Clackamas Community College

Online Course/Outline Submission System

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Section #1 General Course Information

Department: Automotive Technology: Auto Mechanics

Submitter

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Course Prefix and Number: AM - 224

 # Credits: 4

Contact hours

Lecture (# of hours):
Lec/lab (# of hours): 88
Lab (# of hours):
Total course hours: 88

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

Course Title: Comfort Systems

Course Description:

Covers design, construction, testing, maintenance, and repair of automotive heating and air conditioning systems.

Type of Course: Career Technical Preparatory

Is this class challengeable?

Yes

Can this course be repeated for credit in a degree?

No

Is general education certification being sought at this time?

No

Does this course map to any general education outcome(s)?

No

Is this course part of an AAS or related certificate of completion?

Yes

Name of degree(s) and/or certificate(s): Automotive Technology AAS

Are there prerequisites to this course?

No

Are there corequisites to this course?

No

Are there any requirements or recommendations for students taken this course?

No

Are there similar courses existing in other programs or disciplines at CCC?

No

Will this class use library resources?

No

Is there any other potential impact on another department?

No

Does this course belong on the Related Instruction list?

No

GRADING METHOD:

A-F or Pass/No Pass

Audit: Yes

When do you plan to offer this course?

✓ Spring

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

No

Will this course appear in the college catalog?

Yes

Will this course appear in the schedule?

Yes

Student Learning Outcomes:

Upon successful completion of this course, students should be able to:

1. demonstrate how to diagnose and repair heating and air conditioning systems,
2. retrofit R-12 systems to the new R-134A systems,
3. summarize the function of each part in the heating and air conditioning system.

This course does not include assessable General Education outcomes.

Major Topic Outline:

1. Theory of Operation.
a. Heat movement.
b. Handling Refrigerant.
c. Temperature - Pressure relationship.
d. Refrigerant safety precautions.
e. Refrigerant oil.
2. Basic System Operation.
a. Air Conditioning systems.
b. Heating systems.
c. Engine cooling systems.
3. System Controls – Air Conditioning.
a. Compressor controls.
b. Evaporator controls.
c. Condenser controls.
4. Specific Systems – Air Conditioning.
a. Thermostatic switch device.
b. Accumulator type.
c. CCOT.
d. FFOT.
5. System Service – Air Conditioning.
a. Safety use of R 12/R-134a.
b. Gauge use.
c. Adding R 12/R-134a.
d. Leak testing.
e. System repair.
f. Evacuation and recharging.
6. Problem Diagnosis – Air Conditioning.
a. Low R-12/R-134a charges.
b. Expansion valve stuck (closed/open).
c. Restriction in high side.
d. EPR stuck (closed/open).
e. STV stuck (closed/open).
f. Compressor malfunction.
g. Condenser malfunction.
h. Air and moisture in system.
i. CCOT/FFOT system diagnosis.
j. Related electrical components.
k. Related vacuum components.

7. Compressor Repair.
a. Shaft seal replacement.
b. Pulley bearing replacement.
c. Clutch replacement.
8. Heating System.
a. Diagnosis and repair.
9. Engine Cooling System.
a. Diagnosis and repair.
10. Automatic Temperature Control Systems.
a. Vacuum Control Devices.
b. Electronic Control Devices.
c. Diagnosis and Repair.
11. Recycle and Recovery Systems.
a. Single pass system.
b. Multiple pass system.
12. Retrofit.
a. Converting R-12 systems to R-134A.

Does the content of this class relate to job skills in any of the following areas:

1. Increased energy efficiency	**No**
2. Produce renewable energy	**No**
3. Prevent environmental degradation	**Yes**
4. Clean up natural environment	**No**
5. Supports green services	**Yes**

Percent of course: 10%

First term to be offered:

Next available term after approval
: