

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 (see 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 (see eLearning) and by appointment

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	<i>None</i>	Intro to BMEN 4110 & MATLAB / LabVIEW review
2	8/29-9/2	Pre-lab 1 due¹	Lab 1: Artificial pancreas controller
3	9/5-9/9	<i>None</i>	<i>No class this week (Labor day holiday)</i>
4	9/12-9/16	<i>None</i>	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	<i>None</i>	<i>Midterm exam / practical</i>
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	<i>None</i>	<i>Fall break</i>
15	11/28-12/2	Post-Lab 5 due	<i>Final exam / practical</i>
16	12/5-12/7	<i>None</i>	<i>No class this week</i>

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%

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.
