

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: BIOLOGY

CODE NO: BIO 121-5 SEMESTER: 2

PROGRAMME: NURSING

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DATE: JAN/94 PREVIOUS OUTLINE DATED: JAN/93

APPROVED: *Sherry Day* Dec 14/93
Dean Date

BIOLOGY

BIO 121-5

Course Name

Code No.

TOTAL CREDIT HOURS: 75

PREREQUISITE(S): BIO 101-5

I. PHILOSOPHY/GOALS:

The Biology course deals with the structure and function of the human body.

This course also includes common stimuli which affect the structure and function of man as well as man's adaptive responses, which enable him to maintain a relatively constant state.

Understanding the human body and how it reacts to various stimuli will enable the student to relate this knowledge to the practice of nursing.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course, the student will:

- 1) describe biological adaptation in relation to the structure and function of the human body for the selected systems.
 - a) Describe the structure of the human body.
 - b) Describe the function of the human body
 - c) Describe the relationship of function to structure in the human body.
 - d) Describe specified changes that occur in structure and function as the human body ages.
- 2) explain the concept of biological adaptation.
 - a) Discuss some common biological stimuli that impinge upon the human body.
 - b) Explain the concept of adaptation using examples from the biological mode.
 - c) Describe some variables that influence biological responses.
 - d) Illustrate some adaptive and/or ineffective biological responses to specified stimuli.
 - e) Describe how an individual maintains and promotes biological adaptation.

III. TOPICS TO BE COVERED:

- 1) Respiratory System
- 2) Circulatory & Lymphatic Systems
- 3) Urinary System
- 4) Gastrointestinal (Digestive) System
- 5) Fluid, Electrolytes and Acid-Base Balance
- 6) Reproductive System
- 7) Development and Inheritance

IV. LEARNING ACTIVITIES

V. SUPPORT SYSTEMS (cont'd)

B. Respiratory System

1. Define the words associated with the respiratory system.
2. Describe the location and function of the organs of the respiratory system.
 - a) nose
 - b) pharynx
 - c) larynx
 - d) trachea
 - e) bronchi
 - f) lungs
3. Discuss the function of the diaphragm, intercostal muscles, ribs & sternum in the act of ventilation (breathing).
4. Describe the mechanisms involved in inspiration and expiration.
5. Explain the process of gas exchange:
 - a) external respiration
 - b) internal respiration
6. Explain the transportation of O_2 and CO_2 .
7. Describe the control of respiration:
 - a) nervous stimuli
 - b) chemical & pressure stimuli
8. Explain the importance of cardio-pulmonary respiration.

Read about Pulmonary Circulation, p. 468 & 472

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

V. SUPPORT SYSTEMS (cont'd)

B. Respiratory System

1. Define the words associated with the respiratory system.
 2. Describe the structure, location and function of the organs of the respiratory system.
 - a) nose
 - b) pharynx
 - c) larynx
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 - f) lungs
 3. Discuss the function of the diaphragm, intercostal muscles, ribs & sternum in the act of ventilation (breathing).
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 5. Explain the process of gas exchange:
 - a) external respiration
 - b) internal respiration
 6. Explain the transportation of O₂ and CO₂.
 7. Describe the control of respirations:
 - a) nervous stimuli
 - b) chemical & pressure stimuli
 8. Explain the importance of cardio-pulmonary resuscitation.
- Read Unit Five, Chapters 22 and 23
- Review bones, paranasal sinuses
- Read about Pulmonary Circulation, p. 466 & 479

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

9. Development of the respiratory system:

- a) describe the embryonic development
- b) describe the effects of aging
- c) discuss ways to improve life during the aging process

C. Circulatory & Lymphatic Systems

1. Blood

- a) define the words associated with the Circulatory System Read Unit Four, Chapter 16
- b) describe the constituents of blood
- c) state the normal values in the human body of the following:
 - i) erythrocytes 1) An Introduction to the Blood
 - ii) leukocytes 2) White Blood Cells - Defenders Against Infection
 - iii) thrombocytes 3) Antigenic Properties of RBC
 - iv) hemoglobin 4) Normal Hemostasis
 - v) hematocrit
- d) describe the adaptive mechanisms of hemostasis
- e) discuss clotting time, bleeding time and prothrombin time
- f) describe the ABO blood group system on the basis of their antigen-antibody components
- g) describe the Rh factor
- h) explain the significance of cross-matching on the basis of agglutination

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

2. Heart and Blood Vessels

- | | |
|--|---|
| a) describe the structure and function of the heart | Read Unit Four, Chapters 17 and 18 |
| b) trace the flow of blood through the heart & lungs from Superior & Inferior vena cavae to the aorta | Watch filmstrip and complete worksheets |
| c) describe the conduction system of the heart | 1) The Heart: Anatomy I |
| d) describe the nervous control of the heart | 2) The Heart: Anatomy II |
| e) describe the blood supply of the heart | |
| f) explain the structural characteristics & the functions of arteries, capillaries and veins | |
| g) identify major arteries and veins in the human body | |
| h) describe portal circulation | |
| i) describe pulmonary circulation | |
| j) describe systemic circulation by tracing the flow of blood from the heart to different areas of the body & back again | Dissect a heart |
| k) discuss stimuli which influence the P. & B.P. rate | |

3. Lymphatic System

- | | |
|---|--|
| a) define the words associated with the Lymphatic System | |
| b) describe the structure, location & function of parts of the Lymphatic System | Read Unit Four, Chapter 19 |
| i) capillaries | |
| ii) vessels | |
| iii) ducts | |
| iv) nodes | |
| c) describe lymphatic circulation and the importance of it | |
| d) describe the structure, location & function of the spleen, tonsils & thymus | |
| e) list and compare the five classes of immunoglobulins | |
| f) discuss the development, activation and function of B cells and T cells. | Review all types of immunity from the Microbiology unit. |

V. LEARNING ACTIVITIES

REQUIRED RESOURCES

4. Development of the Circulatory and Lymphatic Systems

- a) describe the embryonic development
- b) describe the effects of aging
- c) discuss ways to improve life during the aging process

D. The Urinary System

Read Unit Five, Chapter 27

- 1. Define the words associated with the urinary system.
- 2. Describe the structure, location & function of the organs of the urinary system:
 - a) kidney
 - b) ureters
 - c) urinary bladder
 - d) urethra
- 3. Describe the blood and nerve supply.
- 4. Describe the structure & function of the nephron.
- 5. Describe the process of urine formation.
 - a) glomerular filtration
 - b) tubular reabsorption
 - c) tubular secretion (excretion)
- 6. Explain aldosterone and A.D.H. influence on the kidneys.
- 7. Describe the physical characteristics of normal urine.
- 8. Discuss the normal & abnormal constituents of urine.

- Watch filmstrip and complete worksheets.
- 1) Anatomy of the Kidneys, Ureters, Bladder & Urethra
 - 2) Physiology of the Kidney

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

9. Describe the process of micturition.
10. Development of the Urinary System:
 - a) describe the embryonic development
 - b) describe the effects of aging
 - c) discuss ways to improve life during the aging process

E. The Gastrointestinal (Digestive) System

Read Unit Five, Chapters 24 & 25

1. Define the words associated with the gastrointestinal system.
2. Describe the location, structure & function of the organs of the digestive system.
 - a) mouth (oral cavity)
 - b) pharynx
 - c) esophagus
 - d) stomach
 - e) small intestine
 - f) large intestine (colon)
3. Discuss the structural layers of the gastrointestinal tract.
4. Describe the location, structure & functions of the accessory organs of the gastrointestinal system.
 - a) teeth & tongue
 - b) salivary glands
 - c) liver
 - d) gallbladder
 - e) pancreas
 - f) vermiform appendix

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

5. Describe the digestive processes as they relate to the organs & accessory organs of the gastrointestinal system.
 - a) mechanical digestion
 - b) chemical digestion
 - c) absorption
 - d) defecation
6. Describe the absorption from the stomach, small intestine & large intestine.
7. Describe the circulation of absorbed foodstuffs in blood & lymphatics.
8. Describe the normal composition & characteristics of feces.
9. Describe the metabolic processes of fats, carbohydrates & proteins. Read Unit Five, Chapter 26
 - a) anabolism of each
 - b) catabolism of each
10. Describe the relationship of foods to body heat. Relate to Metabolic rate at various ages
11. Describe the mechanisms of heat gain and loss.
12. Development of the gastrointestinal system.
 - a) describe the embryonic development
 - b) describe the effects of aging
 - c) discuss ways to improve life during the aging process

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

F. Fluid, Electrolytes & Acid-Base Balance

Read Unit Five, Chapter 28 & 29

1. Define the words associated with Fluid, Electrolytes & Acid-Base Balance.
2. Describe the body fluid compartments.
3. Describe water percentage according to age & amount of fat present.
4. Describe fluid intake & output.
5. Differentiate between electrolytes and nonelectrolytes.
6. Describe electrolyte concentration & distribution in the fluid compartments.
7. Explain the functions & regulations of the major electrolytes.
8. Describe the movement of fluid between the 3 body fluid compartments.
9. Describe the mechanisms which regulate body fluids.
10. Explain the buffer systems in maintaining the acid-base balance of the body.
11. Explain the roles of the respiratory & urinary systems in maintaining a normal acid-base balance.
12. Describe briefly respiratory acidosis and alkalosis.
13. Describe briefly metabolic acidosis and alkalosis.

Review diffusion, osmosis, filtration and A.T.

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

G. The Reproductive System

Read Unit Six, Chapters
30 & 31

1. Define the words associated with the reproductive system.
2. Describe the location, structure & function of the male organs of reproduction.
 - a) scrotum
 - b) testes
 - c) epididymis
 - d) vas deferens
 - e) seminal vesicle
 - f) ejaculatory duct
 - g) prostate
 - h) bulbourethral glands
 - i) urethra
3. Describe the components and production of seminal fluid.
4. Describe the structure of the spermatozoa.
5. Explain the hormonal control of the male sex characteristics and the reproductive function. Review the endocrine system (gonadotrophic hormones as well as testosterone, estrogen & progesterone)
6. Describe the nervous control of the male reproductive organs.
7. Describe the location, structure & function of the female organs of reproduction.
 - a) vagina
 - b) Bartholin's glands
 - c) uterus
 - d) fallopian tubes
 - e) ovaries
 - f) vulva and perineum
 - g) mammary glands
8. Describe how the uterus and ovaries are supported in the pelvic cavity.

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

9. Identify the major muscles of the perineum and discuss their function.
10. Describe the structure of the ova.
11. Explain the hormonal control of the female sex characteristics and the reproductive functions.
12. Explain the menstrual cycle when:
 - a) fertilization does not occur
 - b) fertilization does occur
13. Describe the nervous control of the female reproductive organs.
14. Development of the Reproductive System:
 - a) describe the embryonic development
 - b) describe the effects of aging
 - c) discuss ways to improve life during the aging process

H. Development and Inheritance

1. Describe the process of gamete formation.

Review meiosis & mitosis

Read Unit 6, Chapter 32 & 33

 - a) chromosome number
 - b) spermatogenesis
 - c) oogenesis
2. Discuss the process of sexual intercourse.
3. Identify the bones, landmarks and measurements of the pelvis.

Review bones & articulations of pelvis.
4. Discuss the changes that occur to the articulations & ligaments of the pelvis during pregnancy.

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

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|---|---|
| 5. Describe the 4 types of female pelvis:
a) gynecoid
b) anthropoid
c) android
d) platypelloid | Consult: Martin, L.L, Reeder, SJ: 1991
<u>Essentials of Maternity Nursing</u>
J.B. Lippincott Co., New York |
| 6. Discuss the implications of the pelvis in the mechanism of delivery. | |
| 7. Discuss the sequence of events involved in pregnancy.
a) fertilization
b) implantation
c) embryonic growth
d) fetal growth | |
| 8. Describe the development of the placenta. | |
| 9. Describe movement across the placenta. | |
| 10. Describe and state the function of the amnion and chorion. | |
| 11. Describe fetal circulation. | |
| 12. Discuss the hormones of pregnancy. | |
| 13. Describe the signs of pregnancy:
a) presumptive
b) probable
c) positive | |
| 14. Discuss the physiological changes of the body during pregnancy. | |

IV. LEARNING ACTIVITIES

REQUIRED RESOURCES

15. Discuss the potential hazards to the developing embryo and fetus.
 - a) chemicals & drugs (include caffeine, alcohol)
 - b) irradiation
 - c) cigarette smoking
 - d) poor nutrition
16. Determine the significance of the following essential factors in the process of labour (5 P's - Psyche, power, position, passenger, passageway).
17. Define, describe and explain the 4 stages of labour.
18. Describe the normal process of involution as it relates to the:
 - a) reproductive system
 - b) circulatory system
 - c) urinary system
 - d) gastrointestinal system
 - e) musculature
 - f) endocrine system
19. Describe the physiological adjustments confronting the newborn in transition from fetus in the:
 - a) respiratory system
 - b) circulatory system
 - c) gastrointestinal system
20. Explain the physiology of lactation.
21. Discuss the basic concepts of the passage of hereditary traits.
22. Discuss the inheritance of sex X-linked inheritance.
23. Describe the common methods of birth control.

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V. EVALUATION METHODS: (includes assignments, attendance requirements, etc.)

METHOD OF ASSESSMENT (GRADING METHOD):

Grading:	A+	90 - 100%
	A	80 - 89%
	B	70 - 79%
	C	60 - 69%

Please note that a pass in Biology is a "C".

NOTE:

1. Absence from Tests

If you are unable to attend class for a test, you MUST contact the Health Sciences office (759-2554 Ext. 616) before the test. If the test is at 0830 hours you must contact the office before 09:00 hours. If you fail to phone in, you will receive a mark of zero for that test.

Students who miss scheduled tests during the semester will not be allowed to write on another day. They will be allowed to take up the test with the other students.

If the teacher has been notified of your absence for the test, the test you missed will count for the same percentage as you receive on the final exam.

Each student MUST write both the diagram test and the final exam.

2. Excellent attendance (80% or better) will be used to improve borderline marks. (eg. 59, 69, 79, 89)

<u>TERM WORK:</u>	Unit Tests	200 marks
	Diagram Test	50 marks
		<u>250 marks</u>
	Final Exam	150 marks
		<u>400 marks</u>

Final mark = Your mark out of a possible 400 = %

Tentative Test Schedule:

<u>Date</u>	<u>Units</u>	<u>Marks</u>	<u>Your Mark</u>
Week of February 07, 1994	Respiratory and Circulatory	50	
Week of March 07, 1994	Lymphatic and Digestive	50	
Week of April 04, 1994	Fluids & Electro- lytes & Urinary	50	
Week of April 19, 1994	Diagram Test	50	
Week of April 26, 1994	Reproductive	50	
Week of May 02, 1994	Final Exam	150	

Keep track of all your own test marks so that you may calculate your own term mark.

3. Extra handouts may be given out during class time. If you are absent, make sure you ask someone to pick up the handout for you. Handouts will not be available after class or on other days.

4. Supplemental Examinations

A supplemental examination may be offered in this course at the discretion of the teacher subject to the following criteria:

- a) The student must have attended at least 60% of the biology classes.
- b) The student must have received at least 50% on the diagram test as well as the final examination.
- c) The student must have written at least two(2) of the four (4) tests and achieved a passing grade of 60% in each.
- d) The entire semester's course material will be tested. Multiple choice questions, short answer questions and diagrams to be labelled will be used in the supplemental examination.
- e) The final grade for the semester will be based solely on the supplemental examination but the grade achieved will not be higher than a "C". The term mark will not be averaged in with the supplemental examination mark.
- f) There will be only one supplemental examination allowed for this course.
- g) If you are eligible to write, please inform the teacher as soon as possible as to whether you are choosing to write the supplemental exam or not.

Units and Hours:

<u>Units</u>	<u>Approximate Hours</u>
Respiratory System	6
Circulatory & Lymphatic System	14
Urinary System	7
Digestive System	7
Fluids & Electolytes	9
Reproductive System (Labour, etc.)	24
Biology Tests and Exam	8
	<hr/> 75 HOURS

Biology help available weekly (optional) - approximately 15 hours

VI. REQUIRED STUDENT RESOURCES:

- 1) Anatomy & Physiology, Thibodeau, G.A., Times Mirror/Mosby College Publishing Company, Toronto, 1987.
- 2) Biology Workbook, Semester 2
- 3) The A&P Colouring Workbook, A Complete Study Guide, Mariele, Elaine N., 3rd edition, The Benjamin/Cummings Publishing Co., Don Mills, Ont., 1991 (optional)
- 4) Two pair of disposable rubber gloves (Campus Shop)

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION: (title, publisher, edition, date, library call number if applicable)

Articles, reference texts, videos and film strips will be shown in class or available to students from the library as deemed necessary by the teacher.

VIII. SPECIAL NOTES:

Students will be required to complete problems and readings as assigned.

Students with special needs (eg: physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students. Order of topics and subjects may change at the teacher's discretion.

