SEP 1996

GRANDE PRAIRIE REGIONAL COLLEGE
BI 1070 A3
INTRODUCTION TO CELL BIOLOGY

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Description :

All life functions are based on cells, and this course will provide an introduction to cell structure and function. Major topics will include the origin of life, the development of prokaryotic and eukaryotic cell lineages, energy conversions, the compartmentation of biochemical functions within a cell and communication from cell to cell. The genetic control of cell activities is examined through methods of molecular genetic analysis and their application in genetic engineering and biotechnology.

Text-books: "Biology" (4th edition) 1993
Neil A. Campbell
Benjamin Cummings Pub. Co., California

Biology 1070 Lab Manual

Requirements:

Since participation in lectures and completion of assignments are important components of this course, students will serve their best interests by regular attendance. Those who choose not to attend must assume whatever risks are involved. In this regard, your attention is directed to the Academic Guidelines of Grande Prairie Regional College.

All assignments must be completed and handed to the instructor by the date specified. Late assignments will not be marked.

Students must attend the laboratory session and complete the exercise in order to recieve credit for lab reports.

Evaluation:

Mid-term exam	25%
Lab. assignments	10%
Lab Quizes	10%
Final lab. exam	15%
Final exam	40%
Total	100%

BI 1070 TOPIC OUTLINE

Lecture	Topics	Chapter
1	**Macromolecules and inorganic constituents.**	5
2	**Origins of living Systems:** - organic molecules. - heterotrophs and cyanobacteria.	24, 25
3	**Introduction to Metabolism:** - metabolic maps. - enzymes and metabolism. - control of metabolism.	6
4	**Membrane structure and function:** - fluid mosaic model. - permeability and transport. - procaryotic and eucaryotic differences.	8
5	**Procaryotes:** - importance. - morphology. - cell walls (Gram +ve, Gram -ve). - Archaebacteria and Eubacteria.	25
6	**Procaryotic cell structure:** - surface structures. - motility. - internal structures.	25
7	**Procaryotic cell structure:** - genome. - genetic exchange.	17, 25
8	**Procaryotic growth:** - endospores. - binary fission. - colonial growth, growth curves.	11, 25
9	**Viruses:** - structure and replication. - viral infection. - bacteriophage (lytic and lysogenic cycles).	17
10	**Animal viruses:** - reproductive cycles. - viral diseases. - viruses and oncogenes. - viroids and prions.	17

Lecture	Topics	Chapter
11	**Eucaryotic cell structure:** - nucleus, ribosomes, endoplasmic reticulum, lysosomes, vacuoles. - cell wall synthesis.	7
12	**Eucaryotic cell structure:** - cytoskeleton. - contractility.	7
13	**Eucaryotic cell structure:** - mitochondria, structure and function. - chloroplasts, structure and function.	7
14	**Cellular Respiration:** - ATP. - Redox reactions. - respiration.	9
15	**Aerobic respiration:** - Glycolysis. - Kreb's Cycle. - the electron transport chain and oxidative phosphorylation.	9
16	**Eucaryotic anaerobic respiration:** - energy utilization. - anaerobiasis. - carbohydrate metabolism.	9
17	**Midterm Exam - Oct. 18.**	
18	**Procaryotic anaerobic metabolism:** - fermentation. - anaerobic respiration. - facultative anaerobes.	9
19	**Mitosis and the Cell Cycle.**	11
20	**Meiosis and sexual life cycles.**	12
21	**Nucleic acids:** - composition. - complementary base pairing	5, 15
22	**Eukaryote chromosome organization.**	18
23	**DNA replication**	15
24	**Genes, proteins and the genetic code.**	16

Lecture	Topics	Chapter
25 16	**Transcription:** - RNA-polymerase. - processing of mRNA.	
26	**Translation:** - tRNA and codon recognition. - translation at ribosomal level. - post-translational modifications	16
27	**Protein trafficking and targetting:** - peptide signal sequences. - post-translation modification and sorting. - protein secretion.	16
28	**Mutation.**	16
29	**Transcriptional control in Prokaryotes:** - negative control by repression. - negative control by induction. - possitive control.	17
30	**Transcriptional control cont.:** - control in eukaryotes	17, 18
31	**Recombinant DNA - Restriction:** - restriction endonucleases. - mapping restriction fragments.	19
32	**Recombinant DNA - Cloning:** - splicing genes into vectors. - expression of cloned genes (cDNA).	19
33	**Recombinant DNA - Biotechnology:** - PCR - RFLPs - forensic uses	19
34	**Signal transduction:** - hormones. - pheromones. - second regulators	41
35	**Signal transduction:** - second messenger systems - steroid hormones. - oncogenes.	41

BI 1070 LAB SCHEDULE FALL 1996

week of:	activity
Sept. 9	Exercise 1 - Introduction
Sept. 16	Exercise 1 - completion Exercise 2 - Membrane structure and function.
Sept. 23	Hand in Assignment 1 (5%) Introduction for Exercise 2 Exercise 3 - Cell Structure.
Sept. 30	QUIZ 1 (Exercises 1-3) (5%) Exercise 5 - Sugar metabolism in yeast.
Oct. 7	Hand in Assignment 2 (5%) Results/Conclusions from Exercise 5 Exercise 6 - Enumeration of microbial cells.
Oct. 14	MID-TERM EXAM WEEK
Oct. 21	Exercise 4 - Mitosis and Meiosis.
Oct. 28	Exercise 7 - DNA Extraction.
Nov. 4	QUIZ 2 (Exercises 4-6) (5%) Exercise 8 - Composition of genetic material.
Nov. 11	Exercise 9 - Restriction enzyme digestion of DNA.
Nov. 18	Exercise 9 - completion.
Nov. 25	FINAL LAB EXAM (15%)