

III B. Tech – II Semester

(20ME6648) AUTOTRONICS AND SAFETY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	4

Pre-Requisites: Basic automobile engineering

Course Objectives:

The Students will acquire the knowledge:

- To interpret the fundamentals of Automotive Electronics.
- To discuss the concepts of electronic Fuel Injection & Ignition System.
- To outline the working principles of automotive Electricals.
- To discuss the various considerations in comfort & Safety.
- To outline the system approach to control & instrumentation.

UNIT-I: Fundamentals of Automotive Electronics:

Microprocessor and micro Computer applications in automobiles; components for engine management System; electronic management of chassis system; vehicle motion control; electronic panel meters. Sensors & Actuators: Introduction; Basic sensor arrangement; Types of Sensors such as oxygen sensors, Crank angle position sensors, fuel metering/vehicle speed sensors and detonation sensors, altitude sensors, flow Sensors, throttle position sensors, solenoids, stepper motors, relays.

UNIT-II: Electronic Fuel Injection & Ignition System:

Introduction; feedback carburetor system; throttle body injection and multi point fuel injection System; injection system controls; advantage of electronic ignition systems; types of solid state system and their principle of operation; electronic spark timing. Digital Engine Control System: Open loop and closed loop control system; engine cooling and warm-up control; acceleration, deceleration and idle speed control; integrated engine control system; exhaust emission control engineering; on-board diagnostics; future automotive electronic systems.

UNIT-III: Automotive Electricals:

Batteries; starter motor & drive mechanism; D.C. generator and alternator; regulation for charging; lighting design; dashboard instruments; horn, warning system and safety devices.

UNIT-IV: Comfort & Safety:

Seats, mirrors and sun roofs; central locking and electronic Windows; cruise control; in-car multimedia; security; airbag and belt tensioners; other safety and comfort systems; new developments.

UNIT-V: The system approach to control & instrumentation:

Fundamentals, electronic components and circuits, digital electronics, microcomputer instrumentation and control, sensors and actuators, digital engine control systems, vehicle motion control, automotive instrumentation and telematics, new developments. Electromagnetic Interference Suppression: Electromagnetic compatibility Electronic dash board instruments - Onboard diagnosis system. Security and warning system.

Course Outcomes:

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

S. No	Course Outcome	BTL
1.	Illustrate the concepts of fundamentals of Automotive Electronics.	L2
2.	Explain the concepts of electronic Fuel Injection & Ignition System.	L2
3.	Summarize the working principles of automotive Electricals.	L2
4.	Describe the various considerations in comfort & Safety.	L2
5.	Outline the concepts of system approach to control & instrumentation.	L2

Correlation of COs with POs& PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	1	1	1	2	2	2	2	2	3	2
CO2	2	2	1	1	1	1	1	1	2	2	2	1	2	2
CO3	2	2	2	2	3	1	1	1	1	2	2	1	3	1
CO4	2	2	1	1	1	1	1	2	1	2	2	2	3	2
CO5	2	2	1	1	1	1	1	1	1	2	2	2	3	2

Text Books

1. Ribbens, "Understanding Automotive Electronics", 7th Edition, Elsevier, Indian Reprint, 2013.
2. Tom Denton, "Automobile Electrical and Electronics Systems", Edward Arnold Publishers, 2000.
3. Barry Hollembeak, "Automotive Electricity, Electronics & Computer Controls", Delmar Publishers, 2001.
4. Richard K. Dupuy "Fuel System and Emission controls", Check Chart Publication, 2000.
5. Ronald. K. Jurgon, "Automotive Electronics Handbook", McGraw-Hill, 1999.

References:

1. Automotive Electronics Handbook, Ronald K. Jurgon, McGraw Hill Publishing Co., ISBN 0- 07- 034453-1.
2. Automotive Electricity and Electronics, Al Santini, Delmar Publishers, NY, ISBN 0-8273- 6743-0.
3. Automobile Electrical & Electronic Equipments, Young, Griffiths, Butterworth Publication, London.
4. Understanding Automotive Electronics, Bechfold, SAE 199