



# MANIPAL UNIVERSITY JAIPUR

School of Automobile Mechanical and Mechatronics Engineering

Department of Mechatronics Engineering  
Course Hand-out

Mechatronics Systems Elements| MC 1508 | 4 Credits

Session: Jul- Dec 2018 | Faculty: Ashok Kumar Kumawat

**Course Outcomes:** At the end of the course, students will be able to

- MC1508.1** Discuss the basic elements of a mechatronics system.
- MC1508.2** Analyse different type of actuators such as relays, motors and their applications.
- MC1508.3** Understand the working and application of various sensors.
- MC1508.4** Design various type of signal conditioning systems for a mechatronics system.
- MC1508.5** Design and implementation of a control algorithm in a mechatronics system and hence develop employability skill.

## A. SYLLABUS

Introduction of mechatronic systems, needs and benefits of mechatronics in manufacturing, Sensors and Transducers: Displacement Sensor Strain - Strain gauges, Force/Torque, Motion & Velocity sensors, Proximity and Range sensors – Eddy current sensor, ultrasonic sensor, laser interferometer transducer, Hall Effect sensor, inductive proximity switch, Light sensors, phototransistors, Flow sensors, laser Doppler anemometer, tactile sensors, micro-switch & reed switch, Piezoelectric sensors, vision sensor, Drives and Actuators: Solenoids, relays, diodes, Thyristors, TRIACS, BJT, FET, DC motor, Servo motor, BLDC Motor, AC Motor, stepper motors, Piezoelectric actuators, Shape memory alloys, Hydraulic & Pneumatic devices, Power supplies, valves, cylinder sequencing, Data Acquisition & Translation: Signal conditioning, Multiplexer, Pulse width Modulation, Signal Analysis, Linearization of data, Compensation, Signal Averaging, Fourier analysis, Data Presentation System: Display - Cathode ray oscilloscope, LED, LCD, Printers, Magnetic Recording. Controllers and Algorithms: PID controller and controller tuning.

## B. TEXT BOOKS

- i. D. A. Bradley and others, Mechatronics, Chapman & Hall Publications.
- ii. David G. Alciatore & Michael B Histan., Introduction to Mechatronics and Measurement systems, Tata McGraw Hill, 2003.
- iii. Dan Nesculescu, Mechatronics, Pearson Education Pvt. Ltd, 2002.
- iv. C. R. Venkataramana, Mechatronics, Sapna Book house, Bangalore, 2001

