III Year B.Tech. Mechanical Engg. II-Semester	L	T	P	To	C
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ME328 MECHATRONICS

Course Description & Objective:

This course gives an overview of Mechatronics systems and their components for evolving hybrid technologies in various applications.

Course Outcomes:

On successful completion of this module the learner will be able to:

1. *Summerise how mechatronics integrates knowledge from different disciplines in order to realise engineering and consumer products that are useful in everyday life.*
2. *Design static and dynamic boolean logic systems using Combinational, synchronous and asynchronous sequential logic.*
3. *Outline the operation of the fundamental elements of microprocessor systems.*
4. *Select appropriate transducer signal conditioning and devices for data conversion including operational amplifiers for analogue signal processing.*
5. *Implement a continuous-time control design using software on a microprocessor for the Manipulation, Transmission, and Recording of Data.*

UNIT - I Introduction:

Introduction to Mechatronics - Multi disciplinary Scenarios, Systems for Measurement and Control. Microprocessor based controllers, Response of Systems.

UNIT - II Signal Conditioning:

Signal Conditioning, the op-amp, protection, filtering, Wheatstone bridge, digital signals, multiplexers, Data acquisition, Digital signal processing, pulse modulation, displays, magnetic recording, measurement systems, Testing calibration.

UNIT - III System Modeling& Dynamic Response of Systems:

Introduction to Mathematical Modeling, Building Blocks of Mechanical Systems, Electrical Systems, Fluid Systems and thermal systems. Engineering Systems: Rotational, translational, Electro-Mechanical & Hydraulic- Mechanical. Performance measures of first order & second order systems, Transfer function.

UNIT - IV H & P Systems:

Actuation to Hydraulic and Pneumatic Systems, Mechanical Systems, Electrical Systems, Mechanical Switches, Solid State Switches, Operation of Solenoids, AC, DC & Stepper Motors.

UNIT - V Microprocessors & PLC's:

Introduction to digital logic - logic gates - applications of logic gates - sequential logic - Applications - Basic structure of PLCs - selection of a PLC - case studies of mechatronics systems - Microprocessor systems - microcontrollers.

TEXT BOOKS:

1. W. Bolton, "Mechatronics Electronic Control Systems in Mechanical and Electrical Engineering" 3rd ed., Pearson Education, 2009.
2. Appuu Kuttan K K, "Introduction to Mechatronics", 2nd ed., Oxford Press, 2009.

REFERENCE BOOKS:

1. Nitaigour Premchand Mahalik, "Mechatronics Principles, Concepts and Applications" 2nd ed., Tata McGraw Hill, 2008.
2. David G Alciators, Michael B. Histand, "Mechatronics and Measurement Systems" 3rd ed., Tata McGraw Hill, 2009.