

# HVAC MICRO-CREDENTIAL COURSE OVERVIEW



## Course Description

- The HVAC (Heating, Ventilation, and Air Conditioning) micro-credential was built in partnership with Trane Technologies to exclusively offer MajorClarity users a free course teaching the foundational knowledge, skills, and abilities needed to understand the purpose and function of HVAC careers. This micro-credential will help prepare you and qualify you for further pursuit of employment opportunities within HVAC, covering topics such as HVAC theory, systems, and tools.
- Partner: Trane Technologies
- Target Audience: Grades 9-12
- Course Length: 3-4 Hours

## Core Competencies

#	COMPETENCY/SUBCOMPETENCY	TOPICS
1	HVAC Theory	Laws of Thermodynamics Heat Flow (conduction, convection, radiation) Psychrometrics (properties of air) Tools of HVAC
2	Air Systems	Fans types Air distribution Duct airflow characteristics (VP, SP, TP) Fan Curves Indoor Air Quality (IAQ) Set up/calibration of VAV systems
3	Air Conditioning/ Refrigeration Systems	Refrigeration Cycle Oils (polyester/mineral) Identify leaks Pressure test Charge
4	Hydronic Systems	Pump types Pump curves Pump affinity laws Troubleshoot pumps Measuring air flow Chilled water system types
5	Heating Systems	Understand Combustion Process Identify components of boiler system

## Suggested Use Cases

- Leverage as a tool for students to gain additional clarity when in a multi-pathway introductory course such as:
  - Construction Trades
- Embed into first level courses for pathway sequences that culminate in industry placements, such as:
  - HVAC- I
- Use as a differentiator between Honors and Standard Levels of same course
- Consider for an Independent Study component
- Require as pre-requisite prior to Industry-facing experiences or placements such as:
  - Career Fairs, Lunch & Learns, Job Shadowing
  - Summer Work Opportunities, Internships, & Apprenticeships
- Leverage as a tool to help students clarify potential post-secondary program/majors of interest, which may also further focus college & technical program considerations

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## Course Outline

### INTRODUCTION

- Navigating the Course
- What is HVAC?

### HVAC THEORY

- Laws of Thermodynamics
- Heat Flow
- Psychrometrics
- [Knowledge Check](#)

### AIR SYSTEMS

- Fan Types
- Measuring Airflow
- Duct Airflow Characteristics
- Indoor Air Quality (IAQ)
- [Knowledge Check](#)

### AIR CONDITIONING AND REFRIGERATION

- The Refrigeration Cycle
- Identifying Refrigerant Leaks
- [Knowledge Check](#)

### HYDRONIC SYSTEMS

- Hydronic Systems
- Chilled Water Systems
- All About Pumps
- Pump Affinity Laws
- [Knowledge Check](#)

### HEATING SYSTEMS

- Types of Heating Systems
- Understanding The Combustion Process
- Identifying the Components of a Boiler System
- [Knowledge Check](#)

### TOOLS OF HVAC

- Hand Tools
- Piping, Pipe Fittings and Fabrication
- Soldering, Brazing and Welding
- [Knowledge Check](#)

### CONCLUSION

- Summary
- [Final Assessment](#)
- Congratulations