



LABORATORY PRINCIPLES (BE 4382/5382)

FALL SEMESTER 2017

ERB RM 279

Monday 9:00 am-11:50 am
(see schedule below)

Dr. Ashwin Nair

Department of Bioengineering

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Office Hours: Wednesdays & Thursdays 3 pm to 5 pm (by appointment only)

Teaching Assistants: Mr. Amir Hakamivala (amirhossein.hakamivala@mavs.uta.edu)

Office hours: After class (or by appointment) in ERB 279

Class Lectures: Blackboard: elearn.uta.edu

Course Goal

This course will introduce students to the principles, applications, and design of instruments used in biomedical research, clinical evaluations and other relevant applications. Engineering laboratory data will be acquired from electrocardiographs, electroencephalographs, electromyographs, electrooculograph and lie detectors. In addition, other relevant physiological functions such as respiration, visual and cognitive functions will be tested. Data analysis will be performed and results will be interpreted according to relevant physiological principles. Students will learn through in-class examples, homework problems, and active participation.

Course Objectives

After completing this course, the student will be able to:

Work in groups to acquire and analyze data

Acquire & process physiological data and explain physiological relevance

Hypothesize, design and conduct experiments

Relationship to Bioengineering Program Outcomes: This course will help students achieve the following outcomes:

- apply knowledge of mathematics, physical and life science, and engineering, especially bioengineering
- develop basic skills to develop, test & present biologically-based engineering problems
- conduct experiments, analyze, interpret and present data through meaningful reports
- use the techniques, skills, and modern engineering tools necessary for bioengineering practice

Prerequisites:

BE 3320, MATH 3319, PHYS 1444

Other courses that will help you in this class: BE 3380 and MATH 3316 or IE 3301

Recommendation

You will work in groups of 3 or 4. It is highly recommended that students work with different groups every week. This will help you form a project group that complements your work style and ethic. Generally, lab data will be uploaded to Blackboard by the evening giving you enough time for working on the report and any other lab related assignment. Students are expected to know basic statistics (null & alternate hypothesis, testing hypothesis, tests for outliers etc.,). You should also plan to read the chapter summaries and lab procedures before class. The schedule has no provision for repeating lab sessions, so please do not schedule your personal engagements during class timings.

Required Text:

BIOPAC Systems Reference Manual. (Available at the UTA Bookstore)



Publisher: BIOPAC Systems Inc.

Grading*

✓ <u>Attendance</u>	→ 5%
✓ <u>Lab reports</u>	→ 35%
✓ <u>Q&A</u>	→ 25%
✓ <u>Project</u>	→ 35%

The scores will be averaged and a letter grade will be assigned where A > 90%, B > 80%, C > 70%, D > 60%, F < 60%.

If you miss an exam, a grade of zero will be given. There is no provision for taking a make-up exam in this course unless documentation for a University-approved excuse (see Catalog) is received within one week of the exam date.

Lab Reports must be submitted as a group. Late reports will not be accepted and will be due as indicated on Blackboard.

Project

Students will work in groups of 2 or 3 to design an experimental test of human physiology. Specific instructions will be given as the semester progresses. You will be expected to submit a written proposal, make an oral presentation of your project findings in class, defend your methodology and critique your approach. Subjects must be students from BE 4382 and BE 5382 class.

Note: UTA policy will not allow distribution of grade over the phone call or email. There will be no extra credit work to make up the grade and no mercy points will be given.

Attendance and Drop Policy

There is no provision for repeating missed class. You will get a zero for the missed lab's report. If you are absent from class, please provide valid evidence that can be documented. Whether this documentation is acceptable will be determined by the instructor. If it is, then you may be able to submit a report for the missed lab.

Punctuality is very important as attendance will be taken at the beginning of every class. **If you are late for class, you will lose points in your report.** If you show up after 9:15 am, you will lose 10 points on your report. If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursars Office. You may not continue to attend class until your Enrollment Loan has been applied to outstanding tuition fees.

Professionalism

- You are expected to be courteous to everyone, (this includes your instructor and the teaching assistant). Talking, laughing or anything else that can be construed as disruptive will result in you being asked to exit the class.
- In-class discussions are encouraged within the limits of mutual respect and courtesy.
- Electronic devices like computers, tablets, smartphones, may not be used unless permitted by the instructor. (If you are found using these in class, you will be asked to leave and marked absent for that class).
- Prompt submission of assignments and regular attendance in class.
- Academic dishonesty will not be condoned. (Please see section on "academic integrity" below).

Academic Integrity

Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.



I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Electronic Communication:

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Student Feedback Survey

At the end of each term, students enrolled in classes categorized as "lecture," "seminar," or "laboratory" shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Emergency Exit Procedures

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, (please locate the nearest exits on the first day of class). When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Final Review Week

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabi. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week.

Americans with Disabilities Act

The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the



Office for Students with Disabilities at (817) 272-3364.

Title IX

The University of Texas at Arlington is committed to upholding U.S. Federal Law “Title IX” such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Student Support Services

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Disclaimer

This syllabus is provided for student convenience and provides no guarantees as far as conformation to schedule is concerned. If you have special concerns about course information, you are advised to contact the instructor.



Lecture/Topic Schedule

1. 08/28 Introduction: *MP System Overview and Ethics.*
2. 09/04 No class - Labor Day
3. 09/11 Electrocardiography: *ECG (Lab Report)*
4. 09/18 Electromyography (Q&A)
5. 09/25 Pulmonary Function (Lab Report)
6. 10/02 Exercise Physiology
7. 10/09 Electrodermal Activity & Galvanic Skin Resistance (Q&A)
8. 10/16 Electrooculography (Q&A)
9. 10/23 Electrogastrography (Lab Report)
10. 10/30 Biofeedback (Q&A)
11. 11/06 Reaction Time
12. 11/13 Project
13. 11/20 Project
14. 12/04 Presentation

“As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. –Ashwin M. Nair.”

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911.