



APTA BTS-BMT-RP-002-10, Rev. 1

Published: October 1, 2010

First Revision: October 6, 2016

APTA Bus Maintenance Training  
Working Group

# Training Syllabus to Instruct/Prepare for the ASE Transit Bus Transmission and Drive Train Test

**Abstract:** This *Recommended Practice* provides guidelines for establishing a standardized bus maintenance training related to the ASE certification program syllabus for transmissions and drivetrains used in transit buses and coaches.

**Keywords:** Automotive Service Excellence (ASE) H3, bus, certification, drivetrain, training, transit, transmissions

**Summary:** This *Recommended Practice* allows users to instruct/prepare transit bus technicians and mechanics for the Automotive Service Excellence (ASE) H3 Transit Bus Transmission and Drive Train Test and to evaluate, develop or enhance current training programs for the diagnosis, repair and maintenance of transit bus transmission and drivetrain systems. Individual operating agencies should modify these guidelines to accommodate their specific equipment and modes of operation.

**Scope and purpose:** This *Recommended Practice* reflects the consensus of the APTA Bus Standards Program members in conjunction with transit labor organizations, including ATU and TWU, on the subject material, manuals, textbooks, test equipment, methods and procedures that have provided the best performance record based on the experiences of those present and participating in meetings of the program task forces and working groups. APTA recommends the use of this document by organizations that have a training department or conduct training for the maintenance of transit buses, organizations that contract with others for transit bus maintenance training, and organizations that influence how training for transit bus maintenance is conducted.

This document represents a common viewpoint of those parties concerned with its provisions, namely operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any standards, recommended practices or guidelines contained herein is voluntary. In some cases, federal and/or state regulations govern portions of a transit system's operations. In those cases, the government regulations take precedence over this standard. The North American Transit Service Association and its parent organization APTA recognize that for certain applications, the standards or practices, as implemented by individual agencies, may be either more or less restrictive than those given in this document.

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## Participants

The American Public Transportation Association greatly appreciates the contributions of the **Bus Transit Standards Transmissions and Drivetrains Working Group**, which provided the primary effort in the drafting of this document.

At the time this standard was completed, the working group included the following members:

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# Training Syllabus to Instruct/Prepare for the ASE Transit Bus Transmission and Drive Train Test

## 1. Learning environment

For best application of this *Recommended Practice*, a combination of classroom lectures, mentoring, practical training and practice tests should be included in the training program.

## 2. Computer skills

Basic computer skills are now a standard for transit bus technicians. Basic skills and knowledge in the operation of a computer in a Microsoft Windows environment are essential.

## 3. Course descriptions and objectives

The learning objectives listed below have been developed through a labor-management committee of subject matter experts (SMEs). The Learning Objective Levels represent 100 (introductory), 200 (intermediate) and 300 (advanced) levels. Within each level, the learning objectives are organized in the recommended order of instruction. When a transit bus mechanic demonstrates proficiency in the learning objectives, he or she should be capable of attaining ASE Transit Bus Technician Certification.

- **Modules A1, A2 and A3: Automatic Transmission 101, 201, 301:** The objective of these courses is to familiarize the employee with the basics of automatic transmission components and operation, diagnosis, inspection, testing and component repairs/replacements to restore the automatic transmission to OEM specifications.
- **Module B1: Drive Shaft and Universal Joints 101:** The objective of this course is to familiarize the employee with the basics of driveshaft and universal joint components and operation, diagnosis, inspection, causes of failures and needed repairs to restore all components to OEM specifications.
- **Module C1: Drive Axle 101:** The objective of this course is to familiarize the employee with the basics of drive axle diagnosis and repairs, including inspections, cleaning, removing/replacing components and restoring the drive axle to OEM specifications.

## 4. Exam requirements

The minimum acceptable grade to pass the course and all practical tests is 75 percent. Students must pass written tests with a minimum grade of 80 percent.

## 5. ASE test content summary

**TABLE 1**

Specifications for Transit Drive Train Test

Content Area	Questions in Test	Percent of Test
A. Automatic Transmission Diagnosis and Repair	28	70%
B. Drive Shaft and Universal Joint Diagnosis	4	10%
C. Drive Axle Diagnosis and Repair	8	20%
<b>Total</b>	<b>40</b>	<b>100%</b>

## References

National Institute for Automotive Service Excellence (ASE) website. <http://www.ase.com/>

## Definitions

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## Abbreviations and acronyms

<b>ABS</b>	antilock brake system
<b>ASE</b>	Automotive Service Excellence
<b>ATC</b>	automatic traction control
<b>ATU</b>	Amalgamated Transit Union
<b>DMM</b>	digital multimeter
<b>EDSI</b>	Educational Data Systems, Inc.
<b>LED</b>	light-emitting diode
<b>NATSA</b>	North American Transit Service Association
<b>OEM</b>	original equipment manufacturer
<b>OJT</b>	on-the-job training
<b>PPE</b>	personal protective equipment
<b>RPM</b>	revolutions per minute
<b>SME</b>	subject matter expert
<b>TCM</b>	transmission control module
<b>TWU</b>	Transport Workers Union

## Document history

Document Version	Working Group Vote	Public Comment/ Technical Oversight	CEO Approval	Policy & Planning Approval	Publish Date
First published					October 1, 2010
First revision	June 1, 2013	July 7, 2016	Sept. 6, 2016	Sept. 30, 2016	October 6, 2016
Second revision					

## Appendix A: Transit bus transmission/drivetrain learning objectives

<b>101 SAFETY &amp; COMPLIANCE</b>	
<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate proper stall test safety procedures	A4
Demonstrate proper disposal/recycling of fluids	A7, C3, C4
Demonstrate proper disposal of filter	A7
Explain importance of complying with manufacturer's recommendations	All

  

<b>101 THEORY &amp; USE OF REFERENCE MATERIALS</b>	
<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate proper use of service manual	A3, A4, A9, A10, A13, A14, B1
Describe importance of maintaining transmission fluid at correct level	A2
Refer to manufacturer's specs	A3, A4, A7, A18, C3
Check OEM manual for proper fluid type	A2, A7

  

<b>101 PROCEDURES, INSPECTIONS &amp; TESTING</b>	
<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate proper use of dipstick for checking fluid level (operating temperature, level ground, gear selection)	A2
Demonstrate proper use of shifter pad or other level indicators for checking fluid level	A2
Visually check for transmission fluid leaks	A2
Demonstrate proper use of drain pan	A7, A10
Check lines for rubbing or other damage	A10
Visually inspect for leaks	A2, A9, C2
Visually inspect bolt holes	C5
Visually inspect sealant surfaces	C6

  

<b>102 SAFETY &amp; COMPLIANCE</b>	
<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate proper use of safety equipment	A1, A3, A4, A5, A6
Follow proper safety precautions	A1, A3, A6, A5, A6
Demonstrate proper use of personal protective equipment (PPE)	A7, B2, C2

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**102 THEORY & USE OF REFERENCE MATERIALS**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Check OEM manual for proper fluid and filter capacity	A7, C3
Refer to manufacturer's specifications	A2, A7, A16, A17, B3, C1, C2
Demonstrate use of troubleshooting guide	A18
Demonstrate ability to refer to manual for proper part number	A13, B2, C8

**102 TOOL USAGE & DIAGNOSTICS**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate proper use of torque wrench and air pressure gauge	A7, A10, A14, A5, C4, C6, C8, C9
Demonstrate proper use of jacks and jack stands	A15, A20, B2, C4
Demonstrate proper use of handheld diagnostic reader to check level (LED)	A2, A18
Demonstrate proper use of seal installers and pullers	A9, C2
Demonstrate proper use of U-joint pullers and presses	B2

**102 PROCEDURES, INSPECTIONS & TESTING**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Check transmission fluid condition	A1, A7, A10
Check shift cable operation and for proper lubrication	A6
Apply proper torque for drain plug and filter housing bolts	A7
Refill fluid to proper level	A2, A7,
Use of proper external seal and gasket hardware	A9
Visually check for leaks	A9, A10
Drain and refill fluids	A7
Visually inspect for fluid leaks, damaged holes and/or damaged threads	A9, A10
Check driveshaft for proper phase	B1, B2
Check for driveshaft damage	B1, B2
Check mounting flange/fasteners	B1, B2
Check U-joint wear	B1, B2
Check for proper lubrication	B1, B2
Check for play	B2
Check for rust	B2
Check mounting fasteners/hardware for driveline	B2
Check fluid level and condition in rear drive axle	C3
Inspect and clean rear drive axle breather	C1, C2



Training Syllabus to Instruct/Prepare for the ASE Transit Bus Transmission and Drive Train Test

**103 SAFETY & COMPLIANCE**

Learning Objectives	ASE Task Reference
Demonstrate proper safety procedures	A1

**103 THEORY & USE OF REFERENCE MATERIALS**

Learning Objectives	ASE Task Reference
Refer to manufacturer's specs for angle, torque, offset of transmission and flex plate	A15, A16

**103 TOOL USAGE & DIAGNOSTICS**

Learning Objectives	ASE Task Reference
Demonstrate proper use of mechanical tachometer	A4
Demonstrate proper use of gasket sealant	A9
Demonstrate proper use of pyrometer (temp gun) and analog thermometer	A12

**103 PROCEDURES, INSPECTIONS & TESTING**

Learning Objectives	ASE Task Reference
Identify transmission fluid condition through sight and smell	A2
Check cables, shift linkages	A6
Visually inspect cooler, lines, breathers, filters and fittings	A10
Inspect breather for clogs and contaminants	A10
Visually check mounts and clamping hardware for damage	A15, A16
Check driveshaft alignment angle	B1, B3
Check output shaft	B1
Check pinion shaft	B1, C1
Check slip joint and U-joint for proper lubrication and seals	B2

**201 SAFETY & COMPLIANCE**

Learning Objectives	ASE Task Reference
Demonstrate proper use of personal protective equipment (PPE)	C4, C7, C9

**201 THEORY & USE OF REFERENCE MATERIALS**

Learning Objectives	ASE Task Reference
Explain causes and consequences of driveshaft vibrations	A1, B1
Evaluate oil analysis report	A2
Follow manufacturer instructions for flushing machine	A10
Refer to manufacturer's specs for proper resistance, clearance and depth	A12
Refer to manual for proper torque specs	A15, B2, C4

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**201 TOOL USAGE & DIAGNOSTICS**

Learning Objectives	ASE Task Reference
Demonstrate proper use of handheld diagnostic equipment	A1, A13,
Demonstrate use of diagnostic equipment for tachometer reading	A4
Demonstrate proper use of pullers, extractors and installers	A9, C2
Demonstrate proper use of lifts, forklifts and cranes	A15, C4
Demonstrate proper use of digital multimeter (DMM)	A13, A18, A19, A20
Demonstrate proper use of axle puller	C2, C5, C6
Demonstrate proper use of dial indicator	A16, B2, C6, C7, C9
Demonstrate proper use of wheel jack	C7, C8

**201 PROCEDURES, INSPECTIONS & TESTING**

Learning Objectives	ASE Task Reference
Perform stall test	A1, A4
Calibrate dipstick and demonstrate proper dipstick usage	A2, A7
Compare electronic (level sensor) reading to mechanical (dipstick) fluid level	A2, A13
Verify proper bolts are used and check for cracks or bends	A14, A15, A16
Remove air lines	A8
Demonstrate proper use of clamping hardware	A15
Visually inspect flex plate	A15
Check axle mounting hardware	C1, C5
Check for pinion play	C1
Replace rear axle drive unit fluid and fill to proper level	C3, C4
Adjust speed sensor air gap	C6, C7
Visually inspect locking and nuts for damage	C7, C8
Check fluid level in differential	C3, C4
Inspect wheel bearing end play, adjust to manufacturer's specifications or replace as needed	C7, C8
Remove and/or replace seal wear rings	C8
Visually inspect for abnormal wear and/or damage	C4, C8
Visually inspect locking nuts for damage	C8
Inspect planetary thrust washers and planetary gear for abnormal wear	C9

**202 THEORY & USE OF REFERENCE MATERIALS**

Learning Objectives	ASE Task Reference
Describe the uses of different seal types	A9
Use manufacturer's specifications to identify proper runout and engine-to-transmission mounting adapters	A16
Refer to service manual for removal and replacement of axle and driveshaft procedures	B2, C4, C5

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**202 TOOL USAGE & DIAGNOSTICS**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate proper use of analog tachometer (RPMs)	A4
Demonstrate proper use of depth gauge	A8, A9, C9
Demonstrate proper use of flushing equipment	A10
Demonstrate proper use of diagnostic equipment to check temperature circuit	A12
Demonstrate ability to choose appropriate diagnostic tool	A18, A19, A20
Demonstrate proper use of seal remover and installer	A9, C8, C9

**202 PROCEDURES, INSPECTIONS & TESTING**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Check related components for vibrations	A1, B1, C1
Road-test bus to determine shifting problems	A1
Perform road test for lockup converter system test	A5
Drain/flush torque converter and transmission cooler	A7, A10
Demonstrate ability to use proper lines and fittings	A10
Demonstrate ability to troubleshoot using known good parts when appropriate	A13, A19
Disconnect/reconnect electrical cables/harnesses	A17
Inspect seals and gaskets	A9
Inspect wheel bearing end play and adjust to manufacturer's specifications	C8
Demonstrate ability to use proper sealing material	C4, C5, C6
Inspect axle shafts for cracks	C5
Inspect tone ring runout	C6
Visually inspect tone ring for missing teeth and other damage	C6

**203 THEORY & USE OF REFERENCE MATERIALS**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate ability to read and interpret schematics	A13, A17, A19
Demonstrate knowledge of driveline clearances	A14, B3
Demonstrate knowledge of vibrations in transmission and (differential) rear end	A14, B1, C1
Demonstrate ability to use troubleshooting guides for drivetrain mounting problems	A14

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**203 TOOL USAGE & DIAGNOSTICS**

Learning Objectives	ASE Task Reference
Demonstrate proper use of pressure gauge set	A1, A3, A5
Demonstrate proper use of laptop and diagnostic software package	A1, A4, A13, A18, A19, A20
Demonstrate proper use of diagnostic equipment for determining input speed of engine and turbine speed of transmission while in operation	A5, A13
Demonstrate proper use of temperature gauge or laptop to test temperature drop	A12, A13
Demonstrate proper use of pressure-test equipment to check transmission cooler for leaks	A10

**203 PROCEDURES, INSPECTIONS & TESTING**

Learning Objectives	ASE Task Reference
Inspect output speed sensor	A11
Repair damaged holes and threads in housing	A16
Describe the operation of multiplex interface	A19
Demonstrate ability to troubleshoot multiplex interface	A19
Check speed sensor for resistance and output	A11

**301 THEORY & USE OF REFERENCE MATERIALS**

Learning Objectives	ASE Task Reference
Describe the various means of data communication between the drivetrain and other vehicle components	A19

**301 TOOL USAGE & DIAGNOSTICS**

Learning Objectives	ASE Task Reference
Demonstrate proper use of angle gauge	B3
Demonstrate proper use of dial caliper	A11, C9
Demonstrate proper use of offset gauge	B3
Demonstrate proper use of spring tension gauge	A8

**301 PROCEDURES, INSPECTIONS & TESTING**

Learning Objectives	ASE Task Reference
Check pinion shaft backlash	C1, C4
Evaluate transmission fluid analysis report	A2

**302 THEORY & USE OF REFERENCE MATERIALS**

Learning Objectives	ASE Task Reference
Explain the role of temperature and resistance	A12, A13

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**302 TOOL USAGE & DIAGNOSTICS**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate ability to use laptop to check data communication link	A19
Determine proper data interface cable to use for laptop	A13, A18, A19
Determine proper translation module	A19
Demonstrate proper use of a micrometer	C7, C9

**303 THEORY & USE OF REFERENCE MATERIALS**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Describe the process of data networking between different systems (ABS, ATC, etc.)	A19
Demonstrate ability to read hydraulic, pneumatic, electrical and mechanical schematics	A18, A19

**303 TOOL USAGE & DIAGNOSTICS**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate proper use of laptop for testing pressure	A18
Demonstrate proper use of straight edge and feeler gauge	A16
Demonstrate proper use of a breakout box to determine whether problem is software-related or hardware-related	A18, A19

**303 PROCEDURES, INSPECTIONS & TESTING**

<b>Learning Objectives</b>	<b>ASE Task Reference</b>
Demonstrate ability to reset fast adapt/adaptive shifting	A18
Check communications cables	A19
Demonstrate ability to interpret communications	A19

## Appendix B: ASE transit bus drivetrain tasks

### A. Automatic transmission diagnosis and repair

1. Diagnose noise, vibration and shifting problems; determine needed repairs.
2. Check transmission fluid level; check dipstick calibration; diagnose fluid usage, leaks and condition; determine needed repairs.
3. Perform transmission pressure tests; determine needed repairs.
4. Perform stall tests; determine needed repairs.
5. Perform lock-up converter system tests; determine needed repairs.
6. Diagnose mechanical control systems; determine needed repairs.
7. Replace fluid and internal/external filter(s).
8. Inspect, test, adjust and/or replace retarder controls, valves, air lines, sensors and components.
9. Inspect and replace external seals and gaskets.
10. Inspect, test and flush transmission, transmission cooler and lines; inspect breathers, filters and fittings; service as required.
11. Inspect, test, reinstall or replace vehicle speed sensor.
12. Inspect and test transmission temperature circuit for accuracy; determine needed repairs.
13. Inspect, test, diagnose, adjust, repair or replace electrical/electronic components, including the transmission control module (TCM), electronic modulators, solenoids, sensors, relays, switches, lights, fuses/breakers, wiring and connectors.
14. Inspect, replace and align drivetrain mounts.
15. Remove and replace transmission; inspect flex plate.
16. Inspect engine block, flywheel housing and transmission mating surfaces; check runout; check engine-to-transmission mounting adapters; determine needed repairs.
17. Inspect, test, repair or replace electronic shift selectors, switches, displays and indicators, and wiring harnesses.
18. Diagnose automatic transmission and retarder problems using appropriate diagnostic tools and software, procedures, and service information/flow charts; check and record diagnostic trouble codes; clear codes; interpret digital multimeter (DMM) readings;
19. Diagnose automatic transmission problems caused by data link/bus interfaces with the transmission control module (TCM); identify electrical interference problems; determine needed repairs.
20. Inspect, adjust, service, repair or replace power take-off assemblies and controls.

### B. Drive shaft and universal joint diagnosis and repair

1. Diagnose driveshaft and universal joint noise and vibration problems; determine cause of failure and needed repairs.
2. Inspect, service or replace driveshaft, slip joints, yokes, drive flanges, universal joints and vibration dampers; phase driveshaft yokes.
3. Measure driveline angles; determine needed adjustments.

### C. Drive axle diagnosis and repair

1. Diagnose rear axle drive unit noise, vibration and overheating problems; determine needed repairs.
2. Check and repair fluid leaks; inspect and replace rear axle drive unit cover plates, gaskets, breathers, magnetic plugs and pinion seals.
3. Check rear axle drive unit fluid level and condition; determine needed service; add proper type of lubricant.
4. Remove and replace differential carrier assembly; check ring and pinion backlash; inspect rear axle housing mating surfaces; determine needed repairs.
5. Remove, inspect and replace axle shafts.

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6. Remove and replace rear wheel hub assembly; inspect ABS tone/exciter ring and wheel speed sensor; determine needed repairs.
7. Diagnose wheel bearing noises and damage; determine needed repairs.
8. Clean, inspect, lubricate and replace wheel bearing cones and races (cups); clean and inspect locking plates and nuts; replace seals, wear rings and axle flange gasket; adjust rear wheel bearings.
9. Inspect, adjust, repair or replace planetary axle assemblies, including case, idler pinion, pins, gears, thrust washers, shims, seals, cover and springs.

## Appendix C: Sample curriculum

### Transmission/Drive Train—Module A1

#### *Automatic Transmission 101*

**Goal:** Participants should understand the basics of automatic transmission components and operation.

**Objectives:** Familiarize the employee with the basics of automatic transmission components and operation, diagnosis, inspection, testing and component repairs/replacements to restore the automatic transmission to OEM specifications.

**Job tasks/learning objectives/OJT checklist:** OJT checklists may be used with the learning objectives listed under Section A of the ASE Task Lists (Appendix B) and the equivalent tasks listed in Appendix A

**Course description:** Participants will receive classroom instruction in which a qualified instructor will go over the basics of automatic transmission components and operation, including pertinent theory, component identification, safety issues, applicable tools/equipment and basic testing. Participants should leave the course with a basic understanding of how automatic transmissions operate and relevant components to operation.

**Recommended class size:** 8-12

**Prerequisites (previous module and/or demonstrated experience):**

**Delivery method (e.g., lecture, hands-on, online, lab):** Hands-on and classroom

**Course duration:**

**Target audience:** All new and existing mechanics

**Classroom equipment and supplies:** Notepads, pens/pencils, flip chart or whiteboard (and markers), classroom, laptop, projector, highlighters, note cards and name cards

**Course materials, training aids and references:**

**Instructor:**

**Course developer:** EDSI

**Subject matter experts:** Contact APTA.

**Revision dates:** 9/10/2010

**Follow-up:** Most recent revision should be sent to committee for feedback.

**Instructor and course evaluation:** Local course evaluation sheets should be used if present.

### Transmission/Drive Train—Module A2

#### *Automatic Transmission 201*

**Goal:** Participants should understand basic troubleshooting techniques for a transit bus automatic transmission through an enhanced understanding of theory and proper operation.

**Objectives:** Familiarize the employee with intermediate-level tasks for maintaining automatic transmission components and operation, diagnosis, inspection, testing and component repairs/replacements to restore the automatic transmission to OEM specifications.

**Job tasks/learning objectives/OJT checklist:** OJT checklists may be used with the learning objectives listed under Section A of the ASE Task Lists (Appendix B) and the equivalent tasks listed in Appendix A



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**Course description:** Participants will receive instruction from a qualified instructor regarding basic troubleshooting and preventive maintenance procedures for an automatic transmission, including the identification of defective/worn components and probable causes of failure. Emphasis will be placed on inspection and testing procedures.

**Recommended class size:**

**Prerequisites (previous module and/or demonstrated experience):** Participants should have taken Automatic Transmission 101 or have equivalent experience.

**Delivery method (e.g., lecture, hands-on, online, lab):** Hands-on and classroom

**Course duration:**

**Target audience:** Anyone successfully completing Automatic Transmission 101 or demonstrating equivalent knowledge/experience

**Classroom equipment and supplies:** Notepads, pens/pencils, flip chart or whiteboard (and markers), classroom, laptop, projector, highlighters, note cards and name cards

**Course materials, training aids and references:**

**Instructor:**

**Course developer:** EDSI

**Subject matter experts:** Contact APTA.

**Revision dates:** 9/10/2010

**Follow-up:** Most recent revision should be sent to committee for feedback.

**Instructor and course evaluation:** Local course evaluation sheets should be used if present.

**Transmission/Drive Train—Module A3**

*Automatic Transmission 301*

**Goal:** Participants should be able to perform all necessary actions required to restore the automatic transmission to OEM specifications.

**Objectives:** Familiarize the employee with advanced level tasks for maintaining automatic transmission components and operation, diagnosis, inspection, testing and component repairs/replacements to restore the automatic transmission to OEM specifications.

**Job tasks/learning objectives/OJT checklist:** OJT checklists may be used with the learning objectives listed under Section A of the ASE Task Lists (Appendix B) and the equivalent tasks listed in Appendix A

**Course description:** Participants will be led by a qualified instructor through the process of restoring the automatic transmission to OEM specifications. This includes instructor demonstrations and participant practice. This portion is highly interactive and should employ hands-on learning activities.

**Recommended class size:**

**Prerequisites (previous module and/or demonstrated experience):** Participants should have taken Automatic Transmission 201 or have equivalent experience.

**Delivery method (e.g., lecture, hands-on, online, lab):** Hands-on and classroom

**Course duration:**

**Training Syllabus to Instruct/Prepare for the ASE Transit Bus Transmission and Drive Train Test**

**Target audience:** Anyone successfully completing Automatic Transmission 201 or demonstrating equivalent knowledge/experience

**Classroom equipment and supplies:** Notepads, pens/pencils, flip chart or whiteboard (and markers), classroom, laptop, projector, highlighters, note cards and name cards

**Course materials, training aids and references:**

**Instructor:**

**Course developer:** EDSI

**Subject matter experts:** Contact APTA.

**Revision dates:** 9/10/2010

**Follow-up:** Most recent revision should be sent to committee for feedback.

**Instructor and course evaluation:** Local course evaluation sheets should be used if present.

**Transmission/Drive Train—Module B1**  
*Drive Shaft and Universal Joint 101*

**Goal:** Participants should understand the basics of driveshaft and universal joint components and operation and how to troubleshoot and repair them to OEM specifications.

**Objectives:** Familiarize the employee with the basics of driveshaft and universal joint components and operation, diagnosis, inspection, causes of failures and needed repairs to restore all components to OEM specifications.

**Job tasks/learning objectives/OJT checklist:** OJT checklists may be used with the learning objectives listed under section B of the ASE Task Lists (Appendix B) and the equivalent tasks listed in Appendix A

**Course description:** Participants will receive classroom instruction in which a qualified instructor will go over the basics of driveshaft and universal joint components and operation, including diagnosis, inspection, causes of failure and repairs.

**Recommended class size:** 8-12

**Prerequisites (previous module and/or demonstrated experience)**

**Delivery method (e.g., lecture, hands-on, online, lab):** Hands-on and classroom

**Course duration:**

**Target audience:** All new and existing mechanics

**Classroom equipment and supplies:** Notepads, pens/pencils, flip chart or whiteboard (and markers), classroom, laptop, projector, highlighters, note cards and name cards

**Course materials, training aids and references:**

**Instructor:**

**Course developer:** EDSI

**Subject matter experts:** Contact APTA.

**Revision dates:** 9/10/2010

**Follow-up:** Most recent revision should be sent to committee for feedback.

**Instructor and course evaluation:** Local course evaluation sheets should be used if present.

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Transmission/Drive Train—Module C1

*Drive Axle 101*

**Goal:** Participants should understand the basics of drive axle components, operation, diagnosis and repairs to restore the drive axle to OEM specifications.

**Objectives:** Familiarize the employee with the basics of drive axle diagnosis and repairs including inspections, cleaning, removing/replacing components and restoring the drive axle to OEM specifications.

**Job tasks/learning objectives/OJT checklist:** OJT checklists may be used with the learning objectives listed under Section A of the ASE Task Lists (Appendix B) and the equivalent tasks listed in Appendix A

**Course description:** Participants will receive classroom instruction in which a qualified instructor will go over the basics of drive axle components and operation, including diagnosis, inspection, cleaning and repairs to fully restore the drive axle to OEM specifications.

**Recommended class size:** 8-12

**Prerequisites (previous module and/or demonstrated experience):**

**Delivery method (e.g., lecture, hands-on, online, lab):** Hands-on and classroom

**Course duration:**

**Target audience:** All new and existing mechanics

**Classroom equipment and supplies:** Notepads, pens/pencils, flip chart or whiteboard (and markers), classroom, laptop, projector, highlighters, note cards and name cards

**Course materials, training aids and references:**

**Instructor:**

**Course developer:** EDSI

**Subject matter experts:** Contact APTA.

**Revision dates:** 9/10/2010

**Follow-up:** Most recent revision should be sent to committee for feedback.

**Instructor and course evaluation:** Local course evaluation sheets should be used if present.