

BCH 6415
Advanced Molecular and Cellular Biology
3 credits
5th Period, MWF, 11:45 am - 12:35 pm
HSC room C1-11 and online
Spring 2021

Course Description: This course is designed for advanced graduate students and highly advanced undergraduates who already have taken a one semester graduate level survey course in molecular biology (such as BCH 5413, or the BMS core course, GMS 6001) and desire a course on current state-of-the-art aspects of molecular biology. Lectures and discussions will be based entirely upon the current scientific literature on nuclear structure and organization, transcription, RNA processing, protein synthesis, post-translational regulation, DNA replication, DNA repair, and DNA recombination, and emphasize experimental approaches to understanding these cellular processes. Students should have a good working knowledge of molecular biology and be able to comprehend articles on these topics in journals such as *Cell*, *Science*, *Nature*, *Nature Genetics*, etc. No general molecular biology textbook covers the current topics in this course in sufficient detail and depth, though introductory background information may be available in textbooks such as: Lodish et al., *Molecular Cell Biology*; Alberts et al., *Molecular Biology of the Cell*; Krebs et al., *Lewin's Genes XII*; Cox et al., *Molecular Biology: Principles & Practice*; Weaver, *Molecular Biology*

Ample use will be made of PowerPoint lecture notes and reading lists of relevant scientific articles throughout the course; much of the material in the lecture notes are taken from assigned articles in the current scientific literature. Each instructor lectures in areas of his/her research expertise. Students are responsible for obtaining their own copies of the assigned (and optional) reading from scientific journals. The PowerPoint slides from each lecture are available on the UF e-Learning on Canvas website under "BCH 6415" in the "Modules" link.

Pre-requisites: Students should have taken an introductory biochemistry course (e.g. BCH 4024) and an advanced undergraduate/introductory graduate level molecular biology course (e.g. BCH 5413).

Course objectives: This is an advanced graduate level course designed to expose students to state-of-the-art techniques in molecular biology and to provide students with a working knowledge of the current state of the field. After taking this course, students should be able to read the literature and understand how new findings advance our current understanding of the field.

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Exams: There will be three exams and each will cover material from roughly 1/3 of the course. Exams are scheduled in the evenings from 6 - 8 pm on **Thursday, February 18, Thursday, March 25, Monday, April 26** at **6:00 – 8:00 pm**.

Please reserve these dates and times for the exams on your calendar. **Exams will be given online via eLearning on Canvas.** If you have a legitimate conflict, for example, an exam in another course, please discuss this with the course director at least one week prior to the scheduled exam date. If you are ill or injured and cannot take an exam on the scheduled date, please contact the course director ahead of time, if possible. A medical excuse will be *required* to take a make-up exam ([Attendance Policies](#)). There will *NOT* be a cumulative final.

Grades: Grades will be based solely on the scores for the three exams. The exams will be weighted equally, 100 points each. Final grades will be based on the class average. Letter grades and grade points are assigned according to University policy ([Grades and Grading Policy](#)).

Course Location: The course will be delivered in a HyFlex format. Lectures and review sessions will be given in-person in the HSC Communicore Room C1-11. The room is large enough to accommodate all students with proper distancing. The lectures will also be live-streamed via Zoom to students at remote locations. Zoom links will be posted in eLearning on Canvas. Remote students will be able to ask questions via Zoom and hear the in-class discussion. Lectures including questions and answers during the lectures will be recorded, and recordings will be posted in eLearning on Canvas.

Attendance Policy and Class Expectations: Class attendance (live or via Zoom) is strongly encouraged. Students who miss lectures and review sessions will not be able to participate in the class discussions of the material that enhances learning. Students should come to class prepared and should ask questions. Students are expected to take an active role in learning by keeping up with course material, asking questions, and seeking help when they need it.

COVID-19 Policy: We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms](#).
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies](#).

Students Requiring Accommodations: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the [Disability Resource Center](#). 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.

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](#) 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.

Course Evaluation: Students are expected to provide feedback on the quality of instruction in this course by completing [online evaluations](#). 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 on the [Gator Evals page](#).

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 the [Notification to Students of FERPA Rights](#).

Campus Resources

Academic Resources

- [E-learning technical support](#), 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
- [Career Resource Center](#), Reitz Union, 392-1601. Career assistance and counseling.
- [Library Support](#), 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.
- [Writing Studio](#), 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
- [Student Complaints Campus](#)
- [On-Line Students Complaints](#)

Health and Wellness

- **U Matter, We Care:** If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- **Counseling and Wellness Center:** counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- **Sexual Assault Recovery Services (SARS)**
- Student Health Care Center, 392-1161.
- **University Police Department** at 392-1111 (or 9-1-1 for emergencies), or police.ufl.edu.

BCH 6415 – Spring 2021
Lecture Schedule

<u>DATE</u>	<u>DAY</u>	<u>TOPIC</u>	<u>INSTRUCTOR</u>
Jan 11	Mon	Technology/Methodology	Dr. Lu
Jan 13	Wed	Nucleosomes & Chromatin	Dr. Lu
Jan 15	Fri	Basal Transcription/RNA Pol II	Dr. Bungert
Jan 18	Mon	NO CLASSES – MARTIN LUTHER KING DAY	
Jan 20	Wed	Transcription Elongation I	Dr. Bungert
Jan 22	Fri	Transcription Elongation II	Dr. Bungert
Jan 25	Mon	Chromatin Remodeling I	Dr. Kladde
Jan 27	Wed	Chromatin Remodeling II	Dr. Kladde
Jan 29	Fri	Histone Modifications I	Dr. Lu
Feb 1	Mon	Histone Modifications II	Dr. Lu
Feb 3	Wed	DNA Methylation & Epigenetic Regulation I	Dr. Lu
Feb 5	Fri	DNA Methylation & Epigenetic Regulation II	Dr. Lu
Feb 8	Mon	Transcription Activation/Co-Activators/Co-Repressors	Dr. Bungert
Feb 10	Wed	Super Enhancers/Locus Control Regions	Dr. Bungert
Feb 12	Fri	Nuclear Organization/TAD/Transcription Factories	Dr. Lu
Feb 15	Mon	Review Session for Exam 1	
Feb 17	Wed	Gene Regulation by Long Non-Coding RNA's	Dr. Kladde
Feb 18	Thr	<u>EXAM 1 – 6:00-8:00 p.m.; Lectures 1/11 through 2/12 (14 lectures)</u>	
Feb 19	Fri	Pol I and Pol III Transcription	Dr. Kladde
Feb 22	Mon	RNA Processing I – Capping, Polyadenylation	Dr. Berglund
Feb 24	Wed	RNA Processing II – RNA Stability and Turnover	Dr. Berglund
Feb 26	Fri	RNA modifications/epitranscriptome	Dr. Berglund
March 1	Mon	RNA Splicing I	Dr. Xie
March 3	Wed	RNA Splicing II	Dr. Xie
March 5	Fri	Protein Synthesis I	Dr. Gumz
March 8	Mon	Protein Synthesis II	Dr. Gumz
March 10	Wed	Post-Translational Regulation	Dr. Gumz
March 12	Fri	RNAi & Micro RNA's	Dr. Xie
March 15	Mon	DNA Replication: DNA synthesis and fidelity	Dr. Bloom
March 17	Wed	DNA Replication: Polymerases at the fork	Dr. Bloom
March 19	Fri	DNA Replication: Unwinding DNA	Dr. Bloom
March 22	Mon	Review Session for Exam 2	
March 24	Wed	DNA Replication: Replicating chromatin and ends	Dr. Bloom
March 25	Thr	<u>EXAM 2 – 6:00-8:00 p.m.; Lectures 2/17 through 3/17 (13 lectures)</u>	
March 26	Fri	DNA Replication: Initiation of Replication	Dr. Bloom
March 29	Mon	Mismatch Repair	Dr. Çağlayan
March 31	Wed	DNA Repair: DNA base damage & base excision repair	Dr. Çağlayan
April 2	Fri	DNA Repair: Nucleotide excision repair	Dr. Bloom
April 5	Mon	DNA Repair: Double-strand breaks & DSB Repair	Dr. Çağlayan
April 7	Wed	DNA Repair: Homologous Recombination	Dr. Çağlayan
April 9	Fri	DNA Damage Tolerance I	Dr. Bloom
April 12	Mon	DNA Damage Tolerance II	Dr. Bloom
April 14	Wed	Cell Cycle Checkpoints & DNA Damage Response	Dr. Bloom
April 16	Fri	Viral Replication I	Dr. Flanagan
April 19	Mon	Viral Replication II	Dr. Flanagan
April 21	Wed	Review Session for Exam 3	
April 26	Mon	<u>EXAM 3 - 6:00 - 8:00 p.m.; Lectures 3/19 through 4/21 (13 lectures)</u>	