ME27944005500 Robot Mechanics & Control
Mechanical Engineering@SNU Fall 2017

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

Class Schedule: M/W 5:00-6:15pm @ 301-305

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

TA: Sangyul Park (lead-TA)   (office) 301-211   (e-mail) sangyul@snu.ac.kr   (p) 02-880-1690
Yonghan Lee (HW-grading)   (office) 301-211   (e-mail) ldragonfly@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:
Lynch, Park, Modern Robotics: Mechanics, Planning, and Control, Cambridge University Press , 2017
Choset, Burgart, Kavraki, Kantor, Hutchinson, Lynch, Principles of Robot Motion, MIT Press, 2005
Slotine, Li, Applied Nonlinear Control, 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
- Dynamics and control of constrained systems

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

Grading: homework (20%)   mid-term exam 11/3 (F) 7-9:30pm (40%)   final project 12/15   11:59pm (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 deduced. 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.

SG-group and undergraduate (UG) students: For those who want to know the subject matter, yet, don't want to put so much effort to get high grade, SG-option is offered: if elected and also show "sincerity" (i.e., submit all HWs, do best for all exam/project, etc.), at least B- guaranteed, yet, upper-bounded by B+ for fairness to fellow students. For UG students, they will receive regular grade or SG-grade whichever higher as long as show "sincerity".

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.