



A POLYTECHNIC INSTITUTION

School of Health Sciences

Program: Medical Radiography

Option:

**BHSC 1113**  
**Anatomy & Physiology 1****Start Date:** January 4, 2005**End Date:** April 15, 2005**Total Hours:** 32   **Total Weeks:** 16**Term/Level:** 1   **Course Credits:** 2.5**Hours/Week:** 2   **Lecture:** 2**Prerequisites****Course No.**   **Course Name**

None

**BHSC 1113 is a Prerequisite for:****Course No.**   **Course Name**

BHSC 2213   Anatomy &amp; Physiology 2

**■ Course Description**

An introduction to human anatomy and physiology using a systems approach. Emphasis is placed on those systems most commonly examined by the radiographic technologist. After a core of fundamentals are considered, the systems studied in this course are: skeletal, muscular, nervous and cardiovascular.

The remaining systems are covered in the second term anatomy and physiology course, BHSC 2213.

**■ Detailed Course Description**

The goals of this course are:

- to attain a basic understanding of human anatomy and physiology that can be applied to other courses in the Radiography program.
- to become familiar with basic sectional anatomy.

**■ Evaluation****Quizzes**

Midterm 1	(February 10, 2005)	30%
Midterm 2	(March 10, 2005)	30%
Final Exam	(April 18–22, 2005)	40%
<b>TOTAL</b>		<b>100%</b>

**Comments:**

- The pass mark for this course is 60%.
- Except for select material in the final exam, exams are not cumulative but survey only the material since the last exam.

**■ Course Learning Outcomes/Competencies**

Upon successful completion of this course, the student will be able to:

1. use correct terminology to describe the location and relationships of structure in the normal body.
2. identify the components of the integument and their functions.

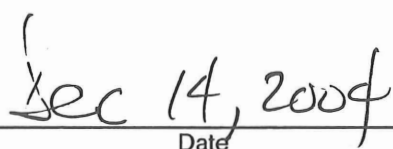
■ **Course Learning Outcomes/Competencies (cont'd.)**

3. describe the skeletal system in terms of:
  - a. functions
  - b. types of bones
  - c. the structure of a long bone
  - d. location of red and yellow marrow in the child and the adult
  - e. intramembranous and endochondral ossification of a long bone and the hormonal and stress factors affecting growth and remodeling
  - f. the structure of a synovial joint and alternate joint structures.
4. relate a muscles structures and its attachments to bone to movement at joints.
5. describe the major movements produced by the action of contracting muscles.
6. describe the major structures of the nervous system (brain, spinal cord and spinal and cranial nerves); describe and explain the various types of protection afforded the CNS.
7. relate the parts of the CNS to the enclosing bones of the skull and the spinal column.
8. where appropriate, relate selected CNS structures to generalized functions.
9. describe the composition of blood, the function of the formed elements, erythropoiesis and red blood cell destruction.
10. compare the structure of arteries, veins and capillaries.
11. describe the location, structure and function of the heart, the myocardial sac; describe basic myocardial physiology and myocardial blood supply and drainage.
12. relate systolic and diastolic arterial blood pressure and blood pumping to the electrical, mechanical and audible events of the cardiac cycle.
13. describe the circulatory and exchange vessels and their functions, and explain the physiology of blood flow.
14. describe the arterial supply and venous drainage of the brain.
15. describe the essential functions of the lymphatic system; relate the role of lymph capillaries to tissue fluid turnover.

■ **Verification**

I verify that the content of this course outline is current.

  
\_\_\_\_\_  
Authoring Instructor

  
\_\_\_\_\_  
Date

I verify that this course outline has been reviewed.

  
\_\_\_\_\_  
Program Head/Chief Instructor

  
\_\_\_\_\_  
Date

I verify that this course outline complies with BCIT policy.

  
\_\_\_\_\_  
Dean/Associate Dean

  
\_\_\_\_\_  
Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

## ■ Instructor(s)

Gordon Handford	Office Location: SW3-3083	Office Phone: 604-451-6922
	Office Hrs.: Wed. 11:30–2:30	E-mail Address: Gordon_Handford@bcit.ca
	Thurs. 11:30–1:30	(Please use this e-mail address exclusively.)

## ■ Learning Resources

We will be covering all the examinable topics in class. To support their learning in this and several subsequent courses, you will need to acquire a comprehensive textbook in anatomy and physiology. Some suggested titles are:

*Fundamentals of Anatomy and Physiology* by Martini.

*Human Anatomy and Physiology* by Marieb.

*Principles of Anatomy and Physiology* by Tortora and Grabowski.

*Clinically Oriented Anatomy* by Moore and Agur.

Any of these might provide an excellent resource for better understanding the topics, seeing rich illustrations, having things presented in a different way from what I might do in class, seeing the material that isn't covered in class but may be important to your grasp of the topic. So take some time to work with a book to ensure that it fits your particular learning needs. The book you choose should be a fairly recent (last five years) edition. You are wise to get one on the second-hand market if you can, as long as it's recent (new versions of the above are \$120 or so). Again, the most important factor is the fit of the book to your way of learning.

## Reference:

The BCIT library has good holdings which may be useful to you in your studies.

*General Anatomy and Physiology Books:* These are located in call number group of QP 34, e.g., *Textbook of Medical Physiology*, Guyton, QP34.5 G9.

## ■ Information for Students

1. During the first class the instructor and student responsibilities and evaluation methods will be discussed and agreed upon.
2. Students will participate in a verbal and written review of the course and instructor performance at midterm and at the end of term.
3. Attendance is required in this course as much of the material presented in lecture will not be available in other formats and as active involvement in discussion and lecture constitutes a significant portion of the course. Therefore, if students are absent for more than 10% of the planned activities without a documented medical reason, they will not meet the attendance requirement of the course and may be withdrawn from the course (see BCIT policy re attendance).
4. **Illness:** A doctor's note is required for any illness causing you to miss assignments, quizzes, tests, projects or exam. At the discretion of the instructor, you may complete the work missed or have the work prorated.
5. Student written work is assumed to be original and specific to this course. Plagiarism, the presentation of other's written work as one's own, will not be tolerated (see BCIT policy re plagiarism). The same applies to any aid that gives a student an unfair advantage in a written examination (see BCIT policy re cheating). Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam or project for all parties involved and/or expulsion from the course.
6. **Course Outline Changes:** The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

## Schedule

No. of Hours	Description
3	<p><b>Functional Body Organization</b></p> <ul style="list-style-type: none"> <li>• organization in terms of cells, tissues, organs and systems.</li> <li>• body cavities, gross contents, quadrants and regions of abdominopelvic cavity.</li> <li>• anatomical terminology</li> <li>• examples of sectional relationships of cavity contents (more details are given during discussion of the body systems).</li> <li>• review of Cytology and Histology.</li> </ul>
2	<p><b>Integument</b></p> <p><i>Epidermis</i> — strata, keratinocytes, melanocytes.</p> <p><i>Dermis</i> — blood vessels, sense receptors, sweat and sebaceous glands, hair roots, loose connective tissue.</p> <p><i>Skin functions</i> — protection, body temperature control.</p>
6	<p><b>Skeletal System</b></p> <p><i>Histology</i> — Haversian systems/osteons, lamellae of compact bone, trabeculae of spongy bone.</p> <p><i>Functions</i> — support, protection, calcium storage, movement.</p> <p><i>Types of bones</i> — long, short, flat, irregular, sesamoid, wormian.</p> <p><i>Description of a long bone</i> — epiphysis, diaphysis, metaphysis, articular cartilage, cancellous and compact bone, periosteum, endosteum, marrow cavity, lamellae, Haversian and Volkmann's canals, canaliculi, Sharpey's fibers, nutrient foramina.</p> <p><i>Description of a flat bone</i> — (skull is example) outer table, diploe, inner table, emissary vein channels, sinuses.</p> <p><i>Bone marrow</i> — location of red and yellow marrow in non-adults and adults.</p> <p><i>Development and growth of bone</i> — intramembranous ossification, endochondral ossification of a long bone — primary and secondary ossification centres, epiphyseal plate, Wolff's law.</p> <p><i>Fracture repair</i> — steps (fracture hematoma fibrocartilaginous callus, bony callus, bone remodelling)</p> <p><i>Hormonal and nutritional effects on bone</i> — dietary requirements — hormones and calcium balance (calcitonin, parathyroid hormone/PTH, calcitriol, estrogens and testosterone)</p> <p><i>Joints</i> — brief description of synarthroses, amphiarthroses, diarthroses, structure of a generalized synovial joint — joint cavity, synovial, membrane and fluid, bursae, ligaments, menisci, joint capsule.</p>

No. of Hours	Description
	<p><i>Movements</i></p> <ul style="list-style-type: none"> <li>– adduction, abduction, flexion, extension, supination, pronation, rotation, circumduction, inversion, eversion, protraction, retraction, depression, elevation, dorsiflexion, plantarflexion, hyperextension.</li> </ul>
1	<p><b>FIRST MIDTERM EXAMINATION</b> (February 10, 2005)</p>
2	<p><b>Muscular Systems</b></p> <ul style="list-style-type: none"> <li>• muscle tissue subtypes</li> <li>• essentials of muscle structure</li> <li>• principles of muscle function</li> </ul>
8	<p><b>Nervous System</b> <i>Nervous Tissue</i></p> <ul style="list-style-type: none"> <li>– neuroglia, neurons</li> <li>– action potential and synaptic transmission</li> </ul>
	<p><b>Basic Structures</b> <i>Brain</i></p> <ul style="list-style-type: none"> <li>– cerebrum, brain stem, cerebellum</li> </ul>
	<p><b>Cerebrum</b> <i>Gross Superficial Anatomy</i></p> <ul style="list-style-type: none"> <li>– hemispheres, lobes, landmarks, cortical localization of function</li> </ul> <p><i>Cerebral Vasculature</i></p> <ul style="list-style-type: none"> <li>– major arteries, veins and venous sinuses</li> </ul> <p><i>Gross Anatomy in Section</i></p> <ul style="list-style-type: none"> <li>– corpus callosum, thalamus, basal ganglia, hypothalamus including association with pituitary stalk and pituitary gland, ventricles, septum pellucidum, functions associated with each of foregoing</li> </ul>
	<p><b>Brain Stem</b></p> <ul style="list-style-type: none"> <li>– midbrain (cerebral peduncles, cerebral aqueduct, substantia nigra)</li> <li>– pons (fourth ventricle)</li> <li>– medulla</li> </ul>
	<p><b>Spinal Cord</b> <i>Gross Anatomy</i></p> <ul style="list-style-type: none"> <li>– grey matter, white matter, central canal, dorsal root ganglion</li> <li>– dorsal columns, anterior median fissure</li> <li>– cervical and lumbar enlargements, filum terminale, cauda equina</li> </ul> <p><i>Cord Tracts</i></p> <ul style="list-style-type: none"> <li>– extent of cord vs dural membranes, lumbar cistern</li> </ul> <p><i>Reflexes</i></p> <ul style="list-style-type: none"> <li>– principal motor and sensory tracts</li> <li>– reflex mechanisms</li> </ul>
1	<p><b>SECOND MIDTERM EXAMINATION</b> (March 10, 2005)</p>

No. of Hours	Description
	<p><b><i>Meningeal Protection</i></b>  <b><i>Roles of CSF</i></b>  <b><i>Meningeal Membranes</i></b> – dura (falx, tentorium), venous sinuses, arachnoid and subarachnoid space, CSF cisterns, pia</p> <p><b><i>CSF Production and Circulation</i></b> – choroid plexus, ependyma, ventricles, medial and lateral foraminae, arachnoid villi</p> <p><b><i>CNS Sectional Anatomy</i></b> – review select coronal and sagittal sections of brain.</p>
	<p><b><i>Peripheral Nervous System:</i></b>  <b><i>Spinal vs Cranial Nerves</i></b>  <b><i>PNS</i></b></p> <ul style="list-style-type: none"> <li>– olfactory and optic vs all others</li> <li>– structure and functions of a peripheral nerve</li> <li>– cervical, brachial, lumbar and sacral plexuses</li> <li>– vagus, phrenic, ulnar, brachial, sciatic and femoral nerves</li> <li>– autonomic nervous system (very brief intro)</li> </ul>
4	<b>Cardiovascular System and Lymphatics</b>
	<p><b><i>Cardiovascular System</i></b></p> <p><b><i>Background</i></b> – the body's fluid compartments; water, ionic, and osmotic distributions</p> <p><b><i>Blood</i></b> – plasma composition and functions  – erythrocytes, formation and destruction  – specific leukocytes  – platelets  – hemopoiesis</p> <p><b><i>Arterial System</i></b> – elastic and muscular arteries, arterioles  – capillary structure, movement of fluid and dissolved substances</p> <p><b><i>Venous System</i></b> – names and locations of selected arteries  – structure of veins and venules, valves  – names and locations of selected veins</p> <p><b><i>Heart</i></b> – location, pericardial sac, myocardium, endocardium  – atria, ventricles, valves, pacemaker and conduction system  – cardiac cycle: electrical and mechanical events, the ECG</p> <p><b><i>Fetal Circulation</i></b> – brief description  – changes at birth</p> <p><b><i>Lymphatics</i></b> – functions  – lymph node/nodules, distribution and function  – major lymphatic vessels, lymph circulation</p>