

DTD-AEA-101

# **Diploma Training Deerwalk Autoservices**

# Program Information



**Nature of the Course**  
Theory + Practical



**Total Hours per Day**  
4 hours



**Course Duration**  
30 Days + 30 Days  
Internship

## Course Summary

The Car Mechanics course is designed to equip learners with the foundational skills and practical knowledge necessary to perform various automotive repairs and diagnostics. This course covers engine fundamentals, transmission and drivetrain repair, electrical systems, air conditioning, bodywork, and detailing. Students will also learn how to work with tools, diagnose issues, and apply safe practices in a workshop environment. The program emphasizes hands-on experience, enabling students to perform tasks such as engine diagnostics, tire services, body repairs, and A/C maintenance, preparing them for a career in automotive repair and service.

## Objective

- Gain an understanding of car mechanics from engine fundamentals to advanced systems such as air conditioning and electrical systems.
- Learn how to use advanced diagnostic tools like OBD-II scanners, multimeters, and manifold gauges to assess vehicle conditions.
- Perform hands-on repairs and maintenance tasks, such as engine diagnostics, brake system repairs, wheel alignments, and bodywork.
- Gain proficiency with a variety of tools, including diagnostic equipment, manual tools, and power tools.
- Understand how different vehicle systems, such as the engine, transmission, suspension, and electrical network, work together to ensure proper vehicle function.
- Develop troubleshooting skills for both simple and complex mechanical issues, focusing on problem identification and repair.

## Target Group

- Individuals looking to begin a career in car maintenance and repair.
- Hobbyists who want to gain a deeper understanding of car mechanics and perform their own repairs.
- Experienced professionals seeking to enhance their skills with the latest diagnostic tools, technologies, and systems.
- Individuals managing vehicle fleets or working in service departments who need practical training for vehicle maintenance.
- Vehicle owners who wish to learn how to maintain and repair their own cars.

# Training Method

- Interactive lessons that cover the fundamental principles of automotive systems, tools, diagnostics, and repairs.
- Each week includes practical sessions where students can work on real vehicles to apply theoretical knowledge. This includes engine diagnostics, brake jobs, tire repairs, and more.
- Instructors will demonstrate repair and diagnostic techniques, such as engine compression tests, brake system replacement, and wheel alignments.
- Students will participate in simulated repair scenarios, addressing common mechanical failures and testing troubleshooting skills.
- Emphasis on proper safety procedures in the workshop, including the handling of hazardous materials, tool usage, and fire prevention.
- Collaborative group exercises, allowing students to work together on complex tasks like major bodywork repairs or full vehicle diagnostic assessments.

# Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

- Students must attend at least 90% of the classes and workshops to ensure adequate exposure to both theory and practical exercises.
  - Successful completion of weekly hands-on assessments with a minimum of 80% performance in tasks such as engine diagnostics, brake system repairs, and tire service.
  - Achieve a minimum score of 60% on written theory exams, which will cover topics like automotive electrical systems, engine repair, and safety procedures.
  - Completion of group and individual projects, such as diagnosing and repairing a vehicle's engine or performing a complete tire service, with satisfactory results.
  - At the end of the course, students will need to complete a final practical and written assessment that demonstrates their proficiency in car mechanics, including system diagnostics, repair techniques, and safety standards.
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# Course Details

## Car Mechanics

### Week 1: Welcome to the World Under the Hood

- Engine Fundamentals: Deep dive into the 4-stroke cycle, exploring each stage in detail. Examine different engine configurations (inline, V, boxer) and their applications.
- Tool Time: Not just "how to use a wrench," but mastering a wide range of tools, from torque wrenches and sockets to specialized diagnostic equipment like compression testers and vacuum gauges.
- Workshop Safety: Beyond the basics, learn how to handle hazardous materials (fuels, oils, coolants), proper lifting techniques, and fire safety in an automotive environment.
- Hands-on: Perform a full service – oil change, filter replacement, spark plug inspection/replacement, air filter check. Learn to identify common wear and tear.

### Week 2: Engine Diagnostics and Repair – Level 1

- The Engine's Language: Learn to diagnose problems by sound – knocking, ticking, hissing – and by analyzing performance issues (stalling, loss of power, rough idling).
- Diagnostic Tools in Action: Master the OBD-II scanner, interpreting codes and live data. Use pressure gauges to test fuel systems, compression testers for cylinder health.
- Common Engine Troubles: Hands-on repair of common issues – replacing a faulty thermostat, diagnosing and fixing a coolant leak, understanding and addressing basic ignition problems.
- Hands-on: Perform a compression test, diagnose a misfire, replace a faulty ignition coil.

### Week 3: Transmission and Drivetrain – The Power Transfer

- Transmission Types: Explore the inner workings of manual, automatic, and CVT transmissions. Understand gear ratios and their impact on performance.
  - Clutch Mastery (Manual): Disassemble and reassemble a clutch system. Learn about hydraulics and how they apply to clutch operation. Adjust and bleed clutch systems.
  - Drivetrain Fundamentals: Understand the role of the differential, driveshaft, and axles in transferring power to the wheels. Learn about different drivetrain layouts (FWD, RWD, AWD).
  - Hands-on: Inspect and replace a CV joint, diagnose a differential problem, understand the function of a transfer case (4WD vehicles).
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## **Week 4: Steering, Suspension, and Brakes – Control and Stopping Power**

- **Steering Systems:** Compare and contrast different steering systems (power steering, rack and pinion, recirculating ball). Diagnose and address common steering problems.
  - **Suspension Deep Dive:** Explore various suspension types (MacPherson strut, double wishbone) and their components. Learn how to inspect and replace shocks, struts, springs, and control arms.
  - **Brake System Fundamentals:** Master the hydraulic brake system, including calipers, rotors, pads, and master cylinder. Learn about ABS and electronic brake systems.
  - **Hands-on:** Perform a brake job (pad and rotor replacement), diagnose a suspension noise, inspect and replace a tie rod end.
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# Car Electricals

## Week 1: Electricity – The Foundation

- **Electrical Theory:** Go beyond the basics – understand voltage, current, resistance, and Ohm's Law. Learn about series and parallel circuits, and how they apply to automotive systems.
- **Wiring Diagrams and Schematics:** Become fluent in reading and interpreting automotive wiring diagrams. Understand common symbols and color codes.
- **Diagnostic Tools:** Master the multimeter, using it to test voltage, current, resistance, and continuity. Learn to use test lights and other electrical diagnostic tools.
- **Hands-on:** Build basic circuits, test continuity in wiring harnesses, identify and repair a broken wire.

## Week 2: Battery and Charging – The Heart of the Electrical System

- **Battery Types and Technologies:** Explore different battery chemistries (lead-acid, AGM, lithium-ion) and their applications in modern vehicles.
- **Charging System Operation:** Understand the alternator's role in charging the battery and powering electrical accessories. Learn about voltage regulators and rectifiers.
- **Troubleshooting and Repair:** Diagnose charging system problems using a multimeter and other tools. Learn to test and replace alternators, starters, and batteries.
- **Hands-on:** Perform a battery load test, diagnose a faulty alternator, replace a starter motor.

## Week 3: Lighting and Accessories – Seeing and Being Seen

- **Automotive Lighting:** Explore different lighting technologies (halogen, LED, HID) and their applications. Learn about headlight aiming and regulations.
  - **Power Accessories:** Understand the operation of power windows, locks, mirrors, and seats. Diagnose and repair common problems with these systems.
  - **Comfort and Convenience Systems:** Explore advanced features like keyless entry, remote start, and power sunroofs. Learn how these systems are integrated with the car's electrical network.
  - **Hands-on:** Diagnose and repair a power window problem, install an aftermarket car alarm, troubleshoot a faulty central locking system.
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## **Week 4: Sensors, ECUs, and Networks – The Brain of the Car**

- **Sensor Technologies:** Deep dive into various automotive sensors (oxygen, MAF, MAP, crankshaft position, camshaft position) and how they provide data to the ECU.
  - **ECU Operation:** Learn how the Engine Control Unit (ECU) processes sensor data and controls engine functions. Understand basic programming concepts and how ECUs are calibrated.
  - **Network Communication:** Introduction to CAN bus (Controller Area Network) and how it allows different modules in the car to communicate with each other.
  - **Hands-on:** Use a scan tool to read live data from sensors, diagnose a faulty sensor, understand basic CAN bus communication.
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# Car A/C

## Week 1: A/C Fundamentals – Keeping Your Cool

- Refrigeration Cycle: Detailed exploration of the refrigeration cycle, including the roles of the compressor, condenser, evaporator, and expansion valve.
- Refrigerant Properties: Understand different refrigerants (R134a, R1234yf) and their environmental impact. Learn about refrigerant handling and safety procedures.
- A/C System Components: Identify and understand the function of all components in an automotive A/C system, including accumulators, dryers, and pressure switches.
- Hands-on: Assemble and disassemble a basic A/C system model, identify components on a real vehicle, practice safe refrigerant handling.

## Week 2: A/C Diagnostics – Finding the Fault

- Diagnostic Tools: Master the use of manifold gauges, thermometers, and leak detectors to diagnose A/C problems.
- Troubleshooting Techniques: Learn to identify common A/C issues, such as low refrigerant, compressor failure, and electrical problems.
- Leak Detection: Explore different leak detection methods, including dye injection, electronic sniffers, and pressure testing.
- Hands-on: Perform pressure checks on a vehicle's A/C system, use a leak detector to find refrigerant leaks, diagnose a faulty compressor.

## Week 3: A/C Repair and Maintenance – Back to Comfort

- System Evacuation and Recharge: Learn how to safely evacuate and recharge an A/C system using a vacuum pump and refrigerant recovery machine.
  - Component Replacement: Gain hands-on experience replacing common A/C components, such as compressors, condensers, evaporators, and expansion valves.
  - Preventive Maintenance: Understand the importance of regular A/C system maintenance, including filter replacement, cleaning, and leak checks.
  - Hands-on: Evacuate and recharge an A/C system, replace a faulty condenser, perform a system flush.
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## **Week 4: Advanced A/C – Climate Control and Beyond**

- Climate Control Systems: Explore automatic temperature control systems, including their sensors, actuators, and control modules.
  - Hybrid and Electric Vehicle A/C: Learn about the unique challenges and solutions for A/C systems in hybrid and electric vehicles.
  - Alternative Refrigerants: Gain an understanding of new refrigerants and their impact on the environment and A/C system design.
  - Hands-on: Diagnose a problem with an automatic climate control system, understand the A/C system in a hybrid vehicle
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# Dent & Paint

## Week 1: Bodywork Basics – The Art of Repair

- Automotive Finishes: Explore different types of paint (lacquer, enamel, urethane) and their properties. Learn about clear coats, primers, and other finishing products.
- Tools of the Trade: Become familiar with a wide range of bodywork tools, including hammers, dollies, sanding blocks, and body files.
- Safety First: Understand the importance of personal protective equipment (PPE) in the body shop. Learn about proper ventilation and handling of hazardous materials.
- Hands-on: Practice basic sanding techniques, identify different types of damage, learn to use body hammers and dollies

## Week 2: Minor Dent Repair – Perfection in the Details

- Paintless Dent Repair (PDR): Master the art of PDR, using specialized tools to remove dents without damaging the paint.
- Filling and Shaping: Learn how to apply body filler to small dents and imperfections. Practice shaping and smoothing the filler for a seamless repair. ○
- Surface Preparation: Understand the importance of proper surface preparation for painting. Learn about sanding, priming, and masking techniques.
- Hands-on: Practice PDR on sample panels, fill and shape small dents, prepare a panel for painting

## Week 3: Major Bodywork – Restoring the Structure

- Welding and Metalworking: Learn basic welding techniques (MIG, TIG) for repairing damaged panels and structural components.
  - Panel Replacement: Gain hands-on experience removing and replacing damaged panels, such as fenders, doors, and quarter panels.
  - Body Filler Application: Master advanced body filler techniques for larger repairs. Learn how to achieve a smooth and even surface.
  - Hands-on: Practice welding on scrap metal, replace a damaged fender, apply body filler to a larger repair area.
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## **Week 4: Painting and Finishing – The Final Touch**

- **Paint Application:** Learn how to properly apply primer, base coat, and clear coat using a spray gun. Understand different spray techniques and gun adjustments.
  - **Color Matching and Blending:** Master the art of color matching and blending to achieve a seamless paint job.
  - **Polishing and Buffing:** Learn how to polish and buff the paint to a high gloss finish. Understand different polishing compounds and techniques.
  - **Hands-on:** Paint a practice panel, blend a repair area into the surrounding paint, polish and buff a vehicle to a showroom shine.
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# Car Washing & Detailing

## Week 1: Exterior Perfection – The First Impression

- **Washing Techniques:** Master the two-bucket method and other safe washing techniques to prevent swirl marks and scratches.
- **Decontamination:** Learn how to remove contaminants like iron particles, tar, and tree sap using clay bars, iron removers, and other specialized products.
- **Drying and Protection:** Understand the importance of proper drying techniques to prevent water spots. Learn about different drying aids and quick detailers.
- **Hands-on:** Wash and dry vehicles using the two-bucket method, decontaminate paint using a clay bar, apply a quick detailer for protection.

## Week 2: Interior Revival – Comfort and Cleanliness

- **Deep Cleaning:** Master techniques for thoroughly cleaning all interior surfaces, including carpets, upholstery, dashboards, and door panels.
- **Stain Removal:** Learn how to effectively remove different types of stains from fabric and leather upholstery.
- **Leather Care:** Understand the importance of proper leather cleaning and conditioning to prevent cracking and fading.
- **Hands-on:** Detail a car's interior, including vacuuming, shampooing carpets, cleaning and conditioning leather seats.

## Week 3: Paint Correction – Beyond the Wash

- **Defect Identification:** Learn to identify different types of paint defects, such as swirl marks, scratches, and etching.
  - **Machine Polishing:** Master the use of dual-action and rotary polishers to remove paint defects and restore shine.
  - **Paint Protection:** Explore different types of paint protection, including waxes, sealants, and ceramic coatings.
  - **Hands-on:** Use a dual-action polisher to remove swirl marks, apply a sealant for paint protection
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## **Week 4: Advanced Detailing – The Extra Mile**

- Engine Bay Detailing: Learn how to safely clean and detail an engine bay, including degreasing, dressing, and protecting components.
  - Headlight Restoration: Master techniques for restoring clarity to faded and yellowed headlights.
  - Trim Restoration: Learn how to restore and protect exterior trim, including plastic, rubber, and chrome.
  - Hands-on: Detail an engine bay, restore faded headlights, apply a trim protectant
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# Wheel Alignment & Tire Service

## Week 1: Tire Knowledge – The Foundation

- **Tire Construction and Types:** Explore different tire types (summer, winter, all-season) and their construction. Understand tire compounds, tread patterns, and sidewall markings.
- **Tire Pressure and Inflation:** Learn about the importance of proper tire pressure for safety and performance. Understand how to use a tire pressure gauge and inflate tires correctly.
- **TPMS Technology:** Gain an understanding of Tire Pressure Monitoring Systems (TPMS), including their components and how they work.
- **Hands-on:** Inspect tires for wear and damage, practice using a tire pressure gauge, learn to identify different tire types.

## Week 2: Wheel Alignment – Steering Straight

- **Alignment Angles:** Deep dive into camber, caster, and toe. Understand how these angles affect tire wear, handling, and vehicle stability.
- **Steering Geometry:** Explore the components of the steering system and how they relate to wheel alignment.
- **Misalignment Diagnosis:** Learn to identify signs of misalignment, such as uneven tire wear, pulling to one side, and steering wheel vibration.
- **Hands-on:** Measure tire tread depth, identify signs of misalignment, use a bubble gauge to check camber.

## Week 3: Alignment Procedures – Hands-on Adjustment

- **Alignment Equipment:** Become familiar with different types of alignment machines and their components.
  - **Adjustment Techniques:** Learn how to adjust camber, caster, and toe using specialized tools and procedures.
  - **Performing a Wheel Alignment:** Master the complete wheel alignment process, from initial inspection to final adjustments.
  - **Hands-on:** Perform a wheel alignment on a vehicle using professional equipment.
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## **Week 4: Tire Service and Repair – Keeping Them Rolling**

- Tire Mounting and Demounting: Learn how to safely mount and demount tires from wheels using tire changers and other tools.
  - Wheel Balancing: Understand the importance of wheel balancing for smooth driving. Learn how to use a wheel balancer to correct imbalances. Tire Repair: Gain knowledge of safe tire repair techniques for punctures and other damage.
  - Hands-on: Change tires on a vehicle, balance wheels using a wheel balancer, perform a basic tire repair.
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