5th Semester	RAU5D001	Automotive Electrical and Electronic Systems	L-T-P 3-0-0	3 CREDITS

MODULE I **(8 HOURS)**

Electricity, Magnetism and Automobile Wiring

A short history of auto-electrical system, constructional and functional details of conductors, semiconductors 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.

MODULE II **(8 HOURS)**

Automobile Battery and Starting System

Types of battery (dry & wet batteries.), Construction of battery, Function of lead acid battery, Various charging processes, Maintenance of battery.Modern developments in battery, Procedure of commissioning of new Battery in vehicle. The various battery rating, Battery performance.

Principal of starter motor,Constructional and functional details of starter,Torque characteristic of starter, Starter drive mechanism: its types (bendix, and folothru & over running Clutch Drives, axial drive), construction, function and comparison of different drive mechanism.Solenoid switch.

MODULE III **(8 HOURS)**

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

MODULE IV **(8 HOURS)**

Charging System,Electronic Ignition and Injection 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.

Spark plugs. Advance mechanisms. Different types of ignition systems. Electronic fuel injection systems, mono and multi point fuel injection system (mpfi).

MODULE V **(8HOURS)**

Sensors and Microprocessors in Automobiles

Basic sensor arrangements. Types of sensors – oxygen sensor, hot wire anaemometer sensor, vehicle speed sensor, detonation sensor, accelerometer sensor, crank position sensor. Microprocessor and microcomputer controlled devices in automobiles such voice warning system, travel information system, keyless entry system, automatic transmission system, electronic steering system.

Books:

[1] Judge.A.W., "Modern ElectricalEquipment of Automobiles", Chapman &Hall, London,1992

[2] William B. Ribbens -Understanding Automotive Electronics, 5th edition- Butterworth Heinemann, 1998

[3] Vinal. G.W., Storage Batteries, John Wiley & Sons inc., New York, 1985.

[4] Crouse.W.H., Automobile Electrical Equipment, McGraw Hill Book Co Inc., NewYork, 1980.

[5] Young.A. P., & Griffiths. L., "Automobile Electrical Equipment", English Language Book Society & New Press, 1990

[6] Spreadbury. F. G., "Electrical Ignition Equipment", Constable & Co ltd., London, 1962.

[7] Robert N Brady "Automotive Computers and Digital Instrumentation". A reston book, Prentice hill, eagle wood cliffs, new jersey, 1988.

[8] Kohli P L., "Automotive Electrical Equipment", Tata McGraw Hill Publishing Co., Delhi, 2004

[9] K.M.Gupta, AutomobileEngineering, Umesh Publication.