**ECE 4320 Instrumentation, Control, Data Acquisition**

**Catalog Description**

**ECE 4320 Instrumentation, Control, Data Acquisition (4)**

Introduce basic concepts in Instrumentation, Control and Data Acquisition. Cover analog and digital signal inputs, outputs, and generation.

**Prerequisite:** ECE 2070 and ECE 3070.

**Prerequisite by topic:**

Signals

Data Acquisition

Control

Circuits

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

**Type:** Selected elective for CE and EE.

**Required Textbook:**

Learning LabVIEW 2013 Fast: A Primer for Automatic Data Acquisition. Douglas Stamps Michael. ISBN: 978-1--58503-850-3. 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-CSG. Circuits and Signals

CE-CSE: Computer Systems Engineering

CE-DSP. Digital Signal Processing

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 (CAC 3b and EAC 3b).
2. Write a professional project report that presents the outcomes of the project and present these findings to the class (CAC 3i and EAC 3g).

3. Use modern engineering tools such as LabVIEW, ELVIS II Data Acquisition System, and Virtual Digital Instruments, to complete the assigned project (EAC 3k)

**Lecture Topics and Rough Schedule**

Week 01 The LabVIEW Environment

Week 02 Selection and Loop Structures in LabVIEW

Week 03 Functions and SubVI’s

Week 04 Arrays and Clusters

Week 05 Data Acquisition: Analog Signal Basics

Week 06 Finite Analog Input using Buffers, Hardware Timing, and Triggering

Week 07 Continuous Analog Input using Hardware Timing, Circular Buffers, and Triggers

Week 08 Continuous Analog Output using Software Timing

Week 09 Continuous Analog Output using Circular Buffers and Hardware Timing

Week 10 Finite Analog Output using Buffers and Hardware Timing

Week 11 Data Acquisition: Digital Basics

Week 12 Continuous Digital I/O with Software Timing

Week 13 Continuous Digital I/O with Hardware Timing

Week 14 Final Project

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 July 12, 2014

**Approval**

Approved by CEE/CS Department on July 30, 2014

**Effective Fall 2016**