Fall 1996

GRANDE PRAIRIE REGIONAL COLLEGE
BI 1070 A3
INTRODUCTION TO CELL BIOLOGY

Instructor: Dr. Sean Irwin
office - J223
phone - 539-2860 (w)
- 538 -1278 (h)

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 I	15%
Mid-term exam II	20%
Lab. assignments	10%
Lab Quizes	5%
Final lab. exam	15%
Final exam	35%
Total	100%

Office Hours : Monday - 2:00 - 3:00 pm
Wednesday - Cloning and Coffee - 10:00 - 11:00 am
Thursday -1:30 - 2:30 pm

BI 1070 TOPIC OUTLINE

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

Lecture	Topics	Chapter
8	**Midterm I - Oct. 3**	
9	**Eucaryotic cell structure:** - nucleus, ribosomes, endoplasmic reticulum, lysosomes, vacuoles. - cell wall synthesis. - cytoskeleton. - contractility.	7
10	**Eucaryotic cell structure:** - mitochondria, structure and function. - chloroplasts, structure and function.	7
11	**Cellular Respiration:** - ATP. - Redox reactions. - respiration. - Glycolysis.	9
12	**Aerobic respiration:** - Kreb's Cycle. - the electron transport chain and oxidative phosphorylation. - energy utilization.	9
13	**Eucaryotic anaerobic respiration:** - anaerobiasis. - carbohydrate metabolism.	9
	Procaryotic anaerobic metabolism: - fermentation. - anaerobic respiration. - facultative anaerobes.	9
14	**Mitosis and Meiosis .**	11,12
15	**Nucleic acids:** - composition. - complementary base pairing	5, 15
	Eukaryote chromosome organization.	18
16	**DNA replication**	15
17 16	**Transcription:** - RNA-polymerase. - processing of mRNA.	
18	**Midterm II - Nov. 7**	

Lecture	Topics	Chapter
19	**Translation:** - the genetic code - tRNA and codon recognition. - translation at ribosomal level. - post-translational modifications	16
20	**Protein trafficking and targetting:** - peptide signal sequences. - post-translation modification and sorting. - protein secretion.	16
	Mutation.	16
21	**Transcriptional control in Prokaryotes:** - negative control by repression. - negative control by induction. - possitive control.	17
	Transcriptional control in eukaryotes	17, 18
22	**Recombinant DNA - Restriction:** - restriction endonucleases. - mapping restriction fragments.	19
	Recombinant DNA - Cloning: - splicing genes into vectors.	19
23	**Recombinant DNA - Biotechnology:** - expression of cloned genes. - PCR - RFLPs - forensic uses	19
24	**Signal transduction:** - hormones. - pheromones. - second regulators - second messenger systems - steroid hormones. - oncogenes.	41

BI 1070 LAB SCHEDULE FALL 1996

Date	Activity
Sept. 9-13	Exercise 1. Introduction.
Sept. 16-20	Exercise 1. Completion. Exercise 2. Membrane structure and function.
Sept. 23-27	Hand in assignment #1 - Exercise 1. Exercise 3. Cell structure.
Sept. 30-Oct.4	Quiz #1 on Exercises 1-3. Exercise 5. Sugar metabolism in yeast.
Oct. 7-11	Hand in assignment #2 - Exercise 5. Exercise 6. Enumeration of microbial cells.
Oct. 14-18	Midterm exam week.
Oct. 21-25	Exercise 4. Mitosis and Meiosis.
Oct. 28 -Nov. 1	Exercise 7. DNA extraction.
Nov. 4-9	Quiz #2 on Exercises 4-6. Exercise 8. Chemical composition of the genetic material.
Nov. 11-15	Exercise 9. Restriction enzyme digestion of DNA.
Nov. 18-22	Hand in assignment #3 - Exercise 8. Exercise 9. Completion.
Nov. 25-29	Final Lab Exam.