I Year M.Tech. CAD/CAM/CAE	Semester - II	L	T	P	Tot.	C
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(ME 560) INDUSTRIAL ROBOTICS

UNIT - I

Introduction and Robot kinematics: Definition need and scope of Industrial robots – Robot an atomy – Work volume – Precision movement – End effectors – Sensors. Robot Kinematics – Direct and inverse kinematics – Robot trajectories – Control of robot manipulators – Robot dynamics –Methods for orientation and location of objects.

UNIT - II

Robot drives and Control: Controlling the Robot motion – Position and velocity sensing devices –Design of drive systems – Hydraulic and Pneumatic drives – Linear and rotary actuators and control valves – Electro hydraulic servo valves, electric drives–Motors– Designing of end effectors – Vacuum, magnetic and air operated grippers.

UNIT – III

Robotsensors: Transducers and Sensors – Tactile sensor – Proximity and range sensors – Sensing joint forces – Robotic vision system – Image Representation – Image Grabbing –Image processing and analysis – Edge Enhancement – Contrast Stretching – Band Rationing – Image segmentation –Pattern recognition – Training of vision system.

UNITI - V

Robot Cell Design and Application: Robot work cell design and control – Safety in Robotics – Robot cell layouts – Multiple Robots and machine interference – Robot cycle time analysis. Industrial application of robots.

UNIT - V

Robot Programming: Methods of Robot Programming – Characteristics of task level languages lead through programming methods – Motion interpolation. Artificial intelligence – Basics – Goals of artificial intelligence – AI techniques.

TEXT BOOKS:

1. K. S. Fu, R. C. Gonzalez and C.S.G. Lee, “Robotics Control, Sensing, Vision and Intelligence”, McGraw Hill, 1987.

REFERENCES

1. Yoram Koren, “Roboticsfor Engineers” Mc.Graw-Hill, 1987.
2. Kozyrey, Yu.“Industrial Robots”, MIR Publishers Moscow, 1985.
3. Richard. D, Klafter, Thomas, A, Chmielewski, Michael Negin, “Robotics Engineering– An Integrated Approach”, Prentice-Hall of India Pvt. Ltd.,1984.
4. Deb, S. R.” Robotics Technology and Flexible Automation”, Tata McGraw-Hill, 1994.
5. Mikell, P.Groover, Mitchell Weis, Roger, N.Nagel, Nicholas G.Odrey, “Industrial Robotics Technology, Programming and Applications”, McGraw-Hill, Int. 1986.
6. Timothy Jordanides et.al , “Expert Systems and Robotics”, Springer – Verlag, NewYork, May 1991.