



Welcome to the Mechanical Engineering Department

~~G. H. PATEL COLLEGE OF ENGINEERING & TECHNOLOGY - V.V.NAGAR - 388 120.~~

PE422 INDUSTRIAL ROBOTICS

CREDITS : 5 (L = 4, P = 2)

- 1. INTRODUCTION :** Definition, robot anatomy, spatial coordinates, geometric configurations and work envelope; Machine intelligence; Applications and robot selection, safety, economic justification, future of robotics.
- 2. PROGRAMMING AND LAUGUAGES :** Introduction; On-line programming : Manual input, lead through programming, teach pendant programming; Off-line programming: Primitive motion languages, structured programming launuages, task oriented languages; Simulation.
- 3. DESIGN AND CONTROL:** Types of motion, kinematics and dynamic considerations, control system concepts, types of motion control, control unit, electric drives and motor control, fluid power drives, transmission systems, planning of trajectories.
- 4. CONTROL COMPONENTS AND SENSORS :** Mechanical control by stops and cams, solenoids, relays; Fluid control components; Internal Sensors : Limit switches, potentiometers, resolvers and synchros, tachogenerator, tachometers, encoders and decoders; External sensing : Simple touch sensing, strain sensing, tactile sensing, acoustic sensing, magnetic sensing, capacitive sensing, laser sensing.

5. **END EFFECTORS** : General design considerations, mechanical grippers, vacuum pads, electromagnets; End effector power sources.
6. **MACHINE VISION** : Vision sensors and their operation, image acquisition and processing, object recognition and interpretation.

REFERENCE BOOKS :

1. Groover M.P.
Industrial Robotics
McGraw Hill
2. Gordon Mair
Industrial Robotics
Prentice Hall
3. Anthony C. McDonald
Robot Technology
Prentice Hall
4. Gonzalez Fu and Lee
Robotics
McGraw Hill