

BCH 6415
Advanced Molecular and Cell Biology
3 Credits
Spring Semester 2019

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 COM BMS core course) 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*, *Genes and Development*, 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 lectures notes are taken from assigned articles in the current scientific literature. Each instructor lectures in areas of his/her research expertise. Whenever possible, instructors will provide handouts of their lectures, but 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 Canvas website under "BCH6415" in the "Modules" link.

Formal lectures and discussions will be held 5th period in Room R3-265 in the Academic Research Building on Monday, Wednesday, and Friday, 11:45 am to 12:35 p.m.

COURSE INSTRUCTORS:

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EXAMS:

Three examinations periods are scheduled during the semester for **Thurs February 14** and **Mon March 25** at **6:00 – 8:00 pm** in Room R3-265 of the Academic Research Building, plus the **Final Exam** on **Mon April 29**. The final exam is NOT cumulative. Please arrange your schedules to enable you to attend these sessions. **There will be NO make-up exams.** Review sessions for Exams 1 and 2 are scheduled for **Wed Feb 13**, and **Fri March 22** from 5-6 pm in Rm. R3-265.

GRADES:

Grades will be based solely on the three exams which will be worth 100 points each. The final exam is **NOT** cumulative and will cover only the material from the final third of the course.

BCH 6415 – Spring 2019

Lecture Schedule

<u>DATE</u>	<u>DAY</u>	<u>TOPIC</u>	<u>INSTRUCTOR</u>
Jan 7	Mon	Technology/Methodology	Dr. Yang
Jan 9	Wed	Nucleosomes & Chromatin I	Dr. Yang
Jan 11	Fri	Nucleosomes & Chromatin II	Dr. Yang
Jan 14	Mon	Basal Transcription/RNA Pol II	Dr. Bungert
Jan 16	Wed	Chromatin Remodeling I	Dr. Yang
Jan 18	Fri	Chromatin Remodeling II	Dr. Yang
Jan 21	Mon	NO CLASSES – MARTIN LUTHER KING DAY	
Jan 23	Wed	Chromatin Remodeling III	Dr. Yang
Jan 25	Fri	Histone Modification I	Dr. Lu
Jan 28	Mon	Histone Modification II	Dr. Lu
Jan 30	Wed	Transcription Activation/Co-Activators/Co-Repressors	Dr. Bungert
Feb 1	Fri	Nuclear Organization/TAD's/Transcription Factories	Dr. Yang
Feb 4	Mon	Super Enhancers/Locus Control Regions	Dr. Bungert
Feb 6	Wed	Gene Regulation by Long Non-Coding RNA's	Dr. Kladde
Feb 8	Fri	Pol I and Pol III Transcription	Dr. Kladde
Feb 11	Mon	Transcription Elongation I	Dr. Yang
Feb 13	Wed	Review Session for Exam 1; 5-6 pm, R3-265	
Feb 13	Wed	Transcription Elongation II	Dr. Yang
<u>Feb 14</u>	<u>Thurs</u>	<u>EXAM 1 – 6:00-8:00 p.m.; Lectures through 2/8</u>	
Feb 15	Fri	RNA Processing I – Capping, Polyadenylation	Dr. Yang
Feb 18	Mon	RNA Processing II – RNA Stability and Turnover	Dr. Yang
Feb 20	Wed	RNA Splicing I	Dr. Xie
Feb 22	Fri	RNA Splicing II	Dr. Xie
Feb 25	Mon	Protein Synthesis I	Dr. Gumz
Feb 27	Wed	Protein Synthesis II	Dr. Gumz
March 1	Fri	Post-Translational Regulation	Dr. Gumz
MARCH 4 – 8		SPRING BREAK	
March 11	Mon	RNAi & Micro RNA's	Dr. Xie
March 13	Wed	DNA Methylation & Epigenetic Regulation	Dr. Yang
March 15	Fri	DNA Topology	Dr. Bloom
March 18	Mon	DNA Replication: Initiation & Origins	Dr. Bloom
March 20	Wed	DNA Replication – Mechanisms I	Dr. Bloom
March 22	Fri	DNA Replication – Mechanisms II	Dr. Bloom
March 22	Fri	Review Session for Exam 2; 5-6 pm, R3-265	
March 25	Mon	DNA Replication: Fidelity	Dr. Bloom
March 25	Mon	<u>EXAM 2 – 6:00-8:00 p.m.; Lectures through 3/18</u>	
March 27	Wed	Completing Replication & Telomeres	Dr. Bloom
March 29	Fri	DNA Damage & Excision Repair	Dr. Bloom
April 1	Mon	Mismatch Repair	Dr. Brown
April 3	Wed	Mechanisms of DNA DSB Repair	Dr. Brown
April 5	Fri	Cell Cycle Mechanics	Dr. Brown
April 8	Mon	Damage Response I	Dr. Brown
April 10	Wed	Damage Response II	Dr. Brown
April 12	Fri	Cell Cycle Checkpoints	Dr. Brown
April 15	Mon	Homologous Recombination	Dr. Bloom
April 17	Wed	Lesion Bypass	Dr. Bloom
April 19	Fri	Viral Replication I	Dr. Flanagan
April 22	Mon	Viral Replication II	Dr. Flanagan
April 24	Wed	Review Session for Exam 3; 11:45 am-12:35 pm, R3-265	
April 29	Mon	FINAL EXAM (Non-Cumulative)	