GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF ACADEMIC DEVELOPMENT
COURSE OUTLINE

BIOLOGY 130
Fall 1988

INSTRUCTOR: Keith Roscoe

OFFICE: Portable A, Office 1

PHONE: 539-2095 (office); 538-3396 (home)

OFFICE HOURS: 1. by appointment (best way)
or
2. 9-10, 11-12, Monday to Friday

EQUIVALENCY: Biology 30

TEXTBOOK: Inquiry Into Life, 5th Ed., Sylvia S. Mader

RECOMMENDED: Study Guide to Inquiry Into Life

COURSE GOALS:

This course is designed to provide students with an understanding of biological concepts, principles, and biology-related social issues, and to develop laboratory and other scientific skills. The course mainly deals with cell structure and function, and human physiology (structure and function of the human).

ATTENDANCE AND LATENESS:

Regular attendance is expected from all students and is crucial for passing the course. Students who miss classes will soon find themselves falling behind and failing. Note that students missing 20% or more of classes will not be permitted to write the final exam.

Lateness will not be tolerated. Classes start at the stated times, so please arrive a few minutes early.

TESTS AND EXAMS:

There will be a test every second week, covering the previous two week's material. There will also be several "quickie quizzes" at intervals between the tests. Absence from quizzes or exams will result in a mark of 0 for that quiz or exam unless previous arrangement is made with the instructor when absence is for medical or other legitimate reasons.

ASSIGNMENTS AND LAB REPORTS:

Assignments and lab reports are due on the dates announced in class. Late penalties will be awarded as follows:

10% per day late (up to a maximum of 3 days late; after 3 days late: 0)

PROJECTS:

Students have a choice of several options for their project mark (10% of final grade): Written research project, oral presentation, video presentation, panel, debate, guest interview, teach a class, role playing. Detailed information and guidelines for these options are available.

LABS:

There will be nine labs during the course, starting in the second week of the semester. This important component of the course introduces basic laboratory skills and problem-solving and reinforces concepts introduced in lecture. A lab coat is optional for biology labs.

Attendance is compulsory for labs. Please note that missing labs will reduce your grade considerably. A lab report is required for the first eight labs.

LAB SCHEDULE (FALL 1988)

Biology 130 X2: Monday, 1200 - 1400, F133

LAB	TOPIC	DATES
1.	Diffusion and Osmosis	Sept. 19
2.	Carbohydrates, Lipids, Proteins	Sept. 26
3.	Enzymes and Digestion	Oct. 3
4.	Circulation	Oct. 17
5.	Breathing & Gas Exchange	Oct. 31
6.	Fetal Pig Dissection	Nov. 17
7.	Excretion	Nov. 14
8.	Coordination I	Nov. 21
9.	Coordination II	Nov. 28

EVALUATION: The stanine grading system is used.

Description	Stanine	Percentage Equivalence
Outstanding	9	90 - 100
Excellent	8	80 - 89
Good	7	72 - 79
Good	6	65 - 71
Pass	5	57 - 64
Pass	4	50 - 56
Fail	3	45 - 49
Fail	2	26 - 44
Fail	1	0 - 25

Evaluation Breakdown*:

Tests	20
Lab	20
Midterm Exam	15
Project	10
Floating Mark**	5
Final Exam	30
	100

* This evaluation scheme is subject to negotiation between the class and the instructor at the beginning of the semester.

** (Floating Mark = participation, attendance, attitude)

LEARNING OBJECTIVES:

These learning objectives are intended to be a clear statement of the content you are expected to learn. Learning objectives should help you to organize your note-taking, text-reading, daily study/review, and exam preparation. All tests and exams will be based on these objectives, but the emphasis will be on understanding and application rather than rote memorization.

Unit 1: Cell Structure and Function (Text reference: Chapters 2 & 3)

1. Summarize the cell theory.

2. Distinguish between eucaryotic and procaryotic cells.

3. Describe the structure and function of the following cell components: plasma membrane, cytoplasm, nucleus, mitochondria, lysosomes, centrioles, vacuoles, endoplasmic reticulum, ribosomes, Golgi Apparatus, microfilaments and microtubules, vacuoles, vesicles.

4. Label the above cell structures on a diagram or photomicrograph.

5. Define: organelle, selectively permeable membrane.

6. Define and explain: diffusion, concentration gradient.

7. State and explain the factors affecting diffusion.

8. Define and explain: osmosis, osmotic pressure.

9. Define: hypotonic, hypertonic, isotonic.

10. Predict the result of placing animal or plant cells in solutions at various tonicities.

11. Define and explain: facilitated transport, protein carrier, active transport.

12. Define and explain: endocytosis, pinocytosis, phagocytosis, exocytosis.

13. State the significance of active transport, endocytosis and exocytosis in cell function.

Unit 2: Cell Metabolism (Text Reference: Chapter 5)

1. Define: metabolism, metabolic pathway.

2. Define: enzyme, substrate, active site, energy of activation, coenzyme.

3. Describe the lock and key theory of enzyme action.

4. Describe factors affecting enzyme action: concentration, competitive inhibition, denaturation.

5. Describe the role of ATP in metabolism.

6. Write the overall equation for aerobic cellular respiration.

7. Describe the three metabolic sub-pathways of cellular respiration and their contribution to ATP production: glycolysis, Krebs Cycle, respiratory chain (not in great deal - main points only)

8. Describe the utilization of other molecules (fats, amino acids) as energy sources in cellular respiration, and the connections between the metabolism of fats, carbohydrates and proteins (main points only).

9. Compare aerobic respiration and anaerobic respiration (fermentation).

Unit 3: Human Organization (Text Reference: Chapter 8)

1. Describe the structure and function of the basic tissue types: epithelial, connective, muscle, and nervous.

2. Distinguish between organs and organ systems.

3. Name the major organ systems and describe the functions of each.

4. Name and locate the major body cavities and list major organs found in these cavities.

5. Define homeostasis and explain its importance.

6. Give examples of homeostatic mechanisms involving negative feedback.

Unit 4: Nutrition and Digestion (Text Reference:Chapters 1 & 9)

Chapter 1

1. Define: unit molecule, synthesis, hydrolysis.

2. Identify the structural differences between proteins, carbohydrates and lipids.

3. State the biological roles of proteins, carbohydrates and lipids.

Chapter 9

4. State the general functions of the digestive system.

5. Define digestion.

6. Describe the structure and function of the following digestive system components: mouth, esophagus, stomach, small intestine, large intestine, anus.

7. Describe the structure and function of the following digestive system accessory structures: salivary glands, liver and gall bladder, pancreas.

8. Describe some common ailments or malfunctions of the digestive system.

9. Name the major digestive enzymes and describe factors which affect their activity.

10. Distinguish between digestion and absorption of nutrients.

11. Describe the nutritive roles of the four major classes of nutrients: proteins, carbohydrates, lipids, vitamins and minerals.

Unit 5: Circulation (Text Reference: Chapters 10 & 11)

1. State and explain the general functions of the circulatory system.

2. Describe the structure and function of arteries, veins and capillaries.

3. Describe the structure and function of the heart and its major blood vessels.

4. Trace the path of the blood through the heart.

5. Discuss the heartbeat and control of the heart.

6. Distinguish between the pulmonary and the systemic systems.

7. Describe the nature of blood pressure, factors affecting blood pressure, and nature and causes of hypertension.

8. Identify the structure and function of the lymphatic system.

9. Describe the nature and causes of common circulatory disorders.

10. Describe the structure and function of the following components of blood: plasma, red blood cells, white blood cells, platelets, plasma, proteins, gases, nutrients and other plasma components.

11. Describe the transportation and exchange of gases and other molecules in the circulatory system.

12. Outline the process of blood clotting.

Unit 8: Breathing and Respiration (Text Reference: Chapter 13)

1. State the general functions of the respiratory system.

2. Identify the structure and function of the following respiratory system structures: nasal cavity, pharynx, epiglottis, trachea, bronchi, bronchioles, alveoli, pleural membranes.

3. Label the above structures in a diagram of the respiratory system.

4. Describe the mechanism of breathing in humans.

5. Explain how gas exchange (external and internal respiration) occurs in the body.

6. Describe the role of hemoglobin and blood plasma in gas exchange and gas transport.

7. State how breathing is controlled in humans.

8. Identify the effects of smoking on the respiratory system and general health.

Unit 7: Excretion (Text Reference: Chapter 14)

1. State the functions and importance of the human excretory system.

2. Summarize the role of the skin, liver, lungs and intestine in excretion.

3. Identify the structure and function of the following excretory system parts: kidneys, ureters, bladder, urethra.

4. Describe the structure and function of the following kidney structures: medulla, cortex, pyramids, renal pelvis, renal artery and vein.

5. Label the above excretory system and kidney structures in given diagrams.

6. Outline the process of urine formation in the kidney nephron.

7. Describe the regulation of blood volume by aldosterone and antidiuretic hormone and the regulation of blood pH.

8. Discuss health applications of the excretory system: kidney infections, dialysis, urine analysis, kidney stones.

Unit 8: Coordination I: Nervous Control (Text Reference: Chapters 15 & 17)

1. Summarize the functions of the nervous system.

2. Identify the two major divisions of the nervous system.

3. Describe the structure and function of the three major types of neurons.

4. Explain the mechanism of a nerve impulse.

5. Define: nerve impulse, resting potential, action potential, upswing, depolarization, downswing, repolarization.

6. Define the following: synapse, neurotransmitter, refractory period, reaction time, all or none response.

7. Explain the role of the following substances in transmission of nervous impulses: acetylcholine, noradrenalin, acetylcholinesterase.

8. Distinguish between the different types of nerves of the peripherial nervous system: sensory, motor or mixed nerves; cranial and spinal nerves.

9. Define and explain a reflex arc.

10. Summarize the structure and function of the autonomic nervous system and its divisions, the sympathetic and parasympathetic nervous systems.

11. Describe the structure and functions of the spinal cord.

12. Describe the structure and function of the brain and its major parts: medulla, cerebellum, hypothalamus, thalamus, cerebrum.

13. Describe the structure and function of skin receptors and chemoreceptors.

14. Describe the structure and function of parts of the eye: cornea, sclera, choroid coat, iris, pupil, lens, retina, rods and cones, optic nerve, conjunctiva.

15. Explain some common eye disorders: far and near sightedness, and astigmatism.

16. Describe the structure and auditory function of the ear.

17. Describe the role of the inner ear in balance and equilibrium.

Unit 9: Coordination II: Endocrine System (Text Reference: Chapter 18)

1. State the functions of the endocrine system.

2. Define: hormone, endocrine gland.

3. Describe the nature and role of hormones.

4. Explain the mechanism of hormone action.

5. Describe the anatomy and function of the following endocrine glands and their hormones: pituitary, thyroid, adrenals, parathyroids, pancreas.

6. Identify examples of homeostasis (negative feedback) in hormone action.

Unit 10: Reproduction (Text Reference: Chapter 19)

1. Describe the structure and function of the parts of the male reproductive system.

2. Describe the path of a sperm which is successfully involved in fertilization.

3. Discuss the role of male reproductive hormones: follicle stimulating hormone, interstitial cell stimulating hormone (lutenizing hormone), testosterone.

4. Describe the structure and function of the parts of the female reproductive system.

5. Discuss the role of female reproductive hormones: lutenizing hormone, follicle-stimulating hormone, estrogen, progesterone.

6. Describe the events of the ovarian and menstrual cycles.