



Functional Anatomy and Physiology 1 – KNES 200

Kinesiology Program/University Studies

Course Outline

COURSE IMPLEMENTATION DATE: Pre 1998
OUTLINE EFFECTIVE DATE: September 2020
COURSE OUTLINE REVIEW DATE: March 2025

GENERAL COURSE DESCRIPTION:

This course is an introduction to the structure and function of the systems involved in the control and execution of human movement. Special emphasis will be placed on the musculoskeletal, nervous and endocrine systems that are responsible for the integration and control of human movement.

Program Information: This is a required course in the Kinesiology Diploma Program and may be used as an elective for students in other disciplines.

Delivery: KNES 200 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.

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	
Total	90

Practicum Hours (if applicable):

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

Course Outline Author or Contact:

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Signature**APPROVAL SIGNATURES:**Department Head
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EDCO

Valid from: September 2020 – March 2025

Education Council Approval Date**COURSE PREREQUISITES AND TRANSFER CREDIT:****Prerequisites:** Minimum 65% in either Anatomy & Physiology 12, BIOL 090, BIOL 101, BIOL 102, or KNES 190, or equivalent**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: HKIN 200 ⇔ KNES 200**Date changed:** September 2012

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/>.

KNES 200 Lab Manual – Available at the College Bookstore

Marieb, E.N., & Brito, S. (2017). *Anatomy and Physiology Coloring Workbook: A Complete Study Guide* (12th Ed.). Pearson Publishing. ISBN-13: 978-0134459363

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.

LEARNING OUTCOMES:

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

- explain and use anatomical and physiological terminology;
 - explain organ system involvement in human structure, sensation and perception, movement, integration, and regulation;
 - identify the various components of the skeletal and articular systems, including joint structures;
 - describe the skeletal system including bone composition, function, remodeling, and growth regulation;
 - identify the main muscles of the human body, their origins, insertions and actions;
 - describe the muscular system, including contraction kinetics, excitation contraction coupling, fibre types, and muscle energetics;
 - identify the structures of the central and peripheral nervous systems;
 - describe the nervous system, including action potentials, impulses, neural processing, structure and function of the central and peripheral nervous systems, and special senses;
 - explain the integration of the skeletal, articular, muscular and nervous systems as it relates to human movement and physical activity;
 - identify the components of the endocrine system; and
 - describe the role the endocrine system plays in control and regulation of the body.
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COURSE TOPICS:

1. ORGANIZATION OF THE BODY

A. 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

B. Histology

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

2. COVERING, SUPPORT & MOVEMENT OF THE BODY

A. Skeletal System

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 and factors affecting function
- Effects of Resistance Training, Diet and Aging on bone

B. Articular System (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

Developmental Aspects of Joints

Effects of Physical Activity, Resistance Training and Aging

C. Muscular System

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
 - The Molecular Basis of Muscle Contraction
 - Regulation of Contraction
 - Force, Velocity and Duration of Muscle Contraction

- Contractions of Skeletal Muscles
 - How Muscles Respond to Stimuli
 - Motor Unit
 - Muscle Twitch/Tension
 - Muscle Tonus
- Types of Skeletal Muscle Fibers
 - Muscle Energetics
 - Muscle Metabolism
 - Energy Storage

Muscle Fatigue

Muscle-joint Lever Actions

Muscular Dystrophy, Atrophy and Hypertrophy

Thermoregulation

- Hypothermia
- Hyperthermia

Smooth Muscle

- Microscopic Structure
- Contraction

Introduction to Muscle and factors affecting function

3. THE ENDOCRINE SYSTEM

Introduction to Endocrine System Function: In-Body Communication

Homeostasis

- Biochemical Nature of Hormones
- Actions of Hormones at a Molecular Level
- Hormonal Feedback Mechanisms

The Pituitary Gland

- Neurohypophyseal hormones: Targets and Actions
- Adenohypophyseal hormones: Targets, Actions and Extended effects

The Endocrine System and Physical Activity

- Role of hormones in physical activity and exercise
- Performance Enhancing Drugs

Introduction to Endocrine System and factors affecting system function

4. THE NERVOUS SYSTEM

Histology

Introduction to Nervous System Function: In-body Communication

- Molecular Basis of the Nerve Impulse Transmission
- Neuron Classification
- Reflexes
- Physical Performance and Movement
 - Integration of the Nervous and Muscular system
 - Saltatory Transmission

Central Nervous System

- Brain and Spinal Cord

Peripheral Nervous System

- Spinal and Cranial Nerves
- Autonomic Nervous System
- Somatic Nervous System

Special Senses

Introduction to Nervous System Diseases and Disorders

LAB PROGRAM

Lab 1: Histology & Anatomical and Movement Terminology, Body Planes

Lab 2: The Skull and Muscles of the Neck and Head

Lab 3: The Bones and Muscles of the Vertebral Column and Thorax

Lab 4: The Bones and Muscles of the Shoulder and Arm

Lab 5: The Bones and Muscles of the Pelvis and Hip

Lab 6: The Bones and Muscles of the Leg

Lab 7: Articulations (Joints)

Lab 8: Nervous System-Brain, Cranial, Spinal & Peripheral Nerves

Lab 9: Ear, Eye & Endocrine Glands

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.

ACADEMIC POLICIES:

See www.cotr.bc.ca/policies for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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.