USING ARDUINO AS A PLATFORM FOR PROGRAMMING,

DESIGN AND MEASUREMENT IN A FRESHMAN ENGINEERING COURSE

The traditional freshman engineering classes are now recognized as being un inspiring to incoming students, even though the skills taught in the class are considered useful. Furthermore, in limiting course content to only the basic skills, students are not exposed to the more creative and applied aspects of engineering practice

Active learning in freshman year courses is also believed to improve retention

and appeal to more diverse population of students.(2)

*Living with the Lab* (LWTL) is a project-based, hands-on curriculum for first year

engineering students.

The *Living with the Lab* curriculum uses design and fabrication projects involving DC electrical circuits, computer programming, solid modeling, machining, rapid-prototyping, working with hand tools, testing, data analysis and plotting5, 11-13.

Students complete homework exercises with this hardware at home, and

then demonstrate their skills and working hardware in class.

The first LWTL course uses the robotics platform as a tool for introducing basic DC circuits and includes a major project

A microcontroller platform provides the context and motivation for students to learn computer programming. Instead of evaluating and printing results from an engineering formula, students write programs to blink lights, read sensor data, and control servo motors, DC motors, or other actuators.

(2) Calabro, K.M., et al. *New directions in freshman engineering design at the University of Maryland*. Frontiers

in Education. Saratoga Springs, New York. October 22-25, 2008. American Society for Engineering

Education.

(10) Meyer, J., N. Lamm, and J. Smith. *Retaining freshman engineering students through participation in a firstyear*

*learning community: what works and what doesn't*. ASEE Annual Conference and Exposition.

Honolulu, Hawaii. June 24-27, 2007. American Society for Engineering Education.

**USING ARDUINO TO ENHANCE COMPUTER PROGRAMMING**

**COURSES IN SCIENCE AND ENGINEERING**

However, lecturers face a complex task when teaching this subject: students consider the subject to be unrelated to their core interests and often feel uncomfortable when learning to program for the first time. A non-traditional approach might help students to overcome these difficulties. Several studies have proposed the use of the physical computing paradigm.

STEM students usually struggle to learn the main programming concepts. They often consider the subject to be unrelated to their core interests and feel uncomfortable when learning to program for the first time [2].

New teaching methodologies might help the student to overcome their initial difficulties [3],[4]. Several studies have proposed the use of the physical computing paradigm. This paradigm takes the computational concepts “out of the screen” and into the real world so that the student can interact with them [5].