



**UNIVERSITY OF ALBERTA
COLLABORATIVE BACCALAUREATE
NURSING PROGRAM
KEYANO COLLEGE**

COURSE SYLLABUS

NURSING 117 A

ANATOMY AND PHYSIOLOGY



SEPTEMBER 7TH – DECEMBER 11TH, 2012

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Nurs 117
Anatomy and Physiology
Course Outline

Nurs 117 - Anatomy and Physiology I (6 credits, 16 weeks, 6 hours lecture)

Calendar Statement

This course is an introduction to the structure and function of the human body. This course must be completed prior to year 3 of the program.

Course Description

Nursing 117 is a 6 credit Anatomy and Physiology course offered to first year nursing students. This course will introduce students to Anatomy, which is the study of the structure and relationships among structures; and Physiology which is the science that describes the normal function of living organisms with respect to the activities of tissues, organs, and systems. The central focus of the course is to illustrate and integrate structural principles and to build a fundamental knowledge and correlation between structure and function and of general system rules.

Course Objectives

1. To facilitate a basic understanding of the structure and normal functions of the human body
2. To be able to use the technical vocabulary and medical terminology related to anatomy in written and verbal communication
3. To be able to link between structures and normal body functions.
4. To be able to integrate the knowledge of anatomy and underlying concepts and principles of physiology to clinical situations.
5. To foster the development of critical thinking skills.

Required Textbooks

Martini, F.H., & Bartholomew, E. F. (2012). *Essentials of Anatomy and Physiology* (6th ed.). San Francisco: Pearson Education Inc.

Suggested Study Guide

Martini, F. H., Bartholomew, E. F., & Seiger C. (2012). *Study Guide: Essentials of Anatomy & Physiology*. 6th Revised Edition. San Francisco: Benjamin-Cummings Publishing Co.

Lectures

Learning for Nurse 117 will take place utilizing a lecture format. The lectures will be supported with power point presentations available through Moodle. A series of guiding questions that will assist in learning are provided in the syllabus.

Classes will be held twice per week:
Tuesday 1300 – 1600h and Friday 0900 - 1200h.
(Classes are noted on N190 timetable)

Classes will be held in room 195.

Specialized Supports and Duty to Accommodate

Disability Support Services: Learner Assistance Program

If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

Specialized Supports and Duty to Accommodate

Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation and defined by a number of Keyano College policies. Keyano

College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.

Nursing Program Policies

Please refer to the Keyano College Nursing Program Student Handbook for specific Nursing program policies and to the Keyano College 2012/2013 Calendar for general college policies.

Absence

If you are ill and unable to write an in-class exam, you must let the instructor know prior to the exam so that other arrangements can be made. Please call the Administrative Assistant at 780 791-4889. If there is no answer, you must leave a message about the absence. Failure to call prior to the exam will result in a failure for that exam.

Evaluation Criteria

Exams may contain multiple choice, fill-in-the-blank, matching questions plus labelling of diagrams.

1.	Chapter Quizzes	10%
2.	Exam #1	15%
3.	Exam #2	20%
4.	Exam #3	25%
5.	<u>Final Exam</u>	30%
		100%

Exam Dates

	Date	Time	Chapters to be tested
Exam #1 15%	Tuesday September 25th	1300-1600	1, 2, 3, 4
Exam #2 20%	Friday October 19th	0900-1200	5, 6, 7
Exam #3 25%	Tuesday November 13th	1300-1600	11, 12, 13
Final Exam 30%	Tuesday December 11th	1300-1600	15, 16, 18

Chapter Quizzes - 10% (total)

At the conclusion of each chapter, a quiz to assess student knowledge will be available on Moodle. Each quiz will be available until the closing date and time shown on the N117 schedule (see page 5). After 1800h on the date shown the quiz will no longer be available to access and a grade of zero will be assigned to any student who has not completed the quiz. All quiz marks will be combined for a final assigned alpha grade and count for 10% of the final course grade.

In order to successfully complete Nursing 117, students must successfully complete all exams as well as receive a passing grade (C-) in the course.

NURS 117 CLASS SCHEDULE

CLASS	DATE	TIME	SUBJECT	REQUIRED READING	CHAPTER QUIZ CLOSE DATE-1800h
1	September 7	0900-1200	Course Orientation		
2	September 11	1300-1600	Intro to A & P	Chapter 1	<i>Sept 12</i>
3	September 14	0900-1200	Intro to chemistry	Chapter 2	<i>Sept 17</i>
4	September 18	1300-1600	Cell structure and function	Chapter 3	<i>Sept 19</i>
5	September 21	0900-1200	Tissue levels	Chapter 4	<i>Sept 24</i>
6	September 25	1300-1600	Exam #1 – 15%	Ch 1 – 4	
7	September 28	0900-1200	Integumentary system	Chapter 5	<i>Oct 1</i>
8	October 2	1300-1600	Skeletal System	Chapter 6	
9	October 5	0900-1200	Skeletal system	Chapter 6	<i>Oct 8</i>
10	October 9	1300-1600	Muscle system	Chapter 7	
11	October 12	0900-1200	Muscle system	Chapter 7	<i>Oct 15</i>
12	October 16	1300-1600	No class		
13	October 19	0900-1200	Exam #2 – 20%	Ch 5 - 7	
14	October 23	1300-1600	CV System: Blood	Chapter 11	
15	October 26	0900-1200	CV System: Blood	Chapter 11	<i>Oct 29</i>
16	October 30	1300-1600	CV System: Heart	Chapter 12	
17	November 2	0900-1200	CV System: Heart	Chapter 12	<i>Nov 5</i>
18	November 6	1300-1600	CV System: Blood vessels & Circulation	Chapter 13	
19	November 9	0900-1200	CV System: Blood vessels & Circulation	Chapter 13	<i>Nov 12</i>
20	November 13	1300-1600	Exam #3 – 25%	Ch 11 - 13	
21	November 16	0900-1200	Respiratory	Chapter 15	
22	November 20	1300-1600	Respiratory	Chapter 15	<i>Nov 21</i>
23	November 23	0900-1200	Digestive	Chapter 16	
24	November 27	1300-1600	Digestive	Chapter 16	<i>Nov 28</i>
25	November 30	0900-1200	Urinary	Chapter 18	
26	December 4	1300-1600	Urinary	Chapter 18	<i>Dec 5</i>
27	December 7	0900-1200	Systems review		
	December 11	1300-1600	Final Exam – 30%	Ch 15, 16, 18	

All classes are held in Room 195

Areas of Focus



Guiding Questions

Chapter I – An Introduction to Anatomy and Physiology

1. Know the basic functions of living organisms.
2. Define anatomy and physiology
3. Identify levels of organization within a living organism.
4. List the 11 organ systems of the body and briefly explain the major function(s) of each system.
5. List and define the functional characteristics important to maintaining life in humans.
6. Define the concept of homeostasis and explain its importance.
7. Compare and contrast negative and positive feedback systems and describe the role of each in maintaining body homeostasis.
8. Describe the anatomical position.
9. Use correct anatomical terminology to describe body directions, regions, and body planes or sections.
10. Locate and name the major body cavities and their subdivisions, and list the major organs contained within them.
11. Name the specific serous membranes and common function.
12. Name the nine regions and four quadrants of the abdominopelvic cavity and list the organs they contain.

Chapter 2 – The Chemical Level of Organization

1. Describe an atom and its subatomic parts.
2. Describe three types of chemical bonds.
3. Describe three types of chemical reactions.
4. Differentiate between acids and bases.
5. Differentiate between organic and inorganic compounds.
6. Describe types and functions of carbohydrates.
7. Describes types and functions of lipids.
8. Describe types and functions of proteins.
9. Describe nucleic acids and their functions.
10. Describe high-energy compounds.

Chapter 3 – Cell Structure and Function

1. Describe a cell.
2. List the three major regions of a generalized cell and indicate the general function of each region.
3. Describe the functions of the cell membrane and its structure.
4. Describe active and passive transport mechanisms.
5. Define diffusion.
6. Define osmosis and osmotic pressure.
7. Define filtration.
8. Describe the differences between types of solutions.
9. Describe carrier-mediated transport.
10. Describe types of vesicular transport.
11. Describe cytoplasm and the composition of the cytosol:
12. Name and describe the structure and function of cytoskeletal elements.
13. List the organelles, their structures and functions.
14. Define inclusions and list some types.
15. Describe functions of the cell nucleus.
16. Briefly list the phases of the cell life cycle, and describe the events of each phase.
17. Describe protein synthesis.
18. Describe transcription and translation.
19. Define mitosis.
20. Define differentiation.

Chapter 4 – The Tissue Level of Organization

1. Identify and describe the four main types of tissue.
2. Describe the types and functions of epithelial tissue.
3. Describe the relationship between the form and function of each type of epithelium.
4. Compare the structure and function of tight junctions, desmosomes, and gap junctions.
5. Compare the structures and functions of various types of connective tissue.
6. Explain how epithelial and connective tissues combine to form four types of membranes and specify the functions of each.
7. Describe three types of muscle tissue and the special structures of each.
8. Describe the basic structure and role of nervous tissue.
9. Outline the process of tissue repair involved in normal healing of a superficial wound.
10. Briefly describe tissue changes that occur with age.

Chapter 5 – The Integumentary System

1. Describe the general functions of the Integumentary system
2. Name the main structural features of the epidermis and the functional significance of each.
3. Name the specific layers of the dermis and describe their function.
4. Describe the factors that normally contribute to skin color. Briefly describe how changes in skin color may be used as clinical signs or certain disease states.
5. Identify and describe the functions of accessory structures; hair, and hair follicles.
6. Compare the structure and most common location of sweat and oil glands. Also, compare the composition and functions of their secretions.
7. Compare and contrast eccrine and apocrine glands.
8. Describe the structure of nails.
9. Describe how the skin maintains homeostasis and responds to injury and repairs itself.
10. Briefly describe the changes that occur in the skin from birth to old age.

Chapter 6 – The Skeletal System

1. List and describe the functions of skeletal system.
2. Compare and contrast the structure of the four bone classes and provide examples of each class.
3. Describe the gross anatomy of a typical long bone. Indicate the locations and functions of bone marrow, periosteum, and endosteum.
4. Briefly compare and contrast the two types of bone formation intramembranous and endochondral ossification.
5. Describe the process of long bone growth that occurs at the epiphyseal plates.
6. Describe the timing and cause of changes in bone architecture and bone mass through life.
7. Describe types of fracture and how bone remodels.
8. Name the major parts of the axial and appendicular skeletons and describe their relative functions.
9. Name and identify the bones of the skull.
10. Compare and contrast the major functions of the cranium and the facial skeleton.
11. Define fontanels and indicate their importance
12. Describe the general structure of the vertebral column, list its components, and describe its curvatures.
13. Indicate common function of the spinal curvatures and the intervertebral discs...
14. Name and describe the bones of the bony thorax.
15. Differentiate true from false ribs.
16. Identify the bones of the pectoral and pelvic girdles and relate to their structural and functional differences
17. Identify or name the bones of the upper limb and their important markings.
18. Identify the bones of the lower limb.
19. Define joint or articulation.
20. Classify joints structurally and functionally.
21. Name and describe (or perform) the common body movements.
22. Explain the relationship between joint structure and mobility
23. Discuss briefly the factors that promote or disturb joint homeostasis.

Chapter 7 – The Muscular System

1. List important functions of muscle tissue.
2. Describe the gross structure of a skeletal muscle with respect to location and names of its connective tissue coverings and attachments.
3. Describe the microscopic structure and functional roles of the myofibrils, sarcoplasmic reticulum, and T tubules of skeletal muscle fibers (cells).
4. Name and describe two types of skeletal muscle fibers
5. Compare skeletal, smooth and cardiac muscle.
6. Be aware of the gross and microscopic anatomy of cardiac and smooth muscle fibers as they compare to skeletal muscle fibers.
7. Explain the sliding filament mechanism of skeletal muscle contractions.
8. Define neuromuscular junction and explain how muscle fibers are stimulated to contract.
9. Define muscle twitch and describe the events occurring during its three phases.
10. Explain how smooth, graded contractions of a skeletal muscle are produced.
11. List and describe factors that influence the force, velocity, and duration of skeletal muscle contraction
12. Describe three ways in which ATP is regenerated during skeletal muscle contraction.
13. Define muscle fatigue. List possible causes of muscle fatigue.
14. Compare and contrast the effects of aerobic and resistance exercise on skeletal muscles and on other body systems.
15. List and define the ways that muscles are named and identify common muscles, including those pertinent to nursing.
16. Explain the function of prime movers, antagonists, synergists, and fixators, and describe how each promotes normal muscular function.
17. Describe effects of aging on the muscular system.

Chapter 11 - CV System: Blood

1. List the functions of blood.
2. Describe the composition and physical characteristics of whole blood. Explain why it is classified as a connective tissue.
3. Discuss the composition and functions of plasma.
4. Describe the structural characteristics, function, and production of erythrocytes.
5. List the classes, structural characteristics, and functions of leukocytes.
6. Describe the structure and function of platelets.
7. Discuss the structure and function of hemoglobin.
8. Describe the ABO and Rh blood groups. Explain the basis of transfusion reactions.
9. Explain the importance of blood testing as a diagnostic tool.
10. Describe the process of homeostasis. List the factors that limit clot formation and prevent undesirable clotting.
11. Give examples of disorders caused by abnormalities of each of the formed elements.
12. Describe the mechanisms that reduce blood loss after an injury.

Chapter 12 - CV System: The Heart

1. Describe the circuits of the cardiovascular system.
2. Describe the size and shape of the heart, and indicate its location and orientation in the thorax.
3. Name the coverings of the heart.
4. Describe the structure and functions of the four heart chambers.
5. Name each chamber and provide the name and general route of its associated great vessel(s).
6. Describe the structural and functional properties of cardiac muscle.
7. Trace the pathway of blood through the heart.
8. Name the heart valves and describe their location, function, and mechanism of operation.
9. Name the major branches of the coronary arteries and describe their distribution.
10. Name the components of the conduction system of the heart, and trace the conduction pathway.
11. Briefly describe the events of cardiac muscle cell contraction.
12. Name the components of the conducting system of the heart, and trace the conduction pathway.
13. Draw a diagram of a normal electrocardiogram tracing: name the individual waves and intervals, and indicate what each represents.
14. Describe the timing and events of the cardiac cycle.
15. Describe normal heart sounds.
16. Name and explain the effects of the various factors involved in regulation of stroke volume and heart rate.
17. Define cardiac output.
18. Describe factors that affect cardiac output
19. Explain the role of the autonomic nervous system and hormones in regulating cardiac output.

Chapter 13 - CV System: The Blood Vessels and Circulation

1. Describe the three layers that typically form the wall of a blood vessel, and state the function of each.
2. Compare and contrast the structure and function of the three types of arteries.
3. Describe the structure and function of a capillary bed.
4. Describe the structure and function of veins, and explain how veins differ from arteries.
5. Trace the pathway of blood through the pulmonary circuit, and state the importance of this special circulation.
6. Describe the general functions of the systemic circuit. Name and give the location of the major arteries and veins in the systemic circulation.
7. Describe the structure and special function of the hepatic portal system.
8. Describe fetal circulation and changes after birth.
9. Define vasoconstriction and vasodilation.
10. Define blood flow, blood pressure, and resistance, and explain the relationships between these factors.
11. List and explain the factors that influence circulatory pressure.
12. Describe systolic, diastolic and pulse pressure and explain elastic rebound.
13. Describe capillary pressure and capillary exchange.
14. Explain edema and congestive heart failure.
15. Explain effects of venous pressure.
16. Describe factors involved in regulation of cardiovascular function.
17. Describe autoregulation of blood flow.
18. Describe the neural control of blood pressure and blood flow.
19. List and describe effects of hormones on cardiovascular regulation.
20. Describe the effects of exercise on the cardiovascular system.
21. Describe short and long term methods of restoring blood pressure during hemorrhage.
22. Provide examples of changes that often occur in blood vessels as a person ages.

Chapter 15 - The Respiratory System

1. Describe the primary functions of the respiratory system.
2. Identify the organs forming the respiratory passageway(s) in descending order until the alveoli are reached.
3. Distinguish between conducting and respiratory zone structures.
4. List and describe several protective mechanisms of the respiratory system.
5. Describe the makeup of the respiratory membrane, and relate its structure to its function.
6. Describe the gross structure of the lungs and pleural coverings
7. Describe the three steps in process of respiration
8. Define hypoxia, anoxia, inspiration, and expiration.
9. Explain the relative roles of the respiratory muscles and lung elasticity in effecting volume changes that cause air to flow into and out of the lungs.
10. Compare quiet and forced breathing.
11. Explain and compare the various lung volumes and capacities. Indicate type of information that can be gained from pulmonary function tests.
12. Describe, in general terms differences in composition of atmospheric and alveolar air, and explain these differences.
13. Describe external and internal respiration.
14. Describe how oxygen is transported in the blood, and explain how oxygen loading and unloading is affected by temperature, pH, and PO_2 .
15. Describe carbon dioxide transport in the blood.
16. Describe the local controls of respiration.
17. Compare and contrast the influences of lung reflexes, volition, emotions, arterial pH, and partial pressures of oxygen and carbon dioxide in arterial blood on respiratory rate and depth.
18. Describe normal changes that occur in the respiratory system from infancy to old age.

Chapter 16 - The Digestive System

1. Identify and describe functions of the organs of the digestive tract and accessory organs.
2. Describe the overall function of the digestive system.
3. Describe the tissue composition and the general function of each of the four layers of the alimentary tube.
4. Explain the dental formula and differentiate clearly between deciduous and permanent teeth.
5. Identify structural modifications of the wall of the stomach and small intestine that enhance the digestive process in these regions.
6. List and define briefly the major processes occurring during digestive system activity.
7. Describe the composition and functions of saliva, and explain how salivation is regulated.
8. Describe the mechanisms of chewing and swallowing.
9. Describe the composition of gastric juice, name the cell types responsible for secreting its various components, and indicate the importance of each component in stomach activity.
10. Explain how gastric secretion and motility in the stomach are regulated through the phases of digestion.
11. Describe the reflexes that effect intestinal movements.
12. List the function of local hormones produced by the small intestine.
13. Describe the digestion that occurs in the small intestine.
14. Describe the structure and functions of the pancreas, liver, and gallbladder and explain how their activities are regulated.
15. List the major functions of the large intestine, and describe its movements and absorptive functions
16. List the enzymes involved in chemical digestion: name the food type on which they act and the end products of protein, fat, carbohydrate, and nucleic acid digestion.
17. Describe important changes of the gastrointestinal tract at different stages of life.

Chapter 18 - The Urinary System

1. Identify the essential functions of the urinary system.
2. Describe the gross anatomy of the kidney and its coverings.
3. Trace the blood supply through the kidney.
4. Describe the anatomy of a nephron.
5. Identify the parts of the nephron responsible for filtration, reabsorption, and secretion.
6. Describe the general structure and function of the ureters.
7. Describe the general structure and function of the urinary bladder.
8. Describe the general structure and function of the urethra.
9. Compare the course, length, and functions of the male urethra with those of the female.
10. Define micturition and describe the micturition reflex.
11. List several urinary system functions that help maintain body homeostasis.
12. Describe the processes involved in urine production.
13. List two factors that affect filtration.
14. Explain the formation of dilute versus concentrated urine.
15. Describe the normal physical and chemical properties of urine.
16. Explain role of aldosterone and ADH on urine production.
17. Define fluid, electrolyte and acid-base balance.
18. Describe fluid balance in terms of intra and extra cellular fluid.
19. Define acidosis and alkalosis.
20. Describe the three buffer systems and their functions.
21. Describe factors that help maintain acid-base balance.
22. Describe the most frequent threats to acid-base balance.
23. List several changes in urinary system anatomy and physiology that occur with age.