COLLEGE OF THE ROCKIES

Introduction to Biomechanics – KNES 103

Kinesiology Program

Course Outline

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

GENERAL COURSE DESCRIPTION:

In this course, students acquire knowledge of the mechanical, anatomical, and physiological aspects of human movement and performance, including the application of basic principles of physics and math to a quantitative analysis of human movement. Analysis will focus on the development of forces within the body and their effect on initiating and controlling 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: This course is delivered in face-to-face format.

COTR Credits: 3

Hours for this course: 45 hours

Typical Structure of Instructional Hours:

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

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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Department Head Signature

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Dean Signature

EDCO

Valid from: September 2020 – March 2025

Education Council Approval Date

COURSE PREREQUISITES AND TRANSFER CREDIT:

Prerequisites: Either Foundations of Math 11, Foundations of Math 12, Pre-Calculus 11, Pre-Calculus 12, Calculus 12, MATH 080 or equivalent; Minimum 55% in KNES 163 or KNES 190 or KNES 152.

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 103 ⇨⇨KNES 103
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:

McGinnis, Peter M. *Biomechanics of Sport and Exercise*. Human Kinetics, 2005.

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

- describe the scope of exercise and sport biomechanics;
- identify and describe methods used to achieve goals in exercise and sport biomechanics;
- name and identify the segments, large bones, joints and major muscles of the body;
- identify and use anatomical terminology to describe movement;
- identify the organization of and basic dimensions used in mechanics, and apply each of Newton's laws of motion to various exercises and sport skills;
- describe and classify "force" and how it applies to linear, angular and general motion;
- describe work, power and energy and how motion is caused using Newton's laws;
- describe torques and movements of force and apply to exercise and sport;
- describe fluid mechanics and how they apply to water sports;
- describe the mechanical forces of the human body during sport and exercise;
- describe the structure and physiology of the skeletal, muscular and nervous systems, and how they adopt to the various forces placed on them in sport and exercise; and
- analyze and apply qualitative and quantitative analysis to a specific sport or exercise skill.

COURSE TOPICS:

- Unit I: Introduction to Biomechanics/External Forces and Their Effect on Human Motion
  - Why Study Biomechanics?
  - Terminology in Exercise and Sport Biomechanics
  - Fundamental Concepts and Principles of Mechanics
  - Forces: Maintaining Equilibrium or Changing Motion
  - Linear Kinematics: Describing Objects in Linear Motion
  - Linear Kinetics: Explaining the Causes of Linear Motion
  - Work, Power and Energy

- Unit II: Angular Kinematics and Fluid Mechanics
  - Angular Kinematics: Describing Objects in Angular Motion
  - Angular Kinetics: Explaining the Causes of Angular Motion
  - Fluid Mechanics

- Unit III: Internal Biomechanics (Bone/Muscle/Nerve) and the Application of Biomechanical Principles in Sport and Exercise
    - Mechanics of Stress and Strain on Human Motion
    - The Skeletal System
    - The Muscular System
    - The Nervous System
    - Applying Biomechanical Principles

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

EVALUATION AND ASSESSMENT:

Assignments	% Of Total Grade
In-Class Assignments	5%
Unit Exams (20% x 2)	40%
Final Exam	30%
Analysis Presentation	25%
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.