



Semester – III

Subject Name: Automobile Electrical System

Subject Code: 09AE0303

Diploma branch in which subject is offered:- Automobile Engineering

Objective: Understanding of application of electrical and electronic system in automobile vehicle

Credits Earned: 4

Course Outcomes: After learning the course the students should be able to:

- Explain the basic of automobile electrical systems.
- Identify the layout of wiring and connections of electrical systems in automobiles.
- Explain the working of different electrical components used in automobiles.

Pre-requisite of course: NA.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
3	0	2	4	50	30	20	25	25	150

Contents:

Sr. No.	Topics	Teaching hrs.	Weightage
1	Electricity, Magnetism And Automobile Wiring A short history of auto-electrical system, constructional and functional details of conductors, semi-conductors and insulators, Ohm's Law, EMF, potential difference and voltage drop, Series and parallel circuits, Effect of electric current, Measurement of DC-Current, Voltage, & resistance, Application & principle of Multimeters, Meaning of magnetism and law of magnetism, Symbols used in wiring, Types of wiring system, wiring harness, Different electrical system	8	20
2	Automobile Battery Types of battery (dry & wet batteries), Construction of battery, Function of lead acid battery, Various charging processes, Maintenance of battery, Modern developments in	6	15



	battery, Procedure of commissioning of new Battery in vehicle, various battery rating, Battery performance		
3	Ignition System Types of ignition system and its layouts, wiring diagram, Coil, Magneto & Capacitor discharge ignition system: construction and working. Comparison of systems, H.T. Coil & Distributor: - Types, construction and working, Distributor less electronic & direct ignition system, mechanical & electronic spark advance mechanism, Hall Effect switch, Spark plug : construction, function, types.	6	15
4	Starting System Principal of starter motor, Constructional and functional details of starter, Torque characteristic of starter, Starter drive mechanism: its types (bendix, and follow thru & over running Clutch Drives, axial drive), construction, function and comparison of different drive mechanism, Solenoid switch	7	15
5	Charging System Necessity of charging system, Introduction & basic principle of generators, Function, Circuit arrangement, Working Principle of Alternator Charging System, Differences between Generator & Alternator, and Advantages of alternator over DC generator. Advanced charging system technology & new developments, Requirement of regulating current & voltage in alternator	8	20
6	Lighting System & Automobile Auxiliaries Lighting Fundamentals, Lighting Circuits, Gas discharge & LED lighting, types of lamps, Meaning of auxiliaries, Construction, function & circuit arrangement of various auxiliary units such as :- Horn, Wiper, Flashers, fuel gauge, temp gauge, oil pressure gauge, warning lights, Mechanical & digital Speedometer & odometer, Electrical Fan for cooling system, Wind shield washer & Defogger, car stereo, Power window, central locking with remote control & without remote control, key less entry.	7	15

References:

1. Understanding Automotive Electronics by Bechhold
2. Automotive Electrical Equipment by Kholi. P.L.
3. Automotive Hand Book by Robert Bosch
4. Internal Combustion Engines by Ganesan V.
5. Automobile Electrical Equipment by Crouse, W.H.
6. Understanding Automotive Electronics by William B. Ribbens



Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyse	Evaluate	Create
35%	40%	25%	0	0	0

Suggested List of Experiments:

1. Demonstrate cable size, colour code, wiring and symbols used in auto wiring.
2. Demonstrate construction and working of automobile batteries.
3. Demonstrate construction and working of different types of ignition systems.
4. Demonstrate construction and working of different types of starter, motor, its drive and switches.
5. Study of working principle of D.C. generator.
6. Demonstrate working principle of A.C. generator and its regulators.
7. Demonstrate automobile bulbs and lights.
8. Demonstrate various instruments & gauges (Dash board units).
9. Demonstrate construction of various electrical accessories e.g. horn, wiper & flashers etc.

Instructional Method:

- a. Lectures cum discussion using Chart (such as distributor less ignition system, Principle of magnetism), Cut Section Model (such as alternator & starter motor), and Display board (such as ignition system).
- b. Use of animations, video or power point presentation.