

Molecular Biomedical Engineering

BME 4311 Section 11843

Class Periods: M, W, F, Period 5 (11:45 – 12:35)

Location: Room: Florida (old) Gym FLG 0270

Academic Term: Spring 2020

Instructor:

Peter S. McFetridge

Associate Professor

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352-273-9325

Office Hours: TBD

Supervised Teaching Assistant:

Matthew Becker

Ph.D. Student

J. Crayton Pruitt Family Department of Biomedical Engineering

University of Florida

JG56 Biomedical Sciences Bldg

Email:

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.

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:

- Describe the scope of molecular biomedical engineering
- Describe biomolecular principles of nucleic acids, lipids and proteins with the principles of biochemistry
- Understand cellular and molecular interactions associated with physiological processes
- Describe molecular biomedical engineering principles and approaches in (for example) biotechnology, regenerative medicine, molecular engineering
- Construct an original and creative research project that reflects concepts presented in class

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Materials and Supply Fees

None

Recommended 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 text book above, however some notes will be in addition to the text. Where additional reading or study is required citations and references will be provided to students accordingly.

Relation to Program Outcomes (ABET):

The table below is an example. Actual outcomes will vary by program.

ABET Outcome	Coverage*	
<i>1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</i>	High	Reinforced
<i>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</i>		
<i>3. an ability to communicate effectively with a range of audiences</i>		
<i>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</i>		
<i>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</i>		
<i>6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</i>		
<i>7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</i>	Low	Introduced

Coverage is given as high (H), medium (M), or low (L). An empty box indicates that this outcome is not part of the course.

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Course Schedule

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

Classes will typically follow the Chapters within the text book (ECB). As this is a new approach to the class, time requirements for each chapter will vary, so a defined timetable is not yet known.

Homework numbers and schedule are subject to change, but likely to be 4 mid 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 the text book

Attendance Policy, Class Expectations, and Make-Up Policy

Excused absences must be consistent with university policies in the graduate catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>) and require appropriate documentation.

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, prepared to learn, engaged, and overall contributors to the learning environment. Poor attendance will affect your participation grade.

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 0pts.

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 work.

Evaluation of Grades

Assignment	Number of	Percentage of Final Grade
Through term pop quizzes	12 (2 drops)	10% ((1% each)
Semester Exam	4	60% (15% each)
Final Exam	1	30%
Total		100%

IMPORTANT note with quiz drops.

You will get two free drops – these are for sickness or other excusable absences, you do not need to bring myself or the TA a note. **However, it is important to get a written notes for all excusable absences in case you miss a third quiz (with a valid reason) - without a valid excusable reason for missing the quiz it will not count as a drop.**

Put another way - if you miss two quizzes without a written valid reason and then get sick and miss another (3rd), you still only get two drops **(therefore a zero for one quiz)**. If you get sick again (or other acceptable written reason), and have two sick notes, you still only get two drops **(therefore a zero for two quizzes)**. If you get sick (or other valid reason) again you will get that as a drop or as a make-up. There will be no make-up quizzes without a written valid excusable event.

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
93.0 - 100	A	4.00
90.0 - 92.9	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

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

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Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/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://www.dso.ufl.edu/sccr/process/student-conduct-honor-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.

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: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

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

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/>.

Other 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://care.dso.ufl.edu>.

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