

Course Outline for NAUT CA2

CONCEPTS OF AUTOMATIC TRANSMISSION/TRANSAXLE

Effective: Fall 2021

I. CATALOG DESCRIPTION:
 NAUT CA2 — Noncredit

This class is lecture only and non-credit. 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.

Grading Methods:

Pass/No Pass

Discipline:

- Automotive Technology

Noncredit Category

I - Short-Term Vocational

	MIN
Total Noncredit Hours:	36.00

II. PREREQUISITE AND/OR ADVISORY SKILLS:

III. 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. Explain transmission gear ratio and hydraulic theory.
- D. Demonstrate Ohm's law in practice

IV. CONTENT:

- A. Safety
- 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. Ohm's law
F. Valve body diagnosis
G. Professionalism

V. METHODS OF INSTRUCTION:

- A. **Lecture** -

VI. TYPICAL ASSIGNMENTS:

- A. Lecture based assignments
 1. Lecture on Automatic transmission clutch packs
- B. Text reading assignments
 1. Read Chapter One.

VII. EVALUATION:

Methods/Frequency

- A. Exams/Tests
monthly
- B. Quizzes
weekly

VIII. TYPICAL TEXTS:

1. Johanson, Chris. *Automatic Transmissions and transaxles*. 5 ed., Goodheart Wilcox, 2021.
2. Duffy, James. *Modern Automotive Technology*. 9 ed., Goodheart Wilcox, 2020.

IX. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Computer with internet access