



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**ELECTRICAL I
AMS3117 3 Credit Hours**

Student Level:

This course is open to students on the college level in either the freshman or sophomore year and to area high school vocational students.

Catalog Description:

AMS 3117 - ELECTRICAL I (3 hrs)

Upon successful completion of this course, the student will be able to diagnose, service, and repair automotive electrical/electronic systems, including the diagnosis, service, and repair of the general electrical system, battery, the starting, charging, and lighting systems, gages, warning devices and driver information systems, horn and wiper/washer as well as other electrical/electronic accessories.

Prerequisites:

None

Controlling Purpose:

This course is designed to help the student increase their knowledge concerning entry-level skills contained in the sequenced competencies, for success, after graduation from the Automotive Technology Program.

Learner Outcomes:

Upon completion of this course the student will be able to analyze and diagnose related problems specific to the automotive electrical system.

The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:

A = All major and minor goals have been achieved and the achievement level is considerably

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- above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.
- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

UNIT 1: General Electrical System Diagnosis

Outcomes: The student will demonstrate a working and academic knowledge of the electrical system.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Identify and interpret electrical/electronic system concern; determine necessary action.
						Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.
						Locate and interpret vehicle and major component identification numbers (VIN, vehicle cert. labels, and calibration decals).
						Diagnose electrical/electronic integrity for series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).
						Using wiring diagrams during diagnosis of electrical circuit problems.
						Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems.
						Check electrical circuits with a test light; determine necessary action.
						Measure source voltage and perform voltage drop tests in electrical/electronic circuits using a voltmeter; determine necessary action.
						Measure current flow in electrical/electronic circuits and components using ammeter; determine necessary action.
						Check continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determine necessary action.
						Check electrical circuits using fused jumper wires; determine necessary action.
						Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
						Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action.
						Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
						Inspect and test switches, connectors, relays, solid state devices, and wires of electrical/electronic circuits; perform necessary action.
						Repair wiring harness and connectors.
						Perform solder repair of electrical wiring.

UNIT 2: Battery Diagnosis and Service

Outcomes: The student will demonstrate acceptable knowledge of the battery, diagnosis, and service.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Perform battery state-of-charge test; determine necessary action.
						Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.
						Maintain or restore electronic memory functions.
						Inspect, clean, fill, and replace battery.
						Perform slow/fast battery charge.
						Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
						Start a vehicle using jumper cables and a battery or auxiliary power supply.

UNIT 3: Starting System Diagnosis and Repair

Outcomes: The student will demonstrate a global understand of the electrical system and how to diagnose common starting system problems.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Perform starter current draw test; determine necessary action.
						Perform starter circuit voltage drop tests; determine necessary action.
						Inspect and test starter relays and solenoids; determine necessary action.
						Remove and install starter in vehicle.
						Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.
						Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.

UNIT 4: Charging System Diagnosis and Repair

Outcomes: The student will demonstrate an understanding of the charging system, common problems, and diagnosis/repair.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Perform charging system output test; determine necessary action.
						Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.
						Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners, check pulley and belt alignment.
						Remove, inspect, and install generator (alternator).
						Perform charging circuit voltage drop tests; determine necessary action.

Projects Required:

As assigned

Textbook:

Contact Bookstore for current textbook.

Materials/Equipment Required:

Students are required to furnish their own Personal Protection Equipment i.e. Safety Glasses.

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:

Based on classroom occupancy

Course Timeframe:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit

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allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability, which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.