Lecture Contact Hours: 64-72; Homework Hours: 128-144; Total Student Learning Hours: 192-216
Laboratory Contact Hours: 48-54; Homework Hours: 0; Total Student Learning Hours: 48-54

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 196 – ASSET–ELECTRICAL, ACCESSORIES AND AIR CONDITIONING

4 hours lecture, 3 hours laboratory, 5 units

Catalog Description
Ford ASSET course to include electrical systems, theory, diagnosis and repair procedures utilizing state of the art equipment. Systems covered will be storage, generating and starting. Coverage of accessory systems such as lighting, power seats, power door locks, cruise controls, electric windows, electronic dashboards, radios, windshield wipers, etc. Also covered are all major topics dealing with automotive air conditioning including refrigeration theory, system evacuation and recovery, leak repair, compressor repair, component replacement, and manual and automatic temperature control. Preparation for ASE Certification. Complemented by required work experience in the dealership.

Prerequisite
None

Course Content
1) Lecture:
    a. Introduction and safety
    b. Laboratory procedures
    c. Equipment operation
    d. Basic electrical principles
    e. Automotive wiring systems
    f. Electro-magnetism
    g. Storage batteries
    h. Starting motors
    i. Charging systems
    j. Refrigeration principles
    k. Electrical controls
    l. Moisture removal
    m. Service valves
    n. Manifold gauge sets
    o. Leak detectors
    p. Refrigerant control valves
    q. System diagnosis
2) Lab:
    a. Introduction and safety
    b. Laboratory procedures
    c. Equipment operation
    d. Battery servicing and diagnosis
    e. Starting system diagnosis and repair
    f. Charging system diagnosis and repair
    g. Electrical system troubleshooting
    h. Air conditioning system diagnosis
    i. Leak testing
    j. Pressure checks
    k. Evacuating system

l. Compressor repair
m. Clutch repair
n. Checking and adding oil
o. Testing and replacing various regulator valves
p. Component replacement
q. Vacuum controls
r. Electrical diagnosis
s. Accessory system diagnosis and repair

Course Objectives
Students will be able to:
1) Demonstrate standardized safety and hazardous waste handling practices.
2) Apply air conditioning and heating operating theory to diagnose heating and air conditioning systems for proper operation.
3) Diagnosis of air conditioning and heating systems in need of repair by applying theory of operation principles and prescribed industry standards.
4) Using proper tools and procedures, diagnose air conditioning systems by comparing high and low side gauge readings to ambient temperatures.
5) Perform accurate diagnosis and repairs of electrical and accessory systems.
6) Utilize manufacturer's repair information and technical service bulletins for accurate diagnosis and repair.

Method of Evaluation
A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.
1) Quizzes, written exams, and hands-on performance exam that measure students' ability to safely identify necessary action or repair, diagnose air conditioning and heating system components, and perform necessary tasks related to air conditioning and heating.
2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing, and adjustment of air conditioning and heating related systems and components.
3) Skills-based summative assessment that measures students' ability to successfully complete the necessary NATEF tasks related to diagnosis, replacement, repair, testing, and adjustment of air conditioning and heating systems and components.

Special Materials Required of Student
1) Mechanic's hand tool set
2) Approved safety glasses
3) Specialized air conditioning repair tools

Minimum Instructional Facilities
1) Auto tech lab (6 bays)
2) Various training vehicles
3) Smart classroom

Method of Instruction
1) Lecture and demonstration
2) Individual assistance

Out-of-Class Assignments
1) Reading assignments
2) Writing assignments

Texts and References
1) Required: None
2) Supplemental: None

Student Learning Outcomes
Upon successful completion of this course, students will be able to:
1) Demonstrate standardized safety and hazardous waste handling practices.
2) Apply air conditioning and heating operating theory to diagnose and repair heating and air conditioning systems for proper operation using assigned lab sheets and hands-on testing.