

# Washtenaw Community College Comprehensive Report

## ASV 256 Electrical and Electronic Systems Effective Term: Fall 2023

### Course Cover

**College:** Advanced Technologies and Public Service Careers

**Division:** Advanced Technologies and Public Service Careers

**Department:** Transportation Technologies

**Discipline:** Auto Services (new)

**Course Number:** 256

**Org Number:** 14100

**Full Course Title:** Electrical and Electronic Systems

**Transcript Title:** Electrical & Electronic Systems

**Is Consultation with other department(s) required:** No

**Publish in the Following:** College Catalog , Time Schedule , Web Page

**Reason for Submission:** Three Year Review / Assessment Report

**Change Information:**

**Consultation with all departments affected by this course is required.**

**Outcomes/Assessment**

**Rationale:** Updating master syllabus based on assessment results.

**Proposed Start Semester:** Winter 2023

**Course Description:** In this course, students learn the theory and operation of automotive electrical systems. It includes the diagnosis and repair of automotive electrical lighting, instrumentation, convenience and accessory systems. There is a focus on advanced tools and techniques used to diagnose electrical and electronic systems found in today's modern automobiles.

### Course Credit Hours

**Variable hours:** No

**Credits:** 4

**Lecture Hours: Instructor: 45 Student: 45**

**Lab: Instructor: 60 Student: 60**

**Clinical: Instructor: 0 Student: 0**

**Total Contact Hours: Instructor: 105 Student: 105**

**Repeatable for Credit:** NO

**Grading Methods:** Letter Grades

Audit

**Are lectures, labs, or clinicals offered as separate sections?:** NO (same sections)

### College-Level Reading and Writing

College-level Reading & Writing

### College-Level Math

No Level Required

### Requisites

**Prerequisite**

ASV 131 minimum grade "C"

## **General Education**

### **Request Course Transfer**

#### **Proposed For:**

Ferris State University

### **Student Learning Outcomes**

1. Read and interpret wiring diagrams and vehicle service manuals.

#### **Assessment 1**

Assessment Tool: Outcome-related departmental exam questions

Assessment Date: Winter 2024

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of students will score 70% or higher.

Who will score and analyze the data: Departmental faculty

2. Diagnose and identify appropriate repairs for electrical circuits.

#### **Assessment 1**

Assessment Tool: Outcome-related scenario-based departmental exam questions

Assessment Date: Winter 2024

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of students will score 70% or higher.

Who will score and analyze the data: Departmental faculty

3. Diagnose and evaluate electrical components, motors, actuators as well as audio and instrumentation circuits.

#### **Assessment 1**

Assessment Tool: Outcome-related scenario-based departmental exam questions

Assessment Date: Winter 2024

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of students will score 70% or higher.

Who will score and analyze the data: Departmental faculty

4. Demonstrate the proper use of tools and processes of electrical system diagnosis.

#### **Assessment 1**

Assessment Tool: Outcome-related practical exam questions

Assessment Date: Winter 2024

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 70% of students will score 80% or higher.

Who will score and analyze the data: Departmental faculty

### **Course Objectives**

1. Recognize and apply shop safety practices.

2. Recognize and apply proper procedures for diagnosing electrical systems.
3. Perform proper inspection, diagnosis and recognize needed repairs on wiring harnesses.
4. Perform proper inspection, diagnosis and on electrical motors and components.
5. Perform repair or replacement as needed on wiring harnesses.
6. Perform diagnosis for automotive electrical systems and components using the various types of testing equipment and procedures.
7. Operate and interpret a Digital Volt Ohm Meter (DVOM).
8. Discuss electrical safety practices on low voltage systems.
9. Discuss electrical safety practices on high voltage systems.
10. Perform repair or replacement as needed for electrical sensors and components.
11. Recognize and apply proper procedure for repairing electrical systems.
12. Perform repairs or replacement as needed for electrical motors and components.
13. Interpret wiring diagrams.

### New Resources for Course

Evolving technology in this area is demanding that electrical technicians have safety training and skills in high voltage automotive electrical systems.(Hybrid and EV vehicles) To do this we will need the funds to acquire high voltage/hybrid safety tools and equipment and also professional development funds to fully train any full and part-time faculty teaching this course on this equipment.

The subject of automotive electrical and electronic systems has constantly evolving technology. Every year the tools used to diagnose and repair automotive electrical components are updated by the manufacturers to service new technology for the next model year of car they are producing. To stay current in the automotive education field, prepare our students to be competitive in the workforce, and prepare students for the constant changes in technology they will encounter in their career, we will need to update all our scan tools and testing equipment yearly. Changes in the industry are requiring the use of manufacturer-specific diagnostic equipment (scan tools). This equipment is required to diagnose and repair electrical components on the cars that each manufacturer produces. We will need to acquire software and hardware from the major automotive brands to continue teaching current diagnosis of their automotive electrical systems and have our students be successful and competitive when they enter the workforce after graduation. Based on the current assessment of this course, faculty feels the assessment data shows that we are lacking in this area and we will need these new resources (manufacturer-specific scan tool hardware ,software and high voltage/hybrid safety tools and equipment) to ensure student success in this area in the future.

### Course Textbooks/Resources

Textbooks  
Manuals  
Periodicals  
Software

### Equipment/Facilities

Level III classroom  
Computer workstations/lab

### Reviewer

#### **Faculty Preparer:**

*Justin Morningstar*

#### **Department Chair/Area Director:**

*Rocky Roberts*

#### **Dean:**

*Jimmie Baber*

#### **Curriculum Committee Chair:**

### Action

*Faculty Preparer*

*Recommend Approval*

*Recommend Approval*

### Date

*Apr 15, 2022*

*Apr 18, 2022*

*Apr 19, 2022*

*Randy Van Wagnen*

*Recommend Approval*

*Feb 17, 2023*

**Assessment Committee Chair:**

*Shawn Deron*

*Recommend Approval*

*Feb 17, 2023*

**Vice President for Instruction:**

*Victor Vega*

*Approve*

*Feb 18, 2023*

## Washtenaw Community College Comprehensive Report

### ASV 256 Electrical and Electronic Systems Effective Term: Spring/Summer 2018

#### Course Cover

**Division:** Advanced Technologies and Public Service Careers

**Department:** Automotive Services

**Discipline:** Auto Services

**Course Number:** 256

**Org Number:** 14100

**Full Course Title:** Electrical and Electronic Systems

**Transcript Title:** Electrical & Electronic Systems

**Is Consultation with other department(s) required:** No

**Publish in the Following:** College Catalog , Time Schedule , Web Page

**Reason for Submission:** Three Year Review / Assessment Report

#### **Change Information:**

**Consultation with all departments affected by this course is required.**

**Outcomes/Assessment**

**Objectives/Evaluation**

**Other:**

**Rationale:** Updating as a result of assessment report

**Proposed Start Semester:** Spring/Summer 2018

**Course Description:** In this course, students learn the theory and operation of automotive electrical systems. It includes the diagnosis and repair of automotive electrical lighting, instrumentation, convenience and accessory systems. There is a focus on advanced tools and techniques used to diagnose electrical and electronic systems found in today's modern automobiles. This course contains material previously taught in ASV 246.

#### Course Credit Hours

**Variable hours:** No

**Credits:** 4

**Lecture Hours: Instructor:** 45 **Student:** 45

**Lab: Instructor:** 60 **Student:** 60

**Clinical: Instructor:** 0 **Student:** 0

**Total Contact Hours: Instructor:** 105 **Student:** 105

**Repeatable for Credit:** NO

**Grading Methods:** Letter Grades

Audit

**Are lectures, labs, or clinicals offered as separate sections?:** NO (same sections)

#### College-Level Reading and Writing

College-level Reading & Writing

#### College-Level Math

No Level Required

#### Requisites

**Prerequisite**

ASV 131 minimum grade "C"

## **General Education**

### **Request Course Transfer**

#### **Proposed For:**

Jackson Community College

### **Student Learning Outcomes**

1. Read and interpret wiring diagrams and vehicle service manuals.

#### **Assessment 1**

Assessment Tool: Departmental/NATEF checklist

Assessment Date: Winter 2020

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: The NATEF requirements will be included in a departmentally-developed checklist that will be used to assess student performance.

Standard of success to be used for this assessment: 70% of students will score an average of 3 out of 5 or higher on all outcome-related items on the checklist

Who will score and analyze the data: Departmental faculty

2. Diagnose and identify appropriate repair for electrical circuits.

#### **Assessment 1**

Assessment Tool: Common departmental exam

Assessment Date: Winter 2020

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Common departmental exam will be scored using an answer sheet

Standard of success to be used for this assessment: 70% of students will score an average of 70% or higher

Who will score and analyze the data: Departmental faculty will blind-score data when possible

3. Diagnose and evaluate electrical components, motors, actuators and audio and instrumentation circuits.

#### **Assessment 1**

Assessment Tool: Common departmental exam

Assessment Date: Winter 2020

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Common departmental exam will be scored using an answer sheet

Standard of success to be used for this assessment: 70% of students will score an average of 70% or higher

Who will score and analyze the data: Departmental faculty will blind-score data when possible

4. Demonstrate the proper use of tools and processes of electrical system diagnosis.

#### **Assessment 1**

Assessment Tool: Departmental/NATEF checklist.

Assessment Date: Winter 2020

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: The NATEF requirements will be included in a departmentally-developed checklist that will be used to assess student performance

Standard of success to be used for this assessment: 70% of students will score an average of 3 out of 5 on all outcome-related items on the NATEF skills checklist, which means that they meet expectations

Who will score and analyze the data: Departmental faculty

### **Course Objectives**

1. Recognize and apply shop safety practices.
2. Recognize and apply proper procedure for diagnosing electrical systems.
3. Perform proper inspection, diagnosis and recognize needed repairs on wiring harnesses.
4. Perform proper inspection, diagnosis and on electrical motors and components.
5. Perform repair or replacement as needed on wiring harnesses.
6. Perform diagnosis using the various types of testing equipment and procedures for automotive electrical systems and components.
7. Operate and interpret a DVOM.
8. Apply electrical safety practices.
9. Perform repair or replacement as needed for electrical sensors and components.
10. Recognize and apply proper procedure for repairing electrical systems.
11. Perform repairs or replacement as needed for electrical motors and components.
12. Interpret wiring diagrams.

### **New Resources for Course**

The subject of automotive electrical and electronic systems has constantly evolving technology. Every year the tools used to diagnose and repair automotive electrical components are updated by the manufacturers to service new technology for the next model year of car they are producing. To stay current in the automotive education field, prepare our students to be competitive in the workforce, and prepare students for the constant changes in technology they will encounter in their career, we will need to update all our scan tools and testing equipment yearly. Changes in the industry are requiring the use of manufacturer-specific diagnostic equipment (scan tools). This equipment is required to diagnose and repair electrical components on the cars that each manufacturer produces. We will need to acquire software and hardware from the major automotive brands to continue teaching current diagnosis of their automotive electrical systems and have our students be successful and competitive when they enter the workforce after graduation. Based on the current assessment of this course, faculty feels the assessment data shows that we are lacking in this area and we will need these new resources (manufacturer-specific scan tool hardware and software) to ensure student success in this area in the future.

### **Course Textbooks/Resources**

Textbooks  
Manuals  
Periodicals  
Software

### **Equipment/Facilities**

Level III classroom  
Computer workstations/lab

<b><u>Reviewer</u></b>	<b><u>Action</u></b>	<b><u>Date</u></b>
<b>Faculty Preparer:</b> <i>Justin Morningstar</i>	<i>Faculty Preparer</i>	<i>May 19, 2017</i>
<b>Department Chair/Area Director:</b> <i>Allen Day</i>	<i>Recommend Approval</i>	<i>Jun 06, 2017</i>
<b>Dean:</b> <i>Brandon Tucker</i>	<i>Recommend Approval</i>	<i>Jun 21, 2017</i>
<b>Curriculum Committee Chair:</b> <i>Lisa Veasey</i>	<i>Recommend Approval</i>	<i>Dec 11, 2017</i>
<b>Assessment Committee Chair:</b> <i>Michelle Garey</i>	<i>Recommend Approval</i>	<i>Dec 20, 2017</i>
<b>Vice President for Instruction:</b> <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Dec 20, 2017</i>