

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Semester: IV

Mechanical (Production Engineering)

Subject Name: **Robotics and Control**

Subject Code: **742801**

Sr No.	Course Content
1	INTRODUCTION: Automation and Robotics, Robot anatomy, robot configuration, motions joint notation work volume, robot drive system, control system and dynamic performance, precision of movement.
2	CONTROL SYSTEM AND COMPONENTS: Basic concept and modals controllers control system analysis, robot activation and feedback components. Positions sensors, velocity sensors, actuators sensors, power transmission system..
3	MOTION ANALYSIS AND CONTROL: Manipulator kinematics, position representation forward transformation, homogeneous transformation, manipulator path control, robot dynamics, configuration of robot controller.
4	END EFFECTORS: Grippers-types, operation, mechanism, force analysis, tools as end effectors consideration in gripper selection and design..
5	SENSORS: Desirable features, tactile, proximity and range sensors, uses sensors in robotics
6	MACHINE VISION: Functions, Sensing and Digitizing-imaging, Devices, Lighting techniques, Analog to digital single conversion, Image storage, Image processing and Analysis-image data reduction, Segmentation feature extraction. Object recognition, training the vision system, Robotics application.

Reference Books:

1. Introduction to Robotics Analysis, Systems, Applications by Saeed B Niku PHI.
2. A Robot Engg text book by Moshen Shahinpoor, Harper and Row Publishers, NY.
3. Fundamentals of Robotics – Analysis and Control, Robert J Schilling, PHI.
4. Robotic technology, Principles and practice – Werner G Holz book – Van Nostrand Reinhold Co NY.

5. Robotic Engineering – An Integrated Approach by Richard D Klaffer, Thomas A Chmielewski, Michael Negin – PHI.
6. Robot Dynamics and Control – Mark W Spong, M Vidyasagar – Wiley India.
7. Intro to Robotics, Mechanics and Control by John J Craig, Pearson Education.
8. Modelling and Control of Vehicular and robotic systems by Sisil Kumararawadu – Narosa publishing house.
9. Industrial Robots by Ganesh S Hegde – Laxmi Publications.