

# AMI25 ROBOTICS AND EXPERT SYSTEMS

## UNIT-1 BASIC CONCEPTS, POWER SOURCES AND SENSOR

- 1.1 Definition and origin of robotics, different types of robots,
- 1.2 Degrees of freedom, Asimov's laws of robotics, dynamic stabilization of robots,
- 1.3 Determination of HP of motor and gearing ratio, variable speed arrangement,
- 1.4 Acid and nickel cadmium batteries, path determination, vision, ranging, laser, acoustics and tactile sensors.

## UNIT- 2 MANIPULATORS, ACTUATORS AND GRIPPERS

- 2.1 Construction of manipulators, manipulator dynamics and force control,
- 2.2 Electronics and pneumatic manipulator, control circuits, pneumatic ,
- 2.3 Hydraulic and electric actuators and effectors,
- 2.4 Various types of grippers, design considerations.

## UNIT-3 KINEMATICS

- 3.1 Homogeneous co-ordinates, solution of inverse.
- 3.2 Kinematics problem, multiple solutions, jacobians, work envelope.

## UNIT-4 AI AND EXPERT SYSTEM

- 4.1 Introduction, components of expert system construction,
- 4.2 Methodology and tools for building- expert systems, characteristics of ES.
- 4.3 Hill climbing techniques, knowledge representation,
- 4.4 Predicate calculus, resolution, robot programming languages.

## UNIT-5 ROBOTS

- 5.1 Robots for production and component handling spare parts policy,
- 5.2 Payback analysis, and future in robotics.

### Reference Books:

1. "Robotics" by R C Gonzalez and C S G Lee
2. "Robotics for Engineers" by Y Koren