University of Wisconsin - Madison  
College of Engineering [EGR]  
Last Offered: 2015-2016 Spring [1164]  
Direct Link to this Syllabus: 

1. E C E 210, Introductory Experience in Electrical Engineering  
2. Credits : 2  Contact Hours : 4  
3. Textbook and Materials : ECE 210 Course Notes  

a. Other Supplemental Materials : None.  

- Specific Course Information :  
  a. Brief description of the content of the course (Course Catalog Description) : An introduction to electrical and electronic devices, circuits and systems including software and hardware focusing on a real-world project.  
  b. Pre-requisites or Co-requisites : Advanced math competence - algebra, trigonometry or suitable placement scores. Open to Freshmen  
  c. Required.  

- Specific Goals for the Course :  
  a. Course Outcomes :  

    1. Use block diagrams to represent complete electrical systems that consists of electric circuits and other building block  
    2. Use simple ac and dc electric power circuits and regulators for providing housekeeping power for electrical systems  
    3. Use sensors to develop an analog electrical representation of physical signals such as position, motion, etc.  
    4. Identify and quantify analog electrical representation of physical signals in time domain and frequency domain forms  
    5. Represent electrical analog quantities in digital format for communications,
computations and control as serial and parallel data streams
6. Visualize the effects of sampling and quantization in data conversion
7. Perform simple logic functions on digital electric signals in a microcontroller
8. Use microcontrollers to perform signal computations using a computer program
9. Write, use and debug simple microcontroller programs to realize functional objectives in an electrical system
10. Use a serial wireless communication system to transmit and receive digital data through microcontroller interfaces
11. Measure and quantify electromagnetic radiation phenomena and patterns in a wireless communication system
12. Use USB computer based instruments such as a multimeter, function generator and oscilloscope to measure electrical variables such as voltage, current, frequency, power and resistance
13. Interpret symbols of electrical devices in an electrical circuit diagram
14. Use an electrical system to perform a function within its capabilities
15. Conduct a test to verify the operation of an electric system according to its functional objectives
16. Document experimental testing and results using narratives, pictures, charts and graphs

- **ABET Student Learning Outcomes:**

  (a) Ability to apply mathematics, science and engineering principles.
  (b) Ability to design and conduct experiments, analyze and interpret data.
  (e) Ability to identify, formulate and solve engineering problems.
  (g) Ability to communicate effectively.
  (h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.
  (i) Recognition of the need for and an ability to engage in life-long learning.
  (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered:** Charge, voltage, current, power, energy, resistors, capacitors, inductors, power supplies, power converters, switches, LEDs, transistors, integrated circuits, binary signals, microcontrollers, computer programs, analog signals, potentiometer, pushbuttons, pulse width modulation, communications, wireless, protocol.