**Lesson Plan**

**Name of Faculty: Dr. Deepak Kumar**

**Discipline: Computer Engineering Department**

**Semester: 1st**

**Subject: Introduction to Robotics**

Lesson plan Duration: 15 Weeks (October 2022 – December 2022)

Work load (lecture) per week (in hours): Lectures: 3 hours,

|  |  |  |
| --- | --- | --- |
| **Lecture No** | **Description** | **Remarks if any** |
| 1 | **Unit-1**: Robotics-Introduction-classification with respect to geometrical configuration (Anatomy) |  |
| 2 | Robotics-Introduction-classification with respect to geometrical configuration (Anatomy) cont… |  |
| 3 | Controlled system & chain type |  |
| 4 | Serial manipulator & Parallel Manipulator |  |
| 5 | Components of Industrial robotics-precession of movement-resolution, accuracy & repeatability |  |
| 6 | Cont… |  |
| 7 | Dynamic characteristics- speed of motion |  |
| 8 | load carrying capacity & speed of response |  |
| 9 | Sensors-Internal sensors: Position |  |
| 10 | sensors,& Velocity sensors |  |
| 11 |  External sensors: Proximity sensors |  |
| 12 | Tactile Sensors, & Force or Torque sensors |  |
| 13 | Tactile Sensors, & Force or Torque sensors cont.. |  |
|  | Minor test |  |
| 14 | **Unit-2** : Grippers – Mechanical Gripper |  |
| 15 | Grasping force--mechanisms for actuation |  |
| 16 | Magnetic gripper |  |
| 17 | vacuum cup |  |
| 18 | gripper-considerations in gripper selection & design |  |
| 19 | Industrial robots specifications |  |
| 20 | Selection based on the Application |  |
| 21 | **Unit-3:**  |  |
| 22 | Kinematics-Manipulators Kinematics |  |
| 23 | Rotation Matrix |  |
| 24 | Homogenous Transformation Matrix |  |
| 25 | D-H transformation matrix |  |
| 26 | D-H method of assignment of frames |  |
| 27 | Direct and Inverse Kinematics for industrial robots |  |
| 28 | Differential Kinematics for planar serial robots |  |
| 29 | Differential Kinematics for planar serial robots cont.. |  |
|  | Minor Test |  |
| 33 | **Unit-4** :  |  |
| 34 |  Robot Applications |  |
| 35 | Material transfer and machine loading/unloading |  |
| 36 | processing operations assembly and inspection |  |
| 37 | Concepts of safety in robotics |  |
| 38 | social factors in use of robots |  |
| 39 | economics of robots |  |
|  |  |  |