**ECE 3340 Control Systems**

**Catalog Description**

**ECE 3340 Control Systems (4)**

Introduce control system analysis and design. Cover control system modeling, time response, reduction of multiple systems, stability analysis, steady-state errors, root locus technique, PID controller, and fuzzy controller.

**Prerequisite:** ECE 3040.

**Prerequisite by topic:**

LabVIEW or Matlab

Linear System

Linear Algebra

Electric Circuits

**Units and Contact Time:** 4 semester units: 3 units lecture (150 minutes), 1 unit lab (150 minutes).

**Type:** Required for CE and EE.

**Required Textbook:**

Control Systems Engineering. (6th Edition). Norman S. Nise John. Wiley & Sons. ISBN-13 978-0-470-54756-4. This book is available in the CSUB Bookstore and at retail and Internet bookstores.

**Recommended Textbook and Other Supplemental Materials:**

Additional material will be provided by the instructor.

**Coordinator(s)**

Wei Li

**Student Learning Outcomes**

This course covers the following ACM/IEEE Body of Knowledge student learning outcomes:

CE-ESY. Embedded Systems

CE-CSE. Computer Systems Engineering

ABET Outcome Coverage

The course maps to the following performance indicators for Computer Science (CAC/ABET) and Computer Engineering (EAC/ABET) and Electrical Engineering (EAC/ABET):

1. Analyze a problem, and identify and define the computing requirements and specifications appropriate to its solution (EAC 3b).
2. Write a professional project report that presents the outcomes of the project and present these findings to the class (EAC 3g).

3. Use modern engineering tools such as LabVIEW, ELVIS++ Bread Board, Virtual Digital Instruments, and Quasar Inverse Pendulum to complete the assigned project (EAC 3k)

**Lecture Topics and Rough Schedule**

Week 01 Introduction to Control System

Week 02 Introduction to LabVIEW

Week 03 LabVIEW Control and Simulation Modules

Week 04 Modeling in the Frequency Domain 1

Week 05 Modeling in the Frequency Domain 2

Week 06 Modeling in the Time Domain

Week 07 Time Responses

Week 08 Reduction of Multiple Systems

Week 09 Stability Analysis

Week 10 Steady-State Errors

Week 11 Root Locus Technique

Week 12 PID Controllers

Week 13 LabVIEW Fuzzy System Module and Fuzzy Controller

Week 14 Quasar Inverse Pendulum

Week 15 Final Project

**Grading Policy**

A 93%

A- 90%

B+ 87%

Lab/Hw Assignments ....35% B 83%

Midterm 1 ......................20% B- 80%

Midterm 2 ......................20% C+ 77%

Final Project....................25% C 73%

C- 70%

D+ 67%

D 63%

D- 60%

F below 60%

**Prepared By**

Wei Li on June 22, 2014

**Approval**

Approved by CEE/CS Department on July 30, 2014

**Effective Fall 2016**