

Mechatronics and Manufacturing Automation - Web course

COURSE OUTLINE

Definition of mechatronics. Mechatronics in manufacturing, products and design. Review of fundamentals of electronics. Data conversion devices, sensors, microsensors, transducers, signal processing devices, relays, contactors and timers. Microprocessors controllers and PLCs. Description of PID controllers. Drives: stepper motors, servo drives. Ball screws, linear motion bearings, cams, systems controlled by camshafts, electronic cams, indexing mechanisms, tool magazines, transfer systems. Hydraulic systems: flow, pressure and direction control valves, actuators, and supporting elements, hydraulic power packs, pumps. Design of hydraulic circuits. Pneumatics: production, distribution and conditioning of compressed air, system components and graphic representations, design of systems. CNC machines and part programming. Industrial Robotics.

COURSE DETAIL

Module	Topics/Contents	No. of Lectures
1. Introduction	Definition of mechatronics. Mechatronics in manufacturing, products and design. Review of fundamentals of electronics.	02
2. Mechatronics elements	Data conversion devices, sensors, microsensors, transducers, signal processing devices, relays, contactors and timers.	08
3. Processors /controllers	Microprocessors, microcontrollers, PID controllers and PLCs.	04
4. Drives and mechanisms of an automated system	Drives: stepper motors, servo drives. Ball screws, linear motion bearings, cams, systems controlled by camshafts, electronic cams, indexing mechanisms, tool magazines, and transfer systems.	06
5. Hydraulic system	Hydraulic systems: flow, pressure and direction control valves, actuators, and supporting elements, hydraulic power packs, pumps. Design of hydraulic circuits.	08
6. Pneumatic system	Pneumatics: production, distribution and conditioning of compressed air, system components and graphic representations, design of systems.	08



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Mechanical Engineering

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7. CNC technology and Robotics	CNC machines and part programming. Industrial Robotics.	04
	Total	40

References:

Textsbooks

[1] Boucher, T. O., Computer automation in manufacturing - an Introduction, Chapman and Hall, 1996.

[2] HMT Ltd. Mechatronics, Tata Mcgraw-Hill, New Delhi, 1988

References:

[1] Deb, S. R., Robotics technology and flexible automation, Tata McGraw-Hill, New Delhi, 1994.

[2] Boltan, W., Mechatronics: electronic control systems in mechanical and electrical engineering, Longman, Singapore, 1999.