Joy of

ME 404 – Dynamics and Control of Mechanical Systems

Fall 2020

Professor Hua Wang
wangh@bu.edu

Office Hours: Monday 3:00 – 4:00PM and by appointment.

Text: *Feedback Control of Dynamic Systems, 8th* edition, Gene F. Franklin et al., Pearson, 2019.

Web: *learn.bu.edu*

Topics & Schedules

1. Introduction to Control – History and Basic principles: (Chapter 1, ½ week)
2. System Modeling and Linearization: (Chapters 2, 9.1, 9.2.1, 1 week)
3. The Laplace Transform and its Properties: (Chapter 3.1, 1 ½ weeks)
4. Transfer Functions and Block Diagrams: (Chapter 3.2, 1 week)
5. Transient Response of First- and Second-order Systems: (Chapter 3.3-3.5, 1 week)
6. Stability (Chapter 3.6) and Steady-state Error (Chapter 4.2): (1 week)

-----*Midterm Exam, Chapters 1-4, 9.2.1, Wednesday, October 20th* ----

7. Basic Controllers (Chapter 4.3, ½ week)
8. Root Locus Analysis and Design: (Chapter 5, 3 weeks)
9. Frequency-domain Analysis and Design: (Chapter 6.1-6.7, 3 weeks)
10. Final Exam Review: (½ week)

Grading

Homework	10%
Quiz	10%
Lab	TBD
Midterm Exam	35%
Final Exam	45%

Remember that grades are not given, they are earned. I expect each and everyone of you to work hard. Your level of effort will be noted. If you are not satisfied with your progress, please consult with me as early as possible.

Policies

Homework must be submitted on the due date to receive credit. Your lowest homework grade will be dropped. **No make-up exams will be given.** Any conflicts with homework submission or exam attendance must be discussed with me **in advance**.

Doing the homework is essential to learning the material and doing well on the exams. General problem concepts can be discussed with classmates. Copying from others or allowing others to copy is grounds for disciplinary action.

Matlab Software

Some homework problems will require the use of Matlab and the associated Control Systems Toolbox. They are available on most BU computers. The book provides short descriptions of the pertinent Matlab commands in each chapter. A table of commands and their page references is found inside the back cover of the text. An online tutorial for Matlab is available at www.bu.edu/eng/matlab. The most useful matlab command is *help <commandname>*.

You must hand in both Matlab input and output. It is often easiest to type your Matlab input commands into an m-file which can later be printed and submitted along with the output generated.