BCH 608 Nucleic Acids - Spring 2014

Course Description:

This course will examine the biochemistry and molecular biology of the nucleic acids, emphasizing the major classes of molecules and the cellular transactions in which they participate.

Prerequisites:
BCH 601/602 or equivalent, or permission of the course director.

Instructors:	**Office Address:**	**Email:**	**Office Phone:**
Michael Fried (Director)	BBSRB B259	michael.fried@uky.edu	3-1205
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Peter Zhou	BBSRB B377	peter.zhou@uky.edu	3-4474

Faculty office hours: By appointment.

Time: **2:00 - 3:00 pm, Monday, Wednesday, Friday (unless noted otherwise).**

Place: **BBSRB, Rm 231 (unless noted otherwise).**

Textbooks:
Molecular Biology of the Gene, Seventh Edition, James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander A.F. Gann, Michael Levine and Richard M. Losick; Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York (2014). **ISBN-13:** 978-0321762436.

Additional reference material will be assigned from the current literature.

This will be a lecture course and will be graded on the basis of four exams of equal weighting (see course schedule for dates). They will consist of essay and problem solving questions graded on a numerical scale. At the end of the term scores will be summed and ranked. Grades will be assigned according to the following scale.

Grade	Numerical Score
A	90-100% (or greater than mean + 1 SD)
B	80-89% (or greater than mean – 0.5 SD)
C	70-79% (or mean – 1.5 SD)

Graduate students cannot receive a grade of D, hence any score below 70% (or < average – 1.5 x S.D.) will be classified as an E.

Class Schedule

#	Date	Topic	Lecturer
1	15-Jan	Introduction	Fried
2	17	Monomers: base and sugar structure	Fried
	20	Martin Luther King day; no class	
3	22	Sequence data-bases	Stamm
4	24	Polymers: RNA, DNA (A, B, Z and quadruplex forms)	Fried
5	27	Polymers: base pairing, stacking	Fried
6	29	Polymers: hybridization, supercoiling	Fried
7	31	Polymers: stiffness, bending	Fried
8	3-Feb	Restriction endonucleases and ligation	Rodgers
9	5	Replication: initiation, regulatory control	Rodgers
10	7	Replication: elongation, polymerases	Rodgers
11	10	Replication: elongation, fidelity	Rodgers
12	12	Replication: termination, telomerase	Rodgers
	14	***Exam #1 (lectures 1-12)***	
13	17	Replication: PCR, DNA sequencing	Rodgers
14	19	Replication: Protein-DNA interactions, structures	Rodgers
15	21	Chromatin: protein DNA interactions, structures	Rodgers
16	24	Chromatin: protein DNA interactions, specificity	Rodgers
17	26	Chromatin: euchromatin vs. heterochromatin	Fried
18	28	Chromatin: remodelling and domains	Fried
19	3-Mar	Recombination/Repair: NER, BER	Fried
20	5	Recombination/Repair: homologous repair, NHEJ	Fried
	7	***Exam #2 (lectures 13-20)***	
21	10	Transcription: promoters, enhancers, binding assays	Zhou
22	12	Transcription: finding a start site (specificity and translocation)	Zhou
23	14	Transcription: RNAP structures	Zhou&Rodgers
	17-21	Spring Break: no class	
24	24	Transcription: Initiation	Zhou
25	26	Transcription: elongation, termination	Zhou
26	28	mRNA processing: capping, polyadenylation	Stamm
27	31	mRNA processing: splicing	Stamm
28	2-Apr	mRNA processing: nuclear export, turnover	Stamm
29	4	mRNA processing: RNA epigenetics	Stamm
30	7	other RNAs: rRNA	Stamm
31	9	other RNAs: tRNAs, aa charging	Stamm
	11	***Exam #3 (lectures 21-31***	
32	14	other RNAs: miRNA, shRNA, piRNA	Stamm
33	16	other RNAs: catalytic RNAs	Stamm
34	18	Therapeutic RNAs	Stamm
35	21	Translation: genetic code / ribosome structure	Gao&Rodgers
36	23	Translation: initiation (Kozak, IRES, eIFs)	Gao
37	25	Translation: elongation, termination, fidelity	Gao
38	28	Translation: suppression, antibiotic targets	Gao
39	30	Translation: secretion	Gao
	2-May	***Exam #4 (Final Exam; lectures 32-39***	