Year & Sem:	Course Code: ME4510	Course Name: **Robotics and Applications**	No. of Credits: 4	L	T&PS	P
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Introduction To Industrial Robotics: Classification of Robot Configurations, functional line diagram, degrees of freedom. Components common types of arms, joints grippers, factors to be considered in the design of grippers.

Robot Actuators And Feedback Components: Actuators, Pneumatic, Hydraulic actuators, Electric &Stepper motors, comparison. Position sensors - potentiometers, resolvers, encoders - velocity sensors, Tactile sensors, Proximity sensors.

Manipulator Kinematics: Homogenous transformations as applicable to rotation and transition - D-H notation, Forward inverse kinematics. Manipulator Dynamics: Differential transformations, Jacobians, Lagrange - Euler and Newton - Euler formations.

Trajectory Planning: Trajectory Planning and avoidance of obstacles path planning, skew motion, joint integrated motion - straight line motion.

Robot Programming: Methods of programming - requirements and features of programming languages, software packages. Problems with programming languages. Robot Application In Manufacturing: Material Transfer - Material handling, loading and unloading - Process - spot and continuous arc welding & spray painting - Assembly and Inspection.

Robot Sensors: Introduction, sensor characteristics, Position sensors- Velocity sensors- accelerating sensors, touch and tactile sensors, force and pressure sensors-piezoelectric, force sensing resistor, strain gauges, Torque sensors, light and infrared sensors, proximity sensors, sniff sensors.

Robot Vision: Introduction, the sensing and digitizing function in Machine Vision, image processing and analysis, Training and vision system vision application in robots.

Reference Books:

1. Robotics , Fu K S, McGraw Hill, 4th edition, 2010. An Introduction to Robot Technology, P. Coiffet and M. Chaironze, Kogam Page Ltd. 1983 London.
2. Robotic Engineering , Richard D. Klafter, Prentice Hall
3. Robotics, Fundamental Concepts and analysis –AshitaveGhosal,Oxford Press
4. Introduction to Robotics - John J. Craig,PearsonEdu.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.

Video Lectures (Web Links):

1.
2.

Study Materials (Web Links):

1.
2.

Problems & Solutions (Web Links):

1.
2.