**BE 492: BIOMEDICAL MEASUREMENTS II**  
**SPRING 2022**

**PREREQUISITES:** BE 491 (required), BE 403 (highly recommended)

**LECTURE:** PHO 206  
Mondays 9:05am-9:55am

**LAB:** BTEC  
(B2) Th 12:30-3:15pm  
(B3) W 6:30-9:15pm  
(B4) Th 3:30-6:15pm  
(B5) M 2:30-5:15pm

**Instructors:**
Kavon Karrobi, PhD (he/him)  
BTEC 201  
(kkarrobi@bu.edu)  
Lectures, Labs B4 & B5  
Office hour: Fri 1:30-2:30pm

Aleks Zosuls (he/him)  
TBA  
(azosuls@bu.edu)  
Labs B2 & B3  
Office hour: by appointment

**Graduate Teaching Assistants:**
Diana Suciu (she/her)  
BTEC  
(dsuci@bu.edu)  
Groups B2a, B2b  
Office hour: Wed 2-3pm

Josh Dupaty (they/them)  
BTEC  
(jdupaty@bu.edu)  
Groups B3a, B3b  
Office hour: Mon 5:15-6:15pm

Ariane Garrett (she/her)  
BTEC  
(arianeg@bu.edu)  
Groups B4a, B4b  
Office hour: Wed 4:30-5:30pm

Sydney Bailes (she/her)  
BTEC  
(smbailes@bu.edu)  
Groups B5a, B5b  
Office hour: Tue 5-6pm

Office hours can also be arranged by appointment. It is preferable that you attend office hours of your assigned TA, though you may attend other office hours in the event of scheduling conflicts.

**Description:**
This is a laboratory course designed to develop basic instrumentation and analysis skills for physiological and biological measurements. Emphasis will be placed on techniques involving light. Lecture periods will focus on introducing fundamental concepts and applications. Laboratory assignments will build on these concepts and provide experience with bridging them into practice using laboratory-grade instrumentation and hardware. There will be three labs in total, each preceded by introductory lectures. Each lab section will be divided into two groups that will meet on alternate weeks. For example, if you signed up for section B2 scheduled for Thursdays 12:30-3:15pm, you will be assigned to one of two groups: B2a or B2b. Group B2a will perform the lab the first week the lab takes place in BTEC. Group B2b will perform the lab the second week the lab takes place. Lectures take place every week, unless otherwise noted. The scheduling is made clear in the calendar below. In addition to the labs, this course will also involve a multi-week group project that will provide an opportunity to apply the techniques introduced through this course, as well as any techniques learned from your previous courses should you choose. Further details regarding the project will be shared later in the semester.
A TA will be assigned to you based on your lab section. This TA is your go-to person throughout the course and is the first person you should contact if you have any questions or problems. TAs will assist you throughout the labs as well as the group project. TA office hours are listed above.

**Grading:**
Scores given may not necessarily reflect your final course grades as adjustments may be applied. Grades will be evaluated as follows:

- **Lab reports:** 60%
- **Group project:** 30%
- **Lecture quizzes:** 10%

(Quizzes given at the start of lectures, with 10 best quizzes counted towards grade)

**Expectations:**
You are expected to attend every lecture and perform every lab. Lecture slides and lab handouts will be made available on Blackboard. You will be responsible for knowing the material covered in lectures and labs. Lab handouts contain detailed instructions on how to perform each lab and how to complete each associated lab report. You are expected to read through the entirety of the lab handouts prior to starting each lab, concentrating on the in-lab portion of these handouts (i.e., the introduction, sections in italics and appendices). To ensure this, during the two weeks a lab is taking place, the brief quiz given at the beginning of each lecture will make sure you have understood the basic preliminaries from both the lab handout and from the previous lecture. In addition, each lab handout features a sign-off sheet at the end. These must be completed and signed off by the TA before you leave the lab.

You will work in teams of two to perform each lab. Your TAs will randomly assign your lab partner for each lab. Data may not be shared between teams unless the instructor has provided explicit and specific permission.

If you cannot attend a lab for reasons of illness, etc., you must notify your TA in advance to reschedule to a different lab time (provided the different lab time is not already full).

**Lab Reports:**
Lab reports are required for each lab. Though labs are performed in teams, data analysis and lab reports (text, figures, tables, or any other component) should be completed individually. The instructions for what to include in your lab report are provided in the lab handout. Follow these instructions to the letter! Include only what is highlighted in bold. The text in the lab reports should be kept brief and to the point (see sample report posted on Blackboard). In other words, there is no need for a long introduction, conclusion or description of methods. Answers to queries should be no longer than a few sentences.

The actual text in the reports should be typed, and, by itself, amount to no longer than a page. Interspersed within the text, you will be asked to include plots, figures, and tables. Make sure these are properly captioned, and that all axes and plot traces are properly labelled (with units!). Reports should be in black and white (please make sure plot traces are easily distinguishable).

Regarding code, at this point in your education and in this course, we expect you to be capable of writing and debugging code. Do not expect the TAs to review your code line by line and point
out any or all errors or bugs. They will give general guidance on concepts and functions related to analysis and data presentation, but we really want you to learn the skills of writing and debugging code on your own.

**Reports must be submitted in the following two ways by the start of your next lab session two weeks later:** (i) by paper in the submission box located in lab BTEC 201, AND (ii) on Blackboard as a PDF, along with your MATLAB code and raw data files. For example, if your lab is on Wednesdays at 6:30pm, your reports are due no later than Wednesdays at 6:30pm two weeks later by the start of your next lab session. Late assignments will receive a 10% deduction for every 24-hour delay (e.g., for an assignment due Wednesday at 6:30pm, if you submit anytime between 6:31pm on Wednesday and 6:30pm on Thursday, your assignment receives an automatic 10% deduction). Late assignments must be dropped off in the submission box and must also be sent to your TA by email (email will provide the time stamp).

**Academic Integrity:**
**Plagiarism in any form will not be tolerated.** Viewing another student’s written lab report/analysis code and/or providing your lab report/analysis code to other students are both violations of the plagiarism policy. In the event this is identified, the plagiarized assignment will be assigned a zero grade and the College of Engineering Academic Conduct Committee will be notified. All items from the University’s conduct code apply to this course and are found here: http://www.bu.edu/academics/policies/academic-conduct-code/

**Safety:**
The following rules apply to both the lecture room and laboratory: students must wear masks covering nose and mouth at all times, and there is no eating/drinking allowed. The following additional rules apply to the laboratory setting: students must wear closed toed shoes, no shorts/skirts allowed, and students are responsible for disinfecting their workspace at the start and end of their lab section (cleaning supplies will be supplied). All students are expected to follow all University guidelines with respect to testing and mask wearing.

**Policy On Inclusion:**
The goal of the course is to learn, engage and understand, and we will do so in a way that is most respectful and inclusive. We want to ensure that all students feel welcomed and can participate freely in a respectful manner at all times. Do not hesitate to reach out to the instructors for any reason on this topic throughout the course.

**Accommodations:**
“Boston University provides reasonable accommodations to eligible individuals with disabilities in conformance with Section 504 of the Rehabilitation Act of 1973 and with the Americans with Disabilities Act of 1990. Requests for disability accommodations must be made in a timely fashion to Disability & Access Services, 25 Buick Street, Boston, MA 02215; 617-353-3658 (Voice/TTY). Students seeking accommodations must submit appropriate medical documentation and comply with the policies and procedures of Disability & Access Services.” (https://www.bu.edu/academics/policies/disability-accommodation/)

v. 2022-01-25
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**SPRING 2022**

**Course Schedule (subject to change):**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Lab</th>
<th>Assignments due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24-Jan</td>
<td><strong>Lecture 1</strong> Course Intro, Spectroscopy Part I</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>31-Jan</td>
<td><strong>Lecture 2</strong> Spectroscopy Part II</td>
<td>Lab 1 (group A)</td>
<td>Light Scattering &amp; Absorption</td>
</tr>
<tr>
<td>3</td>
<td>7-Feb</td>
<td><strong>Lecture 3</strong> Microscopy Part I</td>
<td>Lab 1 (group B)</td>
<td>Light Scattering &amp; Absorption</td>
</tr>
<tr>
<td>4</td>
<td>14-Feb</td>
<td><strong>Lecture 4</strong> Microscopy Part II</td>
<td>Lab 2 (group A)</td>
<td>Microscopy</td>
</tr>
<tr>
<td>5*</td>
<td>22-Feb</td>
<td><strong>Lecture 5</strong> Introduce Group Project</td>
<td>Lab 2 (group B)</td>
<td>Microscopy</td>
</tr>
<tr>
<td>6</td>
<td>28-Feb</td>
<td><strong>Lecture 6</strong> Fluorescence Part I</td>
<td>Project (A+B)</td>
<td>Form project group (lecture)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Spring Break</strong></td>
<td>No Lecture</td>
<td>Choose project option (lab)</td>
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<tr>
<td>7</td>
<td>7-Mar</td>
<td></td>
<td>None</td>
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<tr>
<td>8</td>
<td>14-Mar</td>
<td><strong>Lecture 7</strong> Fluorescence Part II</td>
<td>Lab 3 (group A)</td>
<td>Fluorescence</td>
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<tr>
<td>9</td>
<td>21-Mar</td>
<td><strong>Lecture 8</strong> Project Writing</td>
<td>Lab 3 (group B)</td>
<td>Fluorescence</td>
</tr>
<tr>
<td>10</td>
<td>28-Mar</td>
<td><strong>Lecture 9</strong> Project Presenting</td>
<td>Project (A+B)</td>
<td>Lab 3 reports (group A)</td>
</tr>
<tr>
<td>11</td>
<td>4-Apr</td>
<td><strong>Lecture 10</strong> Fireside Chat</td>
<td>Project (A+B)</td>
<td>Lab 3 reports (group B)</td>
</tr>
<tr>
<td>12</td>
<td>11-Apr</td>
<td><strong>Lecture 11</strong> Ethics Part I</td>
<td>Project (A+B)</td>
<td></td>
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<tr>
<td>13**</td>
<td>20-Apr</td>
<td><strong>Lecture 12</strong> Ethics Part II</td>
<td>Project (A+B)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>25-Apr</td>
<td><strong>Lecture 13</strong> Ethics Part III</td>
<td>Presentations (A+B)</td>
<td>Project Presentations</td>
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<tr>
<td>15</td>
<td>2-May</td>
<td><strong>Lecture 14</strong> Beyond BE492</td>
<td>None</td>
<td>Project Proposal/Review</td>
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<td>(by 5 PM EST on Wed 5/4)</td>
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</tbody>
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*Monday schedule on Tues 2/22 due to holiday*

**Monday schedule on Wed 4/20 due to holiday, Wed lab section B3 meeting time TBD**