

MECH4710 Introduction to Robotics

Course Code: MECH 4710	Course Title: Introduction to Robotics	
Required Course Or Elective Course: Elective	Terms Offered (Credits): Fall or Spring, 3 credits	
Faculty In Charge: Lilong Cai	Pre/Co-Requisites: MECH2030	
Course Structure: Lecture 2 hour, Lab 1hr per week		
Textbook/Required Material: 1. John J. Craig, Introduction to Robotics: Mechanics and Control, 3rd Ed., Prentice-Hall, 2005. 2. Supplementary Texts: Introduction to Robotics, by Phillip John McKerrow.		
Course Description: This is an elective course for the BEng in Mechanical Engineering with Option in Design and manufacturing.		
Course Topics: 1. Introduction to Robotics 2. Spatial Transformations 3. Orientation Matrices 4. Forward Kinematics 5. Inverse Kinematics 6. Jacobian and Singularities 7. Manipulator Dynamics		
Course Objectives:	<ol style="list-style-type: none"> 1. The goal of the course is to familiarize the students with the concepts and techniques in design and analysis of robot manipulator and its application. 2. To introduce basic and entry level theories and terminology for students to develop the skill to description and transforms of the robot in forward and inverse kinematic and dynamic equations for different robotic structures. 3. To provide student hands on experience in laboratory practice to learn simple robot programming and control. 	
Course Outcomes:	<ol style="list-style-type: none"> A. The student will have a thorough understanding of the fundamental kinematics and dynamics of industrial robots. B. The student will be able to analysis and establish kinematic and dynamic equation for different robot manipulators. C. Students will know enough about different applications of robotic systems and be able to evaluate, chose, and incorporate robots in engineering systems according to the kinematic and dynamic features of the robots. 	
Assessment Tools:	Regular homework problems	10 %
	Lab projects	5%
	Mid-term and Final exams	85%