

## Course Syllabus

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### Course Information

**Course Number & Sections:** BMEN 3120.101 -3120.103 and 3120.106 - 3120.111

**Course Title:** Biomedical Circuits and Instrumentation Laboratory

**Term:** Fall 2016

Section	Day	Time	Room	Instructor
.101	Monday	1:00 pm – 3:45 pm	ML1 1.110	Ali
.102	Tuesday	4:00 pm – 6:45 pm	ML1 1.110	Ali
.103	Tuesday	4:00 pm – 6:45 pm	ML1 1.114	Ali
.106	Wednesday	1:00 pm – 3:45 pm	ML1 1.110	Winter
.107	Thursday	10:00 am – 12:45 pm	ML1 1.114	Ali
.108	Tuesday	1:00 pm – 3:45 pm	ML1 1.114	Winter
.109	Thursday	10:00 am – 12:45 pm	ML1 1.110	Ali
.110	Wednesday	1:00 pm – 3:45 pm	ML1 1.114	Winter
.111	Monday	1:00 pm – 3:45 pm	ML1 1.114	Ali

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### Professor Contact Information

*Professor: Tariq Ali, PhD*

*For sections: .101, .102, .103, .107, .109, .111*

*Email: [tariq.ali@utdallas.edu](mailto:tariq.ali@utdallas.edu)*

*Office Location: BSB13.330*

*Phone number: 972-883-6841*

*Professor: Patrick Winter, PhD*

*For sections: .106, .108, .110*

*Email: [patrick.winter@utdallas.edu](mailto:patrick.winter@utdallas.edu)*

*Office Location: BSB13.629*

*Phone number: 972-883-4939*

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

Prerequisite or Corequisite: BMEN 3320. Prerequisite: RHET 1302.

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### Course Description

Experiments in this course teach students the applications of the following concepts: (i) Introduction to analysis methods and network theorems used to describe operation of electric circuits, (ii) Electrical quantities, linear circuit elements, circuit principles, signal waveforms, transient and steady state circuit behavior, (iii) diode and transistor circuits, (iv) operational amplifiers, (v) modeling, analysis and simulation of electrical circuits in biomedical engineering.

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### 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.
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## Student Learning Objectives/Outcomes

Student outcomes followed by ABET classification include:

1. Design and conduct experiments to test electrical circuits and components developed for biomedical devices. –(b) An ability to design and conduct experiments, as well as to analyze and interpret data.
2. Design electrical circuits for biomedical devices using operational amplifiers. – (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.
3. Report experimental data in technical format. – (g) An ability to communicate effectively.
4. Use simulation tools and electrical circuit components towards designing bio-instrumentation. – (k)An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## Required Textbooks and Materials

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

**Academic Calendar** (*see eLearning for assignments and due dates*)

	Monday		Tuesday		Wednesday		Thursday	
	Sections: 101, 111		Sections: 102, 103, 108		Sections: 106, 110		Sections: 107, 109	
Week	Date	Activity	Date	Activity	Date	Activity	Date	Activity
1	8/22	Lab-1	8/23	Lab-1	8/24	Lab-1	8/25	Lab-1
2	8/29	Lab-2	8/30	Lab-2	8/31	Lab-2	9/1	Lab-2
3	9/5	Labor Day	9/6	Lab-3	9/7	Lab-3	9/8	Lab-3
4	9/12	Lab-3	9/13	Lab-4	9/14	Lab-4	9/15	Lab-4
5	9/19	Lab-4	9/20	Project-1 (2 weeks)	9/21	Project-1 (2 weeks)	9/22	Project-1 (2 weeks)
6	9/26	Project-1 (2 weeks)	9/27		9/28		9/29	
7	10/3		10/4	Midterm	10/5	Midterm	10/6	Midterm
8	10/10	Midterm	10/11	Lab-5	10/12	Lab-5	10/13	Lab-5
9	10/17	Lab-5	10/18	Lab-6	10/19	Lab-6	10/20	Lab-6
10	10/24	Lab-6	10/25	Lab-7	10/26	Lab-7	10/27	Lab-7
11	10/31	Lab-7	11/1	Lab-8	11/2	Lab-8	11/3	Lab-8
12	11/7	Lab-8	11/8	Project-2 (2 weeks)	11/9	Project-2 (2 weeks)	11/10	Project-2 (2 weeks)
13	11/14	Project-2	11/15		11/16		11/17	
14	11/21	Thanksgiving	11/22	Thanksgiving	11/23	Thanksgiving	11/24	Thanksgiving
15	11/28	Project-2 (cont'd)	11/29	Final Exam	11/30	Final Exam	12/1	Final Exam
16	12/5	Final Exam	12/6	No Class	12/7	No class (Last Day of Classes)		

- Lab 1 Introduction to Circuits and Instrumentation
- Lab 2 Resistive Circuits
- Lab 3 Capacitive Circuits
- Lab 4 Diode Circuits
- Project 1 Biosignals
- Lab 5 Transistor Circuits
- Lab 6 Instrumentation Workshop
- Lab 7 Operational Amplifiers
- Lab 8 Active Filters
- Project 2 Electromyograph

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## 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:

Pre-labs& Homeworks	25%
Labs 1 to 8: Performance & Report	35%
Projects 1 & 2: Performance & Report	20%
Exams (Midterm and Final)	20%

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

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## 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 projects.
  - Each student is expected to participate in class discussion.
  - 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.
  - Lab reports will be due on the assigned dates (usually a week from lab completion). Late reports will not be accepted.
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## Comet Creed

*This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:*

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

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## **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.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

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