BENG401 – Bioinstrumentation by design
Weekly schedule
Fall of 2008
Instructor: Nathalia Peixoto

Wk	Day	Theme	Detail	Book chapter	HW
1	Aug 26	Engineering Design	Form versus function. Does one imply the other? Examples. Manufacturing versus designing.	Pg 1-15 (chap. 1)	1
1	Aug 28	PCB design part 1 of 3	Fundamentals of layout, printing circuits; software for schematics; requesting samples.		
2	Sept 2	Design Process: fundamentals.	Biomedical applications; the design process; case study.	20-32 (chap. 2)	2
2	Sept 4	PCB design part 2 of 3.	Masking; etching; developing, cleaning.		
3	Sept 9	Design process methods.	Strategies, formal methods for the design process	32-48 (chap. 2)	3
3	Sept 11	PCB design part 3 of 3.	Soldering, desoldering, testing your circuit.		
4	Sept 16	Finding problems	Understanding problems, brainstorming	Ch. 3	4
4	Sept 18	Review of electronics	Opamp configurations; filters.		
5	Sept 23	Functions and Specifications 1/2	Identifying and specifying functions	Ch. 4	5
5	Sept 25	Digital electronics	A/D, D/A, microcontrollers.		
6	Sept 30	Functions and Specifications 2/2	Performance levels; managing specifications stage.	Ch. 4	6
6	Oct 2	Midterm	Midterm exam.		-
7	Oct 7	Morphological charts; prototypes	Design space; patents; morphological charts; prototype building.	Ch. 5	7
7	Oct 9	Project implementation	Assembly versus high level languages, software for project development		
8	Oct 14	No class today	Columbus day recess.	n.a.	n.a.
8	Oct 16	High level prototyping	Project examples (Matlab and LabView)		
9	Oct 21	Reports	Reporting the outcome; characteristics of reports (contents/audience).	Ch. 6	8
9	Oct 23	Proj1. ECG, part 1	ECG fundamentals. Problem statement current solutions.		

10	Oct 28	Project management	Managing the design process	Ch. 7	9
10	Oct 30	Proj1. ECG, part 2	ECG circuit; PCB; test; result evaluation.		
11	Nov 4	Reliable design	Design for sustainability and reliability	Ch. 8	10
11	Nov 6	Proj. 2. ECG tester part 1.	Student design: autonomous ECG tester. Brainstorming section.		
12	Nov 11	Ethics in Biomed Engineering	Conflicting obligations; case studies.	Ch 9	11
12	Nov 13	Proj. 2. ECG tester part 2.	Implementation of best design (building of this project will take place in the lab, BENG402).		
13	Nov 18	Guest speaker	Intellectual property issues. Business plan development. Prof. S.Sikdar, GMU	n.a.	-
13	Nov 20	Project analysis (ECG and ECG tester)	Cost; presentation of results; report; suggestions for improvement (Proj 1 and 2)		
14	Nov 25	Medical device regulation (FDA)	FDA device classification/design controls/clinical research/exemptions (FDA 1/3)	Bk2,ch.7	12
14	Nov 27	Thanksgiving	Recess.	No class.	
15	Dec 2	PMA (FDA)	Premarket approval; 501(k) (FDA 2/3)	Bk2,ch.7	13
15	Dec 4	Commercializing Biomed. Technol.	FDA process (3/3); MDR.	Bk2,ch.7	14
16	Dec 9	No class	Reading day until 4:30pm.	n.a.	
16	Dec 11	No class	Study week (exam week)		
17	Dec 16	Exam	Final – 1:30 to 4:15 (page 3 of GMU class schedule)	n.a.	

Textbook: Engineering design: a project-based introduction; Clive Dym and Patrick Little, 2nd edition; John Wiley & Sons; 2004.
ISBN 0471256870.

Book 2: FDA Regulatory Affairs: A Guide for Prescription Drugs, Medical Devices, and Biologics; By Douglas J. Pisano, David Mantus. 2003.
ISBN 1587160072, 9781587160073

Student Evaluation Criteria

Mid-term:	25%
Homework:	15%
Project report:	35%
Final Exam:	25%