

6th Semester	RMT6C001	Robotics and its Applications	L-T-P 3-0-0	3 Credits
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MODULE – I

(9 HOURS)

Introduction: Automation and Robotics, CAD/CAM And Robotics -An over view of Robotics – present and future applications - classification by coordinate system and control systems. Components of the Industrial Robotics: End effectors-types, Mechanical grippers, and other types of grippers, comparison of Electric, Hydraulic and pneumatic types of locomotion devices

MODULE II

(8 HOURS)

Motion Analysis: Homogeneous transformations as applicable to rotation and translation — Problems. Manipulator Kinematics: Specifications of matrices, D-H notation Joint coordinates and world coordinates – Forward and inverse kinematics — problems.

MODULE III

(7 HOURS)

Manipulator jacobians: Differential transformation and manipulators, Jacobians — problems. Dynamics: Lagrange — Euler and Newton-Euler formulations — Problems.

MODULE IV

(8 HOURS)

Trajectory Planning: Path planning and avoidance of obstacles, Slew motion, joint interpolated motion — straight line motion. Programming Languages: problems. Robot programming, languages and software packages

MODULE V

(7 HOURS)

Robot actuators and Feed-back components: Actuators: Pneumatic, Hydraulic actuators, electric and stepper motors. Feedback components, position sensors – potentiometers, resolvers, encoders – Velocity sensors. Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading – processing – spot and continuous arc welding & spray painting – Assembly and Inspection.

Books :

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Robo Technology Fundamentals, James G. Karamas, CENGAGE Publications
3. Robotics / Fu K S/ McGraw Hill.
4. Robotic Engineering, I Richard D. Klaftezl Prentice Hall.
5. Robot Analysis and intelligence / Asada and Slotine A Wiley Inter Science.
6. Robot Dynamics & Control/Mark W. Spong and M. Vidya Sagar I John Wiley & Sons (ASIA) Pvt. Ltd.
7. Robotics and Control I Mittal R K & Nagrath I J / TMH.