



Waldo County Technical Center

Automotive Technology II

Syllabus

Class Description

During this second class will focus on the maintenance and light repair of modern automobiles. This course will introduce students to automotive service and repair. Additionally, students will inspect vehicles and preform basic maintenance and light repair work, with the help of service information. The class will be a mixture of online and classroom learning, mixed with hands on skills in the shop area. The focus of these skills will be the NATEF maintenance and light repair task list. Students will learn to work in a shop environment and use industry equipment, SAFETY will be the number one priority.

Class Objectives

After completing this course, the student will be familiar with all tasks listed below. He or she must perform all high priority tasks to manufacturer’s specifications and document the completion of each task.

NATEF Tasks for This Module

For every task in Maintenance and Light Repair , the following safety requirement must be strictly enforced: Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

➤ **AUTOMATIC TRANSMISSION AND TRANSAXLE**

For every task in Automatic Transmission and Transaxle, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

II. AUTOMATIC TRANSMISSION AND TRANSAXLE

A. General

- 1. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
- 2. Check fluid level in a transmission or a transaxle equipped with a dip-stick. P-1
- 3. Check fluid level in a transmission or a transaxle not equipped with a dip-stick. P-1

- 4. Check transmission fluid condition; check for leaks. P-2
- 5. Identify drive train components and configuration. P-1

II. AUTOMATIC TRANSMISSION AND TRANSAXLE

B. In-Vehicle Transmission/Transaxle

- 1. Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral position switch. P-2
- 2. Inspect for leakage at external seals, gaskets, and bushings. P-1
- 3. Inspect, replace and/or align power train mounts. P-2
- 4. Drain and replace fluid and filter(s); use proper fluid type per manufacturer specification. P-1

C. Off-Vehicle Transmission and Transaxle

- 1. Describe the operational characteristics of a continuously variable transmission (CVT). P-3
- 2. Describe the operational characteristics of a hybrid vehicle drive train. P-3

➤ **MANUAL DRIVE TRAIN AND AXLES**

For every task in Manual Drive Train and Axles, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

III. MANUAL DRIVE TRAIN AND AXLES

A. General

- 1. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
- 2. Drain and refill manual transmission/transaxle and final drive unit; use proper fluid type per manufacturer specification. P-1
- 3. Check fluid condition; check for leaks. P-2
- 4. Identify manual drive train and axle components and configuration. P-1

III. MANUAL DRIVE TRAIN AND AXLES

B. Clutch

- 1. Check and adjust clutch master cylinder fluid level; use proper fluid type per manufacturer specification P-1
- 2. Check for hydraulic system leaks. P-1

III. MANUAL DRIVE TRAIN AND AXLES

C. Transmission/Transaxle

1. Describe the operational characteristics of an electronically-controlled manual transmission/transaxle. P-2

III. MANUAL DRIVE TRAIN AND AXLES

D. Drive Shaft, Half Shafts, Universal Joints and Constant-Velocity (CV) Joints (Front, Rear, All, and Four-wheel drive)

1. Inspect, remove, and/or replace bearings, hubs, and seals. P-2
2. Inspect, service, and/or replace shafts, yokes, boots, and universal/CV joints. P-2
3. Inspect locking hubs. P-3
4. Check for leaks at drive assembly and transfer case seals; check vents; check fluid level; use proper fluid type per manufacturer specification. P-2

III. MANUAL DRIVE TRAIN AND AXLES

E. Differential Case Assembly

1. Clean and inspect differential case; check for leaks; inspect housing vent. P-1
2. Check and adjust differential case fluid level; use proper fluid type per manufacturer specification. P-1
3. Drain and refill differential housing. P-1
4. Inspect and replace drive axle wheel studs. P-1

➤ **ELECTRICAL/ELECTRONIC SYSTEMS**

For every task in Electrical/Electronic Systems, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

VI. ELECTRICAL/ELECTRONIC SYSTEMS

A. General

1. Research vehicle service information including vehicle service history, service precautions, and technical service bulletins. P-1
2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). P-1
3. Use wiring diagrams to trace electrical/electronic circuits. P-1
4. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. P-1
5. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. P-1
6. Use a test light to check operation of electrical circuits. P-2
7. Use fused jumper wires to check operation of electrical circuits. P-2

- 8. Measure key-off battery drain (parasitic draw). P-1
- 9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P-1
- 10. Repair and/or replace connectors, terminal ends, and wiring of electrical/electronic systems (including solder repair) P-1
- 11. Identify electrical/electronic system components and configuration. P-1

VI. ELECTRICAL/ELECTRONIC SYSTEMS

B. Battery Service

- 1. Perform battery state-of-charge test; determine necessary action. P-1
- 2. Confirm proper battery capacity for vehicle application; perform battery capacity and load test; determine necessary action. P-1
- 3. Maintain or restore electronic memory functions. P-1
- 4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. P-1
- 5. Perform slow/fast battery charge according to manufacturer’s recommendations. P-1
- 6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. P-1
- 7. Identify safety precautions for high voltage systems on electric, hybrid-electric, and diesel vehicles. P-2
- 8. Identify electrical/electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery. P-1
- 9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. P-2

VI. ELECTRICAL/ELECTRONIC SYSTEMS

C. Starting System

- 1. Perform starter current draw test; determine necessary action. P-1
- 2. Perform starter circuit voltage drop tests; determine necessary action. P-1
- 3. Inspect and test starter relays and solenoids; determine necessary action. P-2
- 4. Remove and install starter in a vehicle. P-1
- 5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. P-2
- 6. Demonstrate knowledge of an automatic idle-stop/start-stop system. P-3

VI. ELECTRICAL/ELECTRONIC SYSTEMS

D. Charging System

- 1. Perform charging system output test; determine necessary action. P-1

2. Inspect, adjust, and/or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. P-1
3. Remove, inspect, and/or replace generator (alternator). P-2
4. Perform charging circuit voltage drop tests; determine necessary action. P-2

VI. ELECTRICAL/ELECTRONIC SYSTEMS

E. Lighting, Instrument Cluster, Driver Information, and Body Electrical Systems

1. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. P-1
2. Aim headlights. P-2
3. Identify system voltage and safety precautions associated with high-intensity discharge headlights. P-2
4. Disable and enable supplemental restraint system (SRS); verify indicator lamp operation. P-1
5. Remove and reinstall door panel. P-1
6. Describe the operation of keyless entry/remote-start systems. P-3
7. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. P-1
8. Verify windshield wiper and washer operation; replace wiper blades. P-1

➤ **ENGINE PERFORMANCE**

For every task in Engine Performance the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

VIII. ENGINE PERFORMANCE

A. General

1. Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Perform engine absolute manifold pressure tests (vacuum/boost); document results. P-2
3. Perform cylinder power balance test; document results. P-2
4. Perform cylinder cranking and running compression tests; document results P-2
5. Perform cylinder leakage test; document results P-2
6. Verify engine operating temperature. P-1
7. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. P-1

VIII. ENGINE PERFORMANCE

B. Computerized Controls

1. Retrieve and record diagnostic trouble codes (DTC), OBD monitor status, and freeze frame data; clear codes when applicable. P-1
2. Describe the use of the OBD monitors for repair verification. P-1

VIII. ENGINE PERFORMANCE

C. Fuel, Air Induction, and Exhaust Systems

1. Replace fuel filter(s) where applicable. P-2
2. Inspect, service, or replace air filters, filter housings, and intake duct work. P-1
3. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action. P-1
4. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; determine necessary action. P-1
5. Check and refill diesel exhaust fluid (DEF). P-2

VIII. ENGINE PERFORMANCE

D. Emissions Control Systems

1. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather, valve, tubes, orifices, and hoses; perform necessary action. P-2

Topical Outline of Instruction

1. Safety and Shop Operations Review
2. Automatic Transmission and Transaxle
3. Manual Transmissions and Axles
4. Electrical and Electronics
5. Engine Performance
6. Light Diesel

Class Requirements

- Students will develop a three-ring binder/portfolio of all handouts, quizzes and tests.
- Students will successfully complete homework, quizzes and tests.
- Students will successfully complete shop projects as assigned and approved by instructor and maintain documentation of completion.
- Students will keep the shop clean and organized
- Students are required to wear proper dress while in the lab area (shorts, open toe shoes, etc. will not be permitted).

Automotive Technology

- Students must pass the Safety Exam at the beginning of the year in order to work out in the lab area.
- Students WILL wear safety glasses AT ALL TIMES in the lab area.
- Students must pass all tool safety tests with a 100% score before being allowed to use any given tools out in the shop area.
- Students must turn in all paperwork at the first of the year, signed by their parents/guardian, before participating in work in the lab.
- Students must work in a mature manner in the lab. Any horseplay will endanger the welfare of other students and is grounds for dismissal from the program.
- Students will earn a 10-hour OSHA General Industry safety certification

Entry Recommendations

- Auto Tech I
- Students should have high school level math and reading skills.
- Students should have an interest in the Auto Repair Field.
- Students should be self-motivated.
- Students should have good communication skills.
- Students should be able to work together with others.

Student Evaluation and Grading

10%: Attendance and Participation

10%: Homework

20%: Quizzes

30%: Tests

30%: Practice of Safety and Shop Participation, including Portfolio

A grade of “C” or better is required to satisfactorily complete the course

Text

Online: [Electude-www.meeasterncc.com](http://www.meeasterncc.com)

Students will be given log in information they are responsible to keep track of it to access the online classroom

Students are required to take care of the school supplied tools and equipment.

Required personal protective equipment must be worn at all times in lab. This includes work boots, and safety glasses.

Clothing should be appropriate to shop work, and be okay to get dirty/ greasy.

Office Hours

7:30-2:30 Monday-Friday

Appointments can be made to accommodate student needs.

Cell Phones

Cell phones must be set to vibrate or silence during all class periods. Students that find it necessary to accept a call during class time should do so ONLY on an emergency basis with instructor permission and should leave the classroom/lecture area to do so. Texting or any other disturbance during class times will NOT be tolerated and students will be asked to turn over the cell phone to the instructor and will be assigned a zero (0) for that period. The student can retrieve the phone at the end of the class.

Plagiarism Statement

Adherence to ethical academic standards is obligatory. Cheating is a serious offense, whether it consists of taking credit for work done by another person or doing work for which another person will receive credit. Taking and using the ideas or writings of another person without clearly and fully crediting the source is plagiarism and violates the academic code. If it is proven that a student in any course in which s/he is enrolled has knowingly committed such a violation, appropriate action will be taken which may result in suspension from the course and a failing grade in the course.