Course Information Form (CIF)

Course Code: AFD 115

Course Title: Basic Chassis Electrical Systems

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 47.0604
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 5-5-7
Credit Hour Distribution:

Lecture: 5	Lab: 5	Clinical: 0	**Total: 7**

General Course Information

Catalog Description

Theoretical and practical aspects of electricity in the automobile. Topics include cranking; charging; and accessory systems, components, and wiring circuits; introduction to semiconductors and electronics.

General Course Objectives

Students will have a basic understanding of electric circuit principles and the various electrical systems on today's vehicles.

Minimum Placement Levels

English	Reading	Math
Placement into ENG 098	Placement into CCS 098	Placement into MAT 060

Prerequisites

Credit in AFD 110 or AFD 297

Methods of Evaluation

The minimum number of evaluation methods will include: 3 written exams, 6 written quizzes, 2 laboratory projects, and 6 lab practicals.

Instructional Materials and Additional Supplies

Revel For Automotive Technology: Principles, Diagnosis And Service Access Card (6e), 9780135580066

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.
- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Basic Electricity - Basic Concepts: Voltage (Pressure-Force), Current (Electron Flow vs. Conventional Flow), Resistance (Opposition), and Wattage (Power)	1. Examine the relationships between voltage, current, and resistance in an electrical circuit.	8	0	0
Basic Electricity - Series Circuits: Ohm's Law, Voltage Formula, Current Formula, Resistance Formula, and Circuit Boards	1. Solve series electrical problems for unknown quantities asked for by the instructor.	6	5	0
Basic Electricity - Parallel Circuits: Ohm's Law, Voltage Formula, Current Formula, Resistance Formula, and Circuit Boards	1. Solve parallel electrical problems for unknown quantities asked for by the instructor.	6	4	0
Basic Electricity - Series-Parallel Circuits: Ohm's Law, Voltage Formula, Current Formula, Resistance Formula, and Circuit Boards	1. Solve series-parallel electrical problems for unknown quantities asked for by the instructor.	5	4	0
Basic Electricity - Magnetism: Natural Magnets, Fabricated Magnets, Repulsion-Attraction, and Relay-Controlled Circuits	1. Demonstrate the basic principles of magnetism as applied to electrical circuits and components.	6	5	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Basic Electricity - Electromagnetism: Current, Flux Fields, Number of Windings, Magnet Strength, and Iron Core	1. Define the basic principles of electromagnetism as applied to electrical circuits and components.	2	2	0
Basic Electricity: Amp Meter, Volt Meter, Ohm Meter, and Scale Divisions	1. Apply the theory behind electrical measuring devices on actual electrical circuits.	6	8	0
Transistor/Diodes	1. Explain the theory behind semiconductors such as transistors and diodes.	5	3	0
Wet Cell Batteries: Negative Plates, Positive Plates, Electrolytes, and Charge and Discharge Cycles	1. Demonstrate an understanding of chemical reactions occurring within wet cell batteries.	3	0	0
Battery Test: Battery Visual Inspection, Battery Capacity Test, Battery Cell Test, Three-Minute Battery Charge Test, Specific Gravity Test, Fast Charge Test, and Battery Leakage Test	1. Test a battery according to manufacturer's specifications with various test equipment.	5	6	0
Starter Motors: a) Motor Action - Armature Circuit, Field Pole Circuit, Commutation, Magnetic Repulsion, and b) Motor Windings: Series Wound, High Torque/Low R.P.H., High Current/Low Resistance	1. Explain the theory behind cranking motor and starting solenoid systems by answering questions given by the instructor.	4	0	0
Starting Motor Test: Starter Motor Current Draw, Starting System Insulated Circuit Resistance Test, Starting System Ground, and Starter System Solenoid Switch Circuit Resistance Test	1. Test a starting motor according to manufacturer's specifications with various test equipment.	0	5	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Alternators: a) Alternator Action - Rotor, Stator, Slip-Rings, and Diode Bank; and b) Voltage Regulators	1. Explain the theory behind alternators and their regulating units by answering questions given by the instructor.	6	0	0
Alternator Testing: Alternator Output Test, Voltage Regulator Test, Charging System Circuit Resistance Test, and Charging System Insulated Circuit Resistance Test	1. Test an alternator according to manufacturer's specifications with various test equipment.	0	6	0
Circuit Tracing: Electrical Diagrams - Wire Tracing Relays, Symbols, Schematics, and Tracing Simple Circuits	1. Use automotive electrical diagrams by tracing actual circuits out to completion.	6	11	0
Isolating and Correcting Malfunctions	1. Test and correct electrical malfunctions by using test equipment and master schematics.	5	12	0
Wire Repair of Copper Stranded Wire	1. Demonstrate an understanding of wire repair methods commonly found in the automotive industry. 2. Repair copper stranded wire using a soldering method. 3. Protect a wire repair using heat shrink. 4. Install an electrical connector terminal using special tools.	2	4	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
75	75	0