Fall 2016: BMEN 4110 Syllabus

Course Information

Course Title: Biomedical Feedback Systems Laboratory
Term: Fall 2016
Course Number: BMEN 4110.101-4110.106
Location: ML1 1.110 or ML1 1.114 or ML1 1.118 or ML1 1.122

Course meetings:

Section	Day	Times	Room	Instructor	TA
.101	Monday	10:00 am – 12:45 pm	ML1 1.118	Pacheco	Kumaraju
.102	Monday	10:00 am – 12:45 pm	ML1 1.114	Pacheco	Gangadharan
.103	Thursday	1:00 pm – 3:45 pm	ML1 1.114	Khoubrouy	Gerami Fard
.104	Wednesday	1:00 pm – 3:45 pm	ML1 1.122	Khoubrouy	Gerami Fard
.105	Thursday	1:00 pm – 3:45 pm	ML1 1.110	Khoubrouy	Gangadharan
.106	Monday	4:00 pm – 6:45 pm	ML1 1.122	Pacheco	Kumaraju

Professor Contact Information

Professor: Joe Pacheco, PhD
For sections: .101, .102, .106
Email: joe.pacheco@utdallas.edu
Office Location: BSB 13.641
Phone number: 972-883-4176

Professor: Soudeh A. Khoubrouy, PhD
For sections: .103, .104, .105
Email: sa.khoubrouy@utdallas.edu
Office Location: BSB 13.530
Phone number: 972-883-7252

Office hours: TBD (check e-Learning) and by appointment

TA Contact Information

Name	Email	Primary Sections
Gangadharan, Achintyan	axg148730@utdallas.edu	102, 105
Gerami Fard, Negar	nxg143130@utdallas.edu	103, 104
Kumaraju, Rajeshwari	rxk144630@utdallas.edu	101, 106

TA Office hours: TBD and by appointment (check e-Learning)

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Prerequisite or Corequisite: BMEN 4310. Prerequisite: RHET 1302.

Course Description

This is a laboratory course where we will use LabVIEW and MATLAB to model and design controllers for real-world systems including a DC motor, op-amp based feedback circuits, and physiological systems. The motivation and importance of dynamical system modeling and model validation will be considered. Students will design feedback systems using rule-based, proportional, derivative, and integral types of controllers.

Program Educational Objectives
Biomedical Engineering Bachelor's graduates are expected to attain the following Program Educational Objectives within a few years after graduation:

- Careers that lead to leadership roles in biomedical engineering or related fields
  or
- Gain admission to graduate, professional, or health related programs

Student Outcomes
   (a) An ability to apply knowledge of mathematics, science, and engineering
   (b) An ability to design and conduct experiments, as well as to analyze and interpret data.
   (c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
   (g) An ability to communicate effectively

Course Learning Objectives
   1. Derive, calibrate, and / or utilize models of electrical, mechanical and physiological systems (a)
   2. Design experiments to analyze and test control laws (b)
   3. Design and simulate a controller for a physiological feedback system (c)
   4. Develop and improve skills in technical writing (g)

Course Materials

- **Textbook:** *None*
- **Lab manual and handouts will be posted on the class eLearning page**
- **Software:** National Instruments LabVIEW (*available in lab*), MATLAB (*available in lab*)

Assignments & Academic Calendar

Class #	Week	Assignment Due 11:59pm day before class	Topic
1	8/22-8/26	*None*	Intro to BMEN 4110 & MATLAB / LabVIEW review
2	8/29-9/2	**Pre-lab 1 due[1]**	Lab 1: Artificial pancreas controller
3	9/5-9/9	*None*	*No class this week (Labor day holiday)*
4	9/12-9/16	*None*	Lab 1: cont'd
5	9/19-9/23	**Pre-lab 2 due**	Lab 2: Op-amp feedback circuits
6	9/26-9/30	**Lab 1 Report due**	Lab 2: cont'd
7	10/3-10/7	**Pre-lab 3 due**	Lab 3: DC motor control
8	10/10-10/14	**Post-Lab 2 due**	Lab 3 cont'd
9	10/17-10/21	*None*	*Midterm exam / practical*
10	10/24-10/28	**Pre-lab 4 due**	Lab 4: Action potential modeling
11	10/31-11/4	**Post-Lab 3 due**	Lab 4: cont'd
12	11/7-11/11	**Pre-lab 5**	Lab 5: Advanced DC motor control
13	11/14-11/18	**Lab 4 Report due**	Lab 5: cont'd
14	11/21-11/25	*None*	*Fall break*
15	11/28-12/2	**Post-Lab 5 due**	*Final exam / practical*
16	12/5-12/7	*None*	*No class this week*

Grading Policy

The evaluation of the student's work is the instructor's professional judgment and not subject to negotiation. The grades for this class will consist of:

Lab participation:	10%
Pre-labs 1-5:	15%
Post-labs 2, 3, and 5:	20%
Lab Reports 1 and 4:	25%
Midterm exam / practical:	15%
Final exam / practical:	15%

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[1] For example, if you are in section 4110.101 which meets Mondays at 10am, the Pre-lab 1 assignment will be due Sunday, August 28 by 11:59 pm whereas if you are in section 4110.103 which meets Thursdays at 1pm, the Pre-lab 1 assignment will be due August 31 by 11:59 pm.

Grade	Points	Grade	Points	Grade	Points	Grade	Points
A+	97-100	B+	87-89.9	C+	77-79.9	D+	67-69.9
A	93-96.9	B	83-86.9	C	73-76.9	D	63-66.9
A-	90-92.9	B-	80-82.9	C-	70-72.9	D-	60-62.9
						F	<60

Course & Instructor Policies

- Class attendance is mandatory. Advance notice for any non-emergency absence to the instructor is expected. Student will lose credit for the day of non-participation in the class activity.
- Students must complete all the experiments and assignments.
- Each student is expected to participate in class discussion / activities.
- No alternative testing schedule or make up exams will be administered.
- Guidelines and due dates for lab and project reports will be posted on eLearning, along with the required pre-lab work.
- All assignments will be due on the assigned dates. **Late assignments turned in after the deadline will be penalized 30% and then an additional 30% per full day late.** For example if the assignment was due Sunday 11:59pm and was submitted Tuesday at 12:01am, the total penalty would be **60%** (30% for past deadline + 30% for 1 full day late). If the assignment was submitted Monday at 12:01 am, the total penalty would be **30%.**

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus: http://go.utdallas.edu/syllabus-policies

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the instructor.