LAB EXPERIMENTS / DESIGN PROJECT

ECEN 3723 FALL 2015

During the semester, you will be performing several laboratory experiments that will reinforce/enhance theoretical concepts that are covered throughout the course. In addition, you will design and implement a feedback control system for a DC motor as a final project. Together, these experiments and the final project will make up 25% of your course grade, as described in the syllabus. The experiments can all be done at home, at your own pace.

As you work through each experiment (and the final project), you will create an electronic document (lab notebook), where you will record the work that you perform. This will include theoretical calculations (e.g., partial fraction expansions, block diagram reductions, etc.), plots created in MATLAB/Simulink from simulations and experiments, discussions of results, etc. As with quizzes and exams, your work and your discussions are more important than the numerical "answers" that you report. (In fact, there is no single correct answer for most of the experiments or the final project. The answers will only be considered "correct" if you can justify them with your work and your discussion.)

After you complete each experiment, you will submit a PDF version of your lab notebook. It should contain the results of that experiment, as well as all the experiments you have performed to that point. The notebook will be checked for completeness, and comments may be provided to assist you in improving your notebook. You can go back and make changes to previous experiment write-ups until the final notebook (including the design project) is turned in at the end of the semester. A grade will be assigned to the notebook only at the end of the semester.

You can perform the experiments in teams of two. Notify me at your earliest convenience of the members of your team. Although you can collect data together, and discuss the operation of the experiment, each person on the team should do their own work, and write up their own discussion. In some cases, the experimental setup will be slightly different for the two members (e.g., different loads for the motor). Each team member will turn in his or her own lab notebook.

The experiments can be accessed through the Take Home Labs website (thl.okstate.edu). If you click on the *Experiments -> All* links, you will arrive at a page that lists all of the experiment names. Click on the name of the experiment that you are going to perform. On the resulting page, you will find an experiment handout that will guide you through all of the steps of the experiment. There will also be links to parts that you may need to order to complete the experiment, and software that you can download to assist in the operation of the experiment.

The experiments you should perform, and their due dates, are listed below.

Experiment Title	Due Date
Blinking LED	September 11, 2015
Simple DC Motor	September 25, 2015
Sampling and Data Acquisition	October 9, 2015
Open Loop Step Response	October 23, 2015
Open Loop Frequency Reponse	November 6, 2015
Closed Loop Step Response	November 20, 2015
Root Locus Control Design	December 4, 2015