



A POLYTECHNIC INSTITUTION

School of Health Sciences

Program: Medical Radiography

Option:

**BHSC 1113**  
**Anatomy & Physiology 1****Start Date:** January 4, 2006**End Date:** April 15, 2006**Total Hours:** 28    **Total Weeks:** 14**Term/Level:** 1    **Course Credits:** 2.5**Hours/Week:** 2    **Lecture:** 2**Prerequisites****BHSC 1113 is a Prerequisite for:****Course No.    Course Name****Course No.    Course Name**

None

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 core fundamentals are established, the course continues with studies of the integumentary, skeletal, muscular, nervous, cardiovascular, and lymphatic systems.

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.
- become familiar with basic sectional anatomy.
- relate structure and function.

**■ Evaluation**

Quizzes

Comments:

Midterm 1                      30%

- The pass mark for this course is 65%.

Midterm 2                      30%

Final Exam                    40%

TOTAL                          100%

**■ 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 muscle's structures and its attachments to bone to movement at joints.
5. describe the major movements produced by the action of selected muscles.
6. describe the major structures of the nervous system.
7. relate the parts of the CNS to the enclosing bones of the skull and the spinal column.
8. relate selected CNS structures to function.
9. describe the composition of blood, the function of the formed elements, erythropoiesis, and red blood cell destruction.
10. compare the structure and function 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; 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.

John H. Emes  
Authoring Instructor

December 13 2005  
Date

I verify that this course outline has been reviewed.

John H. Emes  
Program Head/Chief Instructor

December 13 2005  
Date

I verify that this course outline complies with BCIT policy.

Allen Bell  
Dean/Associate Dean

December 14, 2005  
Date

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

## ■ Instructor(s)

John Emes, Ph.D.

Office Location: SW3-3090

Office Hrs.: TBA

Office Phone: 604-451-6920

E-mail Address: John\_Emes@bcit.ca

## ■ Learning Resources

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 (11th ed.). Wiley, 2004.

*Clinically Oriented Anatomy* by Moore and Dalley (5th ed.). Lippincott, 2005.

## 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.

## ■ Information for Students

1. During the first class the instructor and student responsibilities and evaluation methods will be discussed and agreed upon.
2. 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).
3. **Illness:** A doctor's note is required for any illness causing you to miss assignments, quizzes, tests, projects, or exams. At the discretion of the instructor, you may complete the work missed or have the work prorated.
4. 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.
5. **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.

Students are referred to the BCIT website for a complete description of policies affecting students (#5002). The URL for this site is <http://www.bcit.ca/files/pdf/policies/5002.pdf>.

### Schedule

No. of Hours	Description
3	<b>Functional Body Organization</b> <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: directional terms, body planes and sections, imaging conventions</li> <li>examples of sectional relationships of cavity contents</li> <li>review of Cytology and Histology</li> </ul>
2	<b>Integument</b> <i>Epidermis</i> — strata, keratinocytes, melanocytes <i>Dermis</i> — blood vessels, sense receptors, sweat and sebaceous glands, hair roots, loose connective tissue <i>Skin functions</i> — protection, body temperature control
4	<b>Skeletal System</b> <i>Histology</i> — Haversian systems/osteons, lamellae of compact bone, trabeculae of spongy bone <i>Functions</i> — support, protection, calcium storage, movement <i>Types of bones</i> — long, short, flat, irregular, sesamoid, wormian <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 <i>Bone marrow</i> — location of red and yellow marrow in children and adults <i>Development and growth of bone</i> — intramembranous ossification, endochondral ossification of a long bone — primary and secondary ossification centres, epiphyseal plate <i>Fracture repair</i> — steps (fracture hematoma fibrocartilaginous callus, bony callus, bone remodelling) <i>Hormonal and nutritional effects on bone</i> — dietary requirements for bone formation — hormones and calcium balance (calcitonin, parathyroid hormone/PTH, calcitriol, estrogens and testosterone) <i>Joints</i> — types of joints, synarthroses, amphiarthroses, diarthroses, structure of a generalized synovial joint — joint cavity, synovial, membrane and fluid, bursae, ligaments, menisci, joint capsule <i>Movements</i> — adduction, abduction, flexion, extension, supination, pronation, rotation, circumduction, inversion, eversion, protraction, retraction, depression, elevation, dorsiflexion, plantarflexion, hyperextension

No. of Hours	Description
3	<b>Muscular System</b> <ul style="list-style-type: none"> <li>muscle tissue subtypes: smooth muscle, skeletal muscle, cardiac muscle</li> <li>microscopic and macroscopic structure of muscle</li> <li>principles of muscle function: actions of selected muscles</li> </ul>
1	<b>FIRST MIDTERM EXAMINATION</b>
6	<b>Nervous System</b> <i>Nervous Tissue</i> <ul style="list-style-type: none"> <li>neuroglia, neurons, myelinated and non-myelinated neurons</li> <li>action potential and synaptic transmission</li> </ul>
	<b>Brain</b> <i>Gross Superficial Anatomy</i> <ul style="list-style-type: none"> <li>hemispheres, lobes, landmarks, cortical localization of function</li> </ul> <i>Cerebral Vasculature</i> <ul style="list-style-type: none"> <li>major arteries, veins, and venous sinuses</li> </ul> <i>Gross Anatomy in Section</i> <ul style="list-style-type: none"> <li>corpus callosum, thalamus, basal ganglia, hypothalamus including association with pituitary stalk and pituitary gland, ventricles</li> <li>midbrain (cerebral peduncles, cerebral aqueduct, substantia nigra)</li> <li>pons (fourth ventricle)</li> <li>medulla</li> </ul>
	<b>Spinal Cord</b> <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> <li>motor and sensory tracts</li> <li>reflex mechanisms</li> </ul>
	<b>Meningeal Protection</b> <i>Meningeal Membranes</i> <ul style="list-style-type: none"> <li>dura (falx, tentorium), venous sinuses, arachnoid and subarachnoid spaces, CSF cisterns, pia</li> </ul> <i>CSF Production and Circulation</i> <ul style="list-style-type: none"> <li>choroid plexus, ependyma, ventricles, medial and lateral foraminae, arachnoid villi</li> </ul>
	<b>Peripheral Nervous System:</b> <b>Spinal vs Cranial Nerves</b> <b>PNS</b> <ul style="list-style-type: none"> <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>
1	<b>SECOND MIDTERM EXAMINATION</b>

No. of Hours	Description
6	<p><b>Cardiovascular System</b></p> <p><i>Background</i></p> <ul style="list-style-type: none"> <li>– the body's fluid compartments; water, ionic, and osmotic distributions</li> </ul> <p><i>Blood</i></p> <ul style="list-style-type: none"> <li>– plasma composition and functions</li> <li>– erythrocytes, formation and destruction</li> <li>– specific leukocytes</li> <li>– platelets and hemostasis</li> <li>– hemopoiesis</li> </ul> <p><i>Arterial System</i></p> <ul style="list-style-type: none"> <li>– elastic and muscular arteries, arterioles</li> <li>– capillary structure, movement of fluid and dissolved substances</li> </ul> <p><i>Venous System</i></p> <ul style="list-style-type: none"> <li>– names and locations of selected arteries</li> <li>– structure of veins and venules, valves</li> <li>– names and locations of selected veins</li> </ul> <p><i>Heart</i></p> <ul style="list-style-type: none"> <li>– location, pericardial sac, myocardium, endocardium</li> <li>– atria, ventricles, valves, pacemaker, and conduction system</li> <li>– cardiac cycle: electrical and mechanical events, the ECG</li> </ul>
2	<p><b>Lymphatic System</b></p> <ul style="list-style-type: none"> <li>– lymph node/nodules, distribution and function</li> <li>– major lymphatic vessels, lymph circulation</li> <li>– spleen and thymus</li> </ul>