1.	Title of the course	Mechanics and Control of Robotic Manipulators
2.	Course number	ME520L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ME5221/12
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To apply algorithmic approaches, mathematical models and computational and motion control methods to robotic manipulator systems. To recognize and analyze the basic mechanical and electrical systems concerning robots. To analyze and design the basic robotic systems.	
10.	**Course Content:** Manipulator kinematics: transformations, different notations, forward and inverse kinematics; Differential kinematics and statics: Jacobian matrix and workspace singularities; Manipulator dynamics: forward and inverse dynamics; Lagrangian and Newton-Euler formulations; Dynamic modeling and computer simulation; Control of robotic manipulators: joint space and task-space control schemes, trajectory generation; Robot programming: robot operating system (ROS); Classical control concepts: control of a single link, independent joint PID control, Control of a multi-link manipulator.	
11.	**Textbook(s):** 1. Craig J J, *Introduction to Robotics: Mechanics and Control*, 3rd Edition, John Wiley and Sons (2004). 2. Saha S K, *Introduction to Robotics*, 2nd Edition, Tata McGraw-Hill (2014).	
12.	**Reference(s):** 1. Ghosal A, *Robotics: Fundamental Concepts and Analysis*, 2nd Edition, Oxford University Press (2008). 2. Vidyasagar M and Spong M W, *Robot Dynamics and Control*, 2nd Edition, Wiley (2008).	