ME 380

Analysis & Design of Mechanical Control Systems

Spring 2012

Instructor. Dr. Gregory P. Starr—I consider myself to be a shadetree mechanic who learned a ~~little~~ decent amount of math; I have always been fascinated with things that *move* (that's why I'm not a civil engineer). My office is ME 423, phone 277-6298 (no voicemail), email address `starr@unm.edu`, office hours are walk-in or by appointment. Email is the probably the best way to contact me, despite recent comments to the contrary...

Instructor's Health. In the last couple years I have suffered the following (in addition to my previous *twelve* fractures):

- Low-speed motorcycle crash in May 2010: lower back still very painful...
- High-speed (67 mph) mororcycle crash in November 2010: bike totalled; Starr body has numerous bruises, dislocated jaw, badly sprained right wrist...
- In mid-December 2010 I was diagnosed with:
  - Pneumonia
  - Kidney failure
  - Acute hypertension
  - Mycobacterial lung infection

I ended up being out the entire Spring 2011 semester, and still haven't fully recovered. For that reason I am keeping a "lower profile" at UNM than usual.

Goal of Course. An understanding of feedback control systems is absolutely necessary for mechanical engineers (I am the one to thank or curse for making ME 380 required). Some examples of feedback control systems are automation equipment (robots, CNC machine tools, *etc.*), automobiles (engine management, cruise control, active suspension, *etc.*), and the human body (too many to enumerate here). In this course you will learn how to analyze and design simple feedback control systems. *Note:* In ME 380 you will be exposed to a number of topics for the first time—this can be a little overwhelming. We'll try to get you through it. BTW, if you want to get a job in the Albuquerque area, a good knowledge of control systems can be *very helpful!*

During this semester I'm going to focus on *MOTION CONTROL*; this is a very important subset of control applications that is my own area of interest, and is probably one of the easiest application areas to visualize.

Textbooks. Nise, Control Systems Engineering, 6^{th} ed. We will try to cover some/most of Chapters 1-11, although that will be a challenge. I have never used this book before...

Exams/Projects. We will have a midterm exam and a final exam—one or both might be multiple-choice due to the size of the class (I gave a multiple-choice final exam many years ago and got good feedback on it).

Homework. Selected homework problems will be assigned. I will provide homework solutions for most homework assignments (it takes me just about as long as you to do this)—I strongly feel that I shouldn't ask you to do anything I wouldn't do. I have typically had homework "hints and answers" documents available on my website for you to download, but I'm not sure if I'll be able to provide those this semester.

Neither late homework nor projects will be accepted (without prior approval)

Grading. The following table shows the weighting used to evaluate your performance in this course.

Homework	20%
Midterm Exam	40%
Final Exam	40%
TOTAL	100%