

BME 310 – Biomedical Computing

3 Credits, 4 Contact Hours

Instructor: Joel Schesser, Ph.D.

Textbook(s) and other Required Materials:

Signal Processing First, McClellan, Schafer & Yoder

Description:

This course covers the application of digital signal processing to biomedical problems. Labview, a graphical programming language common in engineering, is used for both signal acquisition and processing. Applications include analysis of the electrocardiogram and other electrical signals generated by the body.

Prerequisites by topic:

BME 301

Objectives:

1. **Digital Signal Processing:** Understand the fundamental principles of digital signal processing. Apply knowledge of math, engineering and science to identify, formulate, and solve problems in these areas.
2. **Data Interpretation:** Learn to utilize Labview software to design and analyze data. Apply knowledge of math, engineering and science to interpret data. Develop an understanding of and develop the skills necessary to communicate findings and interpretations in an effective laboratory report.
3. **Biomedical Signal Processing:** Apply knowledge of math, engineering and science to understand the principle of biomedical signal processing. Understand how to apply specific mathematical techniques to solve problems in the areas of biomedical signals.
4. **Work in Multi-disciplinary teams:** Learn to work and communicate effectively with peers on multi-disciplinary teams to attain a common goal.

Topics covered:

1. Sinusoids & Complex Arithmetic
2. The Spectrum
3. Fourier Series
4. Difference Equations & Convolution
5. Sampling and Aliasing
6. FIR Filters
7. Solutions in the Frequency and Time Domain
8. Fourier Transforms
9. Labview Programming :Array Programming, Signal Generation, Spectrum Calculation, Interface to real world instrumentation

Professional Component:

Core Biomedical Engineering Topics

Performance Criteria	Specific Activity During the Course	Assessment Methods/Metrics
Course Objective 1: Digital Signal Processing: Understand the fundamental principles of digital signal processing. Apply knowledge of math, engineering and science to identify, formulate, and solve problems in these areas.		
A-1 Apply foundations of math, science, engineering to develop solution to	Apply student knowledge of the course materials	Test Scores
K Ability to use the techniques, skills, and modern engineering tools needed for engineering practice	Using and Learning Labview	Test Scores Laboratory reports