BME305 Biomedical Signals Analysis– Fall 2011

Time:	Monday, Wednesday, Friday, 3:00 - 3:50 PM
Room:	Tech M345
Instructor:	Dr. Hao F. Zhang
Office:	Tech E334
Phone:	(847) 491-2946
Email:	hfzhang@northwestern.edu
Office hours:	Monday, Wednesday, Friday, 1:00-2:0 PM or by appointment
Lab Instructor:	Nicholas D Marchuk
Office:	Ford B100
Email:	nick.marchuk@gmail.com
Office hours:	3:00-5:00 PM Tuesday & Friday.
TAs:	Ke Ma (KeMa1.2013@u.northwestern.edu) Robert Van Lith (RobertVan2012@u.northwestern.edu)
Office hours:	Monday 4:00-6:00 PM (Robert, E333) Wednesday 4:00-6:00 PM (Ke, E334)
Textbook:	***Electronics out of the Lab***, Michael Peshkin, Northwestern University Mechanical Engineering. ***Basic Engineering Circuit Analysis*** (10th Edition), by J. David Irwin & R. Mark Nelms, Wiley
Prerequisite:	Physics, Calculus, and Differential equations

Course objectives: This course focuses on hand-on knowledge of electrical circuit analysis, electronics, and signal processing designed for biomedical engineering students. This is the first one for the biomedical signal processing series courses (BME 306 and BME 307). At the end of this course, students will be able to (1) understand methods to analyze DC and AC circuits; (2) understand practical signal acquisition and analysis; (3) construct basic electrical circuits for biomedical applications; (4) use simulation software to design and evaluate circuits.

Course Outline

Topic
Basic concepts of circuit analysis
Resistive circuits
Nodal analysis and loop analysis
Op-Amp
Capacitor, inductor, and transistor
AC circuits and power analysis
EKG principle and acquisition

Fourier transform

Filtering, bandwidth, sampling, and aliasing

Grading

Final Exam	15%
Midterm	15%
Homework	20%
Quiz	10%
Projects/Labs	40%
Total	100%

Key Dates:

Oct. 17: Midterm.

Nov. 09: EKG project starts.

Dec. 09: Final exam.

Note: Problem sets due one week after initial assignment (may be extended for a second week depending on the performance of the majority of the class or specified otherwise). There will be penalty for each class meeting late. Course projects will be discussed in lecture and lab sessions.

Quiz on each Monday class.

It is difficult to find a single textbook which covers all of the aforementioned course material. Accordingly, we will draw upon other references (book chapters, research articles, etc.) and internet resources as needed.

The current schedule is subjected to minor revisions as the semester proceeds.

The homework and research project involve the use of Matlab or similar software.

If unanticipated conflicts arise, the student should contact the instructor at least one week in advance to discuss arrangements for make-up examinations or turning in problem sets late.

Zero tolerance to academic plagiarism and dishonesty