



**CURRICULUM GUIDELINES**

**A: Division: Science & Technology**

**Date: November 21, 2000**

**B: Department/ Sport Science  
Program Area:**

**New Course**

**Revision**

**If Revision, Section(s) Revised: C**

**Date Last Revised: November 5, 1993**

**C: SPSC 309**

**D: Mechanics and Kinetics of Human Movement**

**E: 3**

**Subject & Course No.**

**Descriptive Title**

**Semester Credits**

**F:** Calendar Description: This course is an introduction to the laws of physics as applied to human movement and athletic performance. Coverage will include an examination of the biomechanical systems of the human body with respect to the forces developed during physical activity as well as biomechanical analysis of specific sport skills and an introduction to the research tools of biomechanics.

**G:** Allocation of Contact Hours to Types of Instruction/Learning Settings

Primary Methods of Instructional Delivery and/or Learning Settings:

**Lecture/Practice**

Number of Contact Hours: (per week / semester for each descriptor)

**4**

Number of Weeks per Semester:

**14**

**H:** Course Prerequisites:

**SPSC 163  
BIOL 109 and BIOL 209 or BIOL 304 and BIOL 404**

**I.** Course Corequisites:

**None**

**J.** Course for which this Course is a Prerequisite:

**None**

**K.** Maximum Class Size:

**30**

**L:** PLEASE INDICATE:

Non-Credit

College Credit Non-Transfer

College Credit Transfer:

Requested

Granted

SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS ([www.bccat.bc.ca](http://www.bccat.bc.ca))

Equivalent Courses:

U.B.C. PHED 309 = PE 363

S.F.U. PHED 309/409 = KIN 401

U.VIC. PHED 309 = PE 200

(3 Credits) Requested

Granted

Unassigned Credit

**M: Course Objectives/Learning Outcomes**

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

1. Describe the fundamental biomechanical concepts of movement related to the structure and function of the human body
2. Describe the linear and angular kinematics related to human movement and athletic performance
3. Describe the linear kinetics related to human movement and athletic performance
4. Describe the angular kinetics related to human movement and athletic performance
5. Describe the fluid mechanics related to human movement and athletic performance

**N: Course Content****1. Fundamental Biomechanical Concepts of Human Movement**

The student will:

- 1.1 Describe the basic biomechanics of the musculoskeletal system:
  - 1.1.1 lever-like arrangements
  - 1.1.2 wheel and axle-like arrangements
  - 1.1.3 pulley-like arrangements
  - 1.1.4 general considerations of musculoskeletal machines

**2. Linear and Angular Kinematics of Human Performance**

The student will:

- 2.1 Describe the linear and angular kinematics related to human movement and athletic performance:
  - 2.1.1 linear speed and velocity
  - 2.1.2 linear acceleration
  - 2.1.3 projectile motion
  - 2.1.4 relationship between linear and angular motion

**3. Linear Kinetics of Human Performance**

The student will:

- 3.1 Describe the linear kinetics related to human movement and athletic performance:
  - 3.1.1 SI units system
  - 3.1.2 inertia, mass, force, weight, pressure
  - 3.1.3 Newton's laws of motion
  - 3.1.4 centripetal and centrifugal forces
  - 3.1.5 impulse, momentum, impacts
  - 3.1.6 work, energy, power
- 3.2 Describe and demonstrate the linear kinetics of specific sport skills

**4. Angular Kinetics of Human Performance**

The student will:

- 4.1 Describe the angular kinetics related to human movement and athletic performance:
  - 4.1.1 eccentric force, couple, moment, torque
  - 4.1.2 levers and equilibrium
  - 4.1.3 muscle and joint mechanics
  - 4.1.4 moment of inertia
  - 4.1.5 angular momentum
- 4.2 Describe and demonstrate the angular kinetics of specific sport skills

**N: Course Content (continued)****5. Fluid Mechanics of Human Performance**

The student will:

- 5.1 Describe the fluid mechanics related to human movement and athletic performance:
- 5.1.1 fluid drag force
  - 5.1.2 fluid lift force
  - 5.1.3 Magnus effect
  - 5.1.4 buoyancy and flotation
  - 5.1.5 centre of buoyancy
- 5.2 Describe and demonstrate the fluid mechanics of specific sport

**O: Methods of Instruction**

The lectures will emphasize a functional approach, presenting the theory in a meaningful and applied manner. A wide range of audio-visual materials such as coloured overhead transparencies, anatomical charts and models, videotapes and films will be utilized as well as live demonstrations.

The practical experiences are designed to integrate theory with practical "hands on" experience. These applied experiences will take place in the laboratory as well as in athletic settings such as the gymnasium, sports' fields, courts, tracks and training facilities. The students will be introduced to biomechanics instrumentation for analysis of specific sport skills.

**P: Textbooks and Materials to be Purchased by Students**

Hall, Susan, Basic Biomechanics, St. Louise: Mosby Publishers, 1990. (ISBN 0801620872)

**Q: Means of Assessment**

Laboratory Reports		15%
Biomechanical Analysis Project		20%
Practical Applications		10%
Lecture Examinations	- Mid-term	25%
	- Final	30%
	<b>TOTAL:</b>	<u>100%</u>

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

Course Designer(s)

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