

Syllabus for the post of Lecturer

Notification Sl. No. 01

Qualification – 1st Class Master Degree in Mechatronics Engineering

Fluid power automation

- Fluid power generating/utilizing elements:
- Control and regulation elements
- Comparison of hydraulics and pneumatics
- Advanced hydraulics
- Method of control
- Electrical control of fluid power
- Application of propositional and servo valves

Advanced control systems

- Mathematical models of physical systems
- State space analysis
- Stability, controllability and observability
- Nonlinear systems
- Derivation of describing function of backlash nonlinearity

Mechatronics system design

- Introduction to mechatronic system design
- Modelling of mechatronics system
- Generalized mechatronics design process
- Design optimization
- Fault finding

Sensors and signal conditioning

- Introduction to measurement system
- Resistive sensors
- Signal conditioning for resistive sensors
- Reactive variation and electromagnetic sensors
- Signal conditioning for reactive variation sensors
- Self-generating sensors
- Signal conditioning for self-generating sensors
- Digital sensors
- Other transduction methods
- Telemetry and data acquisition

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Automotive electronics

- Automotive fundamentals overview
- Actuators
- Air/ fuel system
- Sensors
- Electronic engine control
- Vehicle motion control
- Communication
- Automotive instrumentation

Micro and smart systems

- Micro fabrication processes
- Mechanics of solids stresses and deformation
- Types of numerical methods for solving partial differential equations
- Electronics and packaging: semiconductor devices

Safety and security of mechatronics system

- Types of automobile
- Electrical system
- Transmission system
- Lubrication systems
- Safety features

Industrial automation

- Automation in production & manufacturing systems
- Automated assembly & material handling systems
- Quality & shop floor control systems
- Control technologies in automation
- Computer based industrial control

Embedded systems with advanced microcontrollers

- Introduction to embedded systems & arm 9 core
- Programming of arm processor
- Introduction & programming of fpga
- Applications of arm 9 & fpga controllers

Programmable logic controllers

- Technical definition of PLC
- Introduction to logic

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- PLC counter
- Data movement instructions
- Industrial communication & networking

Robotics

- Fundamentals of robotics
- Basic elements of robot system
- Vision systems in robotics
- Programming in robot
- Applications of robot

Computer integrated manufacturing system

- Cim and automation
- CNC machines
- Group technology
- Automated shop floor control
- Automated material handling
- Flexible manufacturing system