KIIT POLYTECHNIC, BHUBANESWAR

LESSON PLAN
Session (2022-2023)

Discipline : Mechanical Engineering	**Semester:** 6th (Summer-2023)	**Name of the Teaching Faculty:** Tushar Kanta Mahapatra, Lecturer. **Email**: tushar.mahapatrafme@kp.kiit.ac.in
Subject: Industrial Robotics & Automation	**No. Of Days/ Week:** 4	**Start Date**: 13/ 02/ 2023 **End Date**: 23/ 05/ 2023
Week	**Class Day**	**Theory Topics**
1st	1st	Definition of Robot, Describe Robot anatomy
	2nd	Describe Robot Components: Manipulator, End effectors, Driver, Actuator.
	3rd	State the objectives of Robot, Advantages and disadvantages of robots.
	4th	History of Robots
2nd	1st	Classification of robots; Cartesian, Cylindrical, Spherical, Scara, Vertical Coordinate System.
	2nd	Structural Characteristics of robots; Mechanical rigidity; Effects of structure on control work envelope and work Volume.
	3rd	Application of Robot for human comfort.
	4th	Assignment Evaluation
3rd	1st	Review class
	2nd	Class Test
	3rd	Importance of Actuators and classify Linear actuator; Rotary drives. Hydraulic, and Electrical drives
	4th	Describe the application and working Pneumatic drives, Hydraulic, and Electrical drives
4th	1st	AC servo motor; DC servo motors and Stepper motors; Conversion between linear and rotary motion.
	2nd	Working of AC/ DC servo motor.
	3rd	Type of drive system used in Robot
	4th	Feedback devices; Potentiometers; Optical encoders; DC tachometers.
5th	1st	Robot controller; Level of Controller; Open loop and Closed loop controller.
	2nd	Microprocessor based control system; Robot path control: Point to point.

	3rd	Continuous path control and Sensor based path control; Controller programming.
	4th	Assignment Evaluation
6th	1st	Review class / Drought clearing class
	2nd	Quiz Test
	3rd	Requirements of a sensor application.
	4th	Principles and Applications of the following types of sensors: Position sensors (Encoders, Resolvers,)
7th	1st	Position sensors (Piezo Electric sensor)
	2nd	Range sensors, state Triangulation Principle. Explain structured lighting approach.
	3rd	Types of Sensor and there application area
	4th	State the importance of Proximity sensing, Force and torque sensing.
8th	1st	Review class
	2nd	Assignment Evaluation
	3rd	Class Test
	4th	Robot vision system (scanning and digitizing image data)
9th	1st	Image processing and analysis.
	2nd	Cameras (Acquisition of images)
	3rd	Videocon camera (Working principle & construction)
	4th	Applications of Robot vision system: (Inspection, Identification, Navigation & serving).
10th	1st	Use of Robot vision system
	2nd	Review class
	3rd	Assignment Evaluation
	4th	Class Test
11th	1st	Explain Forward Kinematics and Inverse Kinematics; State the differences between the two Kinematics.
	2nd	Forward Kinematics and Reverse Kinematics of Manipulators with Two Degrees of Freedom (In 2 Dimensional)
	3rd	Problems Discussion
	4th	Teach Pendant Programming
12th	1st	Lead through programming
	2nd	Robot programming Languages; VAL Programming.
	3rd	Programming writtening
	4th	Motion Commands; Sensor Commands; End effecter commands; and Simple programs.
13th	1st	Review class
	2nd	Assignment Evaluation
	3rd	Class Test

	4th	Basic elements of automated system, advanced automation functions, State level of Automation
14th	1st	Application of robots in machining; welding, Assembly and Material handling.
	2nd	Use of Robot in Automobile Industry.
	3rd	Robot application in hazardous environment.
	4th	Assignment Evaluation
15th	1st	Class Test
	2nd	Discussion on Previous year question paper
	3rd	Discussion on Previous year question paper
	4th	Discussion on Previous year question paper