

BME31000: BME Experimental Methods



BME 310: This laboratory course focuses on the principles of experimental design, application of statistics, interpretation of data, and technical writing. Students will perform modular hands-on laboratory experiments in biotransport, biological control, signal analysis, imaging, biomechanics, biomaterials, and cell and tissue engineering. A technical report will be submitted after lab modules.

Labs & Lecture:

Lecture (All): Mondays	1:00PM-2:00PM	ST-402 (BME Confr. Room)
Lab BC1 (23626): Tues	12:30PM-3:30PM	ST-405 (BME Laboratory)
Lab BC2 (23627): Wed	1:00PM-4:00PM	ST-405 (BME Laboratory)
Lab BC3 (23628): Thurs	12:30PM-3:30PM	ST-405 (BME Laboratory)

Instructors:

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Assistants:

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Ms. Caroline Pena	212-650.5958	cpena001@citymail.cuny.edu

Office Hours:

Dr. Majeska:	Thursdays 10AM-12PM
Dr. Vazquez:	Wednesdays 10-11AM
TAs:	TBA as per TA

Pre- and Co-Requisites

All students must have completed BME 22000, ME33000, and ENGL21007. These courses cannot be taken as co-requisites. In addition BIO22900 is a non-negotiable Pre/Co-requisite. NO EXCEPTIONS.

Required Book:

A BME310 course workbook (with laboratories and lectures) must be purchased from Staples on W 125th St for <\$50 prior to the first laboratory. Weekly assignments must be read PRIOR to all lecture and laboratory sessions.

Lateness and Absence:

Students are expected to promptly attend every lecture and laboratory. *Please silence mobiles during each class and lab.* Students may only attend the lab section to which they are assigned unless they have prior, written permission from the instructors. There will be no make-ups for missed labs. Students who do NOT attend a laboratory, arrive significantly late, or arrive without their course workbooks will receive a zero grade for the laboratory report. Students who use the laboratory, equipment, or computers for personal reasons, including unrelated web searches or messaging, will be ejected from the laboratory.

Grading:

Student grades will be comprised of 9 laboratory modules. A timed, 7-minute, closed-book quiz will be administered at the beginning of Every Lecture and Every Laboratory. Quizzes will cover weekly readings assigned prior to lecture and laboratory. Latecomers will not receive extra time and No Makeup Quizzes will be administered. The composition of course grades will be:

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In-Class/In-Lab Quizzes (Best 20 of 23):	20%
Engineering Technical Report (6 of 6):	24%
Practical Exam + Lab book (Required):	40%
Final Exam (Required):	<u>16%</u>
	100%

Lab Notes:

Students must keep an accurate log of the exercises performed in lab using their course workbook. Lab notes are an official, legal record of academic requirements that cannot be altered. ***Lab notes cannot be re-written for neatness/completeness after the exercise.*** Students are required to bring course workbooks to lecture in order to take notes within the same book for lab exercises.

Reports:

Engineering Technical Reports are short summaries of the relevant technical aspects of each lab. Reports are ~400 words and summarize the objectives of the lab, the materials and methods used, key results and the use of the data in future lab modules. Reports must be written in scientific journal/NIH format, with clarity in writing, organization, grammar and spelling counting equally as technical content. Numerically-labeled figures are to be cited in the text but included in the appendix only. Text must be typed, double-space using Arial, 12-point font with 1-2 peer-reviewed references (no Wikipedia!). Specific word limits per sections will be discussed prior to each report. **Reports must be uploaded as PDF files onto blackboard.com by 5PM on the date due.** Reports that do not meet all of these requirements will not be graded.

Students are welcomed and encouraged to discuss data collection, write up, and analysis with all of their classmates, as well as proofread each other's reports.

Students Cannot:

- (1) Use data from another group without explicit instructor permission;
- (2) Copy (even in part) text from another report (including previous years).

Students who copy OR allow their work to be copied will be de-registered.

Course Outcomes:

Upon course completion, students will demonstrate abilities to:

1. Apply engineering knowledge in a hands-on experimental setting.
2. Function effectively within technical teams.
3. Design and conduct experiments within an engineering setting.
4. Produce engineering documents that abide by technical writing guidelines and standards.

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<u>Mod</u>	<u>Date</u>	<u>Topic in Module</u>	<u>Assessment</u>
1	01.29.18	Module 1: Introduction and Safety	No Lecture Quiz
	01.30.18	Lab BC1 (Tues): Module 1	No Quiz
	02.01.18	Lab BC2 (Wed): Module 1	No Quiz
	02.02.18	Lab BC3 (Thrs): Module 1	No Quiz
2	02.05.18	Module 2: Darcy Flow	Lecture Quiz 2
	02.06.18	Lab BC1 (Tues): Module 2	Lab Quiz Mod 2
	02.07.18	Lab BC2 (Wed): Module 2	Lab Quiz Mod 2
	02.08.18	Lab BC3 (Thrs): Module 2	Lab Quiz Mod 2
3A	<i>02.12.18</i>	<i>CCNY Closed (Lincoln's Birthday)</i>	<i>No Classes</i>
	02.13.18	Lab BC1 (Tues): Cell Culture-Module 3A	Lab Quiz 3A
	02.14.18	Lab BC2 (Wed): Cell Culture-Module 3A	Lab Quiz 3A
	02.15.18	Lab BC3 (Thrs): Cell Culture-Module 3A	Lab Quiz 3A
3B	<i>02.19.18</i>	<i>CCNY Closed (Presidents' Day)</i>	<i>No Classes</i>
	02.20.18	Module 3B: Cell Culture B (Mon Sched)	Lecture Quiz 3B
	02.21.18	Lab BC2 (Wed): Cell Culture-Module 3B	Lab Quiz 3B
	02.22.18	Lab BC3 (Thrs): Cell Culture-Module 3B	Lab Quiz 3B
	<i>02.23.18</i>	<i>Technical Report 1 (Module 2)</i>	<i>TR1 Due</i>
3C	02.27.18	Module 3C: Cell Culture C	Lecture Quiz 3C
	02.27.18	Lab BC1 (Tues): Module 3C	Lab Quiz 3C
	02.28.18	Lab BC2 (Wed): Module 3C	Lab Quiz 3C
	03.01.18	Lab BC3 (Thrs): Module 3C	Lab Quiz 3C
3D	03.05.18	Module 3D: Cell Culture 3D	Lecture Quiz 3D
	03.06.18	Lab BC1 (Tues): Module 3D	Lab Quiz 3D
	03.07.18	Lab BC2 (Wed): Module 3D	Lab Quiz 3D
	03.08.18	Lab BC3 (Thrs): Module 3D	Lab Quiz 3D
	<i>03.09.18</i>	<i>Technical Report 2 (Module 3A+3B)</i>	<i>TR2 Due</i>
4A	03.12.18	Module 4A: Fluorescence & Imaging	Lecture Quiz 4A
	03.13.18	Lab BC1 (Tues): Module 4A	Lab Quiz 4A
	03.14.18	Lab BC2 (Wed): Module 4A	Lab Quiz 4A
	03.15.18	Lab BC3 (Thrs): Module 4A	Lab Quiz 4A
4B	03.19.18	Module 4B: Fluorescence & Imaging	Lecture Quiz 4B
	03.20.18	Lab BC1 (Tues): Module 4B	Lab Quiz 4B
	03.21.18	Lab BC2 (Wed): Module 4B	Lab Quiz 4B
	03.22.18	Lab BC3 (Thrs): Module 4B	Lab Quiz 4B
	<i>03.23.18</i>	<i>Technical Report 3 (Modules 3C+3D)</i>	<i>TR3 Due</i>

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<u>Mod</u>	<u>Date</u>	<u>Topic in Module</u>	<u>Assessment</u>
	03.26.18	LAB PRACTICAL EXAM	Lecture Review
	03.27.18	Lab BC1 (Tues): Scheduled Time Slots	Practical
	03.28.18	Lab BC2 (Wed): Scheduled Time Slots	Practical
	03.29.18	Lab BC3 (Thrs): Scheduled Time Slots	Practical
	03.31.18	FIRST DAY OF SPRING BREAK ☺	No Classes
	04.08.18	LAST DAY OF SPRING BREAK ☹	No Classes
4C	04.09.18	Module 4C: Image Analysis	Lecture Quiz 4C
	04.10.18	Lab BC1 (Tues): Imaging	Lab Quiz 4C
	04.11.18	Lab BC2 (Wed): FRI SCHED. Find Alt Day	Lab Quiz 4C
	04.12.18	Lab BC3 (Thrs): Imaging	Lab Quiz 4C
4D	04.16.18	Module 4D: Flow Cytometry	Lecture Quiz 4D
	04.17.18	Lab BC1 (Tues): Equipment Demo	No Lab Quiz
	04.18.18	Lab BC2 (Wed): Equipment Demo	No Lab Quiz
	04.19.18	Lab BC3 (Thrs): Equipment Demo	No Lab Quiz
	04.20.18	<i>Technical Report 4 (Module 4A+4B+4C)</i>	<i>TR4 Due</i>
5	04.23.18	Module 5: Matlab	Lecture Quiz 5
	04.24.18	Lab BC1 (Tues): Module 5: Exercise	Lab Quiz 5
	04.26.18	Lab BC2 (Wed): Module 5: Exercise	Lab Quiz 5
	04.27.18	Lab BC3 (Thrs): Module 5: Exercise	Lab Quiz 5
6A	04.30.18	Module 6A: Detergents and Electrophoresis	Lecture Quiz 6A
	05.01.18	Lab BC1 (Tues): Module 6A	Lab Quiz 6A
	05.02.18	Lab BC2 (Wed): Module 6A	Lab Quiz 6A
	05.03.18	Lab BC3 (Thrs): Module 6A	Lab Quiz 6A
	05.04.18	<i>Technical Report 5 (Modules 4D and 5)</i>	<i>TR5 Due</i>
6B	05.07.18	Module 6B: Electrophoresis	Lecture Quiz 6B
	05.08.18	Lab BC1 (Tues): Module 6B	Lab Quiz 6B
	05.09.18	Lab BC2 (Wed): Module 6B	Lab Quiz 6B
	05.10.18	Lab BC3 (Thrs): Module 6B	Lab Quiz 6B
	05.14.18	Final Lecture: Comprehensive Review	No Lecture Quiz
	05.15.18	Lab BC1 (Tues)	Open Lab
	05.16.18	Lab BC2 (Wed):	Open Lab
	05.18.18	<i>Technical Report 6 (Module 6A+ 6B)</i>	<i>TR6 Due</i>
	05.23.18	Final Exam TBD by CCNY Finals Scheduling	