

AUTO 018: AUTOMOTIVE HEATING, VENTILATION & AIR CONDITIONING

Originator

doanderson

Justification / Rationale

Adding an addition text

Effective Term

Fall 2020

Credit Status

Credit - Degree Applicable

Subject

AUTO - Automotive Technology

Course Number

018

Full Course Title

Automotive Heating, Ventilation & Air Conditioning

Short Title

AUTO HVAC

Discipline**Disciplines List**

Automotive Technology

Modality

Face-to-Face

Catalog Description

This course provides theory and hands-on experience in automotive heating and air conditioning including: theory of operation, service, diagnosis and repair. The course includes the following topics: heating ventilation and air conditioning (HVAC) theory of operation, HVAC housing and ducting, HVAC controls, compressor and clutch operation and servicing and testing HVAC systems. A \$20.00 test fee for the appropriate Automotive Service Excellent (ASE) Student Exam is required. A uniform is required for this course.

Schedule Description

This class provides lecture/discussion and hands-on experience understanding, servicing, troubleshooting, diagnosing and repairing automotive heating and air conditioning systems. A testing fee is required. A \$20.00 test fee for the appropriate Automotive Service Excellent (ASE) Student Exam is required. A uniform is required for this course.

Advisory: RDG 061, ENG 061

Lecture Units

3

Lecture Semester Hours

54

Lab Units

1

Lab Semester Hours

54

In-class Hours

108

Out-of-class Hours

108

Total Course Units

4

Total Semester Hours

216

Prerequisite Course(s)

Advisory: RDG 061, ENG 061

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Chris Johanson

Title

Auto Heating and Air Conditioning Workbook

Edition

4th

Publisher

Goodheart-Willcox

Year

2015

College Level

Yes

Flesch-Kincaid Level

13

ISBN #

9781619607675

Resource Type

Book

Author

Chris Johanson

Title

Modern Automotive Technology NATEF Standards Job Sheets for Performance-Based Learning

Edition

9th

Publisher

G-W

Year

2017

College Level

Yes

Flesch-Kincaid Level

13

ISBN #

9781631263781

Resource Type

Book

Author

Johanson

Title

Auto Heating and Air Conditioning

Edition

4th

Publisher

Goodheart-Willcox

Year

2015

College Level

Yes

Flesch-Kincaid Level

13

ISBN #

9781619607637

Resource Type

Web/Other

Description

1. Safety glasses meeting ANSI Z87.1
2. Three ring binder

Resource Type

Web/Other

Year

2021

Description

The current book is available in digital format and this is going to be offered to the students
2 Year Individual Access Key Code – 978-1-64564-558-0

Class Size Maximum

24

Entrance Skills

ADVISORY SKILLS:

Use various reading strategies to prepare, read and comprehend expository text

Requisite Course Objectives

RDG 061-Use SQ3R /or SOAR along with outlining, note-taking, mapping summarizing and other strategies to prepare, read, comprehend expository text.

Entrance Skills

Read a variety of texts fluently

Requisite Course Objectives

RDG 061-Read a variety of texts fluently.

Entrance Skills

Write organized summaries reactions that capture main idea and supporting details.

Requisite Course Objectives

ENG 061-Use theses to organize paragraphs into coherent analyses.

RDG 061-Write organized summaries reactions that capture main idea and supporting details.

Entrance Skills

Understand multiple word meanings, uses synonyms

Requisite Course Objectives

ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.

RDG 061-Understand multiple word meanings, uses synonyms

Course Content

1. Orientation, safety & environmental concerns
2. Hand tools, special tools and shop equipment
3. Overview of automotive HVAC system operation and components
4. Electricity/electronics for automotive HVAC systems
5. Automotive repair industry terms and conventions
6. Temperature and pressure fundamentals
7. System components
8. Servicing and testing
9. Compressors and clutches
10. HVAC housing and ducting
11. System controls
12. Diagnosis and troubleshooting
13. Refrigerant charging, recovery, recycling and handling including regulations and consumer protection issues
14. Chrysler web-based training modules

Lab Content

1. Safety & Environmental Protection
2. Identify system components on vehicle
3. Practice proper servicing and testing procedures
4. Diagnose, service and repair compressors and clutches concerns
5. Diagnose, service and repair HVAC housing and ducting concerns
6. Diagnose, service and repair system control concerns
7. Maintenance & inspection of HVAC system
8. Required tasks to meet NATEF 2017 MAST standards

Course Objectives

Objectives	
Objective 1	Upon satisfactory completion of the course, in a timely manner to industry standards, students will be able to: Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
Objective 2	General: A/C System Diagnosis and Repair
Objective 3	Refrigeration System Component Diagnosis and Repair
Objective 4	Heating, Ventilation, and Engine Cooling Systems Diagnosis and Repair
Objective 5	Operating Systems and Related Controls Diagnosis and Repair
Objective 6	Refrigerant Recovery, Recycling, and Handling
Objective 7	Shop and Personal Safety
Objective 8	Tools and Equipment
Objective 9	Preparing Vehicle for Service
Objective 10	Preparing Vehicle for Customer

Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Demonstrate shop safety practices while working in a team setting
Outcome 2	Diagnose and repair intermediate to advanced level base HVAC system malfunctions and concerns.
Outcome 3	Demonstrate proficiency in referencing service information while exhibiting ability to inspect/perform maintenance on HVAC systems and documenting repairs.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Laboratory	Student will participate in lab based activities to complete their NATEF standards job sheets
Discussion	Student will participate in classroom discussions
Demonstration, Repetition/Practice	Each student will demonstrate their ability to correctly perform a given task not limited to laboratory assignments, research projects, interactive role-play and group activities
Technology-based instruction	Diagnostic equipment based activities
Participation	Student will work in a team setting while performing lab activities
Lecture	Each class is half lecture covering multiple aspects of course content

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
College level or pre-collegiate essays	Students may be required to complete a research paper.	Out of Class Only
Reading reports	Turned in by report, written, presentation, however, the student is required to research information pertaining to the assignment.	Out of Class Only
Student participation/contribution	Lab activities and student may participate in role play activities.	Out of Class Only
Mid-term and final evaluations	Used to evaluate students' knowledge and understanding of the information presented. Examples of these are not limited to quizzes, exams, presentations, research, or projects.	In and Out of Class
Group activity participation/observation	Classroom and lab activities require critical thinking and diagnosis.	In Class Only
Presentations/student demonstration observations	Student may participate in role play activities and be required to do a visual presentation	In and Out of Class

Laboratory projects	Student will participate in lab based activities to complete their National Automotive Technicians Education Foundation (NATEF) standards job sheets.	In Class Only
Written homework	Read each assigned chapter, answer chapter homework.	Out of Class Only

Assignments

Other In-class Assignments

1. Review homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week.
2. Begin 3 SP2 safety tests.
3. Notes on lecture.
4. Participation in discussion related to topic of lecture.
5. Students must keep a notebook of all course materials including homework, class notes, handouts, class project and team activities. The notebook must be organized by chapter, in-class notes, handouts and extra-credit assignments. The notebook will be evaluated after the half-way point and graded at the end of the course.
6. Review and discuss vehicle diagnosis, troubleshooting and repair of personal, shop and other vehicles to be evaluated by the instructor during lab time.
7. Must develop teamwork skills through classroom interaction and discussion.

Other Out-of-class Assignments

1. Readings from required text: 1-3 chapters per week from both classroom and shop manuals. Each chapter 2 hours per week.
2. Homework from required text: multiple-choice questions, fill in the blank and essay questions to be graded each week. Each chapter 2 hours per week.
3. Completion of 2 SP2 safety tests, each subject including an average of 4 hours.
 - a. Mechanical Safety
 - b. Pollution prevention
4. Assigned readings and written summaries from selected instructor handouts.
5. Written summaries and analysis of assigned websites.
6. Must complete a course project consisting an essay describing, analyzing and summarizing a selected topic, including out of class research and fieldwork. 8 hours
7. Students must keep a notebook of all course materials including homework, class notes, handouts, class project and team activities. The notebook must be organized by chapter, in-class notes, handouts and extra-credit assignments. The notebook will be evaluated after the half-way point and graded at the end of the course.
8. Chrysler web-based training modules, each taking roughly 3 hours.
9. Exam prep. 12 hours

Grade Methods

Letter Grade Only

MIS Course Data

CIP Code

47.0604 - Automobile/Automotive Mechanics Technology/Technician.

TOP Code

094800 - Automotive Technology

SAM Code

C - Clearly Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Transferable to CSU only

General Education Status

Not applicable

Support Course Status

Course is not a support course

C-ID

AUTO 170 X

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

Yes

Additional Fee Amount

\$20.00

Additional Fees Description

Automotive Service Excellent (ASE) Student Exam

Approvals**Curriculum Committee Approval Date**

3/03/2020

Academic Senate Approval Date

3/12/2020

Board of Trustees Approval Date

5/15/2020

Course Control Number

CCC000455026

Programs referencing this courseAutomotive Air Conditioning Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=104/>)

Automotive Braking Systems Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=109/>)
Automotive General Service Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=110/>)
Automotive Light and Medium Duty Diesel Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=111/>)
Automotive Steering, Suspension, Alignment Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=112/>)
Automotive Introductions Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=201/>)
Advanced Transportation Technologies AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=44/>)
Advanced Transportation Technologies AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=45/>)
Air Conditioning Refrigeration AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=51/>)
Automotive Technology AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=57/>)