BIOL-181 – Introductory Human Anatomy and Physiology 1

University Arts and Science

Effective Term & Year: Fall 2025
Course Outline Review Date: 2030-04-01

Program Area: Math and Sciences

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.

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.

Delivery Methods: On-campus (Face-to-Face)

Credit Type: College of the Rockies Credits

Credits: 3

Course type/s: Sciences, Lab Sciences

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	45
Seminar/Tutorials	
Laboratory/Studio	45
Practicum/Field Experience	

Co-op/Work Experience	
Other	
Total	90

Course Requisites:

- Complete 1 of the following
  - Completed at least 1 of the following:
    - BIOL090 – Biology-Provincial Level (Human Biology) (3)
    - ATPH 12 – Anatomy and Physiology 12
    - BIOL101 – Introduction to Biology 1 (3)
  - Life Sciences 11 and Chemistry 12 Highly recommended.

Prior Learning and Recognition: Yes

Students are able to request formal recognition of their prior learning or experience outside the classroom. Challenge examination, portfolio-assisted assessment, work-based assessment or a combination of assessments that is appropriate to identify, assess, and recognize prior skills, competencies, and knowledge to achieve course credit. Tuition fees apply, refer to Policy 2.5.5 Prior Learning Assessment and Recognition (PLAR) or contact an education advisor for more information.

Course Transfer Credit:

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see https://www.bctransferguide.ca/ or https://transferalberta.alberta.ca . For more transfer credit information, please visit https://www.cotr.bc.ca/Transfer

All requests for course transfer credit from institutions in British Columba or elsewhere should go to the College of the Rockies Enrolment Services office.

Textbook 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 https://textbook.cotr.bc.ca/ *for a complete list of the currently required textbooks.*

Learning Outcomes:

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

- use laboratory techniques to relate form to function through observations of prepared slides, dissections of preserved specimens, and measurements of body systems;
- use anatomical, directional, and regional terms to identify the position and location of body structures and describe the movements that occur at joints due to muscle actions;
- identify tissues and provide examples of structures in the body where each type, class, and subclass is located;
- describe the structure and function of membranes, including the integumentary system;
- describe the structure and function of the musculoskeletal system, including the formation, maintenance, and repair of bone, the classification of joints, and the contraction of muscle;
- describe the structure and function of the cardiovascular and respiratory systems, including the control of heart rate, blood pressure, and breathing, and the process of gas exchange; and
- describe the relationship between the normal or abnormal structure and function of specific body systems and the maintenance of homeostasis or development of disease, respectively.

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
- Respirometry
- 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

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 Assessments

Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Midterm 1	15%
Midterm 2	15%
Lab Exam 1	15%
Lab Exam 2 (cumulative)	25%
Final Exam (cumulative)	30%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

Evaluation Notes: A grade of “D” grants credit, but may not be sufficient as a prerequisite for sequential courses.

Evaluation Notes Comments:

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.

Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will

consider other written requests. Any student who misses a scheduled exam without prior approval will receive a “0” on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at https://cotr.bc.ca/about-us/college-policies/ and include the following:

- Policy 2.1.4 Course Audit
- Policy 2.4.1 Credential Framework
- Policy 2.4.3 Students with Documented Disabilities
- Policy 2.4.4 Student Rights, Responsibilities and Conduct
- Policy 2.4.8 Academic Performance
- Policy 2.4.9 Student Feedback and Concerns
- Policy 2.4.11 Storage of Academic Works
- Policy 2.5.3 Student Appeal
- Policy 2.5.5 Prior Learning Assessment and Recognition (PLAR)

Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.