



## Introductory Human Anatomy and Physiology 1 – BIOL 181

University Studies Program

### Course Outline

COURSE IMPLEMENTATION DATE: September 2007  
OUTLINE EFFECTIVE DATE: September 2020  
COURSE OUTLINE REVIEW DATE: April 2025

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#### GENERAL COURSE DESCRIPTION:

This course is an introduction to the structural and functional aspects of the human musculoskeletal, cardiovascular, and respiratory systems. BIOL 181 is presented in a lecture-lab format. The physiology portion of the course is primarily taught during the lecture portion while the anatomy and application portion of the course is dealt with during the laboratory periods.

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**Program Information:** This course is required for the first year of the Bachelor of Science in Nursing Program and is an elective in other disciplines.

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**Delivery:** This course is delivered face to face.

**COTR Credits:** 3

**Hours for this course:** 90 hours

#### Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	45
Seminars / Tutorials	
Laboratory / Studio Hours	45
Practicum / Field Experience Hours	
Other Contact Hours	
<b>Total</b>	90

#### Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-job Experience	N/A
Formal Work Experience	N/A
Other	N/A
<b>Total</b>	

**Course Outline Author or Contact:**

Rob Tillman, BSc, BEd, MSSE

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Signature

**APPROVAL SIGNATURES:**

Department Head  
Erin Aasland Hall  
E-mail: [aaslandhall@cotr.bc.ca](mailto:aaslandhall@cotr.bc.ca)

Dean of Business and University Studies  
Darrell Bethune  
E-mail: [bethune@cotr.bc.ca](mailto:bethune@cotr.bc.ca)

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Department Head Signature

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Dean Signature

EDCO

Valid from: September 2020 – April 2025

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Education Council Approval Date

**COURSE PREREQUISITES AND TRANSFER CREDIT:**

**Prerequisites:** Either Biology 12, Anatomy & Physiology 12, BIOL 090, BIOL 101, BIOL 102, or equivalent. Life Sciences 11 and Chemistry 12 Highly recommended.

**Corequisites:** None

**Flexible Assessment (FA):**

Credit can be awarded for this course through FA  Yes  No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

**Transfer Credit:** For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Students should also contact an academic advisor at the institution where they want transfer credit.

**Prior Course Number:** N/A

## Textbooks and Required Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

OpenStax College, Anatomy & Physiology. OpenStax College. 25 April 2013.  
<http://cnx.org/content/col11496/latest/>.

BIOL 181 Lab Manual- Available in the College Bookstore

*Please see the instructor's syllabus or check COTR's online text calculator*

<http://go.cotr.bc.ca/tuition/tCalc.asp> for a complete list of the currently required textbooks.

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## LEARNING OUTCOMES:

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

- use a compound microscope to identify organs, glands, tissues, and cell types from dissections of preserved specimens and observations of prepared slides;
  - use anatomical, directional, and regional terminology to identify the position and location of body structures, and describe muscle actions;
  - identify the four basic tissue types and provide examples in the body of each, including their classes and subclasses;
  - describe the structure and function of bones and the skeletal system, including the processes of bone formation and bone repair;
  - describe the structural and functional classification of joints, and provide examples in the body of each;
  - describe the structure and function of muscle tissue, and describe the process of skeletal muscle contraction;
  - describe the structure and function of the cardiovascular system, including the heart, blood vessels, and blood, and the control of heart rate and blood pressure;
  - describe the structure, function, and control of the respiratory system, including the mechanism of breathing and the process of gas exchange
  - describe the relationship between the normal structure and function of specific body systems and the maintenance of homeostasis; and
  - describe the relationship between abnormal structure and function of specific body systems and the development of disease.
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## COURSE TOPICS:

### 1. ORGANIZATION OF THE BODY

Levels of Structural Organization

Maintaining Life

Homeostasis

The Language of Anatomy

- Anatomical Position and Directional Terms
- Regional Terms

- Body Planes and Sections
- Body Cavities and Membranes

#### Structure and Function of Cells

#### Histology

- Basic Characteristics
- Definition
- Epithelial Tissue
- Connective Tissue
- Nervous Tissue
- Muscle Tissue
- Tissue Repair

#### Structure and Function of Skin

## 2. COVERING, SUPPORT & MOVEMENT OF THE BODY

### A. Bones & Skeletal Tissues

Functions of the Bones

Classification of Bones

Bone Structure

- Gross Anatomy
- Microscopic Structure of Bone
- Bone Markings
- Chemical Composition of Bone
- Bone Development (Osteogenesis)
- Endochondral Ossification
- Intramembranous Ossification
- Physiological Control of Bone Formation/Maintenance
- Bone Homeostasis: Remodeling and Repair
- Bone Remodeling
- Repair of Fractures
- Introduction to Bone Disorders

### B. Joints

Introduction to Articulations

- Structural and Functional Classification of Joints

Fibrous Joints

Cartilaginous Joints

Synovial Joints

- General Structure and Characteristics
- Types of Synovial Joints
- Introduction to Synovial Joint Injuries

### C. Muscles and Muscle Tissue

Functions of Muscle Tissue

Muscle Types

Skeletal Muscle

- Gross Anatomy of Skeletal Muscle Tissue
- Microscopic Anatomy of a Skeletal Muscle Fiber
- Contraction of a Skeletal Muscle Fiber
- How Muscles Respond to Stimuli

- The Molecular Basis of Muscle Contraction
- Regulation of Contraction
- Contractions of Skeletal Muscle
- Motor Unit
- Muscle Twitch/Tension
- Muscle Tonus
- Types of Skeletal Muscle Fibers
- Muscle Metabolism
- Energy Storage
- Muscle Fatigue
- Force, Velocity and Duration of Muscle Contraction
- Force of Contraction
- Muscle-joint Lever Actions
- Muscular Dystrophy, Atrophy and Hypertrophy
- Thermoregulation
- Hypothermia
- Hyperthermia
- Smooth Muscle
- Microscopic Structure
- Contraction
- Introduction to Muscle Disorders

### **3. THE CARDIOVASCULAR SYSTEM**

#### **A. The Heart**

Size, Location and Orientation

- Coverings
- Heart wall
- Chambers & Associated Vessels
- Pathway of Blood
- Coronary Circulation
- Heart Valves
- Properties of Cardiac Muscle
- Microscopic Anatomy
- Mechanism and Events of Contraction
- Energy Requirements
- Cardiac Physiology
- Electrical Events and the Cardiac Cycle
- Electrocardiography
- Heart Sounds
- Cardiac Output
- Regulation of Stroke Volume
- Preload: Degree of Stretch
- Afterload: Back Pressure
- Regulation of Heart Rate
- Introduction to Cardiac Disorders

#### **B. Blood Vessels**

Blood Vessel Structure and Function

Physiology of Circulation

- Introduction to Blood Flow, Blood Pressure and Resistance

- Systemic Blood Pressure
  - Factor Influencing Blood Pressure
  - Regulation of Blood Pressure
- Circulatory Pathways: Blood Vessels of the Body  
Fetal Circulation  
Introduction to Vascular Disorders

### **C. Blood**

Composition and Functions of Blood

Cellular Phase

- Erythrocytes
- General Structural and Functional Characteristics
- Production of Erythrocytes
- Regulation of Erythropoiesis
- Fate and Destruction of Erythrocytes
- Leukocytes
- General Structural and Functional Characteristics
- Types
- Platelets
- Liquid Phase
- Components of Blood Plasma

Hemostasis

Introduction to Blood Disorders

### **D. The Lymphatic System**

Structure and Function

## **4. THE RESPIRATORY SYSTEM**

Functional Anatomy of the Respiratory System

Mechanics of Breathing

- Respiratory Muscles
- The Respiratory Reflex
- Control of Respiration
- Spirometry
- Respiratory Volumes and Capacities
- Pulmonary Function Tests
- Alveolar Ventilation Role

Gas Exchange in the Body

- Basic Properties of Gases
- Composition of Alveolar Gas
- Gas Exchange Between the Blood, Lungs and Tissues
- Transport of Respiratory Gases

Introduction to Respiratory Disorders

## **LAB PROGRAM**

Lab 1: Histology: the study of tissues

Lab 2: Anatomical positions, planes and the axial skeleton

Lab 3: The appendicular skeleton

Lab 4: Articulations

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- Lab 5: The cardiovascular system
- Lab 6: Anatomical and physiological aspects of respiration
- Lab 7: Hematology
- Lab 8: Muscles I - muscles of the torso, neck and head
- Lab 9: Muscles II – muscles and associated structures of the leg and arm

*See instructor’s syllabus for the detailed outline of weekly readings, activities and assignments.*

**EVALUATION AND ASSESSMENT:**

Assignments	% Of Total Grade
Midterm 1	15%
Midterm 2	15%
Lab Exam 1	15%
Lab Exam 2 (cumulative)	25%
Final Exam (cumulative)	<u>30%</u>
Total	100%

*Please see the instructor’s syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments and use of electronic aids.*

**EXAM POLICY:**

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of “0” for the exam.

**COURSE GRADE:**

Course grades are assigned as follows:

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Mark (Percent)	≥ 90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	< 50

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses. Nursing students must achieve a grade of C or better in BIOL 181 in order to be eligible for, or continue in, the BSN program.

**ACADEMIC POLICIES:**

See [www.cotr.bc.ca/policies](http://www.cotr.bc.ca/policies) for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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**COURSE CHANGES:**

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment and marketing needs. The instructor endeavours to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.