Grande Prairie Regional College

Dept. of Science & Technology

BI 1070
CELLULAR BIOLOGY

COURSE OUTLINE
Fall 1998-99

Instructors

Dr. Georgia Goth
J 222

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J 224

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 procaryotic and eucaryotic 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 in molecular genetic analysis and their application in genetic engineering and biotechnology.

Text-book: 'Biology' 4th Edition, 1993
Neil A. Campbell
Benjamin Cummings Pub. Co., California

Biology 1070 Laboratory 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 at both class and laboratory sessions. Those who chose 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 receive credit for lab reports.

Evaluation:

Mid-term Exam	25%
Lab. Reports	10%
Lab. Quizzes	10%
Final Lab. Exam	15%
Final Exam	40%
TOTAL	100%

TOPIC OUTLINE

Lecture	Topic	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 and Gram -ve) - Archaebacteria and Eubacteria	25
6.	Procaryotic cell structures: - surface structures - motility - internal structures	25
7.	Procaryotic cell structures: - 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/lysogenic cycles)	17
10.	Animal Viruses: - reproductive cycles - viral diseases - viruses and oncogenes - viroids and prions	17

Lecture	Topic	Chapter
11.	Eucaryotic cell structure: - nucleus, ribosomes, E.R. - lysosomes, vacuoles - cell wall synthesis	7
12.	Eucaryotic cell structure: - cytoskeleton - contractility	7
13.	Eucaryotic cell structure: - mitochondria - chloroplasts	7
14.	Cellular respiration: - ATP - Redox reactions - respiration	9
15.	Procaryotic anaerobic metabolism: - fermentation - anaerobic respiration - facultative anaerobes	9
16.	Aerobic respiration: - Glycolysis - Kreb's Cycle - electron transport chain - oxidative phosphorylation	9
17.	Eucaryotic anaerobic respiration: - energy utilization - anaerobiasis - carbohydrate metabolism	9
18.	MID-TERM EXAM	
19.	Mitosis and the Cell Cycle:	11
20.	Meiosis and sexual life cycles:	12
21.	Nucleic Acids: - composition - complementary base pairing	5, 15
22.	Eucaryotic chromosome organization	18
23.	DNA Replication:	15

Lecture	Topic	Chapter
24.	Genes, proteins and the genetic code:	16
25.	Transcription: - RNA-polymerase - processing of mRNA	16
26.	Translation: - tRNA and codon recognition - translation at ribosomal level - post-translational modifications	16
27.	Protein trafficking and targeting: - peptide signal sequences - protein sorting - protein secretion	16
28.	Mutations:	16
29.	Transcriptional control: - negative control by repression - negative control by induction - positive control	17
30.	Recombinant DNA: - restriction endonucleases - mapping restriction fragments	19
31.	Recombinant DNA: - splicing genes into vectors - expression of cloned genes (cDNA)	19
32.	Recombinant DNA: - PCR - RFLP's - uses	19
33.	Signal transduction: - hormones - pheromones - second regulators	41
34.	Signal transduction: - second messenger systems - steroid hormones - oncogenes	41