ME446.632 Control Systems I
Mechanical Engineering@SNU Spring 2016

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

Class Schedule: M/W 2:00-3:15pm @ 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   (p) 02-880-1690

Textbooks:
>Feedback Control Theory, J. Doyle, B. Francis & A. Tannenbaum, Dover
>Linear System Theory and Design, C-T. Chen, Oxford University Press, 1998

References:
>Modern Control Systems, R. C. Dorf & R. H. Bishop, Prentice Hall, 2008
>Linear System Theory, W. J. Rugh & T. Kailath, Prentice -Hall
>Multivariable Feedback Control, S. Skogestad & I. Postlethwaite, John Willey & Sons
>Applied Nonlinear Control, Slotine and Li, Prentice-Hall, 1991
>Principles of Robot Motion, H. Choset et al, MIT Press, 2004

Course Description: This is the first graduate course on dynamic systems and control. This course will mainly deal with analysis and control design techniques for linear control systems.   Three main pillars of the course are: 1) frequency domain techniques for linear systems; 2) time-domain state-spate techniques for linear dynamical systems; and 3) optimal quadratic control and optimal state estimation of linear systems. Main topics of the course in this semester are:
>Robust stability and robust performance
>Loop shaping: performance vs robustness
>Control synthesis constraints and model matching
>Linear dynamical system: stability and solution
>Controllability, observability, and separation principle
>State-space control design techniques
>Linear quadratic control (LQR)
>Kalman estimation
>Kalman filtering (if time permits)

Prerequisites: Undergraduate-level classical control courses or equivalent; or by the consent of instructor

Grading: homework (20%)   mid-term (40%) 4/20 7-9:30pm   final exam (40%) 6/15 7-10pm

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. Each problem of homework will be graded in the scale of 0/0.5/1 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 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.