

2012-13

PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY
(COURSE STRUCTURE FOR AUTONOMOUS SCHEME)

I Year M. Tech. (Machine Design) M.E.

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MEMD2T6B - MECHATRONICS

(Elective IV)

Unit – I

Introduction: Definition of Mechatronics products, design considerations and tradeoffs. Overview of Mechatronic products. Intelligent machine Vs Automatic machine economic and social justification. Measurement Systems - Control Systems - Traditional design and Mechatronics Design.

Unit – II

Actuators and drive systems: Mechanical, Electrical, hydraulic drive systems, Characteristics of mechanical, Electrical, Hydraulic and pneumatic actuators and their limitations.

Unit – III

Motion Control: Control parameters and system objectives, Mechanical Configurations, Popular control system configurations. S-curve, motor/load inertia matching, design with linear slides.

Unit – IV

Motion Control algorithms: Significance of feed forward control loops, shortfalls, fundamentals concepts of adaptive and fuzzy – control. Fuzzy logic compensatory control of transformation and deformation non- linearity's.

Unit – V

Architecture of intelligent machines: Introduction to Microprocessor and programmable logic Controls and identification of systems. System design classification, motion control aspects in Design. Microprocessors: Microprocessors, Control, Microprocessor systems, Architecture. Programmable Logic Controllers: Introduction, Basic structure, input/output processing, programming, Mnemonics Timers, Internal relays and counters. Data handling. - Analog input/ output, D/A Converters and A/D Converters, Selection of PLC.

Unit – VI

Manufacturing data bases: Data base management system, CAD/CAM data bases, and graphic data base, introduction to object oriented concepts, objects oriented model language interface, procedures and methods in creation, edition and manipulation of data.

Unit – VII

Sensor interfacing: Analog and digital sensors for motion measurement, digital transducers, Human-Machine and machine- Machine inter facing devices and strategy. Sensors and Transducers: Introduction-Performance terminology-Displacement, position and proximity - Velocity and Motion-Fluid pressure-Temperature sensors - Light sensors – Selection of sensors-Signal processing.

Unit – VIII

Machine vision: Feature and pattern recognition methods, concepts of perception and cognition in decision-making.

Text books:

1. “Designing intelligent machines”, open university, London.Michel B.Histand and David G. Alciatore.
2. Introduction to Mechatronics and Measurement systems, Tata Mc Graw Hill.
3. C.W.desilva, “Control sensors and actuators, Prentice Hall.

