

COURSE CODE: 1154EE114	COURSE TITLE: AUTOMOTIVE ELECTRICAL & ELECTRONICS SYSTEMS	L	T	P	C
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COURSE CATEGORY:

University Elective

PREAMBLE :

The course is aimed at imparting fundamental knowledge about the electrical layout and to understand the various sensors and related control system assembly within an automobile.

PREREQUISITE COURSES:

Basic Electrical & Electronics Engineering, Basic Mechanical Engineering

RELATED COURSES:

Automobile Engineering, Electrical Machines

COURSE EDUCATIONAL OBJECTIVES:

The objectives of the course are to make the students,

- To introduce the basic layout of an automotive electrical system
- To introduce about the Starting and Charging systems of a vehicle.
- To introduce about the Sensors and Actuators used in an Automobile.
- To introduce about the control systems within a vehicle.
- To introduce about the basic management system within a vehicle.

COURSE OUTCOMES :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
C01	Emphasize the basic architecture of Automotive Electrical systems.	K1
C02	Troubleshoot the problems behind the drives employed in a vehicle.	K2
C03	Analyze the different sensor arrangements in a vehicle	K1
C04	Differentiate the various control strategies on a vehicle	K1
C05	Manage an engine and understand it's input parameters for the ECU.	K2

CORRELATION OF COs AND POs

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M							L				
CO2								M			H	
CO3						L						
CO4								M				
CO5						H					H	

COURSE CONTENT:		
UNIT I	INTRODUCTION TO AUTOMOTIVE ELECTRICAL SYSTEM	9
Automotive Electrical Layout, Automotive component operation, Electrical wiring terminals, Circuit diagrams and symbols On Board Diagnostics, Dash Board instruments, Warning Systems, Fault Diagnosis and troubleshooting.		
UNIT II	STARTING & CHARGING SYSTEMS	9
Condition at starting, behavior of starter during starting, series motor and its characteristics, principle and construction of starter motors& driving mechanism, D.C. Generator and Alternator-Maintenance of Drives- Regulation for Charging, lighting lamps and Fuses.		
UNIT III	AUTOMOTIVE SENSORS	9
Introduction, Basic Sensor Arrangement, Types of sensors, Oxygen Sensor, Cranking Sensor, Position Sensor, Engine cooling water Sensor, engine oil pressure sensor, Flow sensor, Temperature and humidity sensor, Speed and Acceleration sensor, Knock sensor, Torque sensor, Yaw rate sensors		
UNIT IV	AUTOMOTIVE CONTROL SYSTEMS	9
Automotive microcontrollers, Engine Control Systems, Transmission Control System, Cruise Control System, Braking Control System, Traction Control System, Stability Control System, Suspension Control System, Steering Control System		
UNIT V	ENGINE MANAGEMENT SYSTEM	9
Engine-Construction & stroke Classification-Sensor arrangements in Engine, Open & Closed loop Control, engine cooling and warm up control, acceleration, detonation and idle speed control, exhaust emission control engineering		
TOTAL: 45 PERIODS		
TEXT BOOKS:		
<ol style="list-style-type: none"> 1. "Understanding Automotive Electronics", by Mr. William B. Ribbens, Norman P. Mansour, Elsevier, 2012 2. "Automotive Electrical Equipment" by Mr.P L Kohli, Tata McGraw-Hill Education, 2004. 3. "Automobile Electrical and Electronics Systems", by Mr. Tom Denton, Elsevier, 4 edition (April 9, 2012) 		
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Robert Bosch-: Automotive Handbook- SAE- 2011 Edition I. 2. Dr. Kirpal Singh -: Automobile Engineering, standard publishers , Vol- 1and Vol- 2, -2012 3. Judge- A.W. -: Modern Electrical Equipment of Automobiles- Chapman and Hall- London- 2011. 4. R.K. Jurgen- Automotive Electronics Handbook- McGraw Hill 2ndEdition 2010 		