

**EDKP- 206** BIOMECHANICS OF HUMAN MOVEMENT

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Office: Currie Memorial Gymnasium, Room A215  
Phone: (514) 398

- d. Children, adults, and elderly
- e. Motor control
- 6. Derive and solve equations of human motion in two dimensions.
- 7. Draw and use the concept of a free-body diagram as it applies to human movement.
- 8. Explain how forces are generated by the muscle-tendon complex.
- 9. Interpret graphs and simple models used to explain human movement.
- 10. Apply related peer-reviewed research to interpret data collected.
- 11. Apply active learning, critical thinking, and problem-solving skills in the qualitative analysis of human movement.

1.
  - 1.1. Movements in the sagittal, frontal and transverse planes.
  - 1.2. Movements occurring about the medio-lateral, antero-posterior and longitudinal axis.
  - 1.3. Muscle, bones and joints with the correct terminology.
  - 1.4. Degrees of freedom at a joint based on its anatomy.
  - 1.5. Proper terminology to describe human movement.
2.
  - 2.1 Kinematic variables using vector analysis to quantify human movement.
  - 2.2 Problems in 2-dimensions involving: displacement, velocity, acceleration, time.
  - 2.3 Factors that affect the trajectory of a projectile.
  - 2.4 Free-body diagrams to illustrate the variables that affect the trajectory of a projectile.
  - 2.5 Graphical interpretation to determine relationships between kinematic variables in 2-dimensions.
  - 2.6 Peer-reviewed research applied to the interpretation of kinematic data.
  - 2.7 Tools used to acquire human movement data.
3.
  - 3.1. Kinetic variables to the quantification of human movement.
  - 3.2. Problems in 2-dimensions involving: mass, force, friction, acceleration, moment of inertia, work, power, energy, momentum and impulse for both linear and angular movements.
  - 3.3. Free-body diagrams to understand the net effect of forces on a body or system. These free-body diagrams are used to solve problems involving balanced or unbalanced forces and objects on inclined surfaces.
  - 3.4. The role that play internal and external forces in the development of acute and chronic injuries.
  - 3.5. Graphical interpretation to determine relationships between kinetic variables.
  - 3.6. Peer-reviewed research applied to the interpretation of kinetic data.
  - 3.7. Kinetic data collection with the appropriate tools.
4.
  - 4.1. The elements of the human musculo-skeletal system and how the system's properties interact during human movement.
  - 4.2. How muscles generate forces and their effect on the structures surrounding them.
  - 4.3. Concepts of force-length, force-velocity, hysteresis, compression, tension, shear, strain and Young's Modulus to explain musculo-skeletal adaptation.
  - 4.4. The interaction of the mechanical properties of the musculo-skeletal system as they affect human movement.
  - 4.5. Collecting data using surface electrodes over appropriate anatomical landmarks during a range of human movements.
  - 4.6. The conceptual framework for EMG analysis of human movement and the physiological and biomechanical basis for recording electrical potentials from striated muscles

Evaluation will be carried out in accordance with McGill University policy.  
The instructor will present a written course outline with specific evaluation criteria at the beginning of-





Week	Date	Topic (lecture/lab)	Prior to Class	Out of Class
8	Mar 7	Ankle & foot structure, function, analysis of forces during activity	Oatis Ch. 44-46 Submit Report 2	
	Mar 8,10	Walking/Running Gait Video Analysis & Interpreting Gait Waveforms		