

## L504: INTRODUCTION TO GENOME BIOLOGY FOR PHYSICAL SCIENTISTS

Preliminary course schedule (subject to modification)

Week	Session	Date	Topic	Contents	Reading C: Campbell TC: The Cell	Homework/ Exam
1	1	Tues 8/30	Introduction	- Introduction to the class and to molecular biology: Overview (from organisms to nucleotides, and back)	C: ch1 TC: ch1	Quiz (no credit)
	2	Thurs 9/1	Bio molecule	- Cell chemistry and biosynthesis	C: ch 2, ch5 TC: ch 2	
2	3	Tues 9/6		- <u>Cell structure</u> Membrane structure and membrane transportation	C: ch 6, 7 TC: ch 10	
	4	Thurs 9/8		- <u>Cell structure</u> Membrane transportation and Intracellular compartment (nucleus, mitochondria)	C: ch 6, 7 TC: ch 11, 12	
3	5	Tues 9/13		- <u>Cell structure</u> Intracellular compartment and protein sorting (ER, vesicular traffic)	C: ch6, 7 TC:ch12, 13	
	6	Thurs 9/15	Proteins	- Protein structure, Globins and how they work	C:ch5 (brief) TC: ch3	
4	7	Tues 9/20		- Protein domains; enzymes	C:ch5 (brief) TC:ch3	
	8	Thurs 9/22		- Protein structure determination	C:ch 5(brief) TC:ch3	
5	9	Tues 9/27	Genetics: Chromosome, DNA & RNA	- Gene, Genetics, Genome - Chromosome, Chromatin and DNA (structure, cell division, the chromosome theory)	C: ch13, 15 TC:ch 4, ch14 (808-820), ch 18(mitosis) ch 20 (meiosis)	Journal assignment (fund. Mol)
	10	Thurs 9/29		- Mendelian genetics (phenotypes and segregation) - Sex determination, sex linkage, recombination	C:ch14 TC:ch 20	
6	11	Tues 10/4		- DNA replication, repair and recombination	C: 16 TC: ch5	
	12	Thurs 10/6		- How cells read the genome: from DNA to Protein (genetic code, tRNAs, protein synthesis)	C:ch17 TC:ch6	
7	13	Tues 10/11		- - Control of Gene expression (lac operon, DNA binding protein, lac genotypes, effects of general	C:ch19 TC:ch7	

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				recombination) in Prokaryotes and Eukaryotes		
	14	Thurs 10/13		- Control of Gene expression (lac operon, DNA binding protein, lac genotypes, effects of general recombination) in Prokaryotes and Eukaryotes	C:ch19 TC:ch7	Quiz (genetics)
8	15	Tues 10/18		<b>MIDTERM</b>		1st. Assignment due
	16	Thurs 10/20	Molecular biology techniques	- Model organisms - Genotype studies: RFLPs, VNTRs, microsatellites, SNP		
9	17	Tues 10/25		- cDNA and ESTs, mobile elements bacterias		
	18	Thurs 10/27		- Recombinant DNA I (allozyme, restriction enzymes, southernns)		
10	19	Tues 11/1		- Recombinant DNA II (cloning, sequencing, PCR)		Quiz
	20	Thurs 11/3		- Sequence alignment: dot plots, scoring matrices, gap penalties, Needleman-Wunsch, Smith-Waterman I		Journal assignment (mol tech.)
11	21	Tues 11/8		- Multiple sequence alignment and BLAST - Annotating genomes		
	22	Thurs 11/10		- Microarrays: gene expression analysis		
12	23	Tues 11/15		- Proteomics: mass spectrometry and protein-protein interaction		
	24	Thurs 11/17	Topics in molecular Biology	- Development of multi-cellular organisms I (frog embryology)		Quiz (tech.)
13	25	Tues 11/22		- Development of multi-cellular organisms II (fly development)		
	Thanks giving	Thurs 11/24				
14	26	Tues 11/29		- Immunity		2 <sup>nd</sup> assignment due
	27	Thurs 12/1		- Cancer and infectious diseases		
15	28	Tues 12/6		- Genomics for biodiversity:		

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				<b>Guest speaker - John K. Colbourne</b>		
	29	Thurs 12/8		<i>FINAL EXAM</i>		