

BE 491: Engineering Physiology Labs

Boston University, Department of Biomedical Engineering

Fall 2009

STAFF

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COURSE OBJECTIVE

The objective of the course is to equip students with the research skills necessary for a successful career in biomedical engineering. With this in mind, the course has been structured to provide experience with: i) applying engineering tools and concepts learned in class and in other courses to biological systems, ii) working in teams to complete research projects, and iii) collecting and presenting data in a meaningful and professional manner.

TEXTBOOKS

- *BE491 lab manual* (available for purchase from Kinko's copiers)
- *Reporting results: a practical guide for engineers and scientists*, DC Van Aken and WF Hosford, Cambridge University Press, 2008 (ISBN 978-0-521-72348-0)...optional

GRADING

Grades will be based on composite performance on reports and exams as follows:

Reports	80%
Final Exam	20%
Midterm Exam	Pass/Fail (must pass to pass course)

REPORTS

Lab Reports are required for most labs, and they are due 2 weeks after the end of a student's lab section. Thereafter, the score is reduced by 25% of the total possible score every 24 hours. All reports must be typed, stapled, and professionally written. The expected content will vary from lab to lab.

Also, a full Research Report is due on the last day of a student's lab section. The report should present findings of an independent project conducted by the student's research team. A list of possible projects will be distributed at the start of the semester to choose from. With instructor approval students may also create their own project. All projects must adhere to the scientific method, contain data collected only with equipment in the lab from consenting subjects, and apply at least one principle or tool learned in this or another engineering course. There are several open lab weeks during the semester set aside for project data collection.

Although experiments are conducted in teams, each student must submit a report of their own crafting unless otherwise specified. For the report only raw data may be shared between team members (ie, not processed data, figures, or tables). **Plagiarism in any form will not be tolerated!** The report will be assigned a grade of zero and the College of Engineering Academic Conduct Committee will be notified.

EXAMS

The Midterm Exam takes place during scheduled lab time and tests student mastery of skills, like setting up equipment, taking measurements, and analyzing data. There are no labs the week before the exam so that students can use the time to hone their skills. To best prepare labmates should exchange roles during each lab and not have one person run the show. The Final Exam is administered during finals week and covers key concepts over the entire course with short answer questions.

SCHEDULE

Labs cannot be rescheduled. If one is missed due to an emergency, students should inform the instructor when it is convenient and they must provide documentation upon return.

Week	Lecture	Labs	Topic	Assignment
SCIENTIFIC WRITING				
1	09/08, 09/09, 09/11*		Data Presentation (*Monday Section)	Lab Exercise
INSTRUMENTATION				
2	09/14	09/14-09/16	Signal Acquisition and Display	Discussion
3	09/21	09/21-09/23	Signal Amplification and Noise Reduction	Methods
SYSTEM IDENTIFICATION AND MODELING				
4	09/28	09/28-09/30	Linear and Nonlinear Systems	Results
5	10/05	10/05-10/07	Continuous- and Discrete-Time Simulation	Abstract
MIDTERM				
6		10/12-10/14	Open (Exam Preparation)	
7		10/19-10/21	Exam	
SIGNAL PROCESSING AND STATISTICS				
8	10/26	10/26-10/28	Time and Temporal Frequency	Introduction
9	11/02	11/02-11/04	Frequency Response	Full Report
10	11/09	11/09-11/11	Open (Research Project/Labview)	
PHOTONICS				
11	11/16	11/16-11/18	Spectrophotometry	Lab Exercise
CLASS PROJECT				
12		11/23-11/25	Open (Research Project)	
13		11/30-12/02	Open (Research Project/Neural Coding)	
14		12/07-12/09	Open (Research Project)	Project Report
FINAL				
15	TBD		Exam	