

# Dakota County Technical College

## **AUTM 2225: Advanced Engine & Transmission Diagnosis & Repair**

### **A. COURSE DESCRIPTION**

Credits: 6

Lecture Hours/Week: 2

Lab Hours/Week: 4

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course includes: advanced automatic transmission and engine diagnostic procedures. Advanced repair of automatic transmissions and engines. Prerequisite: Successful completion of AUTM2100 Basic Automotive Electricity, AUTM2125 Engine Theory and Operation, AUTM2215 Automatic transmission/Transaxle Theory with a minimum overall score of 70% OR concurrent enrollment in course 2960 Skill Development with instructor approval.

**B. COURSE EFFECTIVE DATES:** 12/11/2009 - Present

**C. OUTLINE OF MAJOR CONTENT AREAS**

## **D. LEARNING OUTCOMES (General)**

1. Complete work order to include customer information vehicle identifying information, customer concern, related service history, cause, and correction
2. Diagnose engine noises and vibrations; determine necessary action
3. Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine necessary action
4. Identify and interpret engine concern; determine necessary action
5. Inspect and replace engine cooling and heater system hoses
6. Inspect auxiliary oil coolers; determine necessary action
7. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action
8. Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action
9. Inspect, and test fans(s) (electrical or mechanical), fan clutch, fan shroud, and air dams
10. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment
11. Inspect, test, and replace oil temperature and pressure switches and sensors
12. Inspect, test, and replace thermostat and gasket
13. Inspect, test, remove, and replace water pump
14. Install engine covers using gaskets, seals and sealers as required
15. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals)
16. Perform cooling system, cap, and recovery system tests (pressure, combustion leakage, and temperature) pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank and hoses; determine necessary action
17. Perform cylinder cranking compression tests; determine necessary action
18. Perform cylinder leakage tests; determine necessary action
19. Perform cylinder power balance tests; determine necessary action
20. Perform engine vacuum tests; determine necessary action
21. Perform oil pressure tests; determine necessary action
22. Remove and reinstall engine in a late model front-wheel or rear wheel drive vehicle (OBD-11 or newer); reconnect all attaching components and restore the vehicle to running condition
23. Remove and replace radiator
24. Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins
25. Test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required
26. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction
27. Diagnose electrical/electronic concerns using principals of electricity (Ohm's law)
28. Diagnose electronic transmission control systems using a scan tool; determine necessary action
29. Diagnose fluid loss and condition concerns; check fluid level on transmissions with and without dipstick; determine necessary action
30. Diagnose mechanical and vacuum control system concerns; determine necessary action
31. Diagnose noise and vibration concerns; determine necessary action
32. Diagnose pressure concerns in the transmission using hydraulic principles (Pascal's Law)
33. Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles
34. Identify and interpret transmission concern; assure proper engine operation; determine necessary action
35. Inspect and replace external seals and gaskets

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36. Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers
37. Inspect extension housing, bushings, and seals; perform necessary action
38. Inspect, adjust or replace (as applicable) vacuum modulator; inspect and repair or replace lines and hoses
39. Inspect, adjust or replace throttle (TV) linkages or cables; manual shift linkages or cables; transmission range sensor; check gear select indicator (as applicable)
40. Inspect, repair, and replace governor assembly
41. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals)
42. Perform lock-up converter system tests; determine necessary action
43. Perform oil and filter change
44. Perform pressure tests; determine necessary action
45. Perform stall test; determine necessary action
46. Remove, overhaul, and reinstall transmission/transaxle
47. Research applicable vehicle and service information, such as transmission/transaxle system operation, fluid type, vehicle service history, service precautions, and technical service bulletins
48. Service transmission; perform visual inspection; replace fluids and filters

**E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted