

COCONINO COMMUNITY COLLEGE

COURSE OUTLINE

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Effective Term: Fall 2020

Date: November, 2019

A. **Identification:**

1. Subject Area: Construction Technology Management (CTM)
2. Course: CTM 239
3. Course Title: Heating Ventilation, Air-Conditioning and Refrigeration II
4. Credit Hrs.: 4
5. Catalog Description:

Pre-requisite CTM 238. Pre or Co-requisite CTM 152

This course will address the operation, installation, service, and repair of heating ventilation, air conditioning and refrigeration system. Study the in-depth principles of mechanics, electrical/electronic controls, diagnostic techniques and test equipment relating to the servicing of HVACr equipment for single family and multi-family dwelling. – Two-hour lecture and Two-hour lab.

B. **Course Goals:**

This course will:

1. Provide the learner/student with the essential fundamentals to become a Level # 1 HVAC. and refrigeration technician.
2. Invite local and regional HVACr providers, suppliers, and manufactures to guest lecture on the latest technology.
3. Identify opportunities for the learner to witness first hand installations via site visits, field trips, ride alongs, and potential internships.
4. Learn the operation, testing, and diagnosis procedure to troubleshoot the various HVAC and refrigeration system.

C. **Course Outcomes:**

Students will be able to:

1. Calculate cooling and heating load calculations for an HVAC system.
2. Determine the difference between superheat and subcooling.
3. Size and select an HVAC unit for a given dwelling.
4. Install Building Automation and Control Systems (analog and digital).
5. Determine the efficiency and energy usage for a given HVACr system.

D: **Course Outcomes Assessment**

1. Chapter Worksheets and assignments
2. Quizzes
3. Midterm

4. Final exam

E. **Course Content:**

Will include:

1. OSHA Safety for specific lab equipment e.g. Electrical/Mechanical/Plumbing (MPE)
2. Technician roles and responsibilities.
3. Review Universal laws of the Refrigeration cycle and systems
4. Codes (IRC) and Standards Organizations. (ANSI/ASHREA 55-2004)
5. HVAC
6. Operation and Maintenance of an HVAC heat pump system.
7. Operation and Maintenance of an HVAC Mini Split system.
8. Operation and Maintenance of light commercial HVAC system.
9. Management of Refrigerant systems – Evacuating, Charging, Recovering, Reclaiming procedures.
10. Indoor Air Quality.
11. Heating and Cooling controls (blower fan and relays, limit and pressure switches).
12. HVACr Control System (manual verses smart), e.g. Johnson/Siemens.
13. Introduction to Duct Systems and Airflow.
14. Concepts of Superheat and Sub-cool transfer points.
15. Installation of residential and Light Commercial HVAC systems
16. HVAC troubleshooting, the operation of various equipment diagnosing a series of factory faults.