MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 425: Robotics (3 credit): Elective Course

Course Description (2008-2010 Catalog):

Introduction to robotic system concepts; analysis of robot arm dynamics, speed and accuracy; end or arm tooling and gripper concepts; smart robot concepts; touch and vision systems; robot software concept

Prerequisite Course: ME320, MAT 429
Corequisite: ME 421

Prerequisite (Corequisite) by Topic:

- Machine dynamics, Differential equation & linear algebra, Automatic Control

Textbook:

Introduction to Robotics, John J. Craig, 1989, Addison-Wesley Publishing Co.

Other Reference Material: N/A

Course Coordinator: Woosoon Yim, Professor

Course learning outcomes:

1. Understand the science and engineering behind the motions generated by robot manipulators
2. To introduce kinematics, dynamics, and control problems of robotic manipulators
3. Design the basic feedback position controller for robot manipulator
4. Simulate the robot system using Matlab and Simulink (kinematics, dynamics, controller)
5. Deal with common control and dynamic problems in robot manipulators

Relationship of Course to Mechanical Engineering Program Educational Outcomes:

Goal1: Provide mechanical engineering graduates with technical capabilities.					Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.				Goal 3: Instilling a sense of responsibility as a professional member of society.			
1.a	**1.b**	**1.c**	**1.d**	**1.e**	**2.a**	**2.b**	**2.c**	**2.d**	**3.a**	**3.b**	**3.c**	**3.d**
H		**L**	**H**	**H**	**M**		**L**					

(L)ow (M)edium (H)igh

Topics Covered:

1. Space description and homogeneous transformation.
2. Robotic Fundamentals
    - Kinematics (DH notations)
    - Manipulator Jacobian
    - Forces, Moments dynamics
    - Feedback control Techniques
3. Applications and Advanced Topics
    - Robot compliance
    - Operational space
    - Force control

Laboratory Projects: None

Assessment of Student Progress toward Course Objectives

Two mid-term exams, Semester Project, final exam

Class/Laboratory Schedule: 75 minutes lecture two sessions per week

Contribution of Course for meeting Professional Component:

(a) Mathematics and basic sciences:	0 credit
(b) Engineering Topics (Design/Science):	3 credit
(c) General Education:	0 credit
(d) Others:	0 credits

Person who prepared this description:

Woosoon Yim, Professor October 12, 2009