

# Industrial Robotics

B.E. Sem. VIII [PROD]

(Elective – I)

## EVALUATION SYSTEM

	Time	Marks
<b>Theory Exam</b>	3 Hrs.	100
<b>Practical Exam</b>	–	–
<b>Oral Exam</b>	–	25
<b>Term Work</b>	–	25

## SYLLABUS

### 1. Introduction

Automation , robotics , Robotic system & Anatomy, Classification, Future Prospects.

### 2. Drives

Control Loops, Basic Control System Concepts & Models, Control System Analysis, Robot Activation & Feedback Components, Position & Velocity Sensors, Actuators, Power Transmission system.

#### **Robot & its Peripherals**

**End Effectors:** Type mechanical and other grippers, Tool as end effector.

**Sensors :** Sensors in Robotics, Tactile Sensors, Proximity & Range Sensors, Sensor Based Systems, Vision systems – Equipment

### 3. Machine vision

Introduction, Low level & High level Vision, Sensing & Digitizing, Image Processing & analysis, Segmentation , Edge detection, Object Description & recognition, interpretation, Applications.

#### **Programming for Robots**

Method, Robot Programme as a path in space, Motion interpolation, motion & task level Languages, Robot languages, Programming in suitable languages, characteristics of robot.

### 4. Robot Kinematics

Forward ,reverse & Homogeneous Transformations, Manipulator Path control, Robot Dynamics.

### 5. Root Intelligence & Task Planning

Introduction, State space search, Problem reduction, use of predictive logic, Means – Ends Analysis, Problem solving, Robot learning, Robot task planning.

### 6. Robot application in manufacturing

Material transfer, machine loading & un loading, processing operation, Assembly & inspectors, robotic Cell design & control, Social issues & Economics of Robotics.

### References Books:

1. Industrial Robotics: Technology, Programming & Applications (*Grover, Weiss, Nagel, Ordey*) Mc Graw Hill
2. Robotics: Control, Sensing, Vision & Intelligence (*Fu, Gonzalez, Lee*) Mc Graw Hill
3. Robotic technology & Flexible Automation (*S R Deb*) TMH
4. Robotics for Engineers (*Yoram Koren*) Mc Graw hill
5. Fundamentals of Robotics (*Larry Health*)
6. Robot Analysis & Control (*H Asada*) JJE Slotine
7. Robot Technology (*Ed. A Pugh*) Peter Peregrinus Ltd. IEE, UK
8. Handbook of Industrial Robotics (*Ed. Shimon Y. No. Of*) John Wiley

