Las Positas College
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Course Outline for AUTO A2

AUTOMATIC TRANSMISSION/TRANSAXLE

Effective: Fall 2016

I. CATALOG DESCRIPTION:
AUTO A2 — AUTOMATIC TRANSMISSION/TRANSAXLE — 4.00 units

An in depth study of engine, transmission, transaxles: mechanical, measurement, and assembly. An in-depth study of the above mentioned components including theory, teardown, evaluate, qualifying, and rebuilding. Students are encouraged to enroll in Automotive Lab concurrently.

2.00 Units Lecture 2.00 Units Lab

Prerequisite
AUTO INTR - Automotive Service and Introduction
with a minimum grade of C
(May be taken concurrently)

Grading Methods:
Letter or P/NP

Discipline:

	MIN
Lecture Hours:	36.00
Lab Hours:	108.00
Total Hours:	144.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:
Before entering the course a student should be able to:

A. AUTOINTR
1. identify and describe uses of automotive related tools;
2. perform basic engine teardown and reassembly;
3. apply Ohm's law, read basic schematics, test automotive electrical systems;
4. identify different transmissions, understand theory of operation of both manual and automatic transmissions and fluid requirements;

IV. MEASURABLE OBJECTIVES:
Upon completion of this course, the student should be able to:

A. Demonstrate the basic safety procedures of handling hazardous waste materials.
B. Explain the history of powertrain evolution.
C. Operate a wide variety of precision measurement equipment.
D. Explain transmission gear ratio and hydraulic theory.
E. Teardown typical transmission assembly.
F. Take measurements of transmission components and compare to specifications.
G. Qualify new and used transmission components
H. Rebuild transmission to manufacturer specifications.
I. Maintain a clean and professional environment.
J. Demonstrate Ohm's law
K. Test transmission valve bodies and diagnose issues

V. CONTENT:
A. Safety
1. Tool usage and nomenclature
2. Proper disposal procedures
3. Environmentally conscious decisions
B. Powertrain evolution
1. Horsepower and emission trade offs
2. Environmental decisions driving design
3. The first automatic transmissions
4. Current automatic transmissions

a. More gear ratios
b. Different fluids
c. Internal design improvements

C. Measurement tools
1. Micrometer
a. Vernier
b. Caliper
2. Dial bore gauge
3. Snap gauges
4. Straight edge
5. Feeler gauges
6. Hole gauges

D. Automatic Transmission Theory
1. Gear Ratios
a. Shift Points
b. Planetary gear sets
c. Valves
d. Clutches
e. Sprags
2. Hydraulics
a. Basic and advanced hydraulics
b. Hydraulic control components
c. Fluid pressures
1. Line
2. Apply
3. Release
4. Clutch
5. Accumulator
6. Torque
7. Servo
8. D4, D3, D2, D1
3. Other Components
a. Final Drives
b. Torque converters
c. Apply systems
d. Differential components
e. Electrical components
1. TCM, THECM, PCM
2. Fluid temperature sensor
3. TISS and TOSS
4. TCC
5. PRNDL

E. Transmission Teardown
1. Removal and identification of FWD
a. Special procedures
2. Removal and identification of RWD
a. Special procedures

F. Component measurement
1. Specification lookup
2. Comparison
a. Component diagnosis
1. Failure analysis

G. . Qualification of replacement components
1. Correct component?
2. New and used part comparison

H. Transmission rebuilding
1. Manufacturer Procedures
a. Component sequence
b. Torque specifications
c. Tightening sequences
d. Special concerns
2. Assembly lube
3. Gaskets and sealers

I. Ohm's law

J. Valve body diagnosis

K. Professionalism
1. Safety glasses
2. Working shop expectations
3. Attitude
4. Cleanliness
5. Maintenance of work areas and tools

VI. METHODS OF INSTRUCTION:

A. **Lab** - Group and individual laboratory activities
B. **Lecture** -

VII. TYPICAL ASSIGNMENTS:

A. Lecture based assignments
1. Lecture on Automatic transmission clutch packs

B. Lab based assignments
1. Remove and measure clutch pack travel, reassemble.

C. Text reading assignments
1. Read Chapter One.

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Quizzes

3. Lab Activities

B. **Frequency**

1. Minimum two tests
    a. Midterm
    b. Final
2. Weekley quizzes
3. Biweekly lab assignments
4. Weekly homework assignments from text

IX. TYPICAL TEXTS:

1. Rehkopf, Jeffery. *Automotive Engine Repair and Rebuilding.*, Prentice Hall, 2014.
2. Birch, Tom. *1. Automatic Transmissions and Transaxles*., Prentice Hall, 2014.
3. Halderman, James. *Automotive Maintenance and Light Repair.* 6 ed., Pearson, 2014.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

A. Safety glasses