



COURSE OUTLINE

BIOL 201

CELL BIOLOGY

**45 HOURS LECTURE, 39 HOURS LAB
3 CREDITS**

PREPARED BY: Tara Stehelin

DATE: May 1, 2015

APPROVED BY: _____

DATE: _____

APPROVED BY ACADEMIC COUNCIL: July 2014

RENEWED BY ACADEMIC COUNCIL: _____

YUKON COLLEGE

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Course Outline prepared by Tara Stehelin, December 29, 2014.

Yukon College
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Y1A 5K4



DIVISION OF APPLIED SCIENCE & MANAGEMENT

Cell Biology
3 Credit Course
Fall, 2015

CELL BIOLOGY

INSTRUCTOR: Tara Stehelin B. Sc., M.Sc., PhD Candidate

OFFICE HOURS: Fridays 11:00 – 12:00, or by appointment

OFFICE LOCATION: A2806

CLASSROOM: A2204

E-MAIL: tstehelin@yukoncollege.yk.ca

TIME: M/W 10:30 – 12:00

Lab: Thur 9:00 – 12:00

TELEPHONE: (867)668-8898

DATES: September 9 – December 18, 2015

COURSE DESCRIPTION

This core second-year biology course examines the structure and function of cells and cell membranes in detail. Students gain an understanding of processes such as cell mobility, the cell cycle and cellular reproduction, vesicular transport, endo- and exocytosis, and membrane transport. Cellular genetics (cytogenetics), homeostasis of the cell, and the evolution of cell organelles will also be examined. Students will gain understanding of cellular flow of information from genetic code to protein and the importance of this flow in cellular processes. Students will gain hands-on experience in basic cellular biology lab techniques, such as various microscope, specimen staining, and separation techniques.

PREREQUISITES

Successful completion of both Biology 101 and 102 (grade of “C-” or higher in both) OR equivalent. A “C-” or higher in CHEM110 or other first-year Chemistry course.

EQUIVALENCY OR TRANSFERABILITY

In progress

LEARNING OUTCOMES

Upon successful completion of this course students will be able to

- explain the unifying and separating features of prokaryotic and eukaryotic cells and the

- implications of these features in evolution and diseases that impact humans
- identify and explain the structure and function of all organelles in eukaryotic cells with an evolutionary approach
 - explain molecular structure and diversity of the four types of molecules important to life: carbohydrate, lipid, protein, and nucleic acids, as well as the importance of water and how these molecules facilitate cellular function
 - describe how organelles and membranes work individually and together to achieve homeostasis of the cell
 - outline and compare theories of evolution of organelles and metabolism.
 - demonstrate lab techniques relating to cellular biology such as various microscope and staining techniques of both live and preserved specimens and separation techniques (lab outcome).

DELIVERY METHODS

Material will be presented in two lectures and one lab session per week. Attendance in the laboratory is mandatory. **Students must pass the lab and lecture portions independently.** Students will be expected to read and understand scientific articles relating to course material.

COURSE FORMAT

Two 1.5 hour-lectures per week and one 3-hour lab per week

ASSESSMENTS

Attendance

Attendance is mandatory in laboratory sessions and strongly recommended in lectures. Students who do not attend a lab session will receive a zero for that day's activities unless the instructor is informed of the absence before the start of that class.

Participation

Students are encouraged to engage in discussion relating to the course topics, especially during lab sessions. A portion of lab assignment marks will be related to a student's participation in classroom discussion and presentations.

Assignments

Lab Assignments: Assignments are given during lab sessions and graded on the basis of understanding and applying principles involved as well as the correctness of answers to solutions. For discussion and presentations marks are awarded for appropriate involvement in classroom discussions or clearly presented results of lab exercises.

Tests

On lecture material: Two midterms on lecture material will be given during regularly scheduled class time. The final examination will be held at the end of the term and covers material from the entire course, although it will focus mostly on the last portion of material. The examination date will be announced as soon as confirmed by administration.

On lab material: Two lab quizzes will be given during regularly-scheduled lab time. A portion of lab assignment marks (the equivalent of one week's lab mark) will be assigned based on appropriate participation in classroom discussions and short presentations on results of lab exercises.

EVALUATION

On lecture material:	2 Midterms worth 20% each	40%	
	Final exam	25%	
Total Lecture:			65%
Laboratory	Assignments/participation	17.5%	
	Quizzes	17.5%	
Total Laboratory			35%
Total		100%	100%

REQUIRED TEXTBOOKS OR MATERIALS

Becker's World of the Cell, 8th edition" (or 7th). 2012. Hardin, J., G. Bertoni and L. J. Kleinsmith, Pearson Benjamin Cummings. San Francisco, CA, USA.

With supplemental material from:

Essential Cell Biology, third edition. 2010. Alberts, B., D. Bray, K. Hopkin, A. Johnson, J. Lewis, M. Raff, K. Roberts, and P. Walter. Garland Science, Taylor and Francis Group, Abingdon, OX, UK.

Laboratory materials will be handed out during the first lab session in the form of 3-hole punched pages.

ACADEMIC AND STUDENT CONDUCT

Information on academic standing and student rights and responsibilities can be found in the Academic Regulations:

http://www.yukoncollege.yk.ca//downloads/Yukon_College_Academic_Regulations_and_Procedures_-_August_2013_final_v1.pdf

Plagiarism

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the College.

YUKON FIRST NATIONS CORE COMPETENCY

Yukon College recognizes that a greater understanding and awareness of Yukon First Nations history, culture and journey towards self-determination will help to build positive relationships among all Yukon citizens. As a result, to graduate from ANY Yukon College program, you will be required to achieve core competency in knowledge of Yukon First Nations. For details, please see www.yukoncollege.yk.ca/yfnccr.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon College Academic Regulations (available on the Yukon College website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or lassist@yukoncollege.yk.ca.

TOPIC OUTLINE/SYLLABUS

UNIT	TOPIC	WEEK
Introduction	Preview of the cell, cell theory, origins, history and modern cell biology	1
Chemistry of the Cell	Carbon, water	2
	Synthesis of polymers and macromolecules	
	Macromolecules in the cell, formation and function	3
	Nucleic acid, amino acids protein structure and formation	
	Lipid bilayers, membrane proteins	
Biological flow of information from DNA to protein	Transcription of DNA to RNA Translation of RNA to protein	4
<i>Midterm I</i>		**** OCT 5 th ****
Energy Flow in the cell	Enzymes	5
Membranes: structure, function, diversity, mosaic	Transport across membranes (passive and active) Homeostasis, membrane potential	6
Mitochondria and Chloroplasts	Endosymbiosis	7
The Endomembrane System	ER structure, vesicle formation, Golgi apparatus structure and function secretion, exo- and endocytosis lysosomes	8-9
<i>Midterm II</i>		***NOV 9 ***
Cytoskeleton	Microfilaments	10
	Intermediate filaments, microtubules, spindle formation	11

The Cell Cycle	12-13
Checkpoints, controls, growth factors	
Interphase, DNA replication	
Mitosis, cytokinesis	
Review	Last class

Final exam

Lab Topic Outline

Lab 1 Introduction to the lab, safety, microscopes and measurements, Introduction to the cell

Lab 2 Cells and cell organelles

Lab 3 Measurement of protein content of cells

Lab 4 Homogenization and fractioning

Lab 5 ***Lab Quiz #1***Oct. 15th
Cell Behavior

Lab 6 Cell cultures

Lab 7 Purification of mitochondria part I

Lab 8 Purification of mitochondria part II

Lab 9 Isolation of chloroplasts
Cytochemical methods

Lab 10 *****Lab Quiz #2*****Nov. 19th