



# Grande Prairie Regional College

**School of Business**

**Department: Academic Upgrading**

COURSE OUTLINE – WINTER 2006

## **BI 0120 - Biology Grade 11 Equivalent 5 (4-0-2) HS**

**Instructor** Nancy Campbell

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**Office** Jan 4 – Feb 17, M-F, 2:30 – 3:10

**Hours** Feb 27 – Apr 13, M-F, 1:00 –  
2:00

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### **Prerequisite(s)/corequisite(s):**

(BI0110, CH0110 and EN0120 placement) or (Science 10 with a grade of 65% or higher and EN0120 placement)

### **Required Text/Resource Materials:**

Krogh, *Biology A Guide to a Natural World*, third edition

### **Other supplies:**

Other supplies you will need include a binder, lined paper, unlined white paper, computer paper, pencil, calculator, stapler, and lab coat (optional).

Many resources for this course, including the lab manual, are accessed through Blackboard, a computer-based course management system. You may access Blackboard via any computer with an Internet link. If you do not have a personal computer, you may sign in to use the computers in A205 during daytime hours, or in the library during evening and weekend hours.

### **Description:**

Photosynthesis, and flow of energy and cycling of matter through the ecosystem will be discussed. Cellular respiration, respiration, digestion, circulation and defense as related to the human system will be analyzed.

**Delivery Mode(s):**

BI0120 is lecture-based. Furthermore, the course has a lab component. The course is supplemented with resource material offered on Blackboard.

**Credit/Contact Hours:**

BI0120 is a 5-credit course including 4 hours of class, and 2 hours of lab per week.

***Session Details:***

January 4, 2006 – April 13, 2006

A final exam is scheduled by the Registrar's office and could be scheduled anytime, up to and including April 25, 2006.

***Course Schedule:*** Dates for tests, exams, labs, and assignments will be announced in class and entered into the calendar in Blackboard

***Lecture Schedule:*** M - R: 8:30am – 9:20am, Room: B201

***Lab Schedule:*** Friday, 8:00am – 9:50pm, Room: J126 or A205

**Objectives:**

The BI0120 course has been designed to provide you with an understanding of biological concepts, principles, and social issues. The program of studies has biology lab and computer lab components to help build your skills in the use of scientific equipment and computers. The course has two themes: the flow of energy and the recycling of matter. Ecology, and human anatomy and physiology of selected systems are explored.

The course is divided into four units:

***Unit 1:*** Circulatory and Respiratory Systems

***Unit 2:*** Digestive and Excretory Systems

***Unit 3:*** The Biosphere

***Unit 4:*** Energy Flows and Matter Cycles

A course syllabus, which lists all the course objectives, is attached.

**Transferability:**

This course is equivalent to the Alberta Learning Biology 20 curriculum, and is listed as such in the Alberta Transfer Guide.

**Grading Criteria:**

***Evaluation:***

Tests .....	40%
Labs .....	15%
Assignments.....	5%
Midterm .....	20%
Final .....	20%

***Tests:*** At the end of each unit is a unit test. Each test is worth 10%.

***Exams:*** A **midterm exam** will be written at the end of Unit 2. It will cover the content discussed in Units 1 & 2. A **final exam** will be scheduled during the final exam time. It will cover the content discussed in Units 3 and 4. If you are absent from an exam, you **MUST** provide a doctor's certificate that explains your absence for that particular time. Only then will an alternate time be scheduled for you to write a **different** exam.

***Assignments and Lab Reports:***

All labs are weighted equally.

Final assignment grade is calculated using raw scores.

If you are late for a lab, you might not be permitted to do the lab as important safety concerns are always addressed at the beginning of each lab period. If you miss a lab, you will not have the opportunity for a make-up lab. You automatically receive a grade of 0 for that lab.

**Statement on Plagiarism and Cheating:**

The instructor reserves the right to use electronic plagiarism detection services. Although you work together in pairs in the lab, you are to write separate reports, which are your own work. Electronic devices, other than simple calculators, are not allowed into tests or exams.

Grades will be assigned on the Letter Grading System.

**Academic Upgrading Department  
Grading Conversion Chart**

Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A <sup>+</sup>	4	90 – 100	EXCELLENT
A	4	85 – 89	
A <sup>-</sup>	3.7	80 – 84	FIRST CLASS STANDING
B <sup>+</sup>	3.3	76 – 79	
B	3	73 – 75	GOOD
B <sup>-</sup>	2.7	70 – 72	
C <sup>+</sup>	2.3	67 – 69	SATISFACTORY
C	2	64 – 66	
C <sup>-</sup>	1.7	60 – 63	
D <sup>+</sup>	1.3	55 – 59	MINIMAL PASS
D	1	50 – 54	
F	0	0 – 49	FAIL

**Classroom Department:**

**AUD STUDENT CLASSROOM DEPARTMENT GUIDELINES**

Philosophy: This is an adult education environment; students are expected to show respect for others. Students are also learning skills to prepare them for the work environment.

Preamble: Even though the department is empathetic to the needs of our students, we have determined over the years that certain activities are not conducive to an

atmosphere of learning. Therefore, we ask the cooperation of all of our students in several areas of classroom deportment.

The following guidelines assist all of us in maintaining an adult learning environment with “respect for the rights of other members of the College community” (from the Student Rights and Responsibilities of the College calendar).

1. Please refrain from unnecessary talking in class (“visiting”, social discussions). Please ask your instructor for information or clarification when you have a question. Other students do not necessarily have the correct information.
2. Turn off your cell phone during class time. Parents who are expecting phone calls from the day care or from schools should see Lani in the main office and complete a form. Lani will then find you in class if any calls come in.

In case of other emergencies, students can use a phone that vibrates, but does not ring. However, please leave the class before answering the phone. The loud talking in class is disruptive to other students.

3. Do not bring children to class with you. This is an adult learning environment and it is not an appropriate setting for children.
4. Eating, drinking coffee, etc are allowed only on a limited basis and if the following are observed:
  - If you must bring food or drink to class, purchase it during your break so that you are coming to class on time and staying for the duration of the class
  - Clean up all garbage, crumbs, etc. from the area where you were eating/drinking
  - Your eating or drinking should not disrupt your learning activities and progress or the learning activities and progress of others in the class
5. As per the student responsibilities section in the College Calendar, you are expected to “arrive on time and remain for the duration of scheduled classes and related activities.”

## **AUD EXAM/ATTENDANCE POLICIES**

As per the College calendar, students are responsible to “write tests and final examinations at the times scheduled by the instructor or the Office of the Registrar”.

### **Attendance**

If you miss more than 15% of classes per semester in any course, you may be debarred from the final exam for that course.

### **Late Exams**

1. In order to be given the opportunity to write an exam after the due date, the student must phone the instructor on the morning of the absence and be given permission to write the test at a later date. If the instructor is unavailable, the student should leave his/her home phone number or the number where the instructor can reach the student. This requirement also applies to quizzes and assignments.
2. If permission to write a late exam is given, the late exam (or quiz or assignment) will be docked a minimum of 10 percentage points per day of lateness. (This means 10 or more points off the mark the student achieves on the test/assignment.)
3. Once the test/quiz/assignment has been handed back to the class, there is no opportunity for a late write or hand-in. The student will be assigned a grade of ‘0’ for that test/quiz/assignment.

**BI0120**  
**Course Syllabus**  
**2006 Winter Semester**

**Introduction: (3 days)**

Chapter 25: 534 - 542

1. Outline the hierarchy of life, and define cell, tissue, organ, and organ system.
2. Discuss the various types of tissues.
3. Categorize the three types of muscle tissue
4. Label a diagram of illustrating the placement of body organs.
5. Identify the human bodies' cavities and label on a diagram
6. Name 10 organ systems, and give a general function for each.

**Unit 1:                   Circulatory and Respiratory Systems (15 days)**

The human organism's circulatory system transports energy and matter to maintain the equilibrium among the body systems as well as between the organism and its external environment.

Chapter 28: 609- 615

1. Identify the functions of the circulatory system.
2. Label the parts of the heart and its major vessels.
3. Trace the path of blood into and out of the heart.
4. Discuss heartbeat and cardiac cycle.
5. Relate the structures of the heart to their functions.
6. Discuss cardiac output and stroke volume.
7. Outline the control of heartbeat. Discuss heart sounds.
8. Describe the structure and function of arteries, arterioles, capillaries, venules, and veins.
9. Trace the path of blood through the pulmonary system, and the various portions of the systemic system.
10. Indicate normal blood pressure, factors affecting blood pressure, and causes of hypertension.

11. Describe the function of various components of blood: plasma, erythrocytes, leukocytes, and platelets.
12. Identify the functions of the lymphatic plays in circulation and immunity.
13. List and briefly explain at least five circulatory disorders.

*The human organism's respiratory system exchanges energy and matter with the environment.*

Chapter 28: pages 616 - 618

1. State the general functions of the respiratory system.
2. Discuss the structure and function of the following respiratory structures: nostril, nasal cavity, pharynx, epiglottis, larynx, trachea, bronchi, bronchioles, alveoli, lungs, and pleural membrane. Label the above parts on a diagram of the respiratory system.
3. Describe the mechanism of breathing (inspiration and expiration).
4. Discuss external and internal respiration and the transport of respiratory gases in the circulatory system.
5. Discuss how breathing is controlled.
6. Explain different respiratory volumes and in the lab determine your own values.
7. List and explain at least three respiratory disorders.

<b>Evaluation for Unit 1</b>		
<b>Activity</b>	<b>Due Date</b>	<b>Grade</b>
Lab: Use and Care of the Light Microscope		
Lab: Circulation		
Lab: Breathing and Gas Exchange		
Unit 1 Test		

**Unit 2: Digestive and Excretory Systems (14 days)**

*The human organism's digestive system exchanges energy and matter within the environment.*

Chapter 6: pages 125 – 128  
 Chapter 3: pages 46 – 57  
 Chapter 28: pages 618 - 624

1. Define enzyme, substrate, product, energy of activation, and coenzyme.
2. Identify two theories of enzymatic function - lock and key, and induced fit. Discuss and illustrate the lock and key theory.
3. Relate how concentration, competitive inhibition and denaturation affect enzyme action.
4. Explain and apply optimum pH and optimum temperature to enzymatic reactions.



5. Define metabolism and metabolic pathway. Categorize reactions into two groups - anabolic and catabolic.
6. Differentiate between synthesis and hydrolysis.
7. Identify carbohydrates, in general, and monosaccharides, disaccharides, and polysaccharides specifically.
8. Identify glycerol, fatty acids, and lipids.
9. Identify amino acids, dipeptides, polypeptides, and proteins.
10. Suggest testing solutions for determining the presence of starch, reducing sugars, fats, and proteins.
11. Describe the structure and functions of the mouth and its accessory organs in mechanical and chemical digestion.
12. Describe the structure and function of the esophagus in digestion.
13. Describe the structure and function of the stomach in mechanical and chemical digestion.
14. Describe the structure and function of the small intestine and its accessory organs in mechanical and chemical digestion.
15. Relate the structure of the small intestine to its function.
16. Illustrate the biofeedback mechanism used to maintain an alkaline pH in the small intestine.
17. Outline the functions of the large intestine in the role of digestion.

*The human organism's excretory system exchanges energy and matter with the environment.*

Chapter 28: pages 624 – 629

1. List the various excretory organs and their contribution to the excretory system. State the functions and importance of the excretory system
2. Indicate the functions of each of the following urinary tract structures: kidneys, ureters, bladder, and urethra. Label the parts on a diagram.
3. Describe the following macroscopic kidney structures: cortex, medulla, pyramids, renal pelvis, renal artery, and renal vein. Label the parts on a diagram.
4. Describe the following macroscopic kidney structures: cortex, medulla, pyramids, renal pelvis, renal artery, and renal vein. Label the parts on a diagram.
5. Draw and fully label the nephron and its circulatory pattern.
6. Outline the process of urine formation in the kidney by discussing the role of each part of the nephron. Indicate the composition of urine.
7. Describe how the kidney maintains blood volume and blood pH.

8. List and describe at least three excretory system disorders.

Evaluation for Unit 2		
Activity	Date Due	Grade
Lab: Compounds and Indicators		
Lab: Enzymes		
Lab: Digestion		
Lab: Excretion (time permitting)		
Unit 2 Test		

### **MIDTERM EXAM**

#### **Unit 3: The Biosphere (14 days)**

*Energy and matter cycle through the biotic components of the biosphere.*

Chapter 31: Pages 678 – 679

Chapter 32: Pages 718 – 723

1. Define ecology.
2. Distinguish between abiotic and biotic factors.
3. Using the hierarchy of life chart, define and give examples of each of the following: population, community, ecosystem and biosphere.
4. Define and give examples of autotrophs and heterotrophs.
5. Classify heterotrophs according to the way they get their food: herbivores, carnivores, omnivores.
6. Draw and interpret trophic levels, food chains and food webs. Include terms such as: producers; consumers; first, second, and third trophic levels; primary, secondary and tertiary consumers; predator and prey; detritus feeders.
7. Draw and explain three ecological pyramids: numbers, biomass, and energy.
8. Define and give examples of biological magnification.

*The cycling of matter through the biosphere perpetuates its steady state equilibrium*

Chapter 32: pages 710 – 718

1. Explain how water is cycled through the biosphere.
2. Identify the properties of water and explain their relevance to the hydrologic cycle.
3. Summarize the carbon cycle and discuss the impact of human activities on this cycle.
4. Summarize the nitrogen cycle and discuss the impact of human activities on this cycle.
5. Summarize the phosphorous cycle and discuss the impact of human activities on this cycle.
6. Determine your personal carbon dioxide emissions.

*The biosphere is composed of a diversity of biomes each with distinctive biotic and abiotic factors.*

Chapter 32: pages 723 - 735

1. Summarize the distribution of solar energy as it strikes the earth.
2. Suggest reasons why the distribution of solar energy is not equally distributed across the whole surface of the earth.
3. Discuss the importance of an intact ozone layer.
4. Define albedo effect and predict possible consequences of changing environmental conditions on the albedo effect and how these changes in turn affect environmental conditions.
5. Define biome.
6. Name seven terrestrial biomes, state their approximate locations and give their predominant abiotic and biotic factors.

<b>Evaluation for Unit 3</b>		
<b>Activity</b>	<b>Due Date</b>	<b>Grade</b>
Assignment: Carbon Dioxide Levels		
Assignment: Cycles		
Assignment: Biomes		
Unit 3 Test		

**UNIT 4: Energy Flows and Matter Cycles (11 days)**

*The energy currency of living things is ATP.*

Chapter 6: pages 120 – 124

1. State the full name for ATP. Draw and explain the ATP cycle.
2. Define oxidation and reduction. Illustrate and explain the oxidation and reduction cycles for NADP.

*Respiration releases potential energy from organic compounds*

Chapter 7: pages 132 - 148

1. Illustrate the NAD, and FAD oxidation and reduction cycles.
2. Identify respiration as a metabolic pathway but state the general equation for respiration in both words and chemical formulas.
3. Name the four main steps of aerobic respiration and indicate where each of these four steps occurs.
4. Give the equation for glycolysis in words. Indicate the number of carbons in the substrate and product. State the number of ATP needed to start the reaction, and give the gross and net ATP produced.
5. Give the equation for transition in words and indicate the number of carbon atoms in the substrate and product.
6. Draw the Krebs cycle and indicate the compounds involved in the cycle. Indicate the number of carbons in each part of the cycle. Show the placements of ATP, NADH<sub>2</sub>, FADH<sub>2</sub>, and CO<sub>2</sub> production. Indicate the number of times the Krebs cycle must turn for each glucose molecule.
7. Discuss the electron transport system. Indicate the number of ATP produced by one molecule of NADH<sub>2</sub> and one molecule of FADH<sub>2</sub>.
8. Prove the general equation for aerobic respiration.
9. Summarize anaerobic respiration.
10. Compare anaerobic respiration in plants to anaerobic respiration in animals.
11. Compare aerobic and anaerobic respiration.

*Photosynthesis stores energy in organic compounds.*

Chapter 8: pages 152 - 167

1. Identify photosynthesis as a metabolic pathway but state the general equation for photosynthesis in both words and chemical formulas.
2. Discuss the structure of chloroplasts, and explain how the pigments in the chloroplasts absorb light.
3. Identify the two main steps of photosynthesis and state generally what happens in each of the steps and indicate where each of the steps occurs in the chloroplast.
4. Outline the steps of the non-cyclic, light-dependent reactions of photosynthesis.
5. Outline the steps of the light-independent reactions (Calvin-Benson cycle) of photosynthesis.
6. State three functions of PGAL.

*Photosynthesis and Respiration processes are linked.*

1. Indicate the linkages between photosynthesis and respiration.
2. Predict what impact the destruction of rainforest may have on this linkage.
3. Compare photosynthesis and respiration.

<b>Evaluation for Unit 4</b>		
<b>Activity</b>	<b>Due Date</b>	<b>Grade</b>
Assignment - Cellular Respiration		
Assignment - Photosynthesis		
Unit 4 Test		

**FINAL EXAM** (Units 3 and 4 only)