Biochem 6701: Advanced Biochemistry: Molecular Biology - Fall 2018

Tues- Thurs 9:35-10:55am (Room 668 BioSci); https://carmen.osu.edu

Course coordinator:
Mark P. Foster
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Office hours: By appointment

GTA:
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TBA

Course guest instructors:
Various instructors from faculty mentors in Ohio State Biochemistry Program

Textbook (required):
Molecular Biology: Principles of Genome Function (2nd Edition)
Craig, Cohen-Fix, Green, Greider, Storz and Wohlberger
Oxford Press, 2014

Course description:
This graduate-level course will provide a broad survey of the processes that underlie the central dogma of biology (Replication, Transcription and Translation), with an emphasis on **biochemical mechanisms** utilized by the enzymes that carry out these processes and **biochemical techniques** that are utilized to study them. Students will demonstrate knowledge of the basic mechanisms and enzymes that function in diverse organisms (from Bacteria to Eukarya) and will understand how these systems can be regulated, as organisms seek to survive various environmental and developmental challenges.

Course format:
Each week will feature a Thursday lecture on a new topic, followed by a Tuesday problem solving/group work session focused on the material. Weekly **quizzes** will also take place during Tuesday classes. Participation in Tuesday discussions is a graded activity, and will feature student-led discussions, assigned at *random*.

Class Presentations will take place during final two weeks of the semester; students will prepare and present an experimental approach taken from the primary biochemical literature. Additional information about the format and structure of class presentations will be provided separately.

Grading:
Grades will be assigned based on cumulative scores out of 300 total points as follows:

- Weekly quizzes: 120 pts (12 total, 10 points each)
- Exam I: 50 pts
- Exam II: 50 pts
- Assignments: 30 pts
- Class presentation: 20 pts
- Written approach: 20 pts
- Class participation: 10 pts

Topics:

From *Molecular Biology: Principles of Genome Function (2nd Edition)*

Introduction: Ch. 1-3, 19

Chromosome Structure and Function: Ch. 4

Cell Cycle: Ch. 5

DNA Replication: Ch. 6

Chromosome segregation (Mitosis): Ch. 7

Transcription: Ch. 8/9

RNA Processing: Ch. 10

Translation: Ch. 11/12

DNA Repair: Ch. 15

DNA Recombination: Ch. 16-17

Regulatory RNAs: Ch. 13

Protein modification/targeting: Ch. 14

Animations from the text, at:

http://global.oup.com/uk/orc/biosciences/molbiol/craig2e/student/animations/

Animation 1: DNA Replication
Animation 2: Replication fork coupling
Animation 3: Mitosis and Cell Division
Animation 4: Transcription
Animation 5: Transcription regulation
Animation 6: mRNA splicing
Animation 7: The regulation of spliceosome-mediated splicing
Animation 8: Translation
Animation 9: Regulation of Translation
Animation 10: Generation and action of siRNAs and miRNAs
Animation 11: Ubiquitin
Animation 12: Non-homologous end joining
Animation 13: Homology-dependent double strand break repair
Animation 14: Holliday junction resolution
Animation 15: DNA cut-and-paste transposition
Animation 16: The retroviral and retroviral-like transposon lifecycle

Attendance:

Attendance is expected. Tuesday quizzes and participation are graded activities that build on Thursday lectures. Medical emergencies must be documented with a note from the attending physician.

Statements on Academic Misconduct (including plagiarism) and Disability Services

Academic Misconduct:
The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. **Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination.** Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so it is recommended that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If a student is suspected of committing academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Disability Statement:
Any student who feels that s/he may need an accommodation based on the impact of a disability should contact me privately to discuss specific needs, as soon as possible. We rely on the assistance of the Office for Disability Services (ODS) (292-3307, Room 150 Pomerene Hall) to verify the need for accommodations and to develop accommodation strategies. You are encouraged to contact ODS if you feel it may be necessary, if you have not previously done so.