

MT431 AUTOMOTIVE ELECTRONICS (Dept. Elective - III)

Course Description & Objectives:

To equips the students with fundamentals of automotive electronics. To understand the electronics systems onboard the automobile. To present an overview of technologies in the field. To provide an understanding of different automotive systems used in automobiles.

Course Outcomes:

At the successful completion of AME, the student is expected to have:

- I A broad understanding of automotive technology.*
- I A thorough knowledge of application of electronics in automotive engineering.*
- I Knowledge of automotive sensors and control systems.*
- I Understand the use of microcomputer, sensors, actuators and the use of various instrumentation systems in automobiles.*

UNIT I - Introduction:

Automotive component operation, electrical wiring terminals and switching, multiplexed wiring, systems Circuit diagrams and symbols. Charging Systems and Starting Systems: Charging systems principles, alternations and charging circuits, New developments, requirements of the starting system, basic starting circuit.

UNIT II - Ignition systems:

Ignition fundamentals, electronic ignition systems, programmed ignition, distribution less ignition, direct ignition, spark plugs. Electronic Fuel Control: Basics of combustion, Engine fuelling and exhaust emissions, Electronic control of carburetion, Petrol fuel injection, Diesel fuel injection.

UNIT III - Instrumentation Systems:

Introduction to instrumentation systems, various sensors used for different parameters, driver instrumentation systems, vehicle condition monitoring, trip computer, different types of visual display. Electronic control of braking

and traction: Introduction and description, control elements and control methodology, Introduction and description of electronic control of automatic transmission, Control of gear shift and torque converter lockup, Electric power steering, Electronic clutch.

UNIT IV - Engine Management Systems:

Combined ignition and fuel management systems, exhaust emission control, Digital control techniques, complete vehicle control systems, artificial intelligence and engine management.

UNIT V - Microprocessor applications in Automotive engineering:

Lighting and Security Systems: Vehicles lighting Circuits, Signaling Circuits, Central locking and electric windows security systems, Airbags and seat belt tensioners, Miscellaneous safety and comfort systems.

TEXT BOOK:

1. TOM DENTON, "Automobile Electrical and Electronic Systems", Edward Arnold publications, 1995.

REFERENCE BOOKS:

1. DON KNOWLES, "Automotive Electronic and Computer controlled Ignition Systems", Prentice Hall, 1988.
2. WILLIAM, T.M., "Automotive Mechanics", McGraw Hill Book Co.,
3. WILLIAM, T.M., "Automotive Electronic Systems", Heiemann Ltd., London, 1978.
4. Ronald K Jurgen, "Automotive Electronics Handbook", McGraw Hill, Inc, 1999.