

Molecular Biomedical Engineering

Academic Term: Spring 2024

BME 4311 Section 103G - Class Number 21643

Class Periods: M, W, F Period 5 (11:45 AM - 12:35 PM)

Location: COMM -011

Instructor:

Dr. Peter S. McFetridge

Email: pmcfetridge@bme.ufl.edu

Phone: 352-273-9325 (email is much better)

Office Hours: STA will have set hours which will be detailed in the first lecture posted. If further assistance is needed, I will be available after class for discussion (as long as needed) or 7:00 - 8:30AM Monday and Friday. We can set a convenient time for a Zoom session if needed.

Office Hours: Days of week, hours available, office location

Supervised Teaching Student:

Please contact through the Canvas website

Bryce Shirk, email address: bshirk@ufl.edu, office hours and location TBD

Course Description

This course focuses on fundamental biological principles at the cellular and molecular level, and how they relate to engineering applications.

Introduces the fundamentals of molecular biology for biomedical engineers. Designed for Juniors (or Seniors) majoring in biomedical engineering to learn the nomenclature and current state of knowledge of the eukaryotic cell and its related structures. Topics include protein structure and function, enzymes, the structure and nature of DNA and the cellular structure and function of various cellular organelles. Learn about energy and the function of mitochondria and chloroplast, cellular communication, and the function of the extracellular matrix.

3 Credits.

Final Exam: 5/03/2024 @ 7:30 AM - 9:30 AM

Course Pre-Requisites / Co-Requisites

BSC 2010 (Biology 1); PCB 3713C (Cellular & Systems Physiology) and CHM 3217 (Organic/Biochemistry) or CHM2210 (**Organic Chemistry 1**) with minimum grades of C.

Course Objectives

Upon completion, a student should be able to:

1. Describe the scope of molecular biomedical engineering across a range of topic covered in class
2. Describe biomolecular principles of protein (primary focus), nucleic acids, lipids with the principles of biochemistry
3. Understand cellular and molecular interactions associated with physiological processes
4. Describe molecular biomedical engineering principles and approaches in (for example) biotechnology, regenerative medicine, molecular engineering as related to the molecular events described above

Materials and Supply Fees: None

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Relation to Program Outcomes (ABET):

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	
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	
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, environmental, 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	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

Title: **Essential Cell Biology** ISBN: 9780815344544
Author: Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander D. Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter
Edition: 4th (or 5th)
Publisher: Garland science

Course notes are derived primarily from the textbook above; however, some notes will be in addition to the textbook with other content discussed in class – you will need to attend to get these details. Where additional reading or study is required citations and references will be provided to students accordingly.

*** Exams are based on lecture content/discussion and the textbook. ***

Exams will almost always have content in them that is part of class discussion and/or written up on the white board, as such is important to attend to make sure you understand the concepts discussed.

Course Schedule

*** Note this is subject to change at instructor's discretion**

Classes will typically follow the Chapters within the textbook (ECB). As this is a new approach to the class, time requirements for each chapter will vary, based on general discussion and examples given in class. Homework numbers and schedule are subject to change, but likely to be 5 semester tests/exams with a final.

Week 1: (08/21)	Course Overview, Introduction to topics (Essential Cell Biology (ECB))
Weeks 2-16	Selected chapters from text book with related engineering content

Attendance Policy, Class Expectations, and Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

- Students are expected to attend course lectures and participate in class discussions.
- It is expected that there will be no cell phone or electronic device distractions in class.
- If you are unable to attend class, will be coming late or leaving early, then you are expected to inform the instructor. Students are expected to be in class. Be prepared to learn, engaged, and contribute to the learning environment.
- Exam content will cover in-class examples and notes written on the white-board; these are generally not on the uploaded ppt slides. If you miss class, it is important that you discuss the class content with another class member to get these notes, otherwise you will not be able to answer all the exam questions. This is your responsibility.
- Unless prior arrangements have been made with the instructor, students will be **deducted 15% per day** for late coursework, with deductions occurring at the time associated with the due date. Unless prior arrangements have been made with instructor, missed exams will receive a grade of **0 points**.
- While students are encouraged to discuss course material and assignments together outside of class, it is expected that all coursework/assignments submitted is the students' own independent work.
- All class material will be posted to CANVAS on or near the day of each class, however some content may take several sessions to get through so these are usually later. Content covered and written up in the whiteboard is the students responsibility to note as this content will not be on CANVAS.
- All exams or term tests will be during the allotted class hours (or the time set by UF for the final exam).
- When noted, some exams will be 'Open Book' – this means you are free to use your class notes and the textbook – ONLY. Failure to follow policy will result in a zero grade for that exam. Please note that all submitted work automatically goes through UF's plagiarism and AI screening tools.

Please pay careful attention to CANVAS for class updates/lectures and general information

Evaluation of Grades

<i>Assignments – subject to change</i>	<i>Number of</i>	<i>Percentage of Final Grade</i>
<i>Homework (subject to change)</i>	<i>2</i>	<i>8% (4% each)</i>
<i>Semester Exams</i>	<i>5</i>	<i>75% (15% each) – one class period each</i>
<i>Final Exam</i>	<i>1</i>	<i>15% (15%)</i>
<i>Attendance (subject to change)</i>	<i>1</i>	<i>2%</i>
<i>Total</i>		<i>100%</i>

Grading Policy

The following is given as an example only.

More information on UF grading policy may be found at:

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

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, 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/>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic

exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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/process/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.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University’s core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

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
- HWCOE Human Resources, 352-392-0904, student-support-hr@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: <https://counseling.ufl.edu>, 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 Connections Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/getting-help/>; <https://distance.ufl.edu/state-authorization-status/#student-complaint>.