

## ME446.612 Robot Mechanics & Control Mechanical Engineering@SNU Spring 2016

**Instructor:** Prof. Dongjun Lee (office) 301-1517 (e-mail) [djlee@snu.ac.kr](mailto:djlee@snu.ac.kr) (p) 02-880-1724

**Class Schedule:** M/W 5:00-6:15pm @ 301-105

**Office Hours:** M/W 11:00am-12:00pm with appointment

**TA:** Nguyen Hai-Nguyen (office) 301-211 (e-mail) [hainguyen@snu.ac.kr](mailto:hainguyen@snu.ac.kr) (p) 02-880-1690

**Textbook:**

Murray, Li, Sastry, A Mathematical Introduction to Robotic Manipulation, CRC Press, 1994  
Spong, Hutchinson & Vidyasagar, Robot Modeling & Control, John Wiley & Sons, 2005

**Reference:**

Choset, et al, Principles of Robot Motion, MIT Press, 2005  
Applied Nonlinear Control, Slotine and Li, Prentice-Hall, 1991

**Course Description:** This is a graduate-level introductory course on robotics, with particular emphasis on the analytical treatments of kinematics, dynamics, and control of mainly robotic manipulators. Main topics of the course are:

- Rigid body motion description in  $SE(3)$
- Forward and inverse kinematics
- Differential kinematics and Jacobians
- Kinematic null-space-based control
- Dynamics: Lagrangian and Newton-Euler approaches
- Nonlinear motion control
- Interaction control
- Some geometric concepts
- Dynamics and control of constrained systems

**Prerequisites:** Undergraduate-level dynamics, linear algebra, and system dynamics; or by the consent of instructor

**Grading:** homework (20%) mid-term exam 4/22 7-9:30pm (40%) final exam 6/17 7-10pm (40%)

**Homework:** Homework should be turned in at the beginning of the lecture on the due date. If turned in late on the same day, 50% will be deducted. Otherwise, it will get zero point. Homework will also be *peer-graded* with the point of 0/0.25/0.5/0.75/1 from 0-1 scale.

**Students conduct:** students are expected to behave professionally in this class: going-in/out during the class, newspaper reading, phone call, texting, or any other unprofessional behaviors (e.g. what you would haven't done in high school) are not allowed.

**Academic integrity:** any academic dishonesty is strictly prohibited in this class, and, if caught, can result in F-grade and academic disciplinary actions.