ET1012: APPLIED ELECTROMECHANICS

Unit.No	Unit Name	Resource	Topics
1	Topic 1**: Electromechanical systems** Block diagram representation, classification, configurations, and components (Mechanical, Electrical and Electronics), robot terminology, Analogy with human body, accuracy, precision, resolution, repeatability etc. Forward and Inverse kinematics. Introduction to transformation matrix.		Sub Topic 1 Sub Topic 2 Sub Topic 3
2	Topic 2**Actuators:** Pneumatic, Hydraulic, Electrical – Solenoid coil, Relay, Construction, Working principle of DC, BLDC, Stepper and Servo motors, Merits and Demerits, applications, and selection of actuators.		
3	Topic 3 **End effectors and robot controls**: End effectors, classification, mechanical, magnetic, vacuum and adhesive gripper. Gripper force analysis and design. Robot control. Introduction to open loop and closed loop control system with examples.		
4	**Electronic devices and applications:** Diodes, Zener Diode, LED, BJT, FET, MOSFET, IGBT, Op-amp. Digital Electronics: Logic gates, Basic gates using transistor, Flip-flop, Counters, Register, ADC, DAC		
5	**Microcontroller:** ATmega328P, architecture, peripherals, ports, registers, memory types, timer/counter, PWM, interrupts, Serial I/O, I2C, SPI		
6	**Sensors:** Proximity sensor (Range sensor), Tactile sensor (Contact sensor), light sensor (photo diode, IR, Photo transistor) Applications: Opto-isolators, Opto-encoders, Gyroscope (Acceleration sensor), Hall-effect sensors, Temperature sensor, Ultrasonic Sensor, Interfacing and Control of sensors		