

**ATL 163 Course Outline as of Fall 2024****CATALOG INFORMATION**

Dept and Nbr: ATL 163 Title: ELECTRICAL 3

Full Title: Mobile Electrical Systems 3

Last Reviewed: 1/22/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.50	17.5	Lecture Scheduled	43.75
Minimum	3.00	Lab Scheduled	1.50	6	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 87.50

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

This course introduces students to hybrid and electric vehicle diagnosis and repair processes, and Advanced Drivers Assistance Systems (ADAS). These technologies are also the foundation for autonomous vehicles. This course could be a preparation for the student to successfully complete the Automotive Service Excellence (ASE) L4 ADAS Specialist certification test along with shop experience with ADAS equipment.

**Prerequisites/Corequisites:**

Course Completion of ATL 140 and ATL 162

**Recommended Preparation:**

Eligibility for ENGL 1A or equivalent

**Limits on Enrollment:****Schedule of Classes Information:**

Description: This course introduces students to hybrid and electric vehicle diagnosis and repair processes, and Advanced Drivers Assistance Systems (ADAS). These technologies are also the foundation for autonomous vehicles. This course could be a preparation for the student to successfully complete the Automotive Service Excellence (ASE) L4 ADAS Specialist

certification test along with shop experience with ADAS equipment. (Grade or P/NP)

Prerequisites/Corequisites: Course Completion of ATL 140 and ATL 162

Recommended: Eligibility for ENGL 1A or equivalent

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:

<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
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<b>CSU Transfer:</b>	Effective:	Inactive:
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<b>UC Transfer:</b>	Effective:	Inactive:
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**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

**Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Demonstrate proper methods for high voltage glove testing
2. Demonstrate the proper use of a voltmeter in performing high voltage battery testing
3. Demonstrate the proper use of ohmmeters for motor testing
4. Demonstrate the calibration process for an ADAS system
5. Demonstrate a scope capture of a specialized internal communications network (BUS) signal
6. Access and interpret module data on an ADAS system

**Objectives:**

At the conclusion of this course, the student should be able to:

1. Demonstrate the appropriate use of personal protection equipment
2. Compare and contrast the different types of high voltage batteries used in hybrid and electric vehicles
3. Perform a removal of, and the appropriate tests to, the high voltage battery
4. Perform a removal of the converter/inverter assembly; perform a removal of the converter / inverter assembly
5. Perform a cooling system service for the converter/inverter system
6. Compare and contrast the pros and cons of electric vehicles
7. Evaluate the condition of motor windings
8. Identify the various ADAS systems
9. Describe the operation of the various ADAS systems
10. Demonstrate the proper use of applicable tools and equipment when working on assigned ADAS system
11. Obtain applicable information related to the operation, diagnosis, service and repair of assigned ADAS system

12. Perform calibration of an ADAS system
13. Perform visual inspections for ADAS systems
14. Perform system interrogation using the applicable equipment
15. Obtain bus signals using the applicable equipment
16. Diagnose ADAS system problems

## **Topics and Scope:**

### Lecture-Related Topics and Scope:

- I. Hybrid and Electric Vehicles
- II. Capacitors and High Voltage Batteries
  - A. Attributes
  - B. Plug-in technology
  - C. Removal
  - D. Testing
- III. Inverters and Converters
  - A. Removal
  - B. Testing
- IV. Electric Motors
  - A. Operation
  - B. Testing
  - C. Test equipment
- V. Electric Vehicles
  - A. Current models
  - B. Charging options
  - C. Benefits and negatives
- VI. Advanced Drivers Assistance Systems (ADAS)
  - A. What are Advanced Drivers Assistance Systems (ADAS) and their purpose
  - B. Lane departure / Lane keep / Lane centering
  - C. Active cruise control
  - D. Blind spot detection
  - E. Parking assist
  - F. Autonomous Emergency Braking (AEB)
  - G. Night vision
  - H. Traffic Sign Recognition (TSR)
  - I. Intelligent High beam Assistant (IHC)
  - J. Tire Pressure Monitoring System (TPMS)
  - K. Front Collision Warning System (FCWS)
  - L. Front Vehicle Departure Warning (FVDW)
  - M. Adaptive lighting
  - N. Driver drowsiness detection
  - O. Hill decent control
  - P. Rear cross traffic
  - Q. Autonomous vehicle

### Lab-Related Topics and Scope:

- I. Demonstrate the Proper Methods to Perform a High Voltage Glove Check
- II. Collect the Appropriate Service Information Related to Disabling the High Voltage System
- III. Remove High Voltage Battery Assembly
- IV. Remove the Inverter / Converter Assembly
- V. Perform Tests on Electric Motors Demonstrate Proper Shop Safety and Working Practices,

- Including Tools and Equipment, And Hazardous Waste Handling
- VI. Perform Interrogation of Applicable Systems Using Appropriate Equipment
- VII. Perform Visual Inspections
- VIII. Perform Calibrations
- IX. Acquire BUS Communication Signals Utilizing the Appropriate Equipment
- X. Perform Vehicle Alignment
- XI. Diagnose ADAS Related Concerns

**Assignment:**

Lecture-Related Assignments:

1. Weekly reading (30-70 pages)
2. Homework assignments (6-10)
3. Quizzes (6-10)
4. Midterm exam
5. Final exam

Lab-Related Assignments:

1. Weekly vehicle component identification
2. Weekly lab exercises and skill tests
3. Weekly lab worksheets and reports.

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Homework assignments	Writing 0 - 15%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab worksheets and reports	Problem solving 5 - 20%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Vehicle component identification; lab exercises and skills test	Skill Demonstrations 30 - 50%
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**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes; midterm exam; final exam	Exams 30 - 50%
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**Other:** Includes any assessment tools that do not logically fit into the above categories.

None

Other Category  
0 - 0%

**Representative Textbooks and Materials:**

Advanced Automotive Electricity and Electronics. Klyde, Michael. CDX: 2018 (classic)

Instructor prepared materials