Robotics

Course outcomes:

- Able to differentiate types of Robots and Robot Grippers
- Understanding Model Forward and Inverse Kinematics of Robot Manipulators
- Understanding how to programme a Robot
- Able to design Intelligent Robots using Sensors.

UNIT - I

Introduction to Robotics :

Definition, classification with respect to Geometrical Configuration (Anatomy), Controlled System & Chain Type : Serial Manipulator & Parallel Manipulator, Components of Industrial Robotics-Precession of Movement - Resolution, Accuracy & Repeatability - Dynamic Characteristics - Speed of Motion, Load Carrying Capacity & Speed of Response - Sensors-Internal Sensors : Position Sensors & Velocity Sensors, External Sensors: Proximity Sensors, Tactile Sensors, & Force or Torque Sensors.

UNIT - II

Grippers :

The Interface, Mechanical Gripper, Grasping Force, Engelberger-G-Factors-Mechanisms for Actuation, Magnetic Gripper , Vacuum cup Gripper, Gripper Selection & Design, Industrial Robots Specifications, Selection based on the Application

UNIT - III

Kinematics :

Manipulators Kinematics, Rotation Matrix, Homogenous Transformation Matrix, D-H Transformation Matrix, D-H method of Assignment of Frames, Direct and Inverse Kinematics for Industrial Robots, Differential Kinematics for Planar Serial Robots

UNIT - IV

Trajectory Planning:

Joint Space Scheme, Cubic Polynomial, Fit-Obstacle, Avoidance in Operation, Space-Cubic Polynomial Fit with Via Point, Bleding Scheme, Introduction Cartesian Space Scheme,

Control : Interaction Control, Rigid Body Mechanics, Control Architecture : Position, Path Velocity, Force Control Systems, Computed Torque Control, Adaptive Control, Servo system for Robot Control

UNIT - V

Programming of Robots and Vision System, Lead Through Programming Methods - Teach Pendent : Overview of Various Textual Programming Languages like VAL, Machine (robot) vision

TEXT BOOKS :

1. Groover M P, "Industrial Robotics", Mc Graw Hill
2. John J. Craig, "Introduction to Robotics", Pearson

REFERENCE BOOKS :

1. Jazar, "Theory of Applied Robotics", Springer
2. Ghosal, "Robotics", Oxford

BOS Members' Signatures :-

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			DATE OF BOS MEETING
9. **DR. K. VASANTH** HOD, ECE, VJIT	10. **DR. D ARUNA KUMARI** Professor in CSE, VJIT	11. **PROF. B. SRINIVASULU** HOD, IT, VJIT	**23 – 06 – 2020**