CSU Course Syllabus: Fall 2020
ECE611 - Nonlinear Control Systems
TR 9:30-10:45am

Instructor: Dr. Peter M. Young, Ext. 1-5406, pmy@rams.colostate.edu.

Office Hours: M 1:00-2:00pm

Course Book: *Nonlinear Systems*
Khalil, 3rd Edition

Recommended Additional Reference Books:

- *Nonlinear Control Systems*
  Isidori

- *Robust Adaptive Control*
  Ioannou and Sun

- *System Identification*
  Ljung

Prerequisites: ECE412

Grading and Exams:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>40%</td>
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<tr>
<td>Computer Projects</td>
<td>20%</td>
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<tr>
<td>Homework Assignments</td>
<td>10%</td>
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Course Schedule: Homework problems will usually be assigned every other week (due two weeks later). In addition there will be a number of special computer projects. You are expected to work on all these problems yourself, but *reasonable* collaboration is allowed.

No collaboration is allowed for the Midterm and Final Exams. Both exams will be take-home, open-book and open-notes.

Course Objective: The students will learn how to analyze the stability and performance properties of nonlinear systems, and also how to design nonlinear feedback controllers. The skills developed will be based on both extensions of linear tools as well as the latest direct nonlinear methods.
ECE611 Course Outline

This course will be lecture-based, with both homework assignments and exams. In addition a number of computer projects will be assigned.

Introduction and Background

Stability Analysis

Design Techniques
Overview of design for nonlinear systems. Jacobian linearization and gain scheduling. Introduction to feedback linearization and extensions of optimal control techniques. Direct design methods.