DOUGLAS COLLEGE

COURSE INFORMATION

DEPARTMENT ENGINEERING SCIENCE DATE MAY 1977

BIO 321	Cell Biology	5
NAME & NUMBER OF COURSE	DESCRIPTIVE TITLE	SEMESTER HOURS CREDIT

CATALOGUE DESCRIPTION:

A study of the ultrastructure and biochemistry of the cell.

COURSE PREREQUISITES: BIO 110 and BIO 210, or permission of the instructor.

COURSE COREQUISITES:

HOURS PER WEEK FOR EACH STUDENT

LECTURE	HRS.	FIELD EXPERIENCE	
LABORATORY	5 HRS.	STUDENT DIRECTED LEARNING	
SEMINAR	2 HRS.	OTHER (SPECIFY)	

TOTAL 7

COLLEGE CREDIT TRANSFER	COLLEGE CREDIT NON-TRANSFER	NON-CREDIT
X		

TRANSFER INFORMATION

EQUIVALENT COURSES

UBC BIO 200 1½ units
SFU BIO 201 3 units
OTHER VVIC Biol (200 level)(1½)

UNASSIGNED CREDIT
(Specify if unassigned within a descipline of a faculty)

G. M. Gilgan
COURSE DESIGNER

Hendrick V. Persad
DEPARTMENT HEAD

DEAN OF CURRICULUM AND INSTRUCTION

PRINCIPAL

(Revised April '72)

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COURSES FOR WHICH THIS IS A PREREQUISITE:	RELATED COURSES:
Nil	Nil

TEXTBOOKS, REFERENCES, MATERIALS (LIST READING RESOURCES ELSEWHERE)

Wolfe, S.L. Biology of the Cell, Wadsworth, 1972.

COURSE OBJECTIVES, CONTENT, METHOD, EVALUATION:

OBJECTIVES

The student will be able to

1. identify organelles in electronmicrographs and discuss their functions.
2. discuss the function of the cell membrane and current theories of transport across the membrane.
3. describe the chemical composition of protoplasm.
4. describe the structures of DNA and RNA and discuss the manner in which replication, storage and transfer of information occurs.
5. describe the structure of proteins and discuss how the structure confers specificity.
6. explain the mechanism of action and specificity of enzymes in terms of their properties as proteins and discuss the factors influencing enzyme action.
7. define the role of high-energy phosphate compounds as common intermediates in the coupling of high-energy phosphate donors with low-energy phosphate acceptors and their importance in energy storage and transfer within the cell.
8. discuss the interrelationships between electron transport, oxidative phosphorylation and metabolic processes and their respective roles in the conservation of respiratory energy as ATP.
9. describe the role of chloroplasts in energy production and fixation in the cell.
10. evaluate the experimental evidence that has contributed to our understanding of the roles of RNA, the ribosomes and other cellular components in the synthesis of proteins.
11. discuss the methods by which enzymatic and structural regulation of cell function occur.

CONTENT

Cell Theory and Cell Ultrastructure
Cytoplasmic and nuclear organelles - their structure and function

Cell Membrane
Membrane structure, permeability properties, and transport across the membrance.

Nature of Protoplasm
Elements and compounds (water, inorganic salts and organic compounds - carbohydrates, fats, proteins, enzymes, nucleic acids)

Nucleic Acids
Structure of DNA and its biological significance
Structure of RNA and its biological function
Types of RNA.

Content (cont.)

Proteins
Size, shape and structure

Enzymes
Protein nature; enzyme-substrate complex; specificity of enzyme action; factors affecting enzyme action.

High Energy Phosphate Compounds
Especially ATP, UTP, CTP, GTP and phosphocreatine
Importance of ATP as a phosphorylating agent, an adenylating agent, and as a messenger between endergonic and exergonic reactions.

Mitochondria and Cellular Respiration
Electron transport, oxidative phosphorylation and ATP formation. Metabolic pathways. Control of respiration

Chloroplasts and the Fixation of Energy
Light and dark reactions of photosynthesis

Ribosomes and the Utilization of Information
Nature of ribosomes and the mechanism of protein synthesis

Cell Differentiation and Control of Cell Structure and Function

METHOD

Information content is integrated with laboratory experiments and demonstrations using the audio-tutorial system of instruction. For more information regarding the A-T system of instruction, refer to the booklet Biology at Douglas College, which is appended.

EVALUATION

Information content is evaluated orally or in written form on a weekly basis. One comprehensive exam to test cumulative lower-order cognitive skills (comprehension and recall) and one comprehensive exam to test higher-order cognitive skills (analysis, synthesis and evaluation) are administered at the end of each semester. An oral presentation on a topic of the student's own choice is required of all students expecting to attain a grade of A or B. For more detailed information refer to BIO 321 Evaluation System, which is appended. In addition to weekly evaluations and student presentations, seminar sessions are used to solve course-related problems and to convey course-related information.