Automotive Technology: Principles, Diagnosis and Service, 2nd ed.

Principles and practices of diagnosis and troubleshooting of automotive electrical, electronic, and computer systems.

Overview

This book covers each area of automotive service and will help you learn how all of the systems within the vehicle are connected. Our revised format with smaller sections will make it easier for students to learn and master the content.

New to this edition
- 3 new chapters on Hybrid and Fuel cell vehicles and vehicle safety procedures

Comprehensive and easy-to-read, this text presents principles and practices of diagnosis and troubleshooting of automotive electrical, electronic, and computer systems at a level of detail that far exceeds most similar texts.

This 1488-page book and interactive multi-media CD-ROM brings to life the sights and sounds of the “whys” and “hows” of all phases of diagnosis and troubleshooting.

Written by: James D. Halderman, Sinclair Community College and Chase D. Mitchell, Utah Valley State College.

Table of Contents:

Each chapter starts with objectives, and ends with a summary, review questions, and ASE Certification-type questions.

Section One: Careers in the Automotive Service Area
Chapter 1-Automotive Background and Overview
Chapter 2-Careers in the Automotive Industry
Chapter 3-Starting a Career in the Automotive Industry
Chapter 4-Working as a Professional Service Technician
Chapter 5- Technician Certification
Section Two: Safety and Environmental
Chapter 6- Shop Safety
Chapter 7-Environmental and Health Concerns

Section Three: Tools, Shop Equipment and Measuring
Chapter 8-Fasteners and Thread Repair
Chapter 9-Hand Tools
Chapter 10-Power Tools and Shop Equipment
Chapter 11-Vehicle Hoisting
Chapter 12- Measuring Systems and Tools

Section Four-Principles, Math and Calculations
Chapter 13-Scientific Principles and Materials
Chapter 14-Math, Charts, and Calculations

Section Five: Vehicle Service Information and Routine Maintenance
Chapter 15-Service Information
Chapter 16-Vehicle Identification and Emission Ratings
Chapter 17-Preventative Maintenance and Service Procedures

Section Six: Engine Repair
Chapter 18- Gasoline Engine Operation, Parts, and Specification
Chapter 19-Diesel Engine Operation, Parts, and Specifications
Chapter 20-Cooling System Operation and Diagnosis
Chapter 21-Lubrication System Operation and Diagnosis
Chapter 22- Intake and Exhaust Systems
Chapter 23-Turbocharging and Supercharging
Chapter 24-Engine Condition Diagnosis
Chapter 25- Engine Disassembly, Cleaning, and Crack Detection
Chapter 26-Cylinder Heads and Valves
Chapter 27- Camshafts and Valve Trains
Chapter 28- Pistons, Rings and Connecting Rods
Chapter 29-Engine Blocks, Crankshafts and Bearings
Chapter 30-Engine Blueprinting and Assembly

Section Seven-Electrical and Electronic Systems
Chapter 31-Electrical Fundamentals
Chapter 32-Electrical Circuits and Ohm’s Law
Chapter 33-Series, Parallel, and Series-Parallel Circuits
Chapter 34-Digital Meters and Scope Usage
Chapter 35-Automotive Wiring and Wire Repair
Chapter 36-Wiring Schematics and Troubleshooting
Chapter 37-Capacitance and Magnetism
Chapter 38-Electronic Fundamentals
Chapter 39-Batteries and Battery Testing
Chapter 40-Cranking System Operation and Diagnosis
Chapter 41-Charging System Operation and Diagnosis
Chapter 42-Lighting and Signaling Circuits
Chapter 43-Driver Information and Navigation Systems
Chapter 44-Horn, Wiper, and Blower Motor Circuits
Chapter 45-Accessory Circuits
Chapter 46-Restraint Systems and Airbags
Chapter 47-Audio System Operation and Diagnosis
Section Eight
Chapter 48- Heating and Air Conditioning Components and Operation
Chapter 49-Automatic Air Conditioning System Diagnosis
Chapter 50-Heating and Air Conditioning System Diagnosis
Chapter 51-Heating and Air Conditioning System Service

Section Nine-Engine Performance
Chapter 52-Gasoline and Alternative Fuels
Chapter 53-Computer and Network Fundamentals
Chapter 54-On Board Diagnosis
Chapter 55- Computer Sensors
Chapter 56-Ignition System Components and Operation
Chapter 57-Ignition System Diagnosis and Service
Chapter 58-Fuel Pumps, Lines, and Filters
Chapter 59-Fuel-Injection Components and Operation
Chapter 60- Fuel Injection System Diagnosis and Service
Chapter 61-Vehicle Emission Standards and Testing
Chapter 62-Emission Control Devices Operation and Diagnosis
Chapter 63-Scan Tools and Engine Performance Diagnosis

Section Ten-Hybrid and Fuel Cell Vehicles
Chapter 64-Hybrid Electric Vehicle Fundamentals
Chapter 65-Hybrid Electric Vehicle Safety Procedures
Chapter 66-Fuel Cells and Advanced Technologies

Section Eleven-Brakes
Chapter 67-Brake System Components and Performance Standards
Chapter 68-Braking System Principles
Chapter 69-Brake Hydraulic Systems
Chapter 70-Hydraulic Valves and Switches
Chapter 71-Brake Fluid and Lines
Chapter 72-Brake Bleeding Methods and Procedures
Chapter 73-Wheel Bearings and Service
Chapter 74-Drum Brake Parts and Operation
Chapter 75-Drum Brake Diagnosis and Service
Chapter 76-Disc Brake Parts and Operation
Chapter 77-Disc Brake Diagnosis and Service
Chapter 78-Parking Brake Operation, Diagnosis, and Service
Chapter 79-Machining Brake Drum and Rotors
Chapter 80-Power-Assisted Brake Device Operation and Diagnosis
Chapter 81-Antilock Brake and Traction Control Systems
Chapter 82-ABS Diagnosis and Service

Section Twelve
Chapter 83- TIres and Wheels
Chapter 84-Tire and Wheel Service
Chapter 85-Suspension System Components and Operation
Chapter 86-Front Suspension and Service
Chapter 87-Rear Suspension and Service
Chapter 88-Electronic Suspension Systems
Chapter 89-Steering Columns and Gears
Chapter 90-Steering Linkage and Service
Chapter 91-Power Assisted Steering Operation and Service
Chapter 92-Wheel Alignment Principles
Chapter 93-Alignment Diagnosis and Service

Section Thirteen-Manual Drive Train and Axles
Chapter 94-Clutches
Chapter 95-Manual Transmission/Transaxles
Chapter 96-Drive Shafts and CV Joints
Chapter 97-Drive Axles Shaft and CV Joint Service
Chapter 98-Differentials
Chapter 99- Four-Wheel Drive and All-Wheel Drive

Section Fourteen
Chapter 100-Automatic Transmission/Transaxle Principles
Chapter 101-Hydraulic Components and Control Systems
Chapter 102-Automatic Transmission/Transaxles Diagnosis and In-Vehicle Service
Chapter 103-Automatic Transmission/Transaxle Service Unit Repair

Appendix 1- ASE Certification Test Correlation Chart
Appendix 2- NATEF Correlation Chart