Lok Jagruti Kendra University
University with a Difference

Diploma
in
Automobile Engineering

LJ Polytechnic

Course Code: 025010402

Basic Automobile Electronics

Programme / Branch Name	Diploma in Automobile Engineering					
Course Name	Basic Automobile Electronics				**Course Code**	025010402
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week					**Evaluation Scheme**				
L	**T**	**P**	**Total Teaching Hours**	**Total Credit**	**CA**	**CCE**	**SEE (TH)**	**SEE (PR)**	**Total**
3	0	2	5	4	10	40	50	50	150

Legends: L: Lectures T: Tutorial P: Practical
CA: Continuous Assessment (Attendance + Activity)
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisite

- ✓ Physics
- ✓ Fundamentals of Electrical & Electronics Engineering

3. Rationale

The course aims to impart basic skills for understanding of modern systems, safety & comfort features used in automobile.

4. Objectives

- ✓ Understand function and applications of various sensors and actuators.
- ✓ Identify and learn importance Safety features in Automobile.
- ✓ Explain modern comfort features in vehicle.
- ✓ Understand the necessity of peripheral systems of Automobile.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcome	% Weightage	Hours
1.	**Introduction to Basics of Electronics**	1.1 Introduction & History of Automobile Electronics 1.2 Introduction, Construction and Types of Semiconductors 1.3 Types, Functions and Applications of PN Junction Diode 1.4 Types, Functions and Applications of Transistor 1.5 Types, Functions and Applications of Special Purpose Diodes and Transistors 1.6 Introduction to Digital Circuits 1.7 Fundamentals of Wheatstone Bridge Circuit	• Understanding working & principle of electronic equipment	20	08
2.	**Introduction to Transducers, Sensors & Actuators**	2.1 Generalized system of Measurement 2.2 Mechanical, Electrical & Electronic Measuring Instruments 2.3 Working Principle, Applications & Types of Transducers 2.4 Working Principle, Applications and Functions of various Sensors 2.5 Working Principle, Applications and Functions of various Actuators	• Understanding applications & working of Transducers, Sensors & Actuators	30	13
3.	**Automobile Safety Systems**	3.1 Importance and Types of Vehicle Safety Systems 3.2 Fundamentals of Active Safety Equipment 3.3 Fundamentals of Passive Safety Equipment 3.4 Concept of Crash Test	• Describe and identify importance of vehicle safety	20	08
4.	**Automobile Comfort Systems**	4.1 Importance of Comfort features in Automobile	• Describe functional details of Automobile Comfort Systems	15	7

		4.2 Various Driver Assistance and Comfort Systems			
5.	**Modern Automobile Peripheral Systems**	5.1 Purpose of Peripheral Systems in Vehicle 5.2 Working & Function of Automobile Peripheral systems	• Describe construction & functions of Automobile peripheral systems	15	6
				Total Hours	**42**

6. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	**U %**	**App %**	**C %**	**E %**	**An %**
1.	Introduction to Basics of Electronics	40	40	10	0	10	0
2.	Introduction to Transducers, Sensors & Actuators	35	45	10	0	10	0
3.	Automobile Safety Systems	30	50	10	0	10	0
4.	Automobile Comfort Systems	30	50	10	0	10	0
5.	Modern Automobile Peripheral Systems	40	40	10	0	10	0

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

7. List of Practicals / Exercises

Sr. No	Practical / Exercises	Key Competency	Hours
1	Build a half wave and full wave rectifier using PN junction diode.	Identify different types of diodes. Understanding working of rectifier circuit. Observe difference between outcome of both circuits.	2
2	Build a Wheatstone bridge circuit using any resistive sensor.	Understanding working and function of the circuit. Understanding the construction and application of the circuit. Observe the outcome of circuit.	2
3	Locate and identify various sensors present on an Internal combustion engine.	List out different sensors of an Internal combustion engine. Understand and identify the sensors. Role of sensors in IC engine.	2
4	Demonstration of various actuators used in a modern vehicle.	Identify various actuator in a vehicle. Understanding working of different actuator in a vehicle.	2
5	Demonstration of SRS Airbag system.	Identify different location of Airbags in a vehicle. Understand construction and working of Airbags. Importance of safety and precautions to be followed with Airbag system.	2
6	Demonstrate working of antitheft alarm system in modern vehicle	Role of antitheft system in modern vehicle. Understanding components of antitheft system. Working of antitheft alarm system.	2
7	Demonstration of adaptive driver assistance systems.	Understanding importance of ADAS. Importance of ADAS for safety. Components of ADAS. Working of pedestrian detection system, adaptive cruise control, automatic emergency braking & lane departure warning system.	2
8	Demonstrate construction and working of Tire pressure monitoring system.	Identify types of tire pressure sensor used in modern vehicle. Understanding working of tire pressure monitoring system.	2
9	Demonstration of car navigation system.	Identify different components of car navigation system. Integral components of car navigation system. Understanding importance of role of satellite in trilateration.	2
10	Demonstration of various peripheral system in a modern vehicle.	List out and identify peripheral systems in a vehicle. Role of each peripheral system. Understanding function and working of peripheral systems.	2
		Total Hours	**20**

8. Reference Books

1) Automobile Electrical and Electronic Systems by Tom Denton, Routledge (Text Book)
2) Automotive Electrical Equipment by PL Kohli, TATA McGraw Hill
3) Understanding Automotive Electronics by William Ribbens, Butterworth-Heinemann
4) Bosch Automotive Electrics and Automotive Electronics by Robert Bosch, Springer Vieweg
5) Automotive Electricity & Electronics by Al Santini, Delmar Cengage Learning
6) Autonomous Driving and Advanced Driver-Assistance Systems (ADAS) by Lentin Joseph, Amit Kumar Mondal, CRC Press

9. Open Sources (Website, Video, Movie)

1) https://www.youtube.com/c/TheAutomotives
2) https://www.youtube.com/channel/UC4la8Cf7-DxaxsfMhaWpHiQ
3) https://theautomobileengineers.blogspot.com/
4) http://nptel.ac.in/
5) https://www.youtube.com/c/LearnEngineering
6) https://www.electronics-tutorials.ws/
7) https://roadsafetyfacts.eu/active-safety-systems-what-are-they-and-how-do-they-work/