B.Tech IV Year I Semester

JNTUA COLLEGE OF ENGINEERING (AUTONOMOUS) PULIVENDULA

19AME76a- VEHICLE DIAGNOSIS AND CONTROL

(Professional Elective-IV)

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Course Objectives: The objectives of the course are to make the students learn about

- Introduce various techniques in Vehicle Diagnosis.
- Familiarize sensors and actuators associated with Oscilloscope Diagnostics
- Identify various faults in the engine system.
- Discuss the concepts of engine system and vehicle systems diagnosis

UNIT – 1: Introduction To Fault Diagnosis **10 Hrs**

Introduction To Fault Diagnosis, Safe Working Practices And Techniques. Diagnostics On Paper, Mechanical And Electrical Diagnostic Techniques. Faults Codes, Systems And Standards. On and Off Board Diagnostics. Data Sources, Tools And Equipments. Oscilloscopes, Scanners/Fault Code Readers, Engine Analyzers. Application Methods and Procedures.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the safe working practices and techniques of fault diagnosis. **L2**
- Demonstrate on fault codes, systems and standards. **L2**
- List various tools and equipments used for fault diagnosis. **L1**

UNIT – II: On and off Board Diagnostics. **10Hrs**

Introduction to oscilloscope Diagnostics. Sensors And Actuators Associated With Oscilloscope Diagnostics. On-Board Diagnostics Various Perspectives. Petrol/Gasoline On-Board Diagnostics. On-Board Sensors And Actuators. Sensors And Actuators Comparative Case Study.

Learning Outcomes:

At the end of this unit, the student will be able to

- List various sensors and actuators associated with oscilloscope Diagnostics. **L1**
- Explain Various Perspectives of On-Board Diagnostics. **L2**
- Determine the practical applications of onboard sensors and actuators **L3**

UNIT – III: Engine Systems Diagnostics **10Hrs**

Introduction Engine Systems Diagnostics. Engine Operation And Fuel System. Ignition System And Emission System. Fuel Injection, Starting And Charging System. Power Flow Control And Energy Efficiency Analysis. Engine Management and Fault finding Information. Air Supply, Exhaust System, Cooling and Lubrication System.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the concepts of engine operation and fuel system **L2**
- Explain the working of fuel injection, starting and charging systems **L2**
- Discuss the importance of engine management and fault finding information **L3**

UNIT – IV: Chassis and Brake System Diagnosis. **8 Hrs**

Introduction to Vehicle System Diagnostics, Anti-Lock Braking System Diagnostics. Traction Control System Diagnostics, Steering And Tires. Transmission Systems Diagnostics.

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Learning Outcomes:
At the end of this unit, the student will be able to

- Demonstration on antilock braking system diagnostics **L2**
- Familiarize with the concepts of traction control system Diagnostics **L3**
- Identify the importance of transmission system diagnostics **L2**

UNIT – V: Electrical Systems Diagnosis **8Hrs**

Introduction To Electronic Components And Circuits. Multiplexing And De Multiplexing. Lighting System Faults And Auxiliary Faults. In-Car Entertainment Security And Communications Implementation. Body-Electrical Systems, Instruments System Faults. Heating Ventilation and Air Conditioning. Cruise Control, Air Bags And Belt Tensioners.

Learning Outcomes:
At the end of this unit, the student will be able to

- Recall the concepts of electronic circuits and electronic components **L1**
- Compare multiplexing and demultiplexing **L4**
- Explain the various types of faults in electrical systems **L2**

Text Books:

1. Richard.C.Dorf and Robert.H.Bishop , "Modern Control System" 12th edition Pearson Prentice Hall,2013.
2. Benjamin.C.Kuo, "Automatic control systems", Prentice Hall of India, 7th Edition, 1995.

Reference Books:

1. Tom denton "Advanced automotive fault diagnosis", Elsevier butterworth-heinemann linacre house, jordan hill, oxford ox2 8dp, uk - isbn-10: 0-75-066991-8.
2. Tom Denton "Automotive Electronics Handbook", - - McGraw-Hill Publishing Co.; 2nd Revised edition 1999, ISBN10:0070344531
3. J.Nagrath and M.Gopal, "Control System Engineering", New Age International Publishers, 5th Edition, 2007.
4. Routledge "Automobile Electrical and Electronic Systems", 4th edition 2012, ISBN10: 0080969429.

Course Outcomes:
At the end of this Course the student will be able to

- Perform vehicle diagnosis and apply the fault finding techniques practically **L3**
- Understand the basic concepts of On board and off board diagnosis **L2**
- Recall the concepts of Exhaust, Cooling and Lubrication systems **L1**
- List various faults in the electrical system diagnosis **L3**
- Summarize the principles of traction control system diagnosis and transmission system diagnosis **L2**

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