



## AST 211 Automatic Transmission Repair

### Course Information

Division	ASET
Contact Hours	120
Theory	30
Lab Hours	90
Total Credits	5

Prerequisites – AST 103, AST 105

### Course Description

This course focuses on the theory of operation, testing, diagnosis and repair of automatic transmissions and transaxles. Hydraulic theory, torque multiplication factor, and planetary gear set operation will be covered in detail. Proper disassembly and reassembly procedures will be emphasized.

This course will be an elective course taken by students who chose to take this as their elective in the AAS in Automotive Service Technology program

### Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to meet the program outcomes listed below:

- A. Demonstrate the correct method of utilizing automotive service tools and equipment
- B. Identify all related system diagnostic/repair information within automotive service information
- C. Employ safe and professional work habits while conducting typical automotive service procedures.
- D. Explain how the various systems of an automobile work
- E. Demonstrate correct service procedures in the various automotive systems
- F. Test and diagnose the proper operation of the various automotive systems

### Course Outcomes

In order to evidence success in this course, the students will be able to:

#### 1. Understand and demonstrate general transmission and transaxle operation and diagnosis

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Identify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine necessary action.
- b) Research applicable vehicle and service information fluid type, vehicle service history, service precautions, and technical service bulletins.
- c) Diagnose fluid loss and condition concerns; determine necessary action.
- d) Check fluid level in a transmission or a transaxle equipped with a dip-stick.
- e) Check fluid level in a transmission or a transaxle not equipped with a dip-stick.
- f) Perform pressure tests (including transmissions/transaxles equipped with electronic pressure control); determine necessary action.



## AST 211 Automatic Transmission Repair

- g) Diagnose noise and vibration concerns; determine necessary action.
- h) Perform stall test; determine necessary action.
- i) Perform lock-up converter system tests; determine necessary action.
- j) Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.
- k) Diagnose electronic transmission/transaxle control systems using appropriate test equipment and service information.
- l) Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law).

### 2. Understand and demonstrate in-vehicle transmission/transaxle maintenance and repair procedures

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.
- b) Inspect for leakage; replace external seals, gaskets, and bushings.
- c) Inspect, test, adjust, repair, or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses.
- d) Drain and replace fluid and filter(s).
- e) Inspect, replace and align powertrain mounts.

### 3. Understand and demonstrate out of vehicle transmission and transaxle repair procedures

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mating surfaces.
- b) Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings.
- c) Inspect converter flex (drive) plate, converter attaching bolts, converter pilot, converter pump drive surfaces, converter end play, and crankshaft pilot bore.
- d) Describe the operational characteristics of a continuously variable transmission (CVT).
- e) Describe the operational characteristics of a hybrid vehicle drive train.
- f) Disassemble, clean, and inspect transmission/transaxle.
- g) Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, sleeves, retainers, brackets, check valves/balls, screens, spacers, and gaskets).
- h) Inspect servo and accumulator bores, pistons, seals, pins, springs, and retainers; determine necessary action.
- i) Assemble transmission/transaxle.
- j) Inspect, measure, and reseal oil pump assembly and components.
- k) Measure transmission/transaxle end play or preload; determine necessary action.
- l) Inspect, measure, and replace thrust washers and bearings.



## **AST 211 Automatic Transmission Repair**

- m) Inspect oil delivery circuits, including seal rings, ring grooves, and sealing surface areas, feed pipes, orifices, and check valves/balls.
- n) Inspect bushings; determine necessary action.
- o) Inspect and measure planetary gear assembly components; determine necessary action.
- p) Inspect case bores, passages, bushings, vents, and mating surfaces; determine necessary action.
- q) Diagnose and inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform necessary action.
- r) Inspect, measure, repair, adjust or replace transaxle final drive components.
- s) Inspect clutch drum, piston, check-balls, springs, retainers, seals, and friction and pressure plates, bands and drums; determine necessary action.
- t) Measure clutch pack clearance; determine necessary action.
- u) Air test operation of clutch and servo assemblies.
- v) Inspect roller and sprag clutch, races, rollers, sprags, springs, cages, retainers; determine necessary action.

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