

# **AUTO 340C: CNG DIAGNOSIS & TROUBLESHOOT**

### Originator

Douglas Redman

# Co-Contributor(s)

# Name(s)

Anderson, Dorothy

### Justification / Rationale

Add online modalities. We have had requests from Clean Cities Coalition and local industry partners to conduct online training.

### **Effective Term**

Fall 2023

### **Credit Status**

Noncredit

# Subject

**AUTO - Automotive Technology** 

#### **Course Number**

340C

### **Full Course Title**

CNG Diagnosis & Troubleshoot

### **Short Title**

**CNG DIAG & TROUBLESHOOT** 

# **Discipline**

# **Disciplines List**

**Automotive Technology** 

### Modality

Face-to-Face 100% Online Hybrid

# **Catalog Description**

This course provides classroom lecture/discussion and interactive training on CNG vehicle diagnosis and repair. The course is designed to introduce the service technician to safety, diagnostic and troubleshooting practices and procedures unique to gaseous fuel vehicles including: ignition, fuel delivery and emissions systems design, operation, diagnosis and service.

# **Schedule Description**

This course provides classroom lecture/discussion and interactive training on CNG vehicle diagnosis and troubleshooting. Prerequisite: AUTO 340

### **Total Non-Credit Contact Hours**

36

# **Lecture Units**

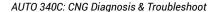
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# Lab Units

0

# **In-class Hours**

18





### **Out-of-class Hours**

18

### **Total Course Units**

0

#### **Total Semester Hours**

36

#### **Override Description**

Noncredit courses do not have lecture and lab. The out of class hours were adjusted to provide the same total as the equivalent credit course.

# Prerequisite Course(s)

**AUTO 340** 

# **Required Text and Other Instructional Materials**

# **Resource Type**

Web/Other

### Description

Handouts provided by the instructor

### **Resource Type**

Web/Other

# **Description**

NFPA 52 Vehicular Fuel Systems Code, 2015 Edition

### **Class Size Maximum**

21

### **Entrance Skills**

Describe component overview and operation.

# **Requisite Course Objectives**

AUTO 340-Upon successful completion of this course, students will be able to: describe CNG components and describe their operation.

# **Entrance Skills**

List shop and vehicle safety practices relevant to compressed natural gas (CNG) vehicles.

# **Requisite Course Objectives**

AUTO 340-Upon successful completion of this course, students will be able to: List shop and vehicle safety practices relevant to compressed natural gas (CNG) vehicles.

# **Entrance Skills**

Comply with shop and vehicle safety practices relevant to compressed natural gas (CNG) vehicles.

#### **Requisite Course Objectives**

AUTO 340-Comply with shop and vehicle safety practices relevant to compressed natural gas (CNG) vehicles.

# **Entrance Skills**

Describe CNG components and describe their operation.

# **Requisite Course Objectives**

AUTO 340-Basic CNG component overview and operation.



# **Course Content**

- 1. Diagnose, troubleshoot and repair CNG ignition system malfunctions.
- 2. Diagnose, troubleshoot and repair CNG fuel system malfunctions.
- 3. Diagnose, troubleshoot and repair CNG emissions system malfunctions.

# **Course Objectives**

	Objectives
Objective 1	Interpret and follow applicable diagnosis and wiring diagrams from CNG vehicle service information.
Objective 2	Diagnose, troubleshoot and repair intermittent or complete failure of electric, electronic or mechanical devices in a CNG vehicle fuel system.
Objective 3	Diagnose, troubleshoot and repair intermittent or complete failure of electric, electronic or mechanical devices in a CNG vehicle fuel system.
Objective 4	Diagnose, troubleshoot and repair intermittent or complete failure of electric, electronic or mechanical devices in a CNG vehicle emission system.
Objective 5	Diagnose, troubleshoot a hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, and lean or rich mixture problems on a CNG vehicle; determine needed repairs.
Objective 6	Comply with shop and vehicle safety practices relevant to CNG vehicles.

# **Student Learning Outcomes**

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Demonstrate proficiency in referencing service information and documenting repairs, while practicing shop safety and teamwork when servicing and repairing CNG concerns.
Outcome 2	Discover the root cause of intermediate to advanced level CNG system malfunction given the diagnostic procedures.

# **Methods of Instruction**

Method	Please provide a description or examples of how each instructional method will be used in this course.
Collaborative/Team	Work in a team setting while performing NATEF tasks, researching information and group-based activities.
Technology-based instruction	Diagnostic equipment-based activities.
Lecture	Each class is half lecture covering multiple aspects of course content.
Discussion	Participate in classroom discussions.
Demonstration, Repetition/Practice	Demonstrate their ability to correctly perform a given task not limited to laboratory assignments, research projects, interactive role-play and group activities.

# **Methods of Evaluation**

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Self-paced testing	Participate in diagnostic scenarios and be required to do a visual presentation.	Out of Class Only
Student participation/contribution	Lab activities and student may participate in diagnostic scenarios.	In and Out of Class
Laboratory projects	Participate in lab-based activities to complete their NATEF standards job sheets.	In Class Only
Reading reports	Understand and follow diagnostic procedures and wiring diagrams.	Out of Class Only
Tests/Quizzes/Examinations	Quizzes and tests based on CNG vehicle scenarios.	In and Out of Class



Other	Out-of-class hours will be accounted for electronically through the learning management	Out of Class Only
	system.	

# **Assignments**

# Other In-class Assignments

- 1. Lecture notes.
- 2. Diagnosis and troubleshooting CNG vehicle scenarios; participation and discussion.
- 3. Interactive activities.

### Other Out-of-class Assignments

- 1. Readings from required text: 1-3 chapters per week from both classroom and shop manuals.
- 2. Completion of two SP2 safety tests.
- 3. Assigned readings and written summaries from selected instructor handouts.
- 4. Written summaries and analysis of assigned websites.
- 5. Vehicle diagnosis, troubleshooting and repair of CNG vehicles to be evaluated by the instructor during lab time.
- 6. Interactive lab worksheets matching each course objective.
- 7. Must develop teamwork skills through lab activities and assigned special projects.

#### **Grade Methods**

Pass/No Pass Only

# **Distance Education Checklist**

Include the percentage of online and on-campus instruction you anticipate.

#### Online %

100

What will you be doing in the face-to-face sections of your course that necessitates a hybrid delivery vs a fully online delivery? This course can be taught in any of the aforementioned modalities. Some industry partners have requested online delivery while

others have requested face-to-face. This will allow both needs to be met.

# Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?

None will be used.

# **Effective Student/Faculty Contact**

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

### Within Course Management System:

Discussion forums with substantive instructor participation
Online quizzes and examinations
Regular virtual office hours
Timely feedback and return of student work as specified in the syllabus
Weekly announcements

### **External to Course Management System:**

Synchronous audio/video

# Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

Regular effective contact will be practiced through online lecture, discussion board postings, email communications, regular announcements, prompt grading and feedback of assignments, and virtual office hours. This contact between the facilitator and learner on a regular basis will enhance learner confidence and understanding and promote critical thinking and analyzation of subject matter.



# Other Information

Provide any other relevant information that will help the Curriculum Committee assess the viability of offering this course in an online or hybrid modality.

With the uncertainty of the teaching environment, enabling the lecture portion of this course to be delivered in an online setting, while keeping the hands-on portion face-to-face, will ensure learners can access needed training to ensure knowledge and experience is achieved to gain employment in the automotive field.

### MIS Course Data

# **CIP Code**

47.0614 - Alternative Fuel Vehicle Technology/Technician.

#### TOP Code

094840 - Alternative Fuels and Advanced Transportation 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**

Other Non-credit Enhanced Funding

# **Approved Special Class**

Not special class

# **Noncredit Category**

Short-Term Vocational

# **Funding Agency Category**

Not Applicable

### **Program Status**

Program Applicable

#### **Transfer Status**

Not transferable

# **General Education Status**

Y = Not applicable

# **Support Course Status**

N = Course is not a support course

# **Allow Audit**

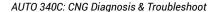
No

### Repeatability

Yes

### **Repeatability Limit**

NC





# **Repeat Type**

Noncredit

# **Justification**

Noncredit courses are repeatable until students are comfortable they have achieved the skills and knowledge to meet the outcomes and objectives of the course.

### **Materials Fee**

No

### **Additional Fees?**

No

# **Approvals**

**Curriculum Committee Approval Date** 10/20/2022

Academic Senate Approval Date 10/27/2022

**Board of Trustees Approval Date** 12/16/2022

**Chancellor's Office Approval Date** 01/07/2023

**Course Control Number** 

CCC000635358

# Programs referencing this course

Compressed Natural Gas Essentials Certificate of Completion (http://catalog.collegeofthedesert.eduundefined/?key=278) CNG Essentials Certificate of Completion (http://catalog.collegeofthedesert.eduundefined/?key=361)