

# Environmental Systems and Refrigeration Technology

## Environmental Systems and Refrigeration Technology Degrees and Certificates

- Environmental Systems and Refrigeration Technology (ESRT)

## Environmental Systems and Refrigeration Technology Classes

### ESRT 102: OSHA 10 Safety Principles

An online course which focuses on the OSHA standards and guidelines for enhancing safety and health in the workplace. Topics include introduction to the OSHA Act, enforcement and recordkeeping, walking-working surfaces, means of egress, emergency action plans, fire protection plans, electrical safety, hazardous materials, personal protective equipment and hazard communication.

**Credits** 1

**Weekly Contact Hours** 1

**Meets Degree Requirements For**  
Restricted Elective

### ESRT 110: Refrigeration Principles

Introduction to basic heat transfer, refrigeration applications, major components, equipment and systems. Includes job opportunities, tools and test instruments. Lab encompasses experiments in boiling, freezing, temperature, refrigerants, gauges and repair standards. Lab projects include repairing residential and light commercial equipment while emphasizing the proper use of repair instruments and procedures.

**Credits** 5

**Weekly Contact Hours** 7

**Meets Degree Requirements For**  
Restricted Elective

**Prerequisites**

MATH 93 or Above or Instructor Permission

### ESRT 114: Refrigerant Recovery/Recycle

Introduction to proper handling of CFC/HCFC refrigerants and non-CFC replacements, including recovery, recycle and reclaiming processes. Global issues, regulations and legislation discussion will prepare students for national certification.

**Credits** 1

**Weekly Contact Hours** 1

**Meets Degree Requirements For**  
Restricted Elective

**Prerequisites**

[ESRT 110](#) or Concurrent Enrollment

## ESRT 120: Heating Systems

Introduction to heating systems, emphasizing electric, gas, oil, solar systems, hot water and steam boiler systems. Includes lab experience troubleshooting, practicing repair procedures and combustion analysis. Proper use of tools, instruments and tests to perform efficiency measurements included.

**Credits 5**

**Weekly Contact Hours 7**

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 110](#)

## ESRT 130: Air Conditioning & Heat Pumps

Principles of the air conditioning and heat pump processes, including mechanical components, ventilation, filtration, psychrometrics and relative humidity. Emphasis will be toward residential applications and tools for service and troubleshooting. Laboratory experience includes repairing and servicing residential and light commercial air conditioning and heat pump equipment.

**Credits 5**

**Weekly Contact Hours 7**

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 110](#)

## ESRT 136: Indoor Air Quality

Learn the techniques used to recognize the signs of IAQ problems, investigate for potential pollutants and their sources, determine the levels of common pollutants in indoor air, and propose solutions to the problem. Provides information, hands-on experience and practical guidance in conducting inspections and evaluating the performance of mechanical ventilation systems.

**Credits 2**

**Weekly Contact Hours 2**

**Meets Degree Requirements For**

Restricted Elective

## ESRT 196: Cooperative Work Experience

Designed to provide students with on-the-job practical field experience. One credit for each five hours of work experience per week.

**Credits 1-5**

**Weekly Contact Hours 25**

**Meets Degree Requirements For**

Restricted Elective

## ESRT 200: Commercial HVACR Equipment

Study of systems and components used in commercial HVACR applications. Emphasis on proper installation and diagnostic procedures. Ice machines, walk-ins, display cases, compressors, condensers, evaporators, valves, piping, service techniques and test equipment to be highlighted. Packaged rooftop HVAC units will also be covered.

**Credits 5**

**Weekly Contact Hours 7**

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 110](#)

## ESRT 205: Blueprint Reading

In-depth study of construction blueprints for residential, commercial and industrial facilities emphasizing interpretation as it applies to energy and HVAC industries. Additional information will include interpretation of contract documents, specifications and addendums emphasizing building components.

**Credits 2**

**Weekly Contact Hours 2**

**Meets Degree Requirements For**

Restricted Elective

## ESRT 210: Boiler Systems

Advanced study of commercial and industrial boiler applications commonly found in larger facilities. Includes low-pressure hot water and steam boilers, high pressure steam boilers, boiler fittings, feed water accessories, combustion accessories, draft control and water treatment. Operations, maintenance, energy efficiency and boiler room safety are emphasized.

**Credits 3**

**Weekly Contact Hours 3**

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 110](#)

## ESRT 215: Commercial DDC HVAC Controls

Course on DDC - Direct Digital Controls for HVAC (heating, ventilation and air conditioning) controls used in commercial building systems. Includes information on electrical, pneumatic, DDC electronic controls and associated equipment. Course work emphasizes generic approach while studying specific manufacturers, specifications and data sheets.

**Credits 3**

**Weekly Contact Hours 3**

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

ELTRO 132

## ESRT 220: Industrial Refrigeration Systems

Principles of industrial refrigeration systems and equipment as applied to industrial warehouses and buildings. Includes information for direct expansion, flooded, overfeed systems. Discussion of ammonia and halocarbon (freon) compressor types, condensers, evaporators, metering devices, pumps, defrost methods, vessels and related devices.

**Credits** 5

**Weekly Contact Hours** 5

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 110](#)

## ESRT 222: Industrial Refrigeration Lab

Industrial refrigeration laboratory experience becoming familiar with machinery, electricity and controls associated with industrial refrigeration equipment including compressors, valves, motors, controls, pumps, boilers and associated components.

**Credits** 3

**Weekly Contact Hours** 6

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

Concurrent enrollment in [ESRT 220](#) or Instructor Permission

## ESRT 223: Design and Load Applications

Application engineering and design course for calculating air conditioning and heating equipment. Includes computerized design of heat loads and heat gains, duct sizing and equipment selection. Design energy efficient HVAC equipment for heating and air conditioning systems used in residential and light commercial buildings.

**Credits** 3

**Weekly Contact Hours** 3

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 110](#)

## ESRT 230: Industrial Refrigeration Maintenance and Safety

Continuation of [ESRT 220](#), with emphasis on maintenance, operation and safety. Information will include scheduling, preventive maintenance, water treatment, troubleshooting, repair procedures, energy conservation, process safety management (PSM) programs and risk management programs (RMP).

**Credits** 2

**Weekly Contact Hours** 2

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 220](#)

## ESRT 238: HVAC Commissioning, Leed and Tab Testing

Reviews HVAC TAB (Test, Adjust and Balancing) process, including the process of commissioning of various types of building HVAC energy management and control systems, and how the LEED (Leadership in Energy and Environmental Design) certification process is implemented and steps to arrive at certification. Documentation requirements are covered to become a certified TAB and LEED individual for students to take the national exam.

**Credits 3**

**Weekly Contact Hours 3**

**Meets Degree Requirements For**

Restricted Elective

**Prerequisites**

[ESRT 110](#) and [ESRT 223](#)

## ESRT 295: Capstone HVACR Project

Provides second-year students the opportunity to advance their skills through an applied project in their field of interest or specialization within the HVACR industries.

**Credits 2**

**Weekly Contact Hours 2**

**Meets Degree Requirements For**

Restricted Elective

## ESRT 296: Cooperative Work Experience

Designed to provide students with on-the-job practical field experience. One credit for each five hours of work experience per week.

**Credits 1-5**

**Weekly Contact Hours 25**

**Meets Degree Requirements For**

Restricted Elective