

Zoology 400: General Molecular Biology - Spring, 2017

3 credits

Cap: 28

M/W/F 11:00-11:50

Instructor:

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Office hours:

Tuesdays, 1-2 pm, State Street Chiptole
Thursdays, 10:00-11:00 pm, 121 Zoology Research, or by appointment

Required Text:

Lewin's GENES XI. Krebs, et al.

Course description:

This lecture-based course will provide students with a broad understanding of the mechanisms of life at the molecular level. It is intended for intermediate and advanced undergraduates majoring in the biological sciences. The course will cover the structure, chemistry and functions of biological macromolecules, focusing primarily on the ways by which nucleic acids carry out their central roles in cells. Other topics will include the governing principles by which life evolved, functions and is organized; the experimental methods used to study these processes, and the historical context for our understanding of them.

Prerequisites:

Zoology 101/102 or 151/152 or Biocore 383; Chem 103/104 or 109 or 115/116. Chemistry 341 or 343 recommended but not required.

Course outline and dates: (dates to change)

<u>Lecture Date</u>	<u>Lecture</u>	<u>Topic</u>	<u>Assigned Reading</u>
W 1-20	1	The chemical nature of the gene	1-24
F 1-22	2	Genes encode RNAs and polypeptides	26-41
M 1-25	3	Molecular biology methods and genetic engineering	42-79
W 1-27	4	Gene, interrupted	81-97
F 1-29	5	What's in a genome?	100-117
M 2-1	6	Genes! Genes! Genes!	120-137
W 2-3	7	Repeating sequences.	141-160
F 2-5	8	Genomes evolve.	161-188
M 2-8	9	Chromosomes	192-219
W 2-10	10	Chromatin	223-260
F 2-12	Exam 1		
M 2-15	11	Replication and the cell cycle	265-282
W 2-17	12	Initiation of replication	286-301
F 2-19	13	Nobel Day	primary literature
M 2-22	14	Replication	304-235
W 2-24	15	Extrachromosomal replication	328-351

F 2-26	16	Nobel Day	primary literature
M 2-29	17	Recombination	354-391
W 3-2	18	DNA repair	395-420
F 3-4	19	Nobel Day	primary literature
M 3-7	20	Transposons and retroviruses	424-456
W 3-9	21	Somatic recombination and immune system hypermutation	459-498
F 3-11	Exam 2		
M 3-14	22	Prokaryotic Transcription	508-544
W 3-16	23	Eukaryotic Transcription	549-573
F 3-18	24	Nobel Day	primary literature
March 19-27	Spring Break		
M 3-28	25	RNA processing	578-616
W 3-30	26	RNA processing	578-616
F 4-1	27	Nobel Day	primary literature
M 4-4	28	mRNA stability and localization	622-643
W 4-6	29	Catalytic RNAs	647-667
F 4-8	30	Nobel Day	primary literature
M 4-11	31	Translation	671-708
W 4-13	32	Uses of the genetic code	714-741
F 4-15	Exam 3		
M 4-18	33	The operon	745-773
W 4-20	34	Phage	777-801
F 4-22	35	Nobel Day	primary literature
M 4-25	36	Eukaryotic transcriptional regulation	804-831
W 4-27	37	Eukaryotic transcriptional regulation	804-831
F 4-29	38	Nobel Day	primary literature
M 5-2	39	Epigenetics	838-865
W 5-4	40	Regulatory RNAs	872-888
F 5-6	41	Nobel Day	primary literature

Final Exam: TBA