

HRODC Postgraduate Training Institute



A Postgraduate - Only Institution



#249

**Automotive Electrical and Electronics
Engineering**

Programme

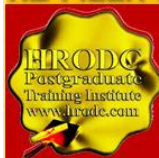
Leading To:

POSTGRADUATE DIPLOMA IN

**Automotive Electrical and Electronics
Engineering**

HRODC Postgraduate Training Institute

HQ : 122A Bhylls Lane, Castlecroft, Wolverhampton, West Midlands WV3 8DZ, UK



Prof. Dr. Ronald B. Crawford - Director

PhD (Uni London); M. Ed. M (Bristol); PGCIS (UWL); Adv. Dip. Sc. Ed (Bristol); Dip. Doc.
Res. (Uni Wlv); F.I.M.S.; HR. S. (I.M.S.); Exec. M. AOM; M. AAM; M.I.S.G.S.; M.S.C.O.S.;
M. RG. C.



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Websites:
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<https://www.hrodc.london>
[postgraduateshortcourses.com/](https://www.postgraduateshortcourses.com/)

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HRODC Postgraduate Training Institute, A Postgraduate-Only Institution

Our UK Government's Verification and Registration

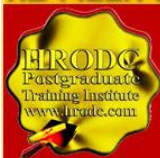
Our Institute is Verified by, and Registered with, the United Kingdom (UK) Register of Learning Providers (UKRLP), of the Department for Education (DfE). Its UK Provider Reference Number (UKPRN) is: 10019585 and might be located at: <https://www.ukrlp.co.uk/>.

Programme Coordinator:

Prof. Dr. R. B. Crawford is the Director of HRODC Postgraduate Training Institute, A Postgraduate-Only Institution. He has the following Qualifications and Affiliations:

- Doctor of Philosophy {(PhD) {University College London (UCL) - University of London}};
- MEd Management (University of Bath);
- Postgraduate (Advanced) Diploma Science Teacher Ed. (University of Bristol);
- Postgraduate Certificate in Information Systems (University of West London, formerly Thames Valley University);
- Diploma in Doctoral Research Supervision, (University of Wolverhampton);
- Teaching Certificate;

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- Fellow of the Institute of Management Specialists;
- Human Resources Specialist, of the Institute of Management Specialists;
- Member of the Asian Academy of Management (MAAM);
- Member of the International Society of Gesture Studies (MISGS);
- Member of the Standing Council for Organisational Symbolism (MSCOS);
- Member of ResearchGate;
- Executive Member of Academy of Management (AOM). There, his contribution incorporates the judging of competitions, review of journal articles, and guiding the development of conference papers. He also contributes to the Disciplines of:
 - Human Resources;
 - Organization and Management Theory;
 - Organization Development and Change;
 - Research Methods;
 - Conflict Management;
 - Organizational Behavior;
 - Management Consulting;
 - Gender & Diversity in Organizations; and
 - Critical Management Studies.

Professor Dr. Crawford has been an Academic in the following UK Universities:

- University of London (Royal Holloway), as Research Tutor;
- University of Greenwich (Business School), as Senior Lecturer (Associate Professor), in Organisational Behaviour and Human Resource Management;
- University of Wolverhampton, (Wolverhampton Business School), as Senior Lecturer (Associate Professor), in Organisational Behaviour and Human Resource Management;
- London Southbank University (Business School), as Lecturer and Unit Leader.


His responsibilities in these roles included:

- Doctoral Research Supervisor;
- Admissions Tutor;
- Postgraduate and Undergraduate Dissertation Supervisor;
- Programme Leader;
- Personal Tutor

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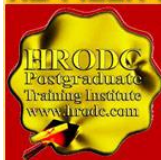


For Whom This Course is Designed

This Programme is Designed For:

- Auto-Mechanics;
- Automotive Diagnostic Specialists;
- Automotive Engineers;
- Automotive Fault Diagnosis and Repair Personnel;
- Automotive Import Specialists;
- Automotive Repair Specialists;
- Automotive Technicians;
- Automotive Wiring Experts;
- Electrical and Electronic Diagnostics Engineers;
- Electrical and Electronic Diagnostics Operators;
- Electrical and Electronic Engineers;
- Electrical Engineers;
- Electronic Engineers;
- Fleet Operators;
- Plant Engineers;
- All others interested in gaining enhanced expertise in Automotive Electrical and Electronic Engineering, Electrical and Electronic Diagnostics, Fault Diagnosis and Repair.

Classroom-Based Duration and Cost:	
Classroom-Based Duration:	12 Weeks (5 Days per Week)
Classroom-Based Cost:	£45,000.00 Per Student
Online (Video-Enhanced) Duration and Cost	
Online Duration:	20 Weeks – 3 Hours Per Day, 6 Days Per Week
Online Cost:	£30,150.00 Per Student



Classroom-Based Programme Cost includes:

- Free Continuous snacks throughout the Event Days;
- Free Hot Lunch on Event Days;
- Free City Tour;
- Free Stationery;
- Free On-site Internet Access;
- Postgraduate Diploma/ Diploma – Postgraduate –or
- Certificate of Attendance and Participation – if unsuccessful on resit.

Students and Delegates will be given a Selection of our Complimentary Products, which include:

- **Our Branded Leather Conference Folder;**
- **Our Branded Leather Conference Ring Binder/ Writing Pad;**
- **Our Branded Key Ring/ Chain;**
- **Our Branded Leather Conference (Computer – Phone) Bag – Black or Brown;**
- **Our Branded 8-16 GB USB Flash Memory Drive, with Course Material;**
- **Our Branded Metal Pen;**
- **Our Branded Polo Shirt.;**
- **Our Branded Carrier Bag.**

Daily Schedule: 9:30 to 4:30 pm.

Delivery Locations:

- 1. Central London, UK;**
- 2. Dubai, UAE;**
- 3. Kuala Lumpur, Malaysia;**
- 4. Amsterdam, The Netherlands;**
- 5. Brussels, Belgium;**
- 6. Paris, France; and**
- 7. Durban, South Africa;**
- 8. Other International Locations, on request.**

Automotive Electrical and Electronics Engineering Programme				
Leading to Postgraduate Diploma in Automotive Electrical and Electronics Engineering				
Module Number	Pre-existing Course #	Module Title	Page #	Credit Value
1		Automotive Electrical and Electronic Systems – Part 1	6	4
2		Automotive Electrical and Electronic Systems – Part 2	17	4
3	014.M4	Automotive Electrical Wiring	26	2
4		Practical Issues in Automotive Electrical Fault Diagnosis, Repair and Maintenance	29	1
5	130.M1	Introduction to Industrial Safety and Health Management	30	1

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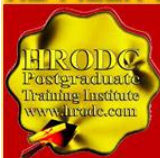
Programme Contents, Concepts and Issues

Module 1
Automotive Electrical and Electronic Systems – Part 1

M1 - Part 1: Evolution of the Automotive Electrical Systems

- History of Automotive Electrical Systems;
- Current Developments in Automotive Electrical Systems;
- Auto-Electrical Systems In The Future;
- Future Automobile Systems;
- The Advent and Future of Robotics/ Humanoids in Automotive Electrical Engineering.

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M1 - Part 2: Electrical and Electronic Concepts (1)

- Electrical Concepts:
 - Electron Flow and Conventional Flow;
 - Current Flow: Effects;
 - Essential Quantities;
 - Electrical Circuits: Description;
 - Conductors, Insulators and Semiconductors;
 - Resistance of a Conductor: Factors Involved;
 - Resistors and Circuit Networks;
 - Magnetism and Electromagnetism;
 - Electromagnetic Induction;
 - Mutual Induction.
- Electronic Components and Circuits;
- Components;
- Integrated Circuits;
- Amplifiers;
- Bridge Circuits;
- Schmitt Trigger;
- Timers;
- Filters;
- Darlington Pair;
- Stepper Motor Driver;
- Digital to Analogue Conversion;
- Analogue to Digital Conversion;
- Digital Electronics:
 - Logic Gates;
 - Combinational Logic;
 - Sequential Logic;
 - Timers and Counters;
 - Memory Circuits;
 - Clock or Astable Circuits.

- Microprocessor Systems:
 - Ports;
 - Central Processing Unit;
 - Memory;
 - Buses;
 - Fetch;
 - Ordinary Microprocessor;
 - Microcontrollers;
 - Testing Microcontroller Systems;
 - Programming.
- Measurement;
- Defining Measurement;

M1 - Part 3: Electrical and Electronic Concepts (2)

- The Measurement System;
- Sources of Error in Measurement;
- Sensors:
 - Thermistors;
 - Thermocouples;
 - Inductive Sensors;
 - Hall Effect;
 - Strain Gauges;
 - Variable Capacitance;
 - Variable Resistance;
 - Accelerometer;
 - Linear Variable Differential Transformer;
 - Hot Wire Air Flow Sensor;
 - Thin Film Air Flow Sensor;
 - Vertex Flow Sensor;
 - Pilot Tube;
 - Turbine Fluid Flow Sensor;

- Optical Sensors;
 - Oxygen Sensors;
 - Light Sensors;
 - Thick-Film Air Temperature Sensor;
 - Methanol Sensor;
 - Rain Sensor;
 - Oil Sensor;
 - Dynamic Vehicle Position Sensors.
- Actuations:
- Solenoid Actuations;
 - EGR Valve;
 - Motorized Actuators;
 - Stepper Motor;
 - Synchronous Motors;
 - Thermal Actuators;
- Testing Electronic Components, Sensors and Actuators.

M1 - Part 4: Tools and Equipment

- Equipment:
- Hand Tools;
 - Test Instrument Accuracy;
 - Multimeters;
 - Logic Probe.
- Oscilloscope;
- Scanners/Fault Code Readers and Analyser:
- On-Board Diagnostics (OBD);
 - Serial Point Communications;
 - OBD2 Signal Protocols;
 - Auto Tap OBD Scanner;
 - Bosch KTS Diagnostic Equipment;
 - Engine Analyser.

- Diagnostic Procedures:
 - The Theory of Diagnostics.

M1 - Part 4: Electrical Systems and Circuit (1)

- The Systems Approach:
 - Defining a System;
 - Vehicle Systems;
 - Open Loop Systems;
 - Closed Loop Systems.
- Electrical Wiring, Terminals and Switching:
 - Cables;
 - Colour Codes and Terminal Designations;
 - Harness Design;
 - Printed Circuits;
 - Fuses and Circuit Breakers;
 - Terminations;
 - Switches.
- Multiplexing:
 - Limits of the Conventional Wiring System;
 - Multiplex Data Bus;
 - Overview;
 - Controller Area Network (CAN);
 - CAN Data Signal;
 - Local Interconnect Network (LIN);
 - FlexRay.
- Media Oriented System Transport (MOST):
 - MOST Network;
 - Protocol;
 - MOST Applications;
 - Consumer Service Gateway.

M1 - Part 5: Electrical Systems and Circuit (1)

- Automotive Ethernet;
- Circuit Diagrams and Symbols:
 - Symbols;
 - Conventional Circuit Diagrams;
 - Layout or Wiring Diagrams;
 - Terminal Diagrams;
 - Current Flow Diagrams.
- Electromagnetic Compatibility;
- Central Electrical Control:
 - Overview;
 - Ford Generic Electronic Module;
 - Communication between Modules.
- Connected Cars:
 - Street Cars and Traffic Systems;
 - Wi-Fi Cars;
 - Bluetooth;
 - Applications;
 - Vision Enhancement;
 - Self-Help;
 - Big Brother;
 - When Computers Go Wrong.

M1 - Part 6: Batteries (1)

- Vehicle Batteries:
 - Requirements;
 - Selecting the Correct Battery;
 - Positioning the Vehicle Battery.
- Lead-Acid Batteries:
 - Construction;
 - Battery Rating.

- Maintenance, Charging And Testing Batteries:
 - Maintenance;
 - Charging the Lead-Acid Battery;
 - Switching Batteries;
 - Battery Faults;
 - Testing Batteries;
 - Safety.
- Advanced Battery Technology:
 - Electrochemistry;
 - Electrolytic Conduction;
 - Ohms' Law and Electrolytic Resistance;
 - Electrochemical Action of the Lead-Acid Battery;
 - Characteristics;
 - Peukert's Law.
- Developments in the Electrical Storage:
 - Lead-Acid;
 - Alkaline;
 - ZEBRA;
 - Sodium Sulphur;
 - Swing;
 - Fuel Cells;
 - Super-Capacitors.
- Charging:
 - Requirements of the Charging System;
 - Essential Operating Principles;
 - Vehicle Electrical Loads.

M1 - Part 7: Batteries (2)

- Principles of the Charging System:
 - Essential Principles;
 - Charging Voltages;
 - Charging Circuits;

- Generation of Electricity;
- Rectification of AC to DC;
- Regulation of Output Voltage.
- Alternators:
 - Bosch Compact Alternator;
 - Efficient Alternators;
 - Water-Cooled Alternators;
 - Denso High-Output Alternators;
 - Charging System Testing Procedure.
- Smart Charging:
 - Introduction and Closed Loop Regulation;
 - Open Loop Regulation;
 - Engine Performance;
 - Fault Conditions.
- Advanced Charging System Technology:
 - Problems and Solutions of the Charging System;
 - Charge Balance Circulation;
 - Characteristics of Alternators;
 - Mechanical and External Considerations.

M1 - Part 8: Starting System, Starter Motors and Circuits

- Requirements of the Starting System:
 - Engine Starting Requirements;
 - Starting System Design;
 - Selecting a Starter Motor.
- Starter Motors and Circuits:
 - Starting System Circuits;
 - Example Circuits;
 - Starter Circuit Testing;
 - Principle of Operation;
 - DC Motor Characteristics.

- Types of Starter Motor:
 - Inertia Starter;
 - Pre-Engaged Starters;
 - Permanent Magnet Starters;
 - Integrated Starters;
 - Electronic Starter Control;
 - Starter Installation;
 - Belt-Driven Starter-Generator.

M1 - Part 9: Ignition

- Ignition Systems:
 - Functional Requirement;
 - Generation of High Tension;
 - Advance Angle;
 - Fuel Consumption and Exhaust Emissions;
 - Contact Breaker Ignition;
 - Plug Leads;
 - Ignition Coil Cores.
- Electronic Ignition;
- Constant Dwell Systems;
- Constant Energy Systems;
- Hall Effect Pulse Generator;
- Inductive Pulse Generator;
- Other Pulse Generator
- Dwell Angle Control;
- Current Limiting and Closed Loop Dwell;
- Capacitor Discharge Ignition;
- Electronic Spark Advanced:
 - Sensors and Input Information;
 - Electronic Control Unit.
- Distributorless Ignition:
 - Principle of Operation;

- System Components.
- Coil on Plug (COP) Ignition:
 - General Description;
 - Control of Ignition.
- Spark Plugs:
 - Functional Requirements;
 - Construction;
 - Heat Range;
 - Electrode Materials;
 - Electrode Gap;
 - V-Grooved Spark Plug;
 - Selecting the Correct Plug;
 - Development of Spark Plug.
- Testing Procedures;
- Advanced Ignition Technology:
 - Ignition Cot Performance.

M1 - Part 10: Fuel Control

- Combustion:
 - Spark Ignition Engine Combustion Process;
 - Range and Rate of Burning;
 - Detonation;
 - Pre-Ignition;
 - Combustion Chamber;
 - Stratification of Cylinder Charge;
 - Mixture Strength and Performance;
 - Compression Ignition Engines;
 - Combustion Chamber Design.
- Engine Fueling and Exhaust Emission:
 - Operating Conditions;
 - Exhaust Emissions;
 - Other Sources of Emission;

- Leaded and Unleaded Fuel.
- Emissions and Driving Cycles:
 - Exhaust Emission Regulations;
 - Test Cycles.
- Electronic Control of Carbureting:
 - Carburation;
 - Areas of Control.
- Fuel Injection:
 - Advantages of Fuel Injection;
 - System Overview;
 - Components of a Fuel Injection System;
 - Bosch 'L' Jetronic;
 - Bosch Mono Jetronic;
 - Sequential Multipoint Injection;
 - Lean Burn Technology;
 - Double Fuel Injectors.
- Diesel Fuel Injection:
 - Concept;
 - Injection Overview;
 - Diesel Exhaust Emissions;
 - Electronic Control of Diesel Injection;
 - Rotary Pump System;
 - Common Rail System;
 - Electronic Unit Injection;
 - Diesel Lambda Sensor;
 - Exhaust Emission Treatments.
- Diagnosing Fuel Control System;
- Advanced Fuel Control Technology;
- Air-Fuel Ratio Calculations.

Module 2 Automotive Electrical and Electronic Systems – Part 2

M2 - Part 1: Engine Management

- Combined Ignition and Fuel:
 - Concept;
 - Variable Inlet Tract;
 - Combustion Flame and Pressure Sensing;
 - Wide Range Lambda Sensors;
 - Injectors with Air Shrouding.
- Exhaust Emission Control:
 - Engine Design;
 - Combustion Chamber Design;
 - Compression Ratio;
 - Valve Timing;
 - Manifold Design;
 - Charge Stratification;
 - Warm Up Time;
 - Exhaust Gas Recirculation;
 - Ignition System;
 - Thermal After-Burning;
 - Catalytic Converters;
 - Closed Loop Lambda Systems.
- Engine Management System:
 - Motronic M3;
 - DI-Motronic;
 - ME-Motronic Principles.
- Other Aspects of Engine Management:
 - Concept ;
 - Variable Valve Timing;
 - Lean Burn Engines;
 - Two-Stroke Engine;

- Combustion and Control System;
 - Active Cooling;
 - Engine Trends: Spark Ignition;
 - Transonic Combustion;
 - Formula 1 Engine Technology;
 - Diagnosing Engine Management Systems.
- Advanced Engine Management Technology:
- Speed Density;
 - Ignition Timing Calculation;
 - Dwell Calculation;
 - Injection Duration Calculation;
 - Developing and Testing Software;
 - Simulation Program;
 - Hot Chipping;
 - Artificial Intelligence;
 - Neural Computing.

M2 - Part 2: Lighting

- Essentials of Lightning:
- Concept;
 - Bulbs;
 - External Lights;
 - Headlight Reflectors;
 - Complex Shape Reflectors;
 - Headlight Lenses;
 - Headlight Leveling;
 - Headlight Beam Setting.
- Lighting Circuits:
- Essentials of Lighting Circuit;
 - Dim-Dip Circuit;
 - General Lightning Circuit;
 - Flow Diagram Lighting Circuit;

- Central Lighting Control Circuit;
- Testing Procedure.
- Gas Discharge, LED and Infrared Lighting:
 - Gas Discharge Lamps;
 - Xenon Lighting;
 - Ultraviolet Headlights;
 - LED Lighting;
 - Infrared Lights.
- Other Lighting Techniques:
 - Mono-Colour Signal Lamps;
 - Linear Lighting;
 - Neon Technology;
 - Bending Light;
 - Intelligent Front Lighting.
- Advanced Lighting Technology:
 - Lighting Terms and Definitions;
 - Single Light-Source Lighting.

M2. Part 3: Auxiliaries

- Widescreen Washes and Wipers:
 - Functional Requirements;
 - Wiper Blades;
 - Wiper Linkages;
 - Wiper Motors;
 - Widescreen Washers;
 - Washer and Wiper Circuits;
 - Electronic Control of Widescreen Wipers;
 - Synchronized Wipers;
 - Wiper Blade Pressure Control;
 - Linear Wiper Systems.
- Signaling Circuit:
 - Concept;

- Flasher Units
- Brake Units;
- Indicators and Hazard Circuit.
- Other Auxiliary Systems
 - Electric Horns;
 - Engine Cooling Fan Motors;
 - Headlight Wipers and Washers;
 - Other Circuits;
 - Diagnosing Auxiliary Systems Technology.
- Advanced Auxiliary Systems Technology:
 - Wiper Motor Torque Calculations;
 - PM Motor – Electronic Speed Control.

M2. Part 4: Instrumentation

- Gauges and Sensors:
 - Concepts;
 - Sensors;
 - Thermal-Types Gauges;
 - Moving Iron Gauges;
 - Air-Cored Gauges;
 - Other Types of Gauges;
 - A Digital Instrumentation System.
- Visual Displays:
 - Choosing the Best Display;
 - Light-Emitting Diode Displays;
 - Liquid Crystal Displays;
 - Vacuum Fluorescent Display;
 - Head-Up Displays;
 - Electroluminescent Instrument Lighting;
 - Display Techniques;
 - Instrumentation System Faults.
- Global Positioning System (GPS):

- Concept;
 - Calculating Position;
 - Sensors;
 - Data Input And Output;
 - Accuracy.
- Driver Information:
- Vehicle Conditioning Monitoring;
 - Trip Computer.
- Advanced Instrumentation Technology:
- Multiplexed Displays;
 - Quantization;
 - Holography;
 - Telemetry;
 - Telematics.

M2. Part 5: Heating, Ventilation and Air-Conditioning

- Conventional Heating and Ventilation:
- Concept;
 - Ventilation;
 - Heating System – Water Cooled Engine;
 - Heater Blower Motors;
 - Electronic Heating Control.
- Air Conditioning:
- Concept;
 - Principle of Refrigeration;
 - Air Conditioning Overview;
 - Air Conditioning System and Components;
 - Automatic Temperature Control;
 - Electrically Driven Air Conditioning.
- Other Heating Systems:
- Seal Heating;
 - Screen Heating;

- Heating Development
- Air Conditioning System Faults.
- Advanced Temperature Control Technology:
 - Heat Transfer;
 - Types of Heat and Temperature;
 - Armature Reaction;
 - Refrigerant Development.

M2. Part 6: Chassis Electrical

- Anti-Lock Brakes:
 - Concept;
 - Introduction;
 - Requirements of Anti-Lock Brakes;
 - General System Description;
 - Components;
 - Anti-Lock Brake System Control;
 - Control Strategy;
 - Honda Anti-Lock Brakes.
- Traction And Stability Control:
 - Concept;
 - Control Functions;
 - System Operation;
 - Electronic Stability Program (ESP).
- Active Suspension:
 - Overview;
 - Sensors and Actuators;
 - Delphi Magneride.
- Automatic Transmission:
 - Concept;
 - Control of Gear Shift and Torque Converter;
 - Tiptronic.
- Other Chassis Electrical Systems:

- Electric Power Steering;
 - Robotized Manual Transmission;
 - Active Role Reduction;
 - Electronic Limited Slip Differential;
 - Brake Assist Systems;
 - X-By-Wire;
 - Diagnosing Chassis Electrical System Faults.
- Advanced Chassis Systems Technology:
- Round Surface and Tyre Friction;
 - ABS Control Cycles;
 - Traction Control Calculations.

M2. Part 7: Passenger Comfort and Safety

- Seat, Mirrors and Sun-Roofs:
- Concept;
 - Electric Seat Adjustment;
 - Electric Mirrors;
 - Electric Sun-Roof Operation;
 - Seat Control Circuit.
- Central Locking and Electric Windows:
- Door Locking Circuit;
 - Electric Window Operation;
 - Electric Windows Example Circuit.
- Cruise Control:
- Concept;
 - System Description;
 - Components;
 - Adaptive Cruise Control.
- In-Car Multimedia:
- Concept;
 - Speakers;
 - In-Car Entertainment (ICE);

- Radio Data System (RDS);
 - Radio Broadcast Data System (RBDS);
 - Radio Reception;
 - Digital Audio Broadcast (DAB);
 - Interference Suppression;
 - Mobile Communications.
- Security:
- Concept;
 - Basic Security;
 - Top of the Range Security;
 - Security Coded Ecus;
 - Alarms and Immobilisers;
 - Keys.
- Airbags and Belt Tensioners:
- Concept;;
 - Operation of the System;
 - Components and Circuit;
 - Seat-Belt Tensioners;;
 - Side Airbags;
 - Intelligent Airbag Sensing System.
- Other Safety and Comfort Systems:
- Obstacle Avoidance Radar;
 - Tyre Pressure Warning;
 - Noise Control;
 - Auto Dimming Mirrors;
 - Automatic Parking System;
 - General Systems Diagnostic Procedure.
- Advanced Comfort and Safety Systems Technology:
- Cruise Control and System Response;
 - Radio Suppression Calculations.

M2. Part 8: Alternative Fuel, Hybrid and Electrical Vehicles

- Alternative Fuels:
 - Overview;
 - Fuels;
- Electric Vehicles;
 - Concept;
 - Electric Drive System;
 - Electric Vehicle Batteries;
 - Drive Motors;
 - General Motors;
 - Tesla Roadster;
 - Case Study ;
- Hybrid Electric Vehicles:
 - Concept;
 - Honda Light Hybrids;
 - Bosch Parallel Full-Hybrid Technology;
 - Case Study.
- Wireless Electronic Vehicle Charging:
 - Concept;
 - Inductive Power Transfer;
 - Technology Overview;
 - IPT System;
 - Detailed Schematic;
 - Battery Management;
 - System Parameters.
- Advanced Electric Vehicle Technology:
 - Motor Torque and Power Characteristics;
 - Optimization Techniques: Mathematical Modelling.

Module 3 Automotive Electrical Wiring

M3. Part 1: Automotive Electrical Principles and Circuits

- Electrical Principles;
- High Current or Low Voltage;
- Ohm's Law;
- The Power of Formula;
- Combinations;
- Kirchhoff's Law;
- Forming and Tracing a Circuit ;
- Wire Resistance Chart;
- Installing an Electric Fuel Pump;
- On-Board Computer Risks;
- Battery Disconnecting;

M3. Part 2: Tools for Automotive Wiring

- Essential Tools for Auto Electrical Wiring;
- Using Test Lights;
- Using Analogue Multi-Meters;
- Using Digital Multi-Meters;
- Functions Multi-Meter.

M3. Part 3: Essentials of Automotive Wiring

- Essential Connections;
- Crimp-Style Connections;
- Using Crimping Tools;
- Soldering Iron and Guns;
- Insulating Connections;

- Temporary Mechanical Connectors;
- Distribution-Type Connectors;
- Connectors and Plugs;
- Basics for AWG Wire 8 and Larger;
- Ignition Switches, Wiring Harness and Controllers;
- Ignition Switch;
- Wiring Harness;
- Essentials of Controllers.

M3. Part 4: Power Accessories and the Charging System

- Electronic Door Lock Circuits;
- Electronic Window Circuits;
- The Charging System.

M3. Part 5: Equipment Wiring and Component Upgrade

- Observing Safety;
- Metal Barrier
- Tachometer Installation;
- The Charging System;
- Work Protection;

M3. Part 6: Troubleshooting

- Flowcharts;
- Typical Problems;
- Circuit Inoperable;
- Blown Circuits;
- Blown Fuses;
- Working to Burned Up Wiring;
- Detecting Faulty Battery: Battery Testing Methods;

- Checking Intermittent Circuit Operation.

M3. Part 7: Installation and Interface

- Power Door Lock and Power Window Circuit Interfacing;
- Factory Wiring Diagrams;
- Power Sunroof and Convertible Top Circuit Interfacing;
- Upgrading Headlights to Higher Power Units;
- Auxiliary Battery;
- Accessory Fuse Panel.

M3. Part 8: Developing Wiring Harness

- Essentials of Harness;
- Building a Harness from the Start;
- Harness Construction Project.

Module 4 Practical Issues in Automotive Electrical Fault Diagnosis, Repair and Maintenance

- Equipment in Lifting Vehicle:
 - Using Trolley Jack;
 - Using Hydraulic Lifts;
 - Understanding the Two-Post Lift;
 - Regulating the Four-Post Lift.
- Dismantle Vehicle Components:
 - Safety and Good Housekeeping;
 - Planning and Preparing;
 - Service Procedure.

➤ Removing and Fitting Mechanical and Electrical Components:

- Electric Circuit Parts;
- Replacing the Solenoid on a Starter Motor;
- Removing and Replacing an Alternator;
- Removing and Replacing the Radiator;
- Removing and Fitting:
 - ✚ A Fuel Pump;
 - ✚ A Turbocharger;
 - ✚ A Diesel Fuel Injection Pump;
 - ✚ An Ignition Coil;
 - ✚ An Electric Window Lifter and Door Lock;
 - ✚ A Front Wiper Motor and Linkage;
 - ✚ Widescreen Washer and Pump.
- Fitting Door Speakers;
- Fitting an Interior Fan.

Module 5 Introduction to Industrial Safety and Health Management

M5. Part 1: The Safety and Health Manager

- A Reasonable Objective;
- Safety versus Health;
- Role in the Corporate Structure;
- Resources at Hand.

M5. Part 2: Development of the Safety and Health Function

- Workers' Compensation;
- Recordkeeping;
- Accident Cause Analysis;
- Organization of Committees;

- Safety and Health Economics;
- Training;
- Job Placement Testing;
- The Smoke-Free Workplace;
- Bloodborne Pathogens;
- Workplace Violence.

M5. Part 3: Concepts of Hazard Avoidance

- The Enforcement Approach;
- The Psychological Approach;
- The Engineering Approach;
- The Analytical Approach;
- Hazard-Classification Scale.

Postgraduate Diploma, Postgraduate Certificate, and Diploma – Postgraduate - Short Course Regulation

Postgraduate Certificate, Postgraduate Diploma, and Diploma – Postgraduate: Their Distinction, Credit Value and Award Title

Postgraduate Short Courses of a minimum of five days' duration, are referred to as Diploma – Postgraduate. This means that they are postgraduate credits, towards a Postgraduate Certificate and Postgraduate Diploma. Postgraduate Certificate and Postgraduate Diploma represent Programmes of Study, leading to Awards bearing their title prefixes. While we, refer to our short studies, of 5 days to five weeks, as 'Courses', those with duration of 6 weeks and more are labelled 'Programmes'. Nevertheless, in line with popular usage, we often refer to all study durations as 'Courses'. Another mark of distinction, in this regard, is that participants in a short course are referred to as 'Delegates', as opposed to the term 'Students', which is confined to those studying a Postgraduate Programme.

Courses are of varying Credit-Values; some being Single-Credit, Double-Credit, Triple-Credit, Quad-Credit, 5-Credit, etc. These short courses accumulate to Postgraduate Certificate, with a total of 180 Credit-Hours (= 6 X 5-Day Courses or 3 X 10-Day Courses), or Postgraduate Diploma, with a total of 360 Credit-Hours (= 12 X 5-Day Courses or 6 X 10-Day Courses).

Delegates studying courses of 5-7 days' duration, equivalent to 30-42 Credit-Hours (Direct Lecturer Contact), will, on successful assessment, receive the Diploma – Postgraduate Award. This represents a single credit at Postgraduate Level. While 6-day and 7-day courses also lead to a Diploma – Postgraduate, they accumulate 36 and 42 Credit Hours, respectively.

Postgraduate Certificate, Postgraduate Diploma, and Diploma – Postgraduate Assessment Requirement

Because of the intensive nature of our courses and programmes, assessment will largely be in-course, adopting differing formats. These assessment formats include, but not limited to, in-class tests, assignments, end of course examinations. Based on these assessments, successful candidates will receive the Diploma – Postgraduate, Postgraduate Certificate, or Postgraduate Diploma, as appropriate.

In the case of Diploma – Postgraduate, a minimum of 70% overall pass is expected. In order to receive the Awards of Postgraduate Certificate and Postgraduate Diploma, candidates must have accumulated at least the required minimum 'Credit-Hours', with a pass (of 70% and above) in at least 70% of the courses taken.

Delegates and students who fail to achieve the requirement for Postgraduate Certificate, Postgraduate Diploma, or Diploma - Postgraduate - will be given support for 2 re-submissions for each course. Those delegates who fail to achieve the assessment requirement for the Postgraduate Diploma or Diploma - Postgraduate - on 2 resubmissions, or those who elect not to receive them, will be awarded the Certificate of Attendance and Participation.

Diploma – Postgraduate, Postgraduate Certificate, and Postgraduate Diploma Application Requirements

Applicants for Diploma – Postgraduate – Postgraduate Certificate, and Postgraduate Diploma are required to submit the following documents:

- Completed Postgraduate Application Form, including a passport sized picture affixed to the form;
- A copy of Issue and Photo (bio data) page of the applicant's current valid passport or copy of his or her Photo-embedded National Identity Card;
- Copies of credentials mentioned in the application form.

Admission and Enrolment Procedure

- On receipt of all the above documents we will assess applicants' suitability for the Course or Programme for which they have applied;
- If they are accepted on their chosen Course or Programme, they will be notified accordingly and sent Admission Letters and Invoices;
- One week after the receipt of an applicant's payment or official payment notification, the relevant Course or Programme Tutor will contact him or her, by e-mail or telephone, welcoming him or her to HRODC Postgraduate Training Institute;
- Those intending to study in a foreign country, and require a Visa, will be sent the necessary immigration documentation, to support their application;
- Applicants will be notified of the dates, location and venue of enrolment and orientation, where appropriate.

Modes of Study and Duration of Postgraduate Certificate and Postgraduate Diploma Programmes

There are two delivery formats for Postgraduate Certificate and Postgraduate Diploma Programmes, as follows:

1. Intensive Full-time (Classroom-Based) Mode, lasting 3 months for Postgraduate Diploma, and 6 weeks for Postgraduate Certificate. These durations are based on six hours' lecturer-contact per day, five days (30 hours) per week, for Postgraduate Diploma.
2. Video-Enhanced On-Line Mode. This interactive online mode lasts twenty (20) weeks, for Postgraduate Diploma, and ten (10) weeks for Postgraduate Certificate. Our calculation is based on three hours per day, six days per week.

Whichever study mode is selected, the aggregate of 360 Credit Hours must be achieved.

Introducing Our Video-Enhanced Online Study Mode

In a move away from the traditional online courses and embracing recent developments in technology-mediated distance education, HRODC Postgraduate Training Institute has introduced a Video-Enhanced Online delivery. This Online mode of delivery is revolutionary and, at the time of writing, unique to HRODC Postgraduate Training Institute.

You are taught as individuals, on a one-to-one or one-to-small-group basis. You see the tutor face to-face, for the duration of your course. You will interact with the tutor, ask and address questions; sit examinations in the presence of the tutor. It is as real as any face-to-face lecture and seminar can be. Choose from a wide range of Diploma – Postgraduate Courses and an increasing number of Specialist Postgraduate Certificate and Postgraduate Diploma Programmes. You might also accumulate Postgraduate Short Courses, via this mode of study, over a 6-year period, towards a Postgraduate Certificate or Postgraduate Diploma.

Key Features of Our Online Study: Video-Enhanced Online Mode

- The tutor meets the group and presents the course, via Video, in a similar way to its classroom-based counterpart.
- All participants are able to see, and interact with, each other, and with the tutor;
- They watch and discuss the various video cases and demonstrations that form an integral part of our delivery methodology.
- Their assessment is structured in the same way as it is done in a classroom setting;
- The Video-Enhanced Online mode of training usually starts on the 1st of each month, with the cut-off date being the 20th of each month, for inclusion the following month;
- Its duration is twice as long as its classroom-based counterpart. For example, a 5-day (30 Credit Hours) classroom-based course will last 10 days, in Video-Enhanced Online mode. This calculation is based on 3 hours tuition per day, adhering to the Institute's required 30 Credit-Hours;
- The cost of the Video-Enhanced Online mode is 67% of similar classroom-based courses;
- For example, a 5-day classroom-based course, which costs Five Thousand Pounds, is only Three Thousand Three Hundred and Fifty Pounds (£3,350.00) in Video-Enhanced Online Mode.

10-Week Video-Enhanced Online Postgraduate Certificate and 20-Week Video-Enhanced Online Postgraduate Diploma

You might study an Online Postgraduate Certificate or Online Postgraduate Diploma, in 10 and 20 weeks, respectively, in the comfort of your office or homes, through HRODC Postgraduate Training Institute's Video-Enhanced Online Delivery. We will deliver the 180 Credit-Hours and 360 Credit-Hours, in line with our regulation, through 'Direct-Lecturer-Contact', within the stipulated timeframe. We aim to fit the tuition around your work, family commitment and leisure, thereby enhancing your maintenance of an effective 'work-study-life-style balance', at times convenient to you and your appointed tutor.

Cumulative Postgraduate Certificate and Postgraduate Diploma Courses

All short courses can accumulate to the required number of Credit-Hours, for the Postgraduate Certificate and Postgraduate Diploma, over a six-year period from first registration and applies to both general and specialist groupings. In this regard, it is important to note that short courses vary in length, the minimum being 5 days (Diploma – Postgraduate) – equivalent to 30 Credit Hours, representing one credit, as is tabulated below.

On this basis, the definitive calculation on the Award requirement is based on the number of hours studied (aggregate credit-value), rather than merely the number of credits achieved. This approach is particularly useful when a student or delegate studies a mixture of courses of different credit-values.

For those delegates choosing the accumulative route, it is advisable that at least one or two credits be attempted each year. This will ensure that the required 180 Credit-Hours and 360 Credit-Hours, for the Postgraduate Certificate and Postgraduate Diploma, respectively, are achieved, within the designated period. These Credit-Values, awards and their accumulation are exemplified below.

Examples of Postgraduate Course Credits: Their Value, Award Prefix & Suffix – Based on 5-Day Multiples		
Credit Value	Credit Hours	Award Title Prefix (& Suffix)
Single-Credit	30-54	Diploma - Postgraduate
Double-Credit	60-84	Diploma – Postgraduate (Double-Credit)
Triple-Credit	90-114	Diploma – Postgraduate (Triple-Credit)
Quad-Credit	120-144	Diploma – Postgraduate (Quad-Credit)
5-Credit	150-174	Diploma – Postgraduate (5-Credit)
6-Credit	180-204	Postgraduate Certificate
7-Credit	210-234	Postgraduate Certificate (+ 1 Credit)
8-Credit	240-264	Postgraduate Certificate (+2 Credits)

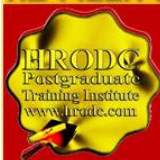
Examples of Postgraduate Course Credits: Their Value, Award Prefix & Suffix – Based on 5-Day Multiples		
Credit Value	Credit Hours	Award Title Prefix (& Suffix)
9-Credit	270-294	Postgraduate Certificate (+3 Credits)
10-Credit	300-324	Postgraduate Certificate (+ 4 Credits)
11-Credit	330-354	Postgraduate Certificate (+5 Credits)
12-Credit	360	Postgraduate Diploma
360 Credit-Hours = Postgraduate Diploma		
12 X 5-Day Courses = 360 Credit-Hours = Postgraduate Diploma		
10 X 6-Day Courses = 360 Credit-Hours = Postgraduate Diploma		

Exemplification of Accumulated Postgraduate Certificate and Postgraduate Diploma Award Titles

All Specialist Postgraduate Certificate and Postgraduate Diploma Programmes have their predetermined Award Titles. Where delegates do not follow a Specialism, for accumulation to a Postgraduate Diploma, they will normally be Awarded a General Award, without any Specialist Award Title. However, a Specialist Award will be given, where a delegate studies at least seventy percent (70%) of his or her courses in a specialist grouping. These are exemplified below:

- 1. Postgraduate Diploma in Accounting and Finance;**
- 2. Postgraduate Certificate in Accounting and Finance;**
- 3. Postgraduate Certificate in Aviation Management;**
- 4. Postgraduate Diploma in Aviation Management;**
- 5. Postgraduate Certificate in Industrial Health and Safety Management, Incorporating Oil and Gas Safety;**
- 6. Postgraduate Diploma in Industrial Health and Safety Management, Incorporating Oil and Gas Safety;**
- 7. Postgraduate Certificate in Business Communication;**
- 8. Postgraduate Diploma in Business Communication;**

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9. **Postgraduate Certificate in Corporate Governance;**
10. **Postgraduate Diploma in Corporate Governance;**
11. **Postgraduate Certificate in Costing and Budgeting;**
12. **Postgraduate Diploma in Costing and Budgeting;**
13. **Postgraduate Certificate in Client or Customer Relations;**
14. **Postgraduate Diploma in Client or Customer Relations;**
15. **Postgraduate Certificate in Engineering and Technical Skills;**
16. **Postgraduate Diploma in Engineering and Technical Skills;**
17. **Postgraduate Certificate in Events Management;**
18. **Postgraduate Diploma in Events Management;**
19. **Postgraduate Certificate in Health and Safety Management;**
20. **Postgraduate Diploma in Health and Safety Management;**
21. **Postgraduate Certificate in Health Care Management;**
22. **Postgraduate Diploma in Health Care Management;**
23. **Postgraduate Certificate in Human Resource Development;**
24. **Postgraduate Diploma in Human Resource Development;**
25. **Postgraduate Certificate in Human Resource Management;**
26. **Postgraduate Diploma in Human Resource Management;**
27. **Postgraduate Certificate in Information and Communications Technology (ICT);**
28. **Postgraduate Diploma in Information and Communications Technology (ICT);**
29. **Postgraduate Certificate in Leadership Skills;**
30. **Postgraduate Diploma in Leadership Skills;**
31. **Postgraduate Certificate in Law – International and National;**
32. **Postgraduate Diploma in Law – International and National;**
33. **Postgraduate Certificate in Logistics and Supply Chain Management;**
34. **Postgraduate Diploma in Logistics and Supply Chain Management;**
35. **Postgraduate Certificate in Management Skills;**
36. **Postgraduate Diploma in Management Skills;**

37. Postgraduate Certificate in Maritime Studies;
38. Postgraduate Diploma in Maritime Studies;
39. Postgraduate Certificate in Oil and Gas Operation;
40. Postgraduate Diploma in Oil and Gas Operation;
41. Postgraduate Certificate in Oil and Gas Accounting;
42. Postgraduate Diploma in Oil and Gas Accounting;
43. Postgraduate Certificate in Politics and Economic Development;
44. Postgraduate Diploma in Politics and Economic Development;
45. Postgraduate Certificate in Procurement Management;
46. Postgraduate Diploma in Procurement Management;
47. Postgraduate Certificate in Project Management;
48. Postgraduate Diploma in Project Management;
49. Postgraduate Certificate in Public Administration;
50. Postgraduate Diploma in Public Administration;
51. Postgraduate Certificate in Quality Management;
52. Postgraduate Diploma in Quality Management;
53. Postgraduate Certificate in Real Estate Management;
54. Postgraduate Diploma in Real Estate Management;
55. Postgraduate Certificate in Research Methods;
56. Postgraduate Diploma in Research Methods;
57. Postgraduate Certificate in Risk Management;
58. Postgraduate Diploma in Risk Management;
59. Postgraduate Certificate in Sales and Marketing;
60. Postgraduate Diploma in Sales and Marketing;
61. Postgraduate Certificate in Travel, Tourism and International Relations;
62. Postgraduate Diploma in Travel, Tourism and International Relations.

The actual courses studied will be detailed in a student or delegate's Transcript.

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The submission of our application form or otherwise registration by of the submission of a course booking form or e-mail booking request is an attestation of the candidate's subscription to our Policy Terms and Conditions, which are legally binding.

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Director
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