University of Wisconsin - Madison  
College of Engineering [EGR]  
Last Offered: 2015-2016 Fall [1162]  
Direct Link to this Syllabus:
http://aefis.wisc.edu/index.cfm/page/CourseAdmin.ViewABET?coursecatalogid=91&pdf=True

1. **E C E 462, Medical Instrumentation**
2. **Credits : 3  Contact Hours : 4.7**
3. **Textbook and Materials :** Medical instrumentation application and design; J. G. Webster; 4th; 2010

   a. **Other Supplemental Materials :** None

   • **Specific Course Information :**

   a. **Brief description of the content of the course (Course Catalog Description) :** Design and application of electrodes, biopotential amplifiers, biosensors, therapeutic devices. Medical imaging. Electrical safety. Measurement of ventilation, blood pressure and flow. Lecture and lab.

   b. **Pre-requisites or Co-requisites :** ECE 342 or cons inst

   c. **This is a Selected Elective course.**

   • **Specific Goals for the Course :**

   a. **Course Outcomes :**

   1. Design and implement linear digital filters including integer-coefficient filters for processing biomedical signals including electrocardiograms.
   2. Write software for analyzing biomedical signals to find clinically-significant features like the QRS complex in the ECG.
   3. Apply template-matching techniques to biomedical feature recognition.
   4. Implement algorithms designed specifically for biomedical signal data reduction.

   • **ABET Student Learning Outcomes :**
(a) Ability to apply mathematics, science and engineering principles.
(b) Ability to design and conduct experiments, analyze and interpret data.
(c) Ability to design a system, component, or process to meet desired needs.
(e) Ability to identify, formulate and solve engineering problems.
(f) Understanding of professional and ethical responsibility.
(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.
(j) Knowledge of contemporary issues.
(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

**Brief List of Topics to be Covered:**

1. Electrocardiographic instrumentation concepts
2. Biomedical digital signal acquisition
3. Digital filter design including integer-coefficient filters
4. Signal averaging techniques for biomedical applications
5. Data reduction techniques for ECGs and other biomedical signals
6. QRS complex filter design
7. ECG analysis systems