

ROBOTICS
(Open Elective-IV, Offered by EEE Dept.)

Pre-Requisites: NIL

Objectives:

- To understand basic concepts of robotics.
- To learn various sensors and actuators used in the design of robots.
- To learn various robot programming methods and languages.

UNIT - I (~8 Lecture Hours)

Introduction: - Basic Concepts such as Definition, brief history, three laws, depth of field, Robot anatomy, Classification and usage, science and technology of robots, associated parameters: resolution, accuracy, repeatability, dexterity.

UNIT - II (~8 Lecture Hours)

Sensors for Robots: - Characteristics of sensing devices, Selections of sensors, Classification and applications of sensors. Types of Sensors, Need for sensors and vision system in the working and control of a robot.

Drives: - Types of Drives, Actuators and its selection while designing a robot system. Types of transmission systems

UNIT - III (~10 Lecture Hours)

Control Systems: - Types of Controllers, Introduction to closed loop control, second order linear systems and their control, control law partitioning, trajectory-following control, modelling and control of a single joint, Present industrial robot control systems and introduction to force control

Machine Vision System: - Vision System Devices, Image acquisition, Masking, Sampling and quantisation, Image Processing Techniques, Noise reduction methods, Edge detection, Segmentation

15) M. S. Gopal

UNIT - IV (~9 Lecture Hours)

Robot Programming: Methods of robot programming, lead through programming, motion interpolation, branching capabilities, WAIT, SIGNAL and DELAY commands, subroutines,

16) R. Balasubramanian

Programming Languages: Introduction to various types such as RAIL and VAL II ...etc., Features of each type and development of languages for recent robot systems

- 5) N. Mallekelly
 6) S. S. Srinivasan
 7) A. M. M. M.
 8) K. S. S.
 9) S. S. S.

- 10) J. J. J.
 11) R. R. R.
 12) G. G. G.
 13) P. P. P.
 14) D. D. D.

UNIT - V (~8 Lecture Hours)

Associated Topics in Robotics: - Socio-Economic aspect of robotisation, Economical aspects for robot design, Safety for robot and associated mass, New Trends & recent updates in robotics, International Scenario for implementing robots in Industrial and other sectors. Future scope for robotisation.

Text Books:

1. John J. Craig, "Introduction to Robotics (Mechanics and Control)", 2nd Edition: Addison-Wesley, 2004.
2. Mikell P. Groover et. al., "Industrial Robotics: Technology, Programming and Applications", McGraw - Hill International, 1986.
3. Richard D. Klafter, Thomas A. Chmielowski, Michael Negin, "Robotic Engineering: An Integrated Approach", Prentice Hall India, 2002.

Reference Books:

1. K.S. Fu, R.C. Gonzales, C.S.G. Lee, "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, 1987.
2. Shimon Y. Nof, "Handbook of Industrial Robotics", John Wiley Co, 2001.

COURSE OUTCOMES:

After completion of the course students will be able to

1. Identify a Robot for a specific application.
2. Identify parameters required to be controlled in a Robot.
3. To select suitable sensors and drive system for an application
4. To learn various robot programming methods and languages
5. To learn various industrial robot control systems and Mission Vision system
6. To understand Socio-Economic aspect of robotisation.

1) N. Malle Reddy

9) ~~Pratt~~

2) D. Suby Lakshmi

10) ~~Pratt~~

3) ~~Pratt~~

11) R. D.

4) S. Sankar

12) G. Anand

5)

13) R. Reddy

6) ~~Pratt~~

14) ~~Pratt~~

7) M. Reddy

15) ~~Pratt~~

8) K. Reddy

16) R. S. Lakshmi