

Robotics and AI [RAI]

B.E. Sem. VII [CMPN]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

SYLLABUS

1. Intelligent Robotics

Automation and Robots, Robot Classification, Robot Specifications, Sensory perception, Robot control and Intelligence.

2. Direct Kinematics

Coordinate Frames, Rotations, Homogeneous Coordinates, The arm Equation, (DK analysis of –2 Axis and 3 Axis Planar robot, Four axis SCARA Robot, Five axis Articulated robot).

3. Inverse Kinematics

General Properties of Solutions, Tool Configuration, (IK analysis of - 2 Axis and 3 Axis Planar robot, Four axis SCARA Robot, Five axis Articulated robot).

4. Workspace Analysis and Trajectory Planning

Workspace analysis, Work envelope of 4-axis SCARA Robot, Work envelope of 5-axis articulated Robot, Workspace Fixtures, The pick-and-place operation, Continuous-Path Motion, Interpolated Motion, Straight-Line Motion.

5. Basic Concepts of Artificial Intelligence

Intelligence, Problem representation in Artificial Intelligence, Problem-solution Techniques used in Artificial Intelligence.

6. Elements of Knowledge Representation

Logic, Production Systems, Semantic Networks, Expert Systems.

7. Task Planning

Task-Level Programming, Uncertainty, Configuration Space, Gross-Motion Planning, Grasp Planning, Fine-Motion Planning, Task Planning Problem.

Reference :

1. Robotics and AI (*Andrew Staugaard*) PHI.
2. Fundamentals of Robotics - Analysis and Control (*Robert Schilling*) Pearson Education.
3. Introduction to Robotics (*J. J. Craig*) Pearson Education.
4. Robotics (*Fu, Gonzales and Lee*) McGraw Hill.
5. Artificial Intelligence : Structures and Strategies for Complex Problem Solving (*George F. Luger*) Pearson Education.
6. Industrial Robotics- Technology, programming, and applications (*Groover, Weiss, Nagel and Odrey*) McGraw Hill.
7. Elaine Rich and Kevin Knight (*Artificial Intelligence*) TMH.

