



# WISCONSIN

## UNIVERSITY OF WISCONSIN-MADISON

University of Wisconsin - Madison  
College of Engineering [EGR]  
Last Offered: 2013 Fall [1142]  
Direct Link to this Syllabus :

<http://aefis.engr.wisc.edu/index.cfm/page/CourseAdmin.ViewABET?coursecatalogid=236&pdf=True>

1. **B M E 463, Computers in Medicine**
2. **Credits : 3    Contact Hours : 4.7**
3. **Textbook and Materials :**

Biomedical Digital Signal Processing. Tompkins, Willis J., Englewood Cliffs: Prentice Hall, 1993. Out of print (available as pdf on eCOW2 web site.)

- a. **Other Supplemental Materials :** Lab Manual used for laboratory portion of course (available on eCOW2 web site).  
Lab software: A MATLAB version of software called UW DigiScope (version 3.0) developed for this course is used for labs (available on eCOW2 web site).

- **Specific Course Information :**

- a. **Brief description of the content of the course (Course Catalog Description) :** Study of microprocessor-based medical instrumentation. Emphasis on real-time analysis of electrocardiograms. Labs and programming project involve design of biomedical digital signal processing algorithms.
- b. **Pre-requisites or Co-requisites :** ECE 330, Comp Sci 302
- c. **Selected Elective**

- **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.
- (c) Ability to design a system, component, or process to meet desired needs.
- (e) Ability to identify, formulate and solve engineering problems.
- (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Program Specific Student Outcomes :** (1) Understanding of biology and physiology as related to biomedical engineering needs.

(2) Ability to apply knowledge of advanced mathematics (including differential equations and statistics), sciences, and engineering to solve problems at the interface of engineering and biology and to model biological systems

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

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