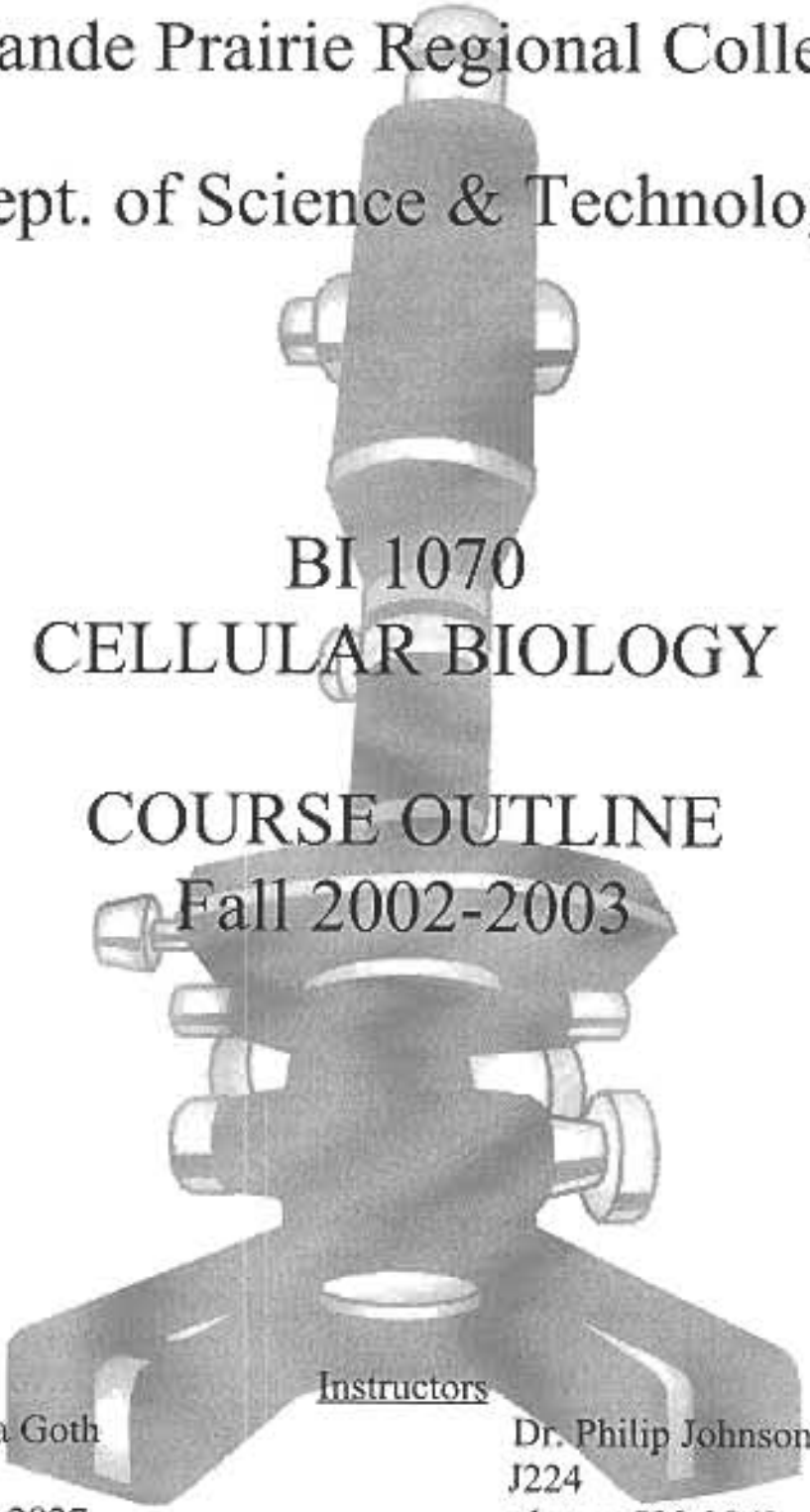
Grande Prairie Regional College

Dept. of Science & Technology



BI 1070
CELLULAR BIOLOGY

COURSE OUTLINE
Fall 2002-2003

Instructors

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Course 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-books: "Biology" (6th edition, 2002)
Campbell, Reese and Mitchell
Benjamin Cummings Pub.
(*Older editions of the text can be used if available*)

Student Study Guide for "Biology" (optional, but useful) (6th ed. 2002)
Martha R. Taylor
Benjamin Cummings Pub.

Biology 1070 Lab Manual (required)

Requirements: Since participation in lectures/laboratories 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 the lab reports.

Evaluation:

Lab. Quizzes	10%
Lab. Reports	10%
Mid-term Exam	20%
Final Lab. Exam	20%
Final Exam	40%
TOTAL	100%

BI 1070 - Topic Outline

TOPIC	Chapter
Macromolecules and inorganic constituents	5
Membrane structure and function: - fluid mosaic model - permeability and transport - procaryotic/eucaryotic differences	8
Procaryotes: - morphology - cell walls (Gram psitive & Gram negative) - Archaebacteria & Eubacteria - cell surface structures - motility - internal structures - genome and genetic exchange - growth and binary fission - growth curves - endospores	27
Viruses: - structure and replication - viral infection - bacteriophage (lytic/lysogenic cycles) - animal viruses - reproductive cycles - viral diseases - viruses and oncogenes - viroids and prions	18
Eucaryotic cell structure: - nucleus, ribosomes, endoplasmic reticulum - lysosomes and vacuoles - cell wall synthesis - cytoskeleton and contractility - mitochondria and chloroplasts - extracellular matrix	7
Introduction to metabolism: - metabolic maps - enzymes and metabolism - control of metabolism	6

TOPIC	Chapter
Cellular respiration: - ATP, Redox reactions, respiration	9
Procaryotic anaerobic metabolism: - fermentation - anaerobic respiration - facultative anaerobes	9
Aerobic respiration: - Glycolysis - Kreb's Cycle - Electron Transport Chain - Oxidative phosphorylation	9
Eucaryotic anaerobic respiration: - energy utilization - anaerobiasis - carbohydrate metabolism	9
Photosynthesis: - Photophosphorylation - Calvin Cycle	10
MID-TERM EXAM	
Mitosis and the Cell Cycle	12
Meiosis and sexual life cycles	13
Nucleic acids: - composition - complementary base pairing	16
Eucaryotic chromosome organization	19
DNA replication	16
Genes, proteins and the genetic code	17
Transcription: - RNA-polymerase - processing of mRNA	17
Translation: - tRNA and codon recognition - translation at the ribosomal level - post-translational modifications	17

TOPIC	Chapter
Protein trafficking and targeting: - peptide signal sequences - protein sorting - protein secretion	17
Mutations	17
Transcriptional control: - negative control by repression - negative control by induction - positive control	19
Recombinant DNA: - restriction endonucleases - chromosome mapping - splicing genes into vectors - expression of cloned genes (cDNA) - PCR, RFLP's - uses of genetic engineering	20
Signal Transduction	11