COURSE TITLE	**TE142471: Robotics and Automation** Credits: 2 ELECTIVE COURSE
LEARNING OBJECTIVES	Giving knowledge to the students in order to understand the robotics and automation system.
COMPETENCY	• Students are able to analyze the robotics and automation system. • Students are able to design the robotics and automation system.
SUBJECTS	• **Introduction** includes robotics evolution, mechanical structure of robot. • **Kinematics** includes forward kinematics, Denavit-Hartenberg method, joint space and operational space, inverse kinematics problem. • **Dynamics** includes Lagrange-Euler formulation, Newton-Euler formulation, inverse dynamics. • **Trajectory Planning** includes path and trajectory, joint space trajectories, operational space trajectories. • **Sensor and Actuator** includes joint actuating system, drives, proprioceptive sensors, exteroceptive sensors; **Motion Control** includes control problem in robotics, joint space control, operational space control; **Force Control** includes robot and environment interaction, compliance control, impedance control, hybrid position/force control; **Visual Servoing** includes vision for control, position-based visual servoing, image-based visual servoing; **Robot Applications** includes material handling, assembly application, inspection application, processing application, flexible manufacture system, computer integrated manufacture.
MAIN REFERENCES	• Bruno Siciliano, Robotics: Modeling, Planning and Control, Springer-Verlag Limited, 2009. • R.K. Mittal, Robotics and Control, Tata Mc-Graw Hill, 2003. • Lung-Wen Tsai, Robot Analysis, John Wiley and Sons, Inc., 1999.
OPTIONAL REFERENCES	IEEE Transactions on Robotics and Automation
PREREQUISITE	-