

Government of Pakistan

National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"



Course Contents/ Lesson Plan

Course Title: Auto Electrician

Duration: 06 Months (180 Days)

Credits Hrs: 240 Hrs

192Hrs(80%Practical)

48Hrs(20%Theory)

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1. Introduction

An **auto electrician** is a tradesman specializing in electrical wiring of motor vehicles. Auto electricians may be employed in the installation of new electrical components or the maintenance and repair of existing electrical components. Auto electricians specialize in cars and commercial vehicles. Auto electricians work in dealer workshops or in independent service centers, diagnosing and repairing a vehicle's electrical faults. As automotive systems increase in complexity and feature more electronic components and accessories, the role of auto electrician becomes more important. Experienced auto electricians might work as independent technicians, offering a specialist service to vehicle owners or service centers.

Scope

Autoelectricians work on all vehicle electrical systems and components, including ignition, fuel injection and engine management systems, braking, battery, wiring and charging systems, lighting and indicators. They must also be familiar with increasingly-sophisticated in-car entertainment systems, including radios and video players, cell phone, navigation and vehicle information systems.

Diagnosis

A key role for auto electricians is fault diagnosis. They meet vehicle owners to discuss problems and carry out tests to identify the problem. If a vehicle has starting problems, intermittent running faults or poor fuel consumption, they use specialist skills and tools to diagnose problems in the ignition, fuel injection and engine management systems. To diagnose a vehicle with braking problems that are not due to mechanical faults, auto electricians diagnose the anti-lock braking system. They also test the battery and charging systems to ensure that electrical components are receiving the correct voltage.

Lighting

Auto electricians test vehicle lighting systems to ensure they are operating correctly. They test headlight beam alignment and lighting intensity in line with specifications and make any necessary adjustments. They fit additional lighting components, such as fog lights or emergency lights, ensuring that they are correctly connected to the electrical system.

Repair

When they have identified the source of a problem, auto electricians estimate the cost of repairing or replacing faulty components. If they cannot repair expensive computerized components, such as engine management systems, they advise customers of the cost before ordering replacements. After replacement or repairs, they carry out further tests to ensure the vehicle is now operating correctly. To test the repair of running problems or braking faults, they may carry out tests on the road in addition to workshop tests.

Installation

Auto electricians install new electrical or electronic components or accessories for customers. They may replace an entertainment system, for example, with a newer version or install a GPS navigation system. If an owner plans to tow a trailer or motor home, the auto electrician might modify the vehicle's electrical system.

The Course

This course is for learners who want to gain knowledge and basic skills required in the job of an Auto Electrician - probably from a role where they work under supervision or independently. The qualifications are for learners who want to increase their skills and take on more

responsibility. Units in the qualification cover all areas of working in Auto Electrical Industry/Workshop, customer support. In particular, the learners will have acquired competencies to:

- Work effectively as Auto Electrician
- Maintain/Service/Repair Lighting System of Vehicles.
- Test and Recharge Battery.
- Service/Repair/Test Starting System of Auto Vehicles.
- Repair/Service/Test Charging System.
- Service/Replace Electrical Accessories.
- Maintain Safety during working.

Note: Teacher should tell the students about the Basic Electricity Fundamentals, Ignition System & EFI (Electronic Fuel Injection) as it is not defined in the course.

After completion of this course, learners will have the opportunities to pursue career opportunities into job roles such as Auto Electrician, Supervisors, Foreman in private workshop, Auto mobile manufacturing companies, Entrepreneurs, Govt. Vehicle maintenance workshops.

Trainees level:	Middle (Preferably Matric /TSC)
Min. Qualification of Teacher:	DAE/Two year's experience/G-1/Level-3 Certificate with two year's workplace experience
Medium of instruction:	English/Urdu/Local language
Sequence of modules:	Trainee must complete all the modules and implement the health and Safety Rules

Scheduled Weeks	Module Title	Days	Hours	Learning Units	Theory	Work place Hrs	Home Assignment
Week 1	Follow safety rules	Day1	Hour 1	Wear Working uniform	04	16	
			Hour 2	Use Protective equipment			
			Hour 3	Use Protective equipment			
			Hour 4	Use Protective equipment			
		Day 2	Hour 1	Use Protective equipment			
			Hour 2	Deal with work Accidents and injuries			
			Hour 3	Deal with work Accidents and injuries			
			Hour 4	Use Special Safety Tools			
		Day 3	Hour 1	Use fire extinguisher			
			Hour 2	Use fire extinguisher			
			Hour 3	Check All around working Area for safe Work			
			Hour 4	Check All around working Area for safe Work			
		Day 4	Hour 1	Manage Tools for proper work			
			Hour 2	Manage Tools for proper work			
			Hour 3	Clean up / Oiling for all machinery			
			Hour 4	Pickup all tools related to machine work			
		Day 5	Hour 1	Apply 1 st Aid Rule			
			Hour 2	Apply 1 st Aid Rule			
			Hour 3	Examine / Checkout ready for working			
			Hour 4	Examine / Checkout ready for working			

			Hour 4	Prepare series circuit on work bench using appropriate tools			
		Day 4	Hour 1	Prepare series parallel circuit on work bench using appropriate tools.			
			Hour 2	Prepare series parallel circuit on work bench using appropriate tools.			
			Hour 3	Prepare series parallel circuit on work bench using appropriate tools.			
			Hour 4	Prepare series parallel circuit on work bench using appropriate tools.			
		Day 5	Hour 1	Prepare indicator circuit on work bench using appropriate			

				tools			
			Hour 2	Prepare indicator circuit on work bench using appropriate tools.			
			Hour 3	Prepare indicator circuit on work bench using appropriate tools.			
			Hour 4	Prepare indicator circuit on work bench using appropriate tools.			
Week 3	Prepare Basic Electric Circuit	Day1	Hour 1	Prepare Head and Tail Light Circuit on work bench using appropriate tools.	04	16	Task 4 Task 5 Task 6
			Hour 2	Prepare Head and Tail Light Circuit on work bench using appropriate tools.			
			Hour 3	Prepare Head and Tail Light Circuit on work bench using appropriate tools.			
			Hour 4	Prepare Head and Tail Light Circuit on work bench using appropriate tools.			
		Day 2	Hour 1	Prepare brake light circuit on work bench			

	Perform Basic Electric Measurement			using appropriate tools.			
			Hour 2	Prepare brake light circuit on work bench using appropriate tools.			
			Hour 3	Prepare brake light circuit on work bench using appropriate tools.			
			Hour 4	Prepare brake light circuit on work bench using appropriate tools.			
		Day 3	Hour 1	Measure/rec ord voltage by Using Digital Multi METER			
			Hour 2	Measure/rec ord voltage by Using Digital Multi METER			
			Hour 3	Measure/rec ord voltage by Using Digital Multi METER			
			Hour 4	Measure/rec ord voltage by Using Digital Multi METER			

		Day 4	Hour 1	Measure/record current by using Digital Multi Meter			
			Hour 2	Measure/record current by using Digital Multi Meter			
			Hour 3	Measure/record current by using Digital Multi Meter			
			Hour 4	Measure/record current by using Digital Multi Meter			
		Day 5	Hour 1	Measure/record resistance by using Digital Multi Meter			
			Hour 2	Measure/record resistance by using Digital Multi Meter			
			Hour 3	Measure/record resistance by using Digital Multi Meter			
			Hour 4	Measure/record resistance by using Digital Multi Meter			
Week 4	Prepare basic Electromagnetic circuits.	Day1	Hour 1	Prepare basic electro magnet with the help of iron core and copper wire	04	16	
			Hour 2	Prepare basic electro magnet with the help of iron core and copper wire			

Task 7
Task 8
Task 9

			Hour 3	Prepare basic electro magnet with the help of iron core and copper wire			
			Hour 4	Prepare basic electro magnet with the help of iron core and copper wire			
		Day 2	Hour 1	Prepare horn circuit on work bench using appropriate tools			
			Hour 2	Prepare horn circuit on work bench using appropriate tools			
			Hour 3	Prepare horn circuit on work bench using appropriate tools			
			Hour 4	Prepare horn circuit on work bench using appropriate tools			
		Day 3	Hour 1	Prepare self-starter circuit on work bench using appropriate tools.			
			Hour 2	Prepare self-starter circuit on work bench using appropriate tools.			

			Hour 3	Prepare self-starter circuit on work bench using appropriate tools.			
			Hour 4	Prepare self-starter circuit on work bench using appropriate tools.			
		Day 4	Hour 1	Test wind in resistance of DC motor by using Digital Multi Meter			
			Hour 2	Test wind in resistance of DC motor by using Digital Multi Meter			
			Hour 3	Test wind in resistance of DC motor by using Digital Multi Meter			
			Hour 4	Test wind in resistance of DC motor by using Digital Multi Meter			
		Day 5	Hour 1	Test Relay function by switching relay coil points and measure / record continuity between contact points			

				by using Digital Multi Meter			Task 10 Task 11 Task 12
			Hour 2	Test Relay function by switching relay coil points and measure / record continuity between contact points by using Digital Multi Meter			
			Hour 3	Test Relay function by switching relay coil points and measure / record continuity between contact points by using Digital Multi Meter			
			Hour 4	Test Relay function by switching relay coil points and measure / record continuity between contact points by using Digital Multi Meter			
Week 5	Perform Service of Battery	Day1	Hour 1	Perform the battery test by use of	04	16	

				hydrometer, Clean Terminals, tight and insulate, secure with battery holder as per given specification.			
			Hour 2	Perform the battery test by use of hydrometer, Clean Terminals, tight and insulate, secure with battery holder as per given specification.			
			Hour 3	Perform the battery test by use of hydrometer, Clean Terminals, tight and insulate, secure with battery holder as per given specification.			
			Hour 4	Perform the battery test by use of hydrometer, Clean Terminals, tight and insulate, secure with battery holder			

	Perform Battery Replace ment			as per given specification.			
		Day 2	Hour 1	Inspect and change the Ground (Earth) cable from the vehicle body.			
			Hour 2	Inspect and change the Ground (Earth) cable from the vehicle body.			
			Hour 3	Inspect and change the Ground (Earth) cable from the vehicle body.			
			Hour 4	Inspect and change the Ground (Earth) cable from the vehicle body.			
		Day 3	Hour 1	Test battery by using the load tester/battery tester and assess the battery performance.			
			Hour 2	Test battery by using the load tester/battery tester and assess the battery performance.			
			Hour 3	Test battery by using the load tester/battery tester and assess the battery performance.			
			Hour 4	Test battery by using the load tester/battery tester and assess the battery			

				performance.			
		Day 4	Hour 1	Perform Safe removal and installation of Battery from the vehicle Inspect/service the battery and assess safety fitting and correctness underspecified procedure.			
			Hour 2	Perform Safe removal and installation of Battery from the vehicle Inspect/service the battery and assess safety fitting and correctness underspecified procedure.			
			Hour 3	Perform Safe removal and installation of Battery from the vehicle Inspect/service the battery and assess safety fitting and correctness underspecified procedure.			

			Hour 4	Perform Safe removal and installation of Battery from the vehicle Inspect/service the battery and assess safety fitting and correctness underspecified procedure.			
			Day 5	Hour 1			
				Hour 2			
				Hour 3			
				Hour 4			
Week 6	Repair starting system	Day1	Hour 1	Inspect the vehicle starting system and troubleshoot the following:	04	16	Task 13 Task 14 Task 15

				Low cranking speed/ not cranking, Ignition switch operation malfunctioning.			
			Hour 2	Inspect the vehicle starting system and troubleshoot the following: Low cranking speed/ not cranking, Ignition switch operation malfunctioning			
			Hour 3	Inspect the vehicle starting system and troubleshoot the following: Low cranking speed/ not cranking, Ignition switch operation malfunctioning			
			Hour 4	Inspect the vehicle starting system and troubleshoot the following: Low cranking speed/ not cranking, Ignition switch operation malfunctioning			
		Day 2	Hour 1	Inspect the vehicle starting system and troubleshoot.			

			Hour 2	Inspect the vehicle starting system and troubleshoot.			
			Hour 3	Inspect the vehicle starting system and troubleshoot.			
			Hour 4	Inspect the vehicle starting system and troubleshoot.			
		Day 3	Hour 1	Remedies for concern fault			
			Hour 2	Remedies for concern fault			
			Hour 3	Remedies for concern fault			
			Hour 4	Remedies for concern fault			
		Day 4	Hour 1	Repair / change faulty parts			
			Hour 2	Repair / change faulty parts			
			Hour 3	Repair / change faulty parts			
			Hour 4	Repair / change faulty parts			
		Day 5	Hour 1	Examine connections / parts related to the system			
			Hour 2	Examine connections / parts related to the system			

			Hour 3	Examine connections / parts related to the system			
			Hour 4	Examine connections / parts related to the system			
Week 7	Service Starter Motor	Day1	Hour 1	Carry out safe procedure to replace the starter motor from the vehicle.	04	16	Task 16 Task 17 Task 18
			Hour 2	Carry out safe procedure to replace the starter motor from the vehicle.			
			Hour 3	Carry out safe procedure to replace the starter motor from the vehicle.			
			Hour 4	Carry out safe procedure to replace the starter motor from the vehicle.			
		Day 2	Hour 1	Service/replace components of starter motor and perform bench testing.			
			Hour 2	Service/replace components of starter motor and perform bench testing.			
			Hour 3	Service/replace components of starter motor and perform bench testing.			
			Hour 4	Service/replace components of starter motor and perform bench testing.			

		Day 3	Hour 1	Checkout all connections related to starting motor / functions			
			Hour 2	Checkout all connections related to starting motor / functions			
			Hour 3	Checkout all connections related to starting motor / functions			
			Hour 4	Checkout all connections related to starting motor / functions			
		Day 4	Hour 1	Checkout the function of starting motor bendex drive			
			Hour 2	Checkout the function of starting motor bendex drive			
			Hour 3	Checkout the function of starting motor bendex drive			
			Hour 4	Checkout the function of starting motor bendex drive			
		Day 5	Hour 1	To replace the fly wheel ring for smooth operation			
			Hour 2	To replace the fly wheel ring for smooth operation			
			Hour 3	To replace the fly wheel ring for smooth operation			
			Hour 4	To replace the fly wheel ring for smooth operation			
Week 8	Repair Ignition System	Day1	Hour 1	Follow safe working procedure.	04	16	

			Hour 2	Follow safe working procedure.			
			Hour 3	Follow safe working procedure.			
			Hour 4	Follow safe working procedure.			
		Day 2	Hour 1	Inspect vehicle Ignition system and troubleshooting			
			Hour 2	Inspect vehicle Ignition system and troubleshooting			
			Hour 3	Inspect vehicle Ignition system and troubleshooting			
			Hour 4	Inspect vehicle Ignition system and troubleshooting			
		Day 3	Hour 1	Inspect vehicle Ignition system.			
			Hour 2	Inspect vehicle Ignition system.			
			Hour 3	Inspect vehicle Ignition system.			
			Hour 4	Inspect vehicle Ignition system.			
		Day 4	Hour 1	Test performance of plug cable			

				(high tension leads) and plugs.			
			Hour 2	Test performance of plug cable (high tension leads) and plugs.			
			Hour 3	Test performance of plug cable (high tension leads) and plugs.			
			Hour 4	Test performance of plug cable (high tension leads) and plugs.			
		Day 5	Hour 1	Inspect ignition timing circuit / Sensors			
			Hour 2	Inspect ignition timing circuit / Sensors			
			Hour 3	Inspect ignition timing circuit / Sensors			
			Hour 4	Inspect ignition timing circuit / Sensors			
Week 9	Repair Ignition System	Day1	Hour 1	Replace ignition timing Sensors	04	16	Task22 Task23 Task24
			Hour 2	Replace ignition timing Sensors			
			Hour 3	Replace ignition timing Sensors			
			Hour 4	Replace ignition timing Sensors			

		Day 2	Hour 1	Take ignition test by using computerize scanner			
			Hour 2	Take ignition test by using computerize scanner			
			Hour 3	Take ignition test by using computerize scanner			
			Hour 4	Take ignition test by using computerize scanner			
		Day 3	Hour 1	Crank engine for operating temperature to solve / inspect the system			
			Hour 2	Crank engine for operating temperature to solve / inspect the system			
			Hour 3	Crank engine for operating temperature to solve / inspect the system			
			Hour 4	Crank engine for operating temperature to solve / inspect the system			
		Day 4	Hour 1	Checkout the V-tech system for ignition			
			Hour 2	Checkout the V-tech system for ignition			
			Hour 3	Checkout the V-tech system for ignition			
			Hour 4	Checkout the V-tech system for ignition			
		Day 5	Hour 1	Take computerize test by using scanner			

			Hour 2	Take computerize test by using scanner			
			Hour 3	Take computerize test by using scanner			
			Hour 4	Take computerize test by using scanner			
Week 10	Repair charging system	Day1	Hour 1	Inspect vehicle charging system and diagnose the following. Battery warning light indication on instrument panel.	04	16	Task 25
			Hour 2	Inspect vehicle charging system and diagnose the following. Battery warning light indication on instrument panel.			Task 26
			Hour 3	Inspect vehicle charging system and diagnose the following. Battery warning light indication on instrument panel.			Task 27
			Hour 4	Inspect vehicle charging system and diagnose the following. Battery warning light			

				indication on instrument panel.			
		Day 2	Hour 1	Test output voltage of alternator.			
			Hour 2	Test output voltage of alternator.			
			Hour 3	Test output voltage of alternator.			
			Hour 4	Test output voltage of alternator.			
		Day 3	Hour 1	Test drives belt condition and Tension, alternator bearing noise.			
			Hour 2	Test drives belt condition and Tension, alternator bearing noise.			
			Hour 3	Test drives belt condition and Tension, alternator bearing noise.			
			Hour 4	Test drives belt condition and Tension, alternator bearing noise.			
		Day 4	Hour 1	Test wire harness, fuse, and proper insulated wires.			

			Hour 2	Test wire harness, fuse, and proper insulated wires			
			Hour 3	Test wire harness, fuse, and proper insulated wires			
			Hour 4	Test wire harness, fuse, and proper insulated wires			
		Day 5	Hour 1	Dismantle/service of alternator as following; Repair connector, replace carbon brushes, Replace Rectifier Bridge, replace voltage regulator and replace stator winding			
			Hour 2	Dismantle/service of alternator as following; Repair connector, replace carbon brushes, Replace Rectifier Bridge, replace voltage regulator and replace stator winding			

			Hour 3	Dismantle/service of alternator as following; Repair connector, replace carbon brushes, Replace Rectifier Bridge, replace voltage regulator and replace stator winding			
			Hour 4	Dismantle/service of alternator as following; Repair connector, replace carbon brushes, Replace Rectifier Bridge, replace voltage regulator and replace stator winding			
Week 11	Repair charging system	Day1	Hour 1	Take charging system test by computerized scanner	04	16	Task 28 Task 29 Task 30
			Hour 2	Take charging system test by computerized scanner			

			Hour 3	Take charging system test by computerized scanner			
			Hour 4	Take charging system test by computerized scanner			
		Day 2	Hour 1	Diagnose fault and rectify			
			Hour 2	Diagnose fault and rectify			
			Hour 3	Diagnose fault and rectify			
			Hour 4	Diagnose fault and rectify			
		Day 3	Hour 1	Inspect all concern sensors to the charging system			
			Hour 2	Inspect all concern sensors to the charging system			
			Hour 3	Inspect all concern sensors to the charging system			
			Hour 4	Inspect all concern sensors to the charging system			
		Day 4	Hour 1	Examine function of the charging			

				system by using scanner			
			Hour 2	Examine function of the charging system by using scanner			
			Hour 3	Examine function of the charging system by using scanner			
			Hour 4	Examine function of the charging system by using scanner			
		Day 5	Hour 1	Examine function of the charging system by using scanner			
			Hour 2	Examine function of the charging system by using scanner			
			Hour 3	Examine function of the charging system by using scanner			
			Hour 4	Examine function of the charging system by using scanner			
		Day 5	Hour 1	Examine function of the charging system by using scanner			
			Hour 2	Examine function of the charging system by using scanner			
			Hour 3	Examine function of the charging system by using scanner			
			Hour 4	Examine function of the charging system by using scanner			
Week 12	Repair Electrical Accessories	Day1	Hour 1	Inspects the oil warning switch operation for correct operation under specified testing instructions.	04	16	Task 31 Task 32 Task 33

			Hour 2	Inspects the oil warning switch operation for correct operation under specified testing instructions.			
			Hour 3	Inspects the oil warning switch operation for correct operation under specified testing instructions.			
			Hour 4	Inspects the oil warning switch operation for correct operation under specified testing instructions.			
		Day 2	Hour 1	Inspects fuse, relay operation for correct operation under specified testing instructions.			
			Hour 2	Inspects fuse, relay operation for correct operation under specified testing			

				instructions			
			Hour 3	Inspects fuse, relay operation for correct operation under specified testing instructions			
			Hour 4	Inspects fuse, relay operation for correct operation under specified testing instructions			
			Day 3	Hour 1	Inspects the fuel sender operation for correct operation under specified testing instructions.		
				Hour 2	Inspects the fuel sender operation for correct operation under specified testing instructions		
				Hour 3	Inspects the fuel sender operation for correct operation under specified		

				testing instructions			
			Hour 4	Inspects the fuel sender operation for correct operation under specified testing instructions			
		Day 4	Hour 1	Inspects the wiper motor, washer motor for correct operation under specified testing instructions.			
			Hour 2	Inspects the wiper motor, washer motor for correct operation under specified testing instructions.			
			Hour 3	Inspects the wiper motor, washer motor for correct operation under specified testing instructions.			
			Hour 4	Inspects the wiper motor, washer motor for correct operation			

				under specified testing instructions.			
		Day 5	Hour 1	Inspects heating Elements for correct operation under specified testing instructions.			
			Hour 2	Inspects heating Elements for correct operation under specified testing instructions.			
			Hour 3	Inspects heating Elements for correct operation under specified testing instructions.			
			Hour 4	Inspects heating Elements for correct operation under specified testing instructions.			

Week 13	Check the Supplementar y Restrain System (SRS)	Day1	Hour 1	Check for vehicle SRS sensor under the specified procedure.	04	16	Task 34 Task 35 Task 36
			Hour 2	Check for vehicle SRS sensor under the specified procedure.			
			Hour 3	Check for vehicle SRS sensor under the specified procedure.			
			Hour 4	Check for vehicle SRS sensor under the specified procedure.			
		Day 2	Hour 1	Check for the vehicle SRS wiring under the specified procedure			
			Hour 2	Check for the vehicle SRS wiring under the specified procedure			
			Hour 3	Check for the vehicle SRS wiring under the specified procedure			
			Hour 4	Check for the vehicle SRS wiring under the specified procedure			
		Day 3	Hour 1	Remove old SRS system from car			

			Hour 2	Remove old SRS system from car			
			Hour 3	Remove old SRS system from car			
			Hour 4	Remove old SRS system from car			
		Day 4	Hour 1	Remove old SRS system from car			
			Hour 2	Remove old SRS system from car			
			Hour 3	Remove old SRS system from car			
			Hour 4	Remove old SRS system from car			
		Day 5	Hour 1	Remove old SRS system from car			
			Hour 2	Remove old SRS system from car			
			Hour 3	Remove old SRS system from car			
			Hour 4	Remove old SRS system from car			

Scheduled Weeks	Module Title	Days	Hours	Learning Units		Theory	Work place Hrs	Home Assignm ent
Week 14	Check the Supplementary Restrain System (SRS)	Day1	Hour 1	Check for vehicle SRS sensor under the specified procedure.	04	16		Task 34 Task 35 Task 36
			Hour 2	Check for vehicle SRS sensor under the specified procedure.				
			Hour 3	Check for vehicle SRS sensor under the specified procedure.				
			Hour 4	Check for vehicle SRS sensor under the specified procedure.				
		Day 2	Hour 1	Check for the vehicle SRS wiring under the specified procedure				
			Hour 2	Check for the vehicle SRS wiring under the specified procedure				
			Hour 3	Check for the vehicle SRS wiring under the specified procedure				
			Hour 4	Check for the vehicle SRS wiring under the specified procedure				

		Day 3	Hour 1	Remove old SRS system from car			
			Hour 2	Remove old SRS system from car			
			Hour 3	Remove old SRS system from car			
			Hour 4	Remove old SRS system from car			
		Day 4	Hour 1	Remove old SRS system from car			
			Hour 2	Remove old SRS system from car			
			Hour 3	Remove old SRS system from car			
			Hour 4	Remove old SRS system from car			
		Day 5	Hour 1	Remove old SRS system from car			
			Hour 2	Remove old SRS system from car			
			Hour 3	Remove old SRS system from car			
			Hour 4	Remove old SRS system from car			

Scheduled Weeks	Module Title	Days	Hours	Learning Units	Theory Hrs	Workplace Hrs	Home Assignment
Week 15	Re Installation New SRS System	Day1	Hour 1	Re Install all around the car SRS System & inspect	04	16	Task 1 Task 2 Task 3
			Hour 2	Re Install all around the car SRS System & inspect			
			Hour 3	Re Install all around the car SRS System & inspect			
			Hour 4	Re Install all around the car SRS System & inspect			
		Day 2	Hour 1	Re Install all around the car SRS System & inspect			
			Hour 2	Re Install all around the car SRS System & inspect			
			Hour 3	Re Install all around the car SRS System & inspect			
			Hour 4	Re Install all around the car SRS System & inspect			
		Day 3	Hour 1	Re Install all around the car SRS System & inspect			
			Hour 2	Re Install all around the car SRS System &			

				inspect			
			Hour 3	Re Install all around the car SRS System & inspect			
			Hour 4	Re Install all around the car SRS System & inspect			
		Day 4	Hour 1	Checkout SRS System operation during different conditions			
			Hour 2	Checkout SRS System operation during different conditions			
			Hour 3	Checkout SRS System operation during different conditions			
			Hour 4	Checkout SRS System operation during different conditions			
		Day 5	Hour 1	Checkout SRS System operation during different conditions			
			Hour 2	Checkout SRS System operation during different conditions			
			Hour 3	Checkout SRS System operation			

				during different conditions			
			Hour 4	Checkout SRS System operation during different conditions			
Week 16	Replace / Repair Hybrid High Voltage Battery cells	Day1	Hour 1	Diagnose problem in battery unit by using scanner	04	16	Task 4 Task 5 Task 6
			Hour 2	Diagnose problem in battery unit by using scanner			
			Hour 3	Diagnose problem in battery unit by using scanner			
			Hour 4	Diagnose problem in battery unit by using scanner			
		Day 2	Hour 1	Diagnose problem in battery unit by using scanner			
			Hour 2	Diagnose problem in battery unit by using scanner			
			Hour 3	Diagnose problem in battery unit by using scanner			
			Hour 4	Diagnose problem in battery unit by using scanner			
		Day 3	Hour 1	Locate the location to remove battery			
			Hour 2	Locate the location to remove battery			
			Hour 3	Locate the location to remove battery			

			Hour 4	Locate the location to remove battery			
			Day 4	Hour 1			
				Hour 2			
				Hour 3			
				Hour 4			
		Day 5	Hour 1	Dismantle all battery cells one by one			
				Hour 2			
				Hour 3			
				Hour 4			
Week 17	Replace / Repair Hybrid High Voltage Battery cells	Day1	Hour 1	Checkout the voltage of old cells by using digital multi meter	04	16	Task 7 Task 8 Task 9
			Hour 2	Checkout the voltage of old cells by using digital multi meter			
			Hour 3	Checkout the voltage of old cells by using digital multi meter			
			Hour 4	Checkout the voltage of old cells by using			

				digital multi meter			
		Day 2	Hour 1	Fitting of new cells one by one together to make battery unit.			
			Hour 2	Fitting of new cells one by one together to make battery unit.			
			Hour 3	Fitting of new cells one by one together to make battery unit.			
			Hour 4	Fitting of new cells one by one together to make battery unit.			
		Day 3	Hour 1	Fitting of new cells one by one together to make battery unit.			
			Hour 2	Fitting of new cells one by one together to make battery unit.			
			Hour 3	Fitting of new cells one by one together to make battery unit.			
			Hour 4	Fitting of new cells one by one together to make battery unit.			
		Day 4	Hour 1	Re fitted battery unit to the compartment			
			Hour 2	Re fitted battery unit to the			

				comportment								
			Hour 3	Re fitted battery unit to the comportment								
			Hour 4	Re fitted battery unit to the comportment								
			Day 5	Hour 1				Reconnect all the concern connections to the systems				
			Hour 2	Reconnect all the concern connections to the systems								
			Hour 3	Recheck battery condition during operation								
			Hour 4	Recheck battery condition during operation								
		Week 18	Inspection / Replacement of Hybrid converter	Day1				Hour 1	Diagnose the problem by using scanner	04	16	Task 10 Task 11 Task 12
								Hour 2	Diagnose the problem by using scanner			
								Hour 3	Diagnose the problem by using scanner			
Hour 4	Diagnose the problem by using scanner											
Day 2	Hour 1			Locate the area of converter fitting to remove								

			Hour 2	Locate the area of converter fitting to remove			
			Hour 3	Locate the area of converter fitting to remove			
			Hour 4	Locate the area of converter fitting to remove			
		Day 3	Hour 1	Locate the area of converter fitting to remove			
			Hour 2	Locate the area of converter fitting to remove			
			Hour 3	Locate the area of converter fitting to remove			
			Hour 4	Locate the area of converter fitting to remove			
		Day 4	Hour 1	Re install / repair converter			
			Hour 2	Re install / repair converter			
			Hour 3	Re install / repair converter			
			Hour 4	Re install / repair converter			

		Day 5	Hour 1	Re install / repair converter			
			Hour 2	Re install / repair converter			
			Hour 3	Re install / repair converter			
			Hour 4	Re install / repair converter			
Week 19	Re Install / Inspect motor generator – 1	Day1	Hour 1	Diagnose for related to motor generator -1	04	16	
			Hour 2	Diagnose for related to motor generator			
			Hour 3	Diagnose for related to motor generator			
			Hour 4	Diagnose for related to motor generator			
		Day 2	Hour 1	Locate the location to disconnect MG-1 unit			
			Hour 2	Locate the location to disconnect MG-1 unit			
			Hour 3	Locate the location to disconnect MG-1 unit			
			Hour 4	Locate the location to disconnect MG-1 unit			
		Day 3	Hour 1	Inspect / checkout MG-1 Unit by using proper			

				equipments			
			Hour 2	Inspect / checkout MG-1 Unit by using proper equipments			
			Hour 3	Inspect / checkout MG-1 Unit by using proper equipments			
			Hour 4	Inspect / checkout MG-1 Unit by using proper equipments			
		Day 4	Hour 1	Re install new MG-1 Unit			
			Hour 2	Re install new MG			
			Hour 3	Re install new MG			
			Hour 4	Re install new MG			
		Day 5	Hour 1	Inspect / check the function of MG-1 unit by using scanner			
			Hour 2	Inspect / check the function of MG-1 unit by using scanner			
			Hour 3	Inspect / check the function of MG-1 unit by using scanner			

			Hour 4	Inspect / check the function of MG-1 unit by using scanner			
Week 20	Re Install / Inspect motor generator – 2	Day1	Hour 1	Diagnose for related to motor generator -2	04	16	
			Hour 2	Diagnose for related to motor generator -2			
			Hour 3	Diagnose for related to motor generator -2			
			Hour 4	Diagnose for related to motor generator -2			
		Day 2	Hour 1	Locate the location to disconnect MG-2 unit			
			Hour 2	Locate the location to disconnect MG-2 unit			
			Hour 3	Locate the location to disconnect MG-2 unit			
			Hour 4	Locate the location to disconnect MG-2 unit			
		Day 3	Hour 1	Inspect / checkout MG-2 Unit by using proper equipments			
			Hour 2	Inspect / checkout MG-2 Unit by using proper equipments			

			Hour 3	Inspect / checkout MG-2 Unit by using proper equipments			
			Hour 4	Inspect / checkout MG-2 Unit by using proper equipments			
			Day 4	Hour 1			
				Hour 2			
				Hour 3			
				Hour 4			
		Day 5	Hour 1	Inspect / check the function of MG-2 unit by using scanner			
			Hour 2	Inspect / check the function of MG-2 unit by using scanner			
			Hour 3	Inspect / check the function of MG-2 unit by using scanner			
			Hour 4	Inspect / check the function of MG-2 unit by using scanner			
Week 21	Repair / Inspect / Install new ABS Brake System	Day1	Hour 1	Diagnose faults related to ABS Brake System	04	16	

			Hour 2	Diagnose faults related to ABS Brake System			
			Hour 3	Diagnose faults related to ABS Brake System			
			Hour 4	Diagnose faults related to ABS Brake System			
		Day 2	Hour 1	Locate all parts related to ABS Brake System			
			Hour 2	Locate all parts related to ABS Brake System			
			Hour 3	Locate all parts related to ABS Brake System			
			Hour 4	Locate all parts related to ABS Brake System			
		Day 3	Hour 1	Remove old ABS Brake System motors Unit			
			Hour 2	Remove old ABS Brake System motors Unit			
			Hour 3	Remove old ABS Brake System motors Unit			

			Hour 4	Remove old ABS Brake System motors Unit			
		Day 4	Hour 1	Remove old ABS Brake System motors Unit			
			Hour 2	Remove old ABS Brake System motors Unit			
			Hour 3	Remove old ABS Brake System motors Unit			
			Hour 4	Remove old ABS Brake System motors Unit			
			Day 5	Hour 1			
		Hour 2		Remove old ABS Brake System Modulator			
		Hour 3		Remove old ABS Brake System Modulator			
		Hour 4		Remove old ABS Brake System Modulator			

Week 22	Repair / Inspect / Install new ABS Brake System	Day1	Hour 1	Remove all wheels ABS Sensors	04	16	
			Hour 2	Remove all wheels ABS Sensors			
			Hour 3	Remove all wheels ABS Sensors			

			Hour 4	Remove all wheels ABS Sensors			
			Day 2	Hour 1			
				Hour 2			
				Hour 3			
				Hour 4			
		Day 3	Hour 1	Remove all wheels ABS Sensors			
				Hour 2			
				Hour 3			
				Hour 4			
		Day 4	Hour 1	Re install new motors unit to ABS System			
				Hour 2			
				Hour 3			
				Hour 4			

		Day 5	Hour 1	Re install new motors unit to ABS System			
			Hour 2	Re install new motors unit to ABS System Re install new motors unit to ABS System			
			Hour 3	Re install new motors unit to ABS System			
			Hour 4	Re install new motors unit to ABS System			
Week 23	Repair / Inspect / Install new ABS Brake System	Day1	Hour 1	Re install new ABS Modulator & Sensors Unit to all Wheels	04	16	
			Hour 2	Re install new ABS Modulator & Sensors Unit to all Wheels			
			Hour 3	Re install new ABS Modulator & Sensors Unit to all Wheels			
			Hour 4	Re install new ABS Modulator & Sensors Unit to all Wheels			
		Day 2	Hour 1	Setting of brake system air bleeding			
			Hour 2	Setting of brake system air			

				bleeding			
			Hour 3	Setting of brake system air bleeding			
			Hour 4	Setting of brake system air bleeding			
		Day 3	Hour 1	Setting of brake system air bleeding			
			Hour 2	Setting of brake system air bleeding			
			Hour 3	Setting of brake system air bleeding			
			Hour 4	Setting of brake system air bleeding			
		Day 4	Hour 1	Checkout all ABS system function by using computer scanner			
			Hour 2	Checkout all ABS system function by using computer scanner			
			Hour 3	Checkout all ABS system function by using computer			

				scanner			
			Hour 4	Checkout all ABS system function by using computer scanner			
		Day 5	Hour 1	Checkout all ABS system function by using computer scanner			
			Hour 2	Checkout all ABS system function by using computer scanner			
			Hour 3	Checkout all ABS system function by using computer scanner			
			Hour 4	Checkout all ABS system function by using computer scanner			
Week 24	Carryout checking / Inspection / Calibration related to EFI / ABS / Hybrid System	Day1	Hour 1	Diagnose faults related to EFI, ABS, Hybrid system sensors/ Actuators by using computer scanner	04	16	

			Hour 2	Diagnose faults related to EFI, ABS, Hybrid system sensors/ Actuators by using computer scanner			
			Hour 3	Diagnose faults related to EFI, ABS, Hybrid system sensors/ Actuators by using computer scanner			
			Hour 4	Diagnose faults related to EFI, ABS, Hybrid system sensors/ Actuators by using computer scanner			
		Day 2	Hour 1	Diagnose faults related to EFI, ABS, Hybrid system sensors by using computer scanner			
			Hour 2	Diagnose faults related to EFI, ABS, Hybrid system sensors by using computer scanner			

			Hour 3	Diagnose faults related to EFI, ABS, Hybrid system sensors by using computer scanner			
			Hour 4	Diagnose faults related to EFI, ABS, Hybrid system sensors by using computer scanner			
		Day 3	Hour 1	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 2	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 3	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 4	Carryout calibration / Remedies for all			

				concern systems by using computer Scanner			
		Day 4	Hour 1	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 2	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 3	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 4	Carryout calibration / Remedies for all concern systems by using computer Scanner			
		Day 5	Hour 1	Carryout calibration / Remedies for all concern systems by using computer			

				Scanner			
			Hour 2	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 3	Carryout calibration / Remedies for all concern systems by using computer Scanner			
			Hour 4	Carryout calibration / Remedies for all concern systems by using computer Scanner			

Workplace/Institute Ethics Guide

Work ethic is a standard of conduct and values for job performance. The modern definition of what constitutes good work ethics often varies. Different businesses have different expectations. Work ethic is a belief that hard work and diligence have a moral benefit and an inherent ability, virtue, or

value to strengthen character and individual abilities. It is a set of values-centered on the importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for student success:

1. Attendance:

Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.

2. Character:

Honesty is the single most important factor having a direct bearing on the final success of an individual, corporation, or product. Complete assigned tasks correctly and promptly. Look to improve your skills.

3. Team Work:

The ability to get along with others including those you don't necessarily like. The ability to carry your weight and help others who are struggling. Recognize when to speak up with an idea and when to compromise by blend ideas together.

4. Appearance:

Dress for success set your best foot forward, personal hygiene, good manner, remember that the first impression of who you are can last a lifetime

5. Attitude:

Listen to suggestions and be positive, accept responsibility. If you make a mistake, admit it. Values workplace safety rules and precautions for personal and co-worker safety. Avoids unnecessary risks. Willing to learn new processes, systems, and procedures in light of changing responsibilities.

6. Productivity:

Do the work correctly, quality and timelines are prized. Get along with fellows, cooperation is the key to productivity. Help out whenever asked, do extra without being asked. Take pride in your work, do things the best you know-how. Eagerly focuses energy on accomplishing tasks, also referred to as demonstrating ownership. Takes pride in work.

7. Organizational Skills:

Make an effort to improve, learn ways to better yourself. Time management; utilize time and resources to get the most out of both. Take an appropriate approach to social interactions at work. Maintains focus on work responsibilities.

8. Communication:

Written communication, being able to correctly write reports and memos. Verbal communications, being able to communicate one on one or to a group.

9. Cooperation:

Follow institute rules and regulations, learn and follow expectations. Get along with fellows, cooperation is the key to productivity. Able to welcome and adapt to changing work situations and the application of new or different skills.

10. Respect:

Work hard, work to the best of your ability. Carry out orders, do what's asked the first time. Show respect, accept, and acknowledge an individual's talents and knowledge. Respects diversity in the workplace, including showing due respect for different perspectives, opinions, and suggestions.

5. List of Tools, Machinery & Equipment

30.	Electrical test bench	03
31.	Car stereo	02
32.	Wiper motor assembly	02
33.	Torque Wrench	02
34.	Pressure Gauge	05
35.	Alternator regulator tester	05
36.	Distributor tester	05
37.	Screw Driver Set	05
38.	Clamp on meter (Digital)	05
39.	Tachometer	05
40.	Spark plug tester and cleaner	05
41.	High rated discharge tester	05
42.	Multimeter (Digital & Analog)	05
43.	Scanner	03
44.	Shop floor cleaner	02
45.	Micrometer	03
46.	S.S.T (Special Serve Tool)	03
47.	Flaring tool	05
48.	Tube cutter	05
49.	Air compressor	03
50.	Trolley jack	03
51.	Safety stand	03
52.	Cleaning gun	02
53.	Oil gun	03
54.	Battery analyzer	02
55.	A/c manifold or refrigerant filling machine	02
56.	Car washing machine	01
57.	Wet and dry vacuum cleaner	02
58.	Spark plug cleaner & tester	03
59.	Electric drill machine	02
60.	Welding machine	01
61.	Brazing & soldering gun	05
62.	Growler	03
63.	Battery charger	03

38.	Headlight alignment equipment	02
39.	Hammer	05
40.	Wire Stripper	05
41.	Soldering Iron	05
42.	Thermometer	10
43.	Dwell Angle Meter	03
44.	Condenser Tester	03
45.	Bearing Puller	03
46.	Mini Hydraulic Press Machine	01
47.	Long nose pliers	20
48.	Side cutter	20
49.	Venire Caliper	05
50.	Grip pliers	10
51.	Injector tester	03
52.	Mallet	05
53.	Allen Key set	05
54.	Combination pliers	20
55.	Pressure Tester	05

5. List of Consumable Supplies

Sr. No.	Name of Consumable Supplies
1.	Harness wire
2.	Distilled Water
3.	Sulphuric Acid
4.	Grease
5.	Cotton rags
6.	Bulbs
7.	Sockets
8.	Fuses
9.	Oil
10.	Spark Plugs/Glow Plugs
11.	Battery Cells
12.	Motor Parts
13.	Relays
14.	Kerosene oil
15.	Brushes
16.	Bearing
17.	Switches
18.	battery Terminals
19.	Soldering wire
20.	Flux
21.	Capacitor
22.	Battery 12 volt
23.	Carbon brushes
24.	Packing kit/seal kit
25.	Timing seal
26.	Insulation tape
27.	Emery paper
28.	Shellac
29.	Distributor coil
30.	C.B Point
31.	Fuse box
32.	Ignition coil
33.	Ignition switch
34.	Horn relay
35.	Relay
37.	Distributor cables