



Format CO COURSE OUTLINE

AUTOMATIC TRANSMISSION

AM215

Course Title

Dept. & Course No.

I COURSE DESCRIPTION

This course is designed to enhance the knowledge, skills and attitude of an individual in servicing hydraulically operated automatic transmission. And it also includes overhauling of all automatic transmission gear box and valve body repair.

II SEMESTER CREDITS: 3

III CONTACT HOURS PER WEEK:

2

Lecture

3

Laboratory

5

Total

IV PREREQUISITE: AM124

V STUDENTS LEARNING OUTCOMES

Upon completion of this course the student will be able, with 65% level of accuracy, to:

1.) Name the main components of automatic transmission and explain their functions as per repair manual specification.

2.) Explain the operating performance of automatic transmission.

3.) Perform stall test in a correct procedure.

VI. COURSE CONTENT

A. Main components of automatic transmission and their functions

1. Torque converter
2. Oil pump assembly
3. Planetary gear box
4. Neutral safety switch
5. Valve body
6. Parking lock mechanism
7. Servo piston

B. Operating performance of automatic transmission

1. Stall speed
2. Hydraulic pressure (line pressure)
3. Time lag
4. Type of Automatic transmission fluid

C. Stall test procedure

1. Applying brakes (parking brake and pedal brake).
2. Accelerating accelerator pedal
3. Engine rpm
4. Fluid level

- 4.) Name automatic transmission gear box parts and components and explain their functions as per repair manual specifications.
 - 5.) Explain the operating principle of automatic transmission.
 - 6.) Explain automatic transmission power flow in all speed ranges.
 - 7.) Explain automatic transmission gear ratio in all speed ranges.
 - 8.) Service automatic transmission gear box as per repair manual specifications.
5. Locking tires
 - D. Automatic transmission gear box parts and components
 1. Forward clutch
 2. Direct clutch
 3. Planetary gear unit number 1 and 2
 4. One-way clutch number 1 and 2
 5. Brake number 1, 2, and 3 assemblies
 6. Overdrive assembly
 7. Input shaft
 8. Intermediate shaft
 9. Output shaft
 - E. Automatic transmission operating principle
 1. Torque converter
 2. Lock-up mechanism
 3. Oil pump
 4. Valve body
 5. Actuating mechanism
 6. Accumulators
 - F. Automatic transmission power flow
 - a. D – range (1st, 2nd, 3rd, and OD)
 - b. L – range (low speed engine brake)
 - c. R – range (reverse direction)
 - d. Cranking the engine (P or N position)
 - G. Automatic transmission gear ratio
 - a. D – range (1st, 2nd, 3rd, and OD)
 - b. L – range (low speed engine brake)
 - c. R – range (reverse direction)
 - d. Planetary gear ratio formula
 - H. Automatic transmission gear box servicing
 1. Forward clutch assembly
 2. Direct clutch assembly
 3. Planetary gear unit number 1 and 2
 4. One-way clutch number 1 and 2
 5. Brake number 1, 2, and 3 assemblies
 6. Overdrive assembly
 7. Input shaft
 8. Intermediate shaft
 9. Output shaft
 10. Seal rings
 11. O –rings

- 9.) Name valve body parts and components and explain their functions as per repair manual specifications.
 - 10.) Explain the operating principle of valve body.
 - 11.) Service valve body assembly as per repair manual specifications.
 - 12.) Name automatic transmission solenoid valves and explain their functions as per manual specifications.
 - 13.) Explain the operating principles of automatic transmission solenoid valves.
 - 14.) Check automatic transmission solenoid valve circuitry.
 - 15.) Perform automatic transmission solenoid valve functionality test as per repair manual specifications.
- I. Valve body parts and components
 1. Throttle valve
 2. Primary regulator valve
 3. Manual valve
 4. 1-2 shift valve
 5. 2-3 shift valve
 6. 3-4 shift valve
 7. Relay valve
 8. Signal valve
 - J. Valve body operating principle
 1. D – range (1st, 2nd, 3rd, and OD)
 2. L – range (low speed engine brake)
 3. R – range (reverse direction)
 - a. Throttle valve
 - b. Primary regulator valve
 - c. Manual valve
 - d. 1-2 shift valve
 - e. 2-3 shift valve
 - f. 3-4 shift valve
 - g. Relay valve
 - h. Signal valve
 - K. Valve body servicing
 1. Upper valve body
 2. Lower valve body
 3. Valve body plate
 4. Steel balls and valve retainers
 - L. Automatic transmission solenoid valves
 1. Solenoid valve number 1
 2. Solenoid valve number 2
 3. Solenoid valve number 3 to 5
 - M. Solenoid valve operating principle
 1. Solenoid valve number 1
 2. Solenoid valve number 2
 3. Solenoid valve number 3 to 5
 4. Hydraulic circuitry
 - N. Solenoid valve circuitry
 1. Solenoid valve number 1
 2. Solenoid valve number 2
 3. Solenoid valve number 3 to 5
 - O. Automatic transmission solenoid valve functionality test
 1. Solenoid valve number 1
 2. Solenoid valve number 2
 3. Solenoid valve number 3 to 5

16.) Explain automatic transmission shifting linkage mechanism operating principle.

- P. Automatic transmission shifting linkage
1. Throttle cable
 2. Shift cable
 3. Neutral start switch
 4. Shift lever

17.) Service shifting linkage mechanism of automatic transmission in a correct procedure.

- Q. Shifting linkage servicing procedure
1. Throttle cable
 2. Shift cable
 3. Neutral start switch
 4. Shift lever and lock mechanism

VII MATERIALS AND EQUIPMENT

Materials	Equipment
Automatic transmission fluid	OBD II (On-Board Diagnostic Generation II)
Automatic transmission sealer	Stethoscope
Washing solvent	Oil pressure gauge
Cork gasket	Oscilloscope tester
Vellumoid gasket	Automatic transmission puller
Hand soap	Multi meter digital
Shop rugs	Multi meter analog
Gasket silicon	
O-ring gasket	

VIII TEXT AND REFERENCES

A Required Text:

James E. Duffy, **Modern Automotive Technology**, Tinley Park Illinois,
 GOODHEART-WILLCOX COMPANY, INC. 2004
 ISBN-10: 1-59070-186-0
 ISBN-13: 978-1-59070-186-7

IX METHOD OF INSTRUCTION

- A. Lecture
- B. Visual Aid
- C. Demonstration
- D. Discussion

X METHOD OF EVALUATION:

1.) The components with corresponding weight in percent included in the computation of the final grade are:

Course work (quizzes / class works / homework / projects)	30%
Skill Tests	40%
Exam (Midterm and final exam)	30%

	100%

2.) The transmutation of the total percent to a letter grade is as of follows:

90 – 100 A

80 – 89 B

70 – 79 C

65 – 69 D

0 – 64 F



**Form NC-2
TASK LISTING SHEET**

AM215 AUTOMATIC TRANSMISSION

Course No. & title

Credits: 2 1 48 hours
Lec. lab Total lab Hrs.

Laboratory objectives	Time allotment
1.) Perform stall test in a correct procedure. a. Check automatic transmission for functionality. b. Check automatic transmission for hydraulic pressure. c. Check automatic transmission for shifting time d. Check automatic transmission fluid for quantity and quality.	8 hours
2.) Service automatic transmission gear box as per repair manual specifications. a. Check automatic transmission clutches for functionality. b. Check automatic transmission brakes for functionality. c. Check automatic transmission one-way clutch for functionality. d. Check automatic transmission planetary gear unit for backlash and clearances.	15 hours
3.) Service valve body assembly as per repair manual specifications. a. Overhaul valve body upper unit. b. Overhaul valve body lower unit.	10 hours
4.) Check automatic transmission solenoid valve circuitry. a. Check solenoid valves for forward gears for functionality and circuitry. b. Check solenoid valve for reverse gear.	5 hours
5.) Perform functionality test for automatic transmission solenoid valve as per repair manual specifications. a. Perform functionality test for forward gear solenoid valves. b. Perform functionality test for reverse gear solenoid valves.	5 hours
6.) Service shifting linkage mechanism of automatic transmission in a correct procedure. a. Check throttle and shifting cable for smooth movement. b. Check neutral safety switch for functionality and circuitry. c. Check shift and lock mechanism for functionality.	5 hours



PALAU COMMUNITY COLLEGE
AM215 AUTOMATIC TRANSMISSION
COURSE LEARNING OUTCOMES

During the course experience, the course learning outcomes (CLO's) will be assessed through the use of signature assignments. A rating scale will be used to determine the students' proficiency level of each CLO using specifically aligned assignments. The numerical ratings of 3, 2, and 1 are not intended to represent the traditional school grading system of A, B, C, D, and F. The descriptions associated with each of the numbers focus on the level of student performance of each of the course learning outcomes listed below:

Rating scale:

Level of performance

- 3. Highly Competent 85% to 100%
- 2. Competent 70% to 84%
- 1. Beginner Below 70%

Course learning outcome #1: Inspect Automatic Transmission Operating Performance

Paper based assessment: Name Automatic transmission parts and components and explain gear box and torque converter operating principle and analyze cause and effect involving automatic transmission problems.

Authentic Assessment: Check ATF quality and quantity, Conduct hydraulic test, stall test, time lag test and/or change ATF to correction specification.

Highly Competent 3 (10 points)	Student demonstrates the knowledge and skills in inspecting Automatic Transmission Operating Performance with 85% to 100% performance accuracy.
Competent 2 (7 points)	Student demonstrates the knowledge and skills in inspecting Automatic Transmission Operating Performance with 70% to 84% performance accuracy.
Beginner 1 (3 points)	Student demonstrates the knowledge and skills in inspecting Automatic Transmission Operating Performance with below 70% performance accuracy.

Course learning outcome #2: Service Gear Box assembly

Paper based assessment: Name automatic transmission planetary gear type parts and components, and their functions, and draw the power flow of D-range 1st, 2nd, 3rd, 4th, overdrive, reverse, and low speed gear.

Authentic Assessment: Service planetary gear set, gear box clutches, gear box brakes, gear box one-way clutch, and/or overhaul automatic transmission assembly.

Highly Competent 3 (10 points)	Student demonstrates the knowledge and skills in servicing Gear Box assembly with 85% to 100% performance accuracy.
Competent 2 (7 points)	Student demonstrates the knowledge and skills in servicing Gear Box assembly with 70% to 84% performance accuracy.
Beginner 1 (3 points)	Student demonstrates the knowledge and skills in servicing Gear Box assembly with below 70% performance accuracy.

Course learning outcome #3: Service Valve body Assembly

Paper based assessment: Name valve body parts and components and explain their function, explain the operating principles of automatic transmission hydraulic circuitry, and analyze cause and effect involving valve body problems.

Authentic Assessment: Overhaul valve body assembly and/or check throttle valve, lock-up valve, modulator and accumulator valve, shift valves, regulator valves, and pressure relief valves for functionality.

Highly Competent 3 (10 points)	Student demonstrates the knowledge and skills in servicing Valve body Assembly with 85% to 100% performance accuracy.
Competent 2 (7 points)	Student demonstrates the knowledge and skills in servicing Valve body Assembly with 70% to 84% performance accuracy.
Beginner 1 (3 points)	Student demonstrates the knowledge and skills in servicing Valve body Assembly with below 70% performance accuracy.

Course learning outcome #4: Service Automatic Transmission Solenoid Valves

Paper based assessment: Name automatic transmissions Solenoid valves and explain their functions, explain the operating principle of automatic transmission solenoid valves, and analyze cause and effect involving automatic transmission solenoid valve problems.

Authentic Assessment: Clean solenoid valve for clogged and/or check forward solenoid valves, reverse solenoid valves, overdrive solenoid valves, check brake band solenoid valves, and actuators for functionality, rationality, and circuitry.

Highly Competent 3 (10 points)	Student demonstrates the knowledge and skills in servicing Automatic Transmission Solenoid Valves with 85% to 100% performance accuracy.
Competent 2 (7 points)	Student demonstrates the knowledge and skills in servicing Automatic Transmission Solenoid Valves with 70% to 84% performance accuracy.
Beginner 1 (3 points)	Student demonstrates the knowledge and skills in servicing Automatic Transmission Solenoid Valves with below 70% performance accuracy.

Course learning outcome #5: Service Automatic Transmission Shifting Linkage

Paper based assessment: Name automatic transmission shifting linkage parts and components and explain their functions, explain the operating principle of Automatic transmission shifting linkage.

Authentic Assessment: Check shifting linkage movement, Adjust shifting linkage as per manual specification, and/or check shifting lock and neutral safety switch for functionality and circuitry.

Highly Competent 3 (10 points)	Student demonstrates the knowledge and skills in servicing Automatic Transmission Shifting Linkage with 85% to 100% performance accuracy.
Competent 2 (7 points)	Student demonstrates the knowledge and skills in servicing Automatic Transmission Shifting Linkage with 70% to 84% performance accuracy.
Beginner 1 (3 points)	Student demonstrates the knowledge and skills in servicing Automatic Transmission Shifting Linkage with below 70% performance accuracy.