



Course: M.Sc Electronic Science	Name of Faculty: Dr. JAMES KURIAN
Topic: Robotics Technology	Semester: II
Lecture Hall: Room No. 220	Timings: as per CBCS

Week and date	Lecture topics	Assignments	Remarks
Week 1 (3 rd Jan 17)	Definition, Robot Classifications		
Week 2 (9 th Jan 17)	Degree of freedom, Joint variables, Grippers	<i>Assignment-1</i>	
Week 3 (16 th Jan 17)	Kinematics: World frame, joint frame, end-effectors frame, Rotation Matrix		
Week 4 (23 rd Jan 17)	composite rotation matrix, Homogeneous Matrix		
Week 5 (30 th Jan 17)	Link Coordinate, Denavit-Hartenberg representation, Arm equation, Tool Configuration		
Week 6 (6 th Feb 17)	First Internals		
Week 7 (13 th Feb 17)	Dynamics: Velocity Kinematics, Jacobian, Singularities, Differential motion, Euler – LaGrange Equation	<i>Assignment-1 submission</i>	
Week 8 (20 th Feb 17)	Expression of Kinetic and Potential Energy, Equations of Motion.	<i>Assignment-2</i>	
Week 9 (27 th Feb 17)	Sensors: Potentiometric, Optical sensors - Optical Encoders, Absolute, Incremental, Quadrature decoding Encoder Resolution. Direction of rotation, Velocity and acceleration measurements		
Week 10 (6 th Mar 17)	Actuators- Hydraulic and Pneumatic, Electrical actuators: DC motors, AC motors, Stepper motors, BLDC, Solenoids. Motor drives: PWM and H-bridges, case study L298 based drive.		
Week 11 (13 th Mar 17)	Robot Programming: Teach-in, Teach-Through, High-Level languages –robot talk, Comparison of teaching and programming methods, Software speedup		
Week 12 (20 th Mar 17)	Robot Controllers: essential components, joint actuation and Sensing, Overload, Over current and stall detection methods, Position, Speed and Direction Sensing.		
Week 13 (27 th Mar 17)	Second Internals		
Week 14 (3 rd Apl 17)	Open discussions on modern trends in Robotics	<i>Assignment-2 submission</i>	
Week 15 (10 th Apl 17)	<i>Publication of Sessionals</i>		
Week 16 (17 th Apl 17)	Commencement of II Sem Examinations		