Automotive Electrical Diagnosis and Repair
AUMT 2321
(Spring 2014)

Course Description: Repair of automotive electrical subsystems, lighting, instrumentation, and accessories. Emphasis on accurate diagnosis and proper repair methods using various troubleshooting skills and techniques. May be taught manufacturer specific.

Semester Hours Credit: 3

Lecture/Lab Hours: This course meets for (2) lecture and (4) lab hours per week

Prerequisite: Intermediate

Textbook(s): Automotive Technology, Erjavec, Jack. 5th ed. ISBN#9781428311

Student Learning Outcomes: Utilize appropriate safety procedures, the student will diagnose and repair lighting systems; inspect, test, and repair various automotive accessories; troubleshoot malfunctions and effect necessary repairs to instrumentation, gauges, and sending units; and make proper repairs to wiring harnesses.

Performance Objectives:
By the end of the course, the student will develop entry level skills and knowledge necessary to perform the following tasks.

1. Demonstrate knowledge of correct safety procedures in the automotive lab in accordance with shop safety and dress code standards.

2. Demonstrate knowledge of proper procedures involving the operation and cleaning of the automotive lab and tool room according to the standards of the instructor and the Industrial Division.

3. Acquire acceptable work skills and attitudes according to Industrial Division standards which will increase the students chances of securing gainful employment in the field.

4. Identify all electrical, hand, and power tools used by craftsmen of the field to perform satisfactory repairs on automotive electrical equipment.

5. Demonstrate ability to distinguish and identify auto-motive wiring and circuits using manufacturer’s wiring diagrams and schematics and shop manual procedures.

6. Demonstrate knowledge of basic electrical and electronic theory needed by technician’s to correctly diagnose and repair electrical malfunctions in the automotive electrical systems.
Teaching Methods:
1. Lecture
2. Discussion
3. Audio Visual Aids
4. Hand Outs
5. Hands On (Lab)

Evaluation Methods:
1. Written Exams
2. Classroom Participation
3. Lab Work
4. Safety Practices

Grading Procedures:
1. Classroom (Test and Participation) 20%
2. Lab Project Completion and Safety 50%
3. Final Exam 30%

Attendance Policy:
Fall and Spring Semesters: ONE letter grade will be lost for each TWO absences
Summer Semester: ONE letter grade will be lost for EACH absence

Reference Materials:
1. Automotive Technology
2. College Library
3. Shop Publications
4. LAC (Learning Assistance Center)
5. Equipment operating manuals
6. Manufactures' Service Manuals

Course Outline:
LIGHTING SYSTEMS
I. Lamps
II. Headlights
   A. Sealed-Beam Headlights
   B. Halogen Headlights
   C. Composite Headlights
   D. HID Headlights
   E. Headlight Switches
   F. Dimmer Switches
      1. Flash-to-pass
      2. Automatic headlight dimmer
   G. Headlight Circuits
   H. Daytime Running Lights
      I. Concealed Headlights
   J. Automatic Light Systems
      1. Photocell sensor
   K. Headlight Replacement
   L. Headlight Adjustment
III. Interior Light Assemblies
   A. Engine Compartment Light
   B. Glove Box Light
   C. Luggage Compartment Light
D. Trunk Lid Light
E. Vanity Light
F. Courtesy Light
G. Illuminated Entry System

IV. Rear Exterior Light Assemblies
   A. Turn, Stop, and Hazard Warning Light Systems
   B. Flashers
   C. Stop Light Switch
   D. Back-Up Lights

V. Light Bulbs
   A. Other Bulbs
   B. Auxiliary Lights
   C. Driving and Passing Lights
   D. Fog Lights

VI. Lighting Maintenance

   Electrical Instruments and Accessories
   I. Body control Modules
      A. Trouble Codes
      B. Entering Diagnostics
   II. Instrument Panels
      A. Light-Emitting Diodes
      B. Liquid Crystal Display
      C. Vacuum Florescent

   III. Instrument Gauges
      A. IVR (Instrument Voltage Regulator)
      B. Magnetic Gauges
      C. Thermal or Bimetallic Gauges

   IV. Basic Information Gauges
      A. Speedometer
      B. Odometer
      C. Other Gauges
         1. Oil pressure gauge
         2. Coolant temperature gauge
         3. Fuel level gauge
         4. Tachometer
         5. Charging gauges

   V. Indicators and Warning Lights
      A. Air Bag Readiness Light
      B. Air Suspension Light
      C. Fasten Belts Indicator
      D. High Beam Light
      E. Left and Right Turn Indicators
      F. Anti-lock Light
      G. Retractable Headlight
      H. Oil Temperature Warning Light
         I. Charge Indicator Light
      J. Oil Pressure Indicator Light
      K. Stop Light Warning Light
      L. Lamp-Out Warning Light
      M. Brake Warning Light
      N. Brake Fluid Level Warning Light
O. Low Fuel warning Light
P. Check Engine Warning Light
Q. Door Lock Indicator Light
R. Door Ajar Warning Light
S. Rear (or Front) Defrost Indicator Light
T. Drive Indicator light
U. Sound Warning Devices
V. Diagnosis and Testing
  1. Fuses
  2. Indicator bulbs
  3. Detector switches (indicator systems)
  4. Sender units (gauge systems)
  5. IVR (gauge systems)
  6. Gauges (gauge systems)
W. Driver information Centers
X. Steering Wheel Touch Controls
Y. Head-Up Display (HUD)
VI. Electrical Accessories
  A. Windshield Wiper/Washer Systems
     1. Permanent magnet motor circuits
     2. Electronic field motor circuits
        a. Three-speed motors
     3. Intermittent wiper systems
     4. Windshield washers
     5. Windshield wiper linkage and blades
     6. Liftgate wiper/washer system
B. Wiper System service
C. Washer System service
D. Power Door lock Systems
E. Power Trunk Release
F. Power Windows
   1. Circuit operation
G. Power Seats
   1. Power lumbar supports
   2. Heated seats
   3. Memory seats
   4. Adaptive seating
   5. Massaging seats
   6. Adjustable pedals
H. Power Mirror System
   I. Rear- and Front-Window Defrosters and Heated Mirror System
J. Heated Windshields
K. Night Vision
L. Moon (Sun) Roof System
M. Horns/Clock/Cigarette (Cigar) Lighter System
N. Cruise (Speed) Control Systems
O. Electrical and Vacuum Circuits
P. Electronic Cruise Control Components
   1. Cruise control system service

OTHER COMFORT, SAFETY, AND SECURITY EQUIPMENT
I. Restraint Systems
   A. Seat Belts
B. Servicing Seat belts
   1. Webbing inspection
   2. Buckle inspection
   3. Retractor inspection
   4. Drive track assembly and anchor inspection
   5. Seat belt tensioners
C. Rear Seat Restraint System
D. Child Seat
E. Warning Light and Sound System

II. Air Bags
A. Electrical System components
   1. Sensors
   2. Diagnostic monitor assembly
   3. Wiring harness
   4. Clock spring
   5. SIR or air bag readiness light
B. Air Bag Module
C. passenger-Side and Side Air Bags

III. Servicing the Air Bag System
A. Air Bag Safety and Service Warnings
B. Service Guidelines

IV. Security and Anti-theft Devices
A. Locks
B. Keyless Entry System
C. Disabling Devices
D. Pass-Key Systems
E. Alarm Systems
F. Vehicle tracking Systems

V. Other Electronic Equipment
A. Navigation Systems
B. Sound Systems
C. Speaker and Sound Quality
D. Cellular Phones

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See at: GL (Legal)

Special Needs Services: Students with special needs, including physical and learning disabilities, who wish to request accommodations in this course should contact the Student Development Office as soon as possible to make arrangements; this should occur no later than the second week of class or as soon as the student has the documentation on the disability and requested accommodation per a certified medical or psychological professional. In accordance with federal law, a student requesting accommodations must provide documentation of disability to the Student Development Advisor.

For more information, contact: in Alice at sdalice@coastalbend.edu; Beeville at sdbeeville@coastalbend.edu; Kingsville at sdkingsville@coastalbend.edu; and Pleasanton at sdpleasanton@coastalbend.edu.

Academic Dishonesty: Each student is charged with notice and knowledge of the contents and provisions of Coastal Bend College’s rules and regulations concerning student conduct. All students shall obey the law, show
respect for properly constituted authority, and observe correct standards of conduct. Scholastic dishonesty shall constitute a violation of these rules and regulations and is punishable as prescribed by Coastal Bend College Policies FLB (Local) and FM (Local). Scholastic dishonesty shall include, but not be limited to, cheating on a test, plagiarism, and collusion.

See at: FLB (Local) and FM (Local).

See the Student Handbook for further explanation of Scholastic Dishonesty.

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**NOTE:** The College website (www.coastalbend.edu) serves as the main source with the most current version of the Coastal Bend College Board Policies and the Coastal Bend College Catalog.