



<b>Course: M.Tech. (Electronics &amp; Communication Engineering)</b>	<b>Name of Faculty: Dr. Tripti S Warriar</b>
<b>Topic: 18-437-0111 Robotics and Automation</b>	
<b>Lecture Hall: 117</b>	<b>Timings: as per CBCS</b>

<i>Week and date</i>	<i>Lecture topics</i>	<i>Assignments</i>	<i>Remarks</i>
Week 1 (8 <sup>th</sup> July 19)	<b><u>Module 1</u></b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Robot Classification</li> <li>• Types of Joints</li> <li>• Number of Axes and Degree of freedom</li> </ul>		
Week 2 (15 <sup>th</sup> July 19)	<ul style="list-style-type: none"> <li>• Joint Variables</li> <li>• Open loop and closed Loop Controllers</li> <li>• Resolution, Accuracy and Repeatability</li> <li>• Gripper</li> </ul>	<i>Assignment 1</i>	
Week 3 (22 <sup>nd</sup> July 19)	<b><u>Module 2</u></b> <ul style="list-style-type: none"> <li>• Measurement devices</li> <li>• Position and Odometry sensors</li> <li>• Beacon and range sensors</li> </ul>		
Week 4 (29 <sup>th</sup> July 19)	<ul style="list-style-type: none"> <li>• Actuators</li> <li>• H-bridge</li> <li>• Pneumatic and Hydraulic Systems</li> <li>• Drive mechanisms</li> </ul>		
Week 5 (5 <sup>th</sup> Aug 19)	<b><u>Module 3 – Robot Kinematics</u></b> <ul style="list-style-type: none"> <li>• World, joint and end effector frame</li> <li>• Rotation Matrix &amp; Composite Rotation Matrix</li> <li>• Homogenous Matrix</li> <li>•</li> </ul>		
Week 6 (12 <sup>th</sup> Aug 19)	First Internals		
Week 7 (26 <sup>th</sup> Aug 19)	<ul style="list-style-type: none"> <li>• Link coordinate</li> <li>• Denavit-Hartenberg representation</li> <li>• Arm equation and Tool configuration</li> </ul>	<i>Assignment 1 submission</i>	
Week 8 (19 <sup>th</sup> Aug 19)	<b><u>Module 3 – Robot Dynamics</u></b> <ul style="list-style-type: none"> <li>• - Velocity Kinematics</li> <li>• - Jacobian Singularities</li> <li>• - Differential motion</li> </ul>		
Week 9 (2 <sup>nd</sup> Sep 19)	<ul style="list-style-type: none"> <li>• Euler – LaGrange Equation</li> <li>• Expression of Kinetics and Potential Energy</li> <li>• Equation of Motion</li> </ul>	<i>Assignment 2: Problems on Robot Kinematics</i>	
<i>Onam Vacation</i>			

Week 10 (16 <sup>th</sup> Sep 19 )	<b><u>Module 4</u></b> <ul style="list-style-type: none"> <li>• Tech -in, Teach-through</li> <li>• High-level languages – robot talk, Comparison of teaching and programing methods</li> </ul>		
Week 11 (23 <sup>rd</sup> Sep 19)	<ul style="list-style-type: none"> <li>• Software speedup</li> <li>• Robot Controllers – essential components, joint actuation and sensing</li> </ul>		
Week 12 (30 <sup>th</sup> Sep 19)	<ul style="list-style-type: none"> <li>• Overload, Over current and Stall detection methods</li> <li>• Position, Speed, Direction Sensing</li> </ul>	<b><i>Assignment 2 submission</i></b>	
Week 13 (7 <sup>th</sup> Oct 19)	<b><u>Module 5</u></b> <ul style="list-style-type: none"> <li>• Definition of Automation</li> <li>• Types of production</li> <li>• Functions of Manufacturing</li> <li>• Organization and information Processing in Manufacturing</li> <li>•</li> </ul>		
Week 14 (14 <sup>th</sup> Oct 19)	<ul style="list-style-type: none"> <li>• Production Concepts and Mathematical Models</li> <li>• Automation Strategies</li> <li>• Production Economics: Methods of evaluating investment alternatives</li> </ul>		
Week 15 (21 <sup>st</sup> Oct 19)	<ul style="list-style-type: none"> <li>• cost in Manufacturing</li> <li>• Break-even analysis</li> <li>• Unit cost of production</li> <li>• Cost of Manufacturing Lead time</li> <li>• work in process</li> </ul>		
Week 16 (28 <sup>th</sup> Oct 19)	<b>Second Internals</b>		
Week 17 (4 <sup>th</sup> Nov 19)	<i>Publication of Sessional</i>		