Install, troubleshoot, and repair gas ranges--The student will be able to: |
| 14.01                               | Install a gas range.   |
| 14.02                               | Identify components and their function.                                    |
| 14.03                               | Read and interpret schematics and diagrams.                                |
| 14.04                               | Explain acceptable CO levels   |
| 14.05                               | Explain required equipment to measure carbon monoxide                      |
| 14.06                               | Perform Carbon Monoxide Testing  |
| 14.07                               | Troubleshoot clocks/timers/electronic controls.                            |
| 14.08                               | Remove and replace clocks/timers/electronic controls.                      |
| 14.09                               | Troubleshoot oven thermostats.   |
| 14.10                               | Remove and replace oven thermostats.                                       |
| 14.11                               | Troubleshoot oven selector switches.                                       |
| 14.12                               | Remove and replace oven selector switches.                                 |
| 14.13                               | Troubleshoot self-clean relays.  |
| 14.14                               | Remove and replace self-clean relays.                                      |
| 14.15                               | Troubleshoot oven sensors.   |
| 14.16                               | Remove and replace oven sensor.  |
| 14.17                               | Troubleshoot fans.   |

## CTE Standards and Benchmarks

14.18 Remove and replace fan.

14.19 Troubleshoot gas valves for surface burners.

14.20 Remove and replace gas valve for surface burner.

14.21 Troubleshoot gas valve for oven.

14.22 Remove and replace gas valve for oven.

14.23 Troubleshoot electric igniters.

14.24 Remove and replace electric igniter.

14.25 Troubleshoot safety valves.

14.26 Remove and replace safety valve.

14.27 Troubleshoot pressure regulators.

14.28 Remove and replace pressure regulator.

14.29 Perform operational check.

14.30 Instruct consumer on use and care.

15.0 Install, troubleshoot, and repair microwave ovens--The student will be able to:

15.01 Install a microwave oven.

15.02 Describe the operation and application of components.

15.03 Read and interpret schematics and diagrams.

15.04 Explain the functionality of inverter boards.

15.05 Explain the safety procedures when handling inverter boards.

15.06 Troubleshoot an inverter board.

15.07 Explain the procedures required to properly diagnose inverter boards.

15.08 Remove and replace inverter board.

15.09 Perform temperature test and calibration.

## CTE Standards and Benchmarks

15.10 Troubleshoot clocks/timers/electronic controls.

15.11 Remove and replace clocks/timers/electronic controls.

15.12 Troubleshoot door switches.

15.13 Remove and replace door switches.

15.14 Troubleshoot relays.

15.15 Remove and replace relays.

15.16 Troubleshoot thermal protectors.

15.17 Remove and replace thermal protectors.

15.18 Troubleshoot the power transformer.

15.19 Remove and replace the power transformer.

15.20 Troubleshoot the high voltage diode.

15.21 Remove and replace the high voltage diode.

15.22 Troubleshoot the capacitor.

15.23 Remove and replace the capacitor.

15.24 Troubleshoot the magnetron.

15.25 Remove and replace the magnetron.

15.26 Troubleshoot the fan.

15.27 Remove and replace the fan.

15.28 Troubleshoot the stirrer blade and motor.

15.29 Remove and replace the stirrer blade and motor.

15.30 Troubleshoot the turntable motor.

15.31 Remove and replace the turntable motor.

15.32 Perform operational check.

**CTE Standards and Benchmarks**

15.33 Instruct consumer on use and care.

**Course Title:** Major Appliance and Refrigeration Repair 7  
**Course Number:** 8706070  
**Course Credit:** 1

**Course Description:** The Major Applications and Refrigeration Repair 7 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study installing, troubleshooting and repairing dishwashers.

| <b>CTE Standards and Benchmarks</b> |   |
|-------------------------------------|---|
| 16.0                                | Install, troubleshoot, and repair dishwashers--The student will be able to: |
| 16.01                               | Install a dishwasher.   |
| 16.02                               | Identify components and their function.                                     |
| 16.03                               | Read and interpret schematics and diagrams.                                 |
| 16.04                               | Troubleshoot timers and electronic control or components.                   |
| 16.05                               | Remove and replace timer and electronic control or component.               |
| 16.06                               | Troubleshoot selector switches.   |
| 16.07                               | Remove and replace selector switch.   |
| 16.08                               | Troubleshoot float switches.  |
| 16.09                               | Remove and replace float switch.  |
| 16.10                               | Troubleshoot door switches.   |
| 16.11                               | Remove and replace door switch.   |
| 16.12                               | Troubleshoot motors and components.   |
| 16.13                               | Remove and replace motor and component.                                     |
| 16.14                               | Troubleshoot heating elements.  |
| 16.15                               | Remove and replace heating element.   |
| 16.16                               | Troubleshoot relays.  |
| 16.17                               | Remove and replace relay.   |



## CTE Standards and Benchmarks

16.18 Troubleshoot water valves and components.

16.19 Remove and replace water valve or component.

16.20 Troubleshoot hoses.

16.21 Remove and replace hoses.

16.22 Troubleshoot pumps and components.

16.23 Remove and replace pump or component.

16.24 Troubleshoot seals.

16.25 Remove and replace seals.

16.26 Troubleshoot dispensers and components.

16.27 Remove and replace dispenser or component.

16.28 Troubleshoot spray arms.

16.29 Remove and replace spray arm.

16.30 Troubleshoot blower motors.

16.31 Remove and replace blower motor.

16.32 Troubleshoot thermostats.

16.33 Remove and replace thermostat.

16.34 Perform operational check.

16.35 Perform electronic diagnostic.

16.36 Identify error codes and troubleshooting procedures.

16.37 Instruct consumer on use and care.

**Course Title:** Major Appliance and Refrigeration Repair 8  
**Course Number:** 8706080  
**Course Credit:** 1

**Course Description:** The Major Applications and Refrigeration Repair 8 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study basic refrigeration.

| <b>CTE Standards and Benchmarks</b> |   |
|-------------------------------------|---|
| <b>17.0</b>                         | Utilize the fundamentals of refrigeration--The student will be able to:             |
| 17.01                               | Explain commonly used terms.  |
| 17.02                               | Perform heat transfer, measuring and temperature conversions.                       |
| 17.03                               | Perform pressure measuring and conversion calculations.                             |
| 17.04                               | Explain the concept of state of matter.   |
| 17.05                               | Explain the differences in refrigerants and their uses.                             |
| 17.06                               | Diagram and explain the functions of the components of basic refrigeration systems. |
| 17.07                               | Identify purpose and importance of CFC recover/recycling.                           |
| 17.08                               | Identify operation of recovery system components.                                   |
| 17.09                               | Recover and recycle refrigerants.   |
| 17.10                               | Describe how a compressor functions.  |
| <b>18.0</b>                         | Work with tubing and fittings--The student will be able to:                         |
| 18.01                               | Identify types and uses of solders and brazing alloys.                              |
| 18.02                               | Identify types and sizes of tubing and fittings.                                    |
| 18.03                               | Measure, cut, flare, swage and bend tubing.   |
| 18.04                               | Soft solder with acetylene.   |
| 18.05                               | Braze with acetylene and oxyacetylene.  |
| 18.06                               | Fabricate replacement sections of tubing for appliances.                            |

**Course Title:** Major Appliance and Refrigeration Repair 9  
**Course Number:** 8706090  
**Course Credit:** 1

**Course Description:** The Major Applications and Refrigeration Repair 9 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study installing, troubleshooting and repairing icemakers and freezers.

| <b>CTE Standards and Benchmarks</b> |  |
|-------------------------------------|--|
| 19.0                                | Install, troubleshoot, and repair refrigeration icemakers and freezers--The student will be able to: |
| 19.01                               | Install a refrigerator and a freezer.  |
| 19.02                               | Identify components, electronic controls, variable speed compressors and their functions.            |
| 19.03                               | Read and interpret schematics and diagrams.  |
| 19.04                               | Troubleshoot gaskets and seals.  |
| 19.05                               | Remove and replace gaskets and seals.  |
| 19.06                               | Troubleshoot light and fan switches.   |
| 19.07                               | Remove and replace light and fan switches.   |
| 19.08                               | Troubleshoot fans.   |
| 19.09                               | Remove and replace fans.   |
| 19.10                               | Troubleshoot the manual and electronic adaptive controls defrost timers.                             |
| 19.11                               | Remove and replace the manual and electronic adaptive control defrost timers.                        |
| 19.12                               | Troubleshoot the defrost thermostats and thermistors.  |
| 19.13                               | Remove and replace the defrost thermostats and thermistors.  |
| 19.14                               | Troubleshoot the defrost heater.   |
| 19.15                               | Remove and replace the defrost heater.   |
| 19.16                               | Troubleshoot the cold control.   |
| 19.17                               | Remove and replace cold control.   |

## CTE Standards and Benchmarks

19.18 Troubleshoot icemakers.

19.19 Remove and repair icemakers.

19.20 Use test equipment to determine operating conditions of a refrigeration system.

19.21 Troubleshoot refrigeration system.

19.22 Remove and replace compressors.

19.23 Remove and replace condensers, evaporators, metering devices and dryers.

19.24 Perform operational check.

19.25 Instruct consumers on use and care.

**Course Title:** Major Appliance and Refrigeration Repair 10  
**Course Number:** 8706100  
**Course Credit:** 1

**Course Description:** The Major Applications and Refrigeration Repair 8 course is designed to provide instruction for entry into the major appliance and refrigeration repair industry. Students explore career opportunities and requirements of a professional appliance repairman. Students study installing, troubleshooting and repairing window air conditioners.

| <b>CTE Standards and Benchmarks</b> |   |
|-------------------------------------|---|
| 20.0                                | Install, troubleshoot, and repair window air conditioners--The student will be able to: |
| 20.01                               | Install a window air conditioner.   |
| 20.02                               | Read and interpret schematics and diagrams.   |
| 20.03                               | Describe and understand selector switches.  |
| 20.04                               | Describe and understand thermostats.  |
| 20.05                               | Describe and understand capacitors.   |
| 20.06                               | Describe and understand the fan motor.  |
| 20.07                               | Describe and understand the heater.   |
| 20.08                               | Describe and understand the deicer.   |
| 20.09                               | Describe and understand the reversing valve.  |
| 20.10                               | Describe and understand the compressor.   |
| 20.11                               | Use test equipment to determine operating conditions of refrigeration systems.          |
| 20.12                               | Perform operational check.  |
| 20.13                               | Instruct consumer on use and care.  |