ECE5251 - Biomedical Signal Processing (4 credits), Spring 2017

(Draft - 1/9/17)

Course Instructor: Kevin Buckley, Tolentine 433a, 610-519-5658, buckley@ece.villanova.edu, www.ece.villanova.edu/user/buckley

Office Hours: Mon. & Wed. 11:30-12:20pm; Thurs. 12-2pm; Fri. 9:30-10:20am; by appointment; stop by my office anytime I'm available

Lectures: MWF 12:30pm-1:20pm; CEER 212

Practicums: to be determined

Prerequisites- topics covered in: ECE3720; ECE3220 or ECE3240

Grading Policy:
* Weekly Homeworks – including Matlab components: 50%
* Practicum Reports, 15%
* Class Participation, 10%
* Project Presentations, 25%

Text: *(recommended but not required)* Biomedical Signal Analysis: A Case-Study Approach, Rangaraj Rangayyan, Wiley InterScience, 2002.

References:

1. Biomedical Signal Processing & Signal Modeling, Bruce, Wiley InterScience, 2001.
2. Human Physiology - 9-th Ed., Fox, McGraw Hill, 2006.
3. Bioelectrical Signal Processing in Cardiac & Neurological Applications, Sornmo & Laguna, Elsevier, 2005.
4. System Theory & Practical Applications of Biomedical Signals, Baura, Wiley Inter-Science, 2002.
5. Medical Imaging Signals & Systems, Prince & Links, Pearson Prentice-Hall, 2006.

Course Description: The purpose of this Course is to introduce students with background in signal processing to the broad and challenging field of Biomedical Signal Processing. This field represents a very interesting application of signal processing, and it will be one of the fastest growing areas of engineering in the U.S. over the next decade. We will explore a number of signal processing functions, including filtering, detection & classification, spectrum & parameter estimation, and array signal processing. We will applying these functions to study numerous human physiological systems, including the cardiovascular and nervous systems. Matlab examples of processing real biomedical signals will be integrated throughout the course.

Homework Grading Policy:

Approximately twelve homeworks will be assigned throughout the semester. Due dates will correspond with the completion of the topics they cover. Due dates will be indicated on the assignments and announced when the homeworks are assigned.

A homework is due by the beginning of class on the due date indicated on the assignment. Submissions will be accepted after this, but will be considered late. Homework solutions will be posted after 5pm on the day following the due date. A late homework submitted prior to the solutions posting will be deducted 10% for being late. If submitted after that, the deduction will be at least 30% (depending on the correlation between the submission and the posted solutions). Note that submission of a homework late is much better than not submitting it at all!

Each student must do each problem to be submitted without interaction with anyone other than the instructor. Failure to adhere to this policy will result in significant deduction. Students are encouraged to work with others in understanding and solving the Homework Set problems which are not required to be submitted. Students are encouraged to discuss homeworks with the instructor.

Practicum Grading Policy:

The policy for deduction for late submission of a Practicum Report Form is the same as for homeworks. That is: 10% if late but before 5pm the next day; at least 30% thereafter.