

**Course Outline for AUTO INTL**

**AUTOMOTIVE SERVICE AND INTRODUCTION HANDS-ON LAB**

**Effective: Fall 2021**

**I. CATALOG DESCRIPTION:**

AUTO INTL — AUTOMOTIVE SERVICE AND INTRODUCTION HANDS-ON LAB — 2.00 units

This is the Lab section that can only be taken if you are also taking INTZ. Bumper-to-Bumper Automotive Knowledge. Starting with hazardous waste handling, tool identification, maintenance and lubrication, moving into engine mechanical, emissions controls, suspension systems, air conditioning, airbags and safety, transmissions, axles, and finishing off with the future of the automotive industry. This is an introductory class for people who want to know more about their vehicle or who are planning an automotive career.

2.00 Units Lab

**Corequisite**

AUTO INTZ - Automotive Service and Introduction Lecture

**Grading Methods:**

Letter or P/NP

**Discipline:**

- Automotive Technology

	<b>MIN</b>
<b>Lab Hours:</b>	108.00
<b>Total Hours:</b>	108.00

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

**III. PREREQUISITE AND/OR ADVISORY SKILLS:**

**IV. MEASURABLE OBJECTIVES:**

**Upon completion of this course, the student should be able to:**

- A. Utilize and apply hazardous waste handling;
- B. Identify and describe uses of automotive related tools;
- C. Describe the importance of preventative maintenance and inspection procedures as they relate to the automobile;
- D. Discuss four stroke engine cycle and identify engine parts;
- E. Perform basic engine teardown and reassembly;
- F. Apply Ohm's law, read basic schematics, test automotive electrical systems;
- G. Identify emissions components, understand 5 gas theory;
- H. Discuss heating and cooling systems, perform basic cooling systems tests;
  - I. Identify air conditioning systems, understand cycles of refrigerant;
- J. Discuss braking systems, perform a brake inspection, identify parts;
- K. Differentiate between suspension and steering system types, inspect and qualify components;
- L. Identify different transmissions, understand theory of operation of both manual and automatic transmissions and fluid requirements;
- M. Restraints system identification, know safety concerns of each system and inspection of restraint systems;
- N. Theorize on the future of the automotive industry.

**V. CONTENT:**

- A. Safety and Handling of hazardous waste materials
  - 1. Occupational Safety Health Administration (OSHA) Shop standards applied
  - 2. Industry safety standards applied
  - 3. Hazardous material handling; waste oil, as well as other chemicals related to the automobile
- B. Tool Identification
  - 1. Ratchets, Sockets, Wrenches, Screwdrivers
  - 2. Torque Wrenches
  - 3. Hammers, Pliers
  - 4. Specialty Tools
- C. Maintenance and inspection
  - 1. Manufacturing recommendations
  - 2. Periodic inspections for unusual conditions
  - 3. Component failure inspections
  - 4. Chassis lubrication

- 5. Engine oil changes
  - a. On car application
- 6. Fluid inspection and service
  - a. Leaks
  - b. Power steering
  - c. Transmission
  - d. Axles
  - e. Washer
  - f. Coolant/Antifreeze
  - g. On car application
- D. Four stroke Engine Cycle
  - 1. Intake
  - 2. Compression
  - 3. Power
  - 4. Exhaust
  - 5. Timing
    - a. Spark
    - b. Camshaft
- E. Gasoline Engine Component Identification and Teardown
  - 1. History of design and metallurgy of engines
  - 2. Engine Block components
  - 3. Cylinder Head components
  - 4. Intake, Exhaust and other major bolt on components
- F. Electrical Systems
  - 1. Ohms law Theory
  - 2. Electrical Schematic Icons and drawings
  - 3. Battery Basics
  - 4. Alternator/Generator Basics
  - 5. Starter Motor Basics
  - 6. Electrical Testing
    - a. Battery
      - 1. Theory
      - 2. On car application
    - b. Alternator
      - 1. Theory
      - 2. On car application
    - c. Starter
      - 1. Theory
      - 2. On car application
- G. Emissions Systems
  - 1. Parts Identification
  - 2. Reading Emissions Labels
  - 3. Smog Controls
    - a. California and Federal Requirements
    - b. History of the Smog Program
    - c. Government and Manufacturer laws and regulations
  - 4. Environmental Responsibilities
- H. Heating and Cooling
  - 1. History and current innovations of heating and cooling systems
  - 2. Parts Identification
  - 3. Heating operation
  - 4. Heating Systems Testing
    - a. On car application
  - 5. Coolant Systems Testing
    - a. On car application
- I. Air Conditioning Systems
  - 1. Environmental concerns
  - 2. Parts Identification
  - 3. On car Testing and inspection procedures and application
- J. Braking systems
  - 1. Base Systems
    - a. Brake systems history and improvements through time
    - b. Fluid differences and cautions
    - c. Parts Identification
    - d. On car inspection procedures
    - e. Government and Manufacturer laws and regulations
    - f. On car application
  - 2. Antilock Systems
    - a. Differences from base systems
    - b. Parts Identification
- K. Steering and Suspension Systems
  - 1. Historical information and current technology
  - 2. Steering
    - a. Fluid usage current and historical
    - b. Different steering systems
    - c. Parts Identification
    - d. On car inspection procedures and application
    - e. Government and Manufacturer laws and regulations
  - 3. Steering
    - a. Different suspension systems
    - b. Parts Identification
    - c. On car inspection procedures and application
- L. Transmissions and Axles
  - 1. History of the transmission
  - 2. Automatic Transmissions
    - a. Fluid Requirements
      - 1. On Car fluid checking
    - b. Gears sets
    - c. Clutches, Bands and Sprags
    - d. Torque Converters

- 3. Manual Transmissions
  - a. Fluid Requirements
  - b. Clutch
  - c. Gears
- 4. Front and Rear Axles
  - a. Fluid Requirements
  - b. Ring Gear
  - c. Pinion Gear
  - d. Propshafts
- 5. Transfer Cases
  - a. Fluid Requirements
  - b. Electronic and Manual
  - c. Clutches
  - d. Gears
- M. Safety Restraints
  - 1. Seat Belts
    - a. Installation Concerns
    - b. Inspection and Replacement
  - 2. Airbags
    - a. History of Airbags and current technology
    - b. Parts Identification
  - 3. Inspection and Replacement
  - 4. Airbag deployment demonstration
- N. Automotive Industry Future
  - 1. Environmental Concerns
  - 2. Oil Supply Concerns
    - a. Middle East Stability
    - b. How much is left?
  - 3. Electronic Integration
    - a. Computers
    - b. Steering
    - c. Braking
    - d. Parking
    - e. Heads up Displays
    - f. Navigation
    - g. Entertainment Systems
    - h. Communication Systems
    - i. Optical Systems
  - 4. Alternative Fuels
    - a. CNG
    - b. Propane
    - c. Bio-Diesel
    - d. E85
    - e. Hydrogen
  - 5. Hybrids
    - a. Gasoline/Electric
    - b. Diesel/Electric
    - c. Hydrogen/Electric

#### VI. METHODS OF INSTRUCTION:

- A. Mockup parts from automobiles
- B. **Lab** - Student Hands-on laboratory activities and assignments

#### VII. TYPICAL ASSIGNMENTS:

- A. Apply lecture in lab by evaluating vehicles in lab setting
- B. Evaluate and discuss Fluke 87 readings with class
- C. Repair and confirm basic automotive maintenance issues

#### VIII. EVALUATION:

##### **Methods/Frequency**

- A. Group Projects  
Weekly
- B. Class Participation  
Daily
- C. Class Work  
Daily
- D. Lab Activities  
Weekly

#### IX. TYPICAL TEXTS:

- 1. Giles, Tim. *Automotive Service: Inspection, Maintenance, Repair*. 6 ed., Cengage, 2019.
- 2. Halderman, James. *Automotive Maintenance and Light Repair*. 6 ed., Pearson, 2020.
- 3. Duffy, James. *Modern Automotive Technology*. 9 ed., Goodheart-Wilcox Publishing, 2017.

#### X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Safety glasses