SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

		Class/Lect.		Lab						
Course Number:	ELE-111	Hours:	3	Hours: 3	Credits: 4	Dept.:	Electronics			

Course Title: The Internet of Everything (IOE)   Semester: Fall   Year: 2015

Course Description, Prerequisite, Corequisite:

This course is an introduction to the Internet of Everything (IOE) which is sometimes called the Internet of Things (IOT). The Internet of Everything is the connection of various "smart" electronic devices to the traditional data networks. Such components are the heart of modern day "smart" electronic and electro-mechanical systems and can be found extensively in fields such as automotive, HVAC, biomedical instrumentation equipment, remote monitoring (such as weather station and utility infrastructure), consumer and industrial electronics, high tech manufacturing processes, and anywhere sensors and data acquisition are required.

This is a "hands on" introduction to the Internet of Everything and the connection to the data networks. The course is a blend of electronic principles, programming and interfacing microcontrollers, and connecting them to the wired and wireless data networks. It introduces the principles of embedded computer controllers, selecting sensors and actuators, loading and configuring software and networking these systems to the traditional information technology data networks.

Basic computer skills are required to take this course. No prior programming, electronic, or networking experience is assumed. CSE-110, is a recommended co-requisite but not required.

Three hours lecture and three hours of lab.

Corequisite(s): ELE-111L

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Course Objectives	Competencies
Identify the traits of common small computer systems	Understand the concept of a microcontroller. Identify common systems such as the Raspberry Pi, Beagle Bone, Arduino and similar systems. Be able to evaluate the relative benefits of each platform.
Understand basic networking	Be able to identify the parameters to configure an IPV4 or IPV6 network. Configure and test wired or wireless networks Use common network commands such as ifconfig, ping, traceroute, and netstat to test and troubleshoot the connectivity of network devices.
Configure a common networked microcontroller.	Configure the operating system and boot a common microcontroller such as the Raspberry PI or Arduino. Identify the USB abd network connectors and attach the device to a PC. Configure the wired and wireless networking. Identify the electrical connections for additional devices, sensors and actuators.
Deploy an IOE device	Select common sensors, electronic device or actuators. Read and follow directions to successfully attach the sensors, electronic device or actuator. Make the electronic connections to the device. Load and configure the necessary software and drivers. Configure and test the wired or wireless networking. Integrate the device into a larger network. Send data to or recieve data from a network server or cloud based service.

Course Objectives	Competencies
Install and update software on the IOE platform.	Configure the core software for the microcontroller board. Install and update the operating system. Understand the basics of version control and use a local or Internet git software repository.
Understand basic electronics quantities	Understand voltage, current, resistance, and power. Be able to perform basic calculations of V, I, R, and P. Be able to use and understand basic electrical units and metric prefixes. Be able to differentiate between DC and AC quantities. Be able to take basic electrical measurements with a DVM and an oscilloscope. Understand the basics of the relationship between frequency, time, and duty cycle in AC waveforms.
Be able to work with schematic diagrams	Be able to recognize common electrical symbols. Be able to follow the pinouts and signals of common integrated circuits and connectors. Be able to select components to build the circuits in the schematic.