**ECE 4570 Robotics**

**Catalog Description**

**ECE 4570 Robotics (4)**

Introduce robotic systems. Cover Mindstorms NXT, motion control, target steering and trajectory planning, obstacle avoidance, line tracking, and multiple sensor fusion.

**Prerequisite:** ECE 2070 and ECE 3040.

**Prerequisite by topic:**

LabVIEW and C Programming

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, CS and EE.

**Required Textbook:**

LabVIEW for LEGO Mindstorms NXT (University Edition). Michael Gasperi. ISBN: 978-1--934891-05-6. 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:

CS-PF: Programming Fundamentals

CE-ALG. Algorithms

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 (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, LEGO Mindstorms, and DaNI Platform, to complete the assigned project (EAC 3k)

**Lecture Topics and Rough Schedule**

Week 01 Introduction to Robotics Concepts

Week 02 Selection and Loop Structures in LabVIEW

Week 03 Mindstorms NXT

Week 04 Motion Control

Week 05 Target Steering and Trajectory Planning

Week 06 Line Tracking

Week 07 Obstacle Avoidance

Week 08 Multiple Sensor Fusion

Week 09 Introduction to DaNI Robot

Week 10 Color Detection

Week 11 Color-Based Tracking

Week 12 Chemical Sensor Interface

Week 13 Chemical Plume Tracking

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 June 29, 2014

**Approval**

Approved by CEE/CS Department on July 30, 2014

**Effective Fall 2016**