Suggested course prefix and number level: CDE 349 – Physical Computing

Date Approved by Department:

I. Course Description:
This course will focus on the study of human interaction with computers. Students will use sensors and microcontrollers to capture human interaction and write software to react to the inputs in a variety of ways. Students will focus on using digital technologies to extend human capabilities by observing and responding to physical actions. This course will also introduce users to the basics of electronics, microcontrollers, and hardware programming.

2 s.h./6 c.h. A minimum of 6 hours of work outside of class is required per week.

Prerequisites: C or better in CDE 356 or CSC 220, or permission of the Department Chair

II. Rationale:
The role of an interactive designer is changing. Designers are being asked to think more holistically with respect to large-scale projects. Designers are no longer constrained to making a print design or a website, they now lead in the design of complete interactive experiences. The only way to effectively work in this environment is to prototype interactions off-screen and test how users react with a piece in the physical world. This course will give students the foundation to prototype with simple electronic inputs and outputs and create software to react in real-time.

III. Objectives:
Upon successful completion of this course the students will be able to:

A. Identify elements human-computer interaction
B. Create basic of microcontroller electronics
C. Demonstrate functional sensors and actuators controlled by computers
D. Create code to program microcontrollers
E. Construct input and output hardware devices
F. Create physical inputs to control visuals on a computer
G. Generate rapid prototypes to build an interactive installation using physical and digital inputs

IV. Assessment:
Assessment of each student’s level of accomplishment with reference to course objectives will be based upon a subset the following:
V. Course Outline

A. Introduction and history of physical computing
   1. Prominent figures in art
   2. Physical computing in product design
   3. Commercial applications

B. Rapid prototyping techniques
   1. Paper prototypes
   2. Bodystorming
   3. Tangible interfaces

C. Basics of electricity and circuits

D. Introduction to microcontrollers
   1. Arduino introduction
   2. Input/output ports

E. Introduction to sensors
   1. Jumpers, soldering, and prototyping
   2. Wiring a breadboard

F. Digital & Analog input and output
   1. Reading digital and analog inputs
   2. Sending digital outputs to physical devices

VI. Instructional Resources


