

BME 4503L Biomedical Instrumentation Laboratory

Location: NSC 0407 **Academic Term:** Spring 2020

Class Periods: Monday 12:50-3:50pm (section 0733); Tuesday 8:30-11:30am (section 0738)

Instructor:

Dr. Eric Fuller | efuller@bme.ufl.edu

J293 BMS building

352-273-9338

Office Hours: TBD

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

- Scott Siegel, sns08j@ufl.edu
- Markia Bowe, mbowe@ufl.edu

Course Description

(1 Credit) – Laboratory to go with BME 4503 Biomedical Instrumentation. Students will put into practice what they learn in the course.

Course Pre-Requisites

MAC 2313, MAP 2302 and PHY 2049

Corequisites:

BME 4503

Course Objectives

- Understand practical aspects of measurement and instrumentation
- Understand the limitations of physiological measurements
- Learn to design, build, and test biomedical instrumentation equipment
- Learn to acquire measurements and interpret data from physiological systems

Materials and Supply Fees

\$146.40

Professional Component (ABET):

This course covers 1 credit of engineering topics

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Medium
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	High
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	High
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

Required Textbooks and Software

No textbook is required. Laboratories will be performed using handout documents and materials posted on the class website. A windows compatible USB drive is required to capture results from the Tektronix Oscilloscope. A breadboard is required for Labs 7 and 8. Matlab and word processing software are required.

Recommended Materials

- Medical Instrumentation Application and Design
John G. Webster, 4th edition ISBN-13: 978-0471676003 ISBN-10: 0471676004

Course Schedule (subject to change)

Week#	Week of	SUBJECT
1	01/06	NO LAB
2	01/13	Lab 0 - Introduction Lab
3	01/20	NO LAB - Martin Luther King Holiday
4	01/27	Lab 1 - Op-amp Circuits 1 (Simple measurements)
5	02/03	Lab 2 - Op-Amp Circuits 2 (Simple Op-Amp circuits)
6	02/10	Lab 3 - Op-Amp Circuits 3 (Active filters)
7	02/17	Lab 4 - Thermistors
8	02/24	Lab 5 - Flex Detector
9	03/02	NO LAB - Spring Break
10	03/09	Lab 6a - Neuroamplifier (Soldering)
11	03/16	Lab 6b - Neuroamplifier (Testing)
12	03/23	Lab 7 - ECG Amplifier
13	03/30	Lab 8a - Simple Pacemaker
14	04/06	Lab 8b - Simple Pacemaker
15	04/13	In-Class Practical Exam

Attendance Policy

Attendance is mandatory. Students are expected to show up on time. Late arrival may affect your attendance grade.

Class Expectations

No food or drinks are allowed on the lab benches. Use of cell phones and electronic devices is limited to class-related activities.

Make-Up Policy

Only one make-up lab can be taken per semester with medical documentation. There are no make-ups for practical exams. Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

Evaluation of Grades

Students will work in groups of two and turn in one post-lab report per group. Students will receive individual grades for pre-lab reports, class participation and lab exams.

- Pre-labs: 25%, (Online to be completed per student)
- Lab reports: 40%, (One report per group)
- Practical lab exams (individual) and final project: 30%
- Participation, handling of equipment and tidiness of desk: 5% (Individual grades).

Grading Policy

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
≥92	90-91	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	< 60

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any

condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Plagiarism

Plagiarism is a common infraction to the UF Honor Code. If you are confused as to what constitutes plagiarism, see here: <https://guides.uflib.ufl.edu/copyright/plagiarism>. Plagiarism on any of your assignments **will be reported to the Dean of Students as a UF Student Honor Code violation**. Also, note that **copying solutions for any assignment, regardless of the source (e.g. other students, pirated website solutions), will be treated as plagiarism**. If you have any questions or concerns, please consult with the instructor in this class. Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: [https://www.dso.ufl.edu/documents/UF Complaints policy.pdf](https://www.dso.ufl.edu/documents/UF%20Complaints%20policy.pdf).

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.