

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 2

Mechanical Engineering (Advanced Manufacturing Systems)

Subject Name: Robotics & Artificial Intelligence

Subject Code: 1725001

Sr_No	Content
1.	Introduction: Brief history, robot technology, classification, and characteristics, physical configuration, structure of industrial robot
2.	Robot end Effectors
3.	Robot motion and analysis and control: Kinematics, Dynamics, trajectory planning, control, Robot vision and programming
4.	Robot Cell Design and Control: Robot cell layouts, multiple robots and machine interference, work cell control, interlocks, robot cycle time analysis
5.	Economic analysis for robotics: Economic analysis: basic data required, methods of economic analysis, subsequent use of the robot, differences in production rates, other factors more difficult to quantify
6.	Introduction of AI: Concepts and definition of AI, AI Problems, The Underlying assumption, What is an AI technique?, AI characteristics, AI versus Natural Intelligence, Applications of AI, Etc.
7.	Problems, Problem Spaces, and Search: Defining the Problem as State Space Search, Production Systems, Problem Characteristics, Production Systems Characteristics, Issues in the Design of Search Programs, Advantages and Disadvantages of DFS & BFS Techniques.
8.	Heuristic and Introduction to Heuristic Search Techniques: What is heuristic?, Heuristic Function, Importance of Heuristic Function, Introduction to Search Techniques: Generate – and – Test, Hill Climbing, Best-First Search, Problem reduction, Constraint – Satisfaction, Means- Ends Analysis. .
9.	Application of AI in manufacturing: Use of software in AI

Text Books:

1. R.K. Mittal & I.J. Nagrath, “Robotics & Control” TMH-2007.
2. John J. Craig, “Introduction To Robotics: Mechanics And Control”, 3rd Ed., Pearson

Reference Books:

1. Industrial Robotics (Technology, Programming and applications) Mc Graw Hill Editions. {By Mikell P. Groover, Mitchell Weiss}
2. Robotics – An introduction {By Douglas R. Malcolm. Jr } Delmar Publisher Inc
3. Robot technology fundamentals {By Saures G. Keramas} Delmar publishers
4. Fundamentals of robotics – analysis & control {By Robert J. Schilling} (PHI) edition