

# El Paso Community College

## Syllabus

### Part II

## Official Course Description

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| <b>SUBJECT AREA</b>             | <u>Automotive Technology</u>                                    |
| <b>COURSE RUBRIC AND NUMBER</b> | <u>AUMT 2321</u>  |
| <b>COURSE TITLE</b>             | <u>Automotive Electrical Diagnosis<br/>and Repair</u>           |
| <b>COURSE CREDIT HOURS</b>      | <u>3      2      :      4</u><br>Credits    Lec      :      Lab |

### I. Catalog Description

Discusses the repair of automotive electrical subsystems, lighting, instrumentation, and accessories. Emphasizes accurate diagnosis and proper repair methods using various troubleshooting skills and techniques. May be taught manufacturer specific. **Prerequisite: AUMT 1307 (2:4). Lab fee.**

### II. Course Objectives

- A. Unit I. Shop Safety
  - 1. Work safely in an automotive shop.
  - 2. Explain laws regarding hazardous materials in the shop.
  
- B. Unit II. General Electrical System Diagnosis
  - 1. Obtain repair information and specifications from manuals and computers.
  - 2. Use wiring diagrams while diagnosing electrical problems.
  - 3. Use a strategy-based diagnostic procedure while solving customer concerns.
  - 4. Document service or repair procedure on the Work Order or Lab Report.
  - 5. Compare actual time spent on a repair to flat rate time.
  - 6. Demonstrate efficiency from start to finish of the job.
  - 7. Identify proper tools and equipment for the job.
  - 8. Check continuity in an electrical circuit with a test light and determine needed repairs.
  - 9. Check applied voltages and voltage drops in electrical/electronic circuits.
  - 10. Check current flow in electrical/electronic circuits and components with an ammeter and determine needed repairs.
  - 11. Check continuity and resistances in electrical/electronic circuits and components with an ohmmeter and determine needed repairs.
  - 12. Check electrical/electronic circuits with jumper wires and determine needed repairs.
  - 13. Find shorts, grounds, opens, and high resistance problems in electrical/electronic circuits and determine needed repairs.
  - 14. Diagnose the cause of abnormal battery drain and determine needed repairs.
  - 15. Inspect, test, and replace fuseable links, circuit breakers, and fuses.
  - 16. Demonstrate wiring repair procedures.
  - 17. Follow service procedures for air bags.
  
- C. Unit III. Lighting System Diagnosis
  - 1. Diagnose the cause of brighter than normal, intermittent, dim, or no operation of the headlights.
  - 2. Inspect, replace, and aim headlights/bulbs.
  - 3. Inspect, test, and repair or replace headlight and dimmer switches, relays, sockets, connectors, and wires of headlight circuits.
  - 4. Diagnose the cause of intermittent, slow, or no operation of retractable headlight assemblies.
  - 5. Inspect, test, and repair or replace motors, switches, relays, connectors, and wires of retractable headlight assembly circuits.
  - 6. Diagnose the cause of brighter than normal, intermittent, dim, or no operation of parking and or taillights.

7. Inspect, test, and repair or replace switches, relays, bulbs, sockets, connectors, and wires of parking light and taillight circuits.
  8. Diagnose the cause of intermittent, dim, no lights, or no brightness control of dash light circuits.
  9. Inspect, test, and repair or replace switches, relays, bulbs, sockets, connectors, wires, and printed circuit boards of dash light circuits.
  10. Diagnose the cause of intermittent, dim, or no operation of the courtesy light.
  11. Inspect, test, and repair or replace switches, relays, bulbs, sockets, connectors, and wires of courtesy light circuits.
  12. Diagnose the cause of intermittent, dim, or no operation of stoplight.
  13. Inspect, test, adjust, and repair or replace switch, bulbs, sockets, connectors, and wires of the stoplight circuit.
  14. Inspect, test, and repair or replace switches, flasher units, bulbs, sockets, connectors, and wires of turn signal and hazard light circuits
  15. Diagnose the cause of intermittent, dim, or no back-up light.
  16. Inspect, test, and repair or replace switch, bulbs, sockets, connectors, and wires of back-up light circuits.
- D. Unit IV. Gauges, Warning Devices, and Driver Information Centers
1. Diagnose the cause of intermittent, high, or low gauge readings.
  2. Test and replace gauge circuit voltage regulators.
  3. Inspect, test, and repair or replace gauges, gauge sending units, connectors, wires, and printed circuit boards of gauge circuits.
  4. Diagnose the cause(s) of intermittent, low, or no readings on electronic digital instrument clusters.
  5. Inspect, test, and repair or replace sensors, sending units, connector, and wires of electronic digital instrument circuits.
  6. Diagnose the cause of constant, intermittent, or no operation of warning light/driver information system warning devices.
  7. Inspect, test, and repair or replace bulbs, sockets, connectors, wires, and electronic components of warning light/driver information system warning devices.
  8. Diagnose the cause of constant, intermittent, or no operation of audible warning devices.
- E. Unit V. Horn and Wiper/Washer Circuits
1. Diagnose the cause of constant, intermittent, or no operation of horn(s).
  2. Inspect, test, and repair or replace horn(s), horn relay, horn button, connectors, and wires of horn circuits.
  3. Diagnose the cause of constant, intermittent, poor speed control, parking, or no operation of wiper.
  4. Inspect, test, and replace intermittent (pulsing) wiper speed controls.
  5. Inspect, test, and replace wiper motor, resistors, switches, relays, connections, and wires of wiper circuits.
  6. Diagnose the cause of constant, intermittent, or no operation of windshield washer.
  7. Inspect, test, and repair or replace washer motor, pump assembly, relays, switches, connectors, and wires of washer circuit.
- F. Unit VI. Accessories
1. Diagnose the cause of slow, intermittent, or no operation of power side windows and power tailgate window.
  2. Inspect, test, and repair or replace regulators, switches, relays, motors, connectors, and wires of power side window and power tailgate circuits.
  3. Diagnose the cause of slow, intermittent, or no operation of power seat.
  4. Inspect, test, adjust, and repair or replace power seat gear box, cables, slave units, switches, relays, connectors, and wires of power seat circuits.
  5. Diagnose the cause of poor, intermittent, or no operation of rear window defogger circuits.
  6. Inspect, test, and repair or replace switches, relays, window grid, blower motors, connectors, and wires of rear window defogger circuits.
  7. Diagnose the cause of poor, intermittent, or no operation of electric door and hatch/trunk lock.
  8. Inspect, test, and repair or replace switches, relays, actuators, connectors, and wires of electric door lock circuits.
  9. Diagnose the cause of poor, intermittent, or no operation of keyless lock/unlock device circuits
  10. Inspect, test, and repair or replace components, connectors, and wires of keyless lock/unlock devices.
  11. Diagnose the cause of slow, intermittent, or no operation of electrical sunroof and convertible top.
  12. Inspect, test, and repair or replace motors, switches, relays, connectors, and wires of electrically operated sunroof and convertible top circuits.
  13. Diagnose the cause of radio static and weak, intermittent, or no radio reception.
  14. Inspect, test, and repair or replace speakers, antennas, leads, grounds, connectors, and wires of sound system circuits.

15. Inspect, test, and repair or replace switches, motor, connectors, and wires of power antenna circuits.
16. Inspect, test, and replace noise suppression components.
17. Trim (adjust) radio antenna.
18. Diagnose the cause of unregulated, intermittent, or no operation of cruise control.
19. Inspect, test, adjust, and repair or replace speedometer cables, regulator, servo, hoses, switches, relays, electronic control units, speed sensors, connectors, and wires of cruise control circuits.
20. Diagnose the cause of poor, intermittent, or no operation of anti-theft system.
21. Inspect, test, and repair or replace components, switches, relays, connectors, and wires of anti-theft system circuits.
22. Diagnose the cause of the airbag warning light staying on or flashing.
23. Inspect, test, and repair or replace the airbag, airbag module, and sensors.

### **III. THECB Learning Outcomes (WECM)**

1. Utilize appropriate safety procedures.
2. Operate a Digital Multimeter and other electrical test equipment.
3. Diagnose and repair automotive electrical and accessory systems and instrumentation.
4. Repair wiring and wiring harnesses.

### **IV. Evaluation**

- A. Unit exams will count 60% toward the final grade.
- B. Lab reports will count 40% toward the final grade.
- C. Grading Scale

90 to 100 = A  
80 to 89 = B  
70 to 79 = C  
60 to 69 = D  
Below 60 = F

Cheating will not be permitted. Any person caught cheating will receive a grade of zero for that exam.

### **V. Disability Statement (Americans with Disabilities Act [ADA])**

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

### **VI. 6 Drop Rule**

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.