

Course Code	Course Name	Credits
26PE510	Applied Kinesiology and Sports Biomechanics	04

Course Objectives

- Introduce the meaning, scope, and importance of applied kinesiology and sports biomechanics.
- Explain anatomical and biomechanical concepts such as axes, planes, motion, and force.
- Understand muscle structure, origin, insertion, and action in human movement.
- Apply principles of motion, force, leverage, and equilibrium to sports performance.
- Analyse projectile motion, stability, and mechanical efficiency in physical activities.
- Evaluate movement through kinesiological, biomechanical, and cinematic analysis methods.

Learning Outcomes

Upon successful completion of this course, it is intended that a student will be able to:

- Understand basic concepts of biomechanics, motion, and muscle mechanics.
- Apply knowledge of muscles, forces, and motion to sports skills.
- Analyse laws of motion and mechanical principles in human movement.
- Evaluate stability, equilibrium, and projectile mechanics in sports.
- Conduct basic movement analysis using biomechanical methods.

Unit 1 - Introduction

Meaning, nature, role and scope of Applied kinesiology and Sports Biomechanics. Meaning of Axis and Planes, Dynamics, Kinematics, Kinetics, Statics, Centre of gravity -Line of gravity plane of the body and axis of motion, Vectors and Scalars.

Unit 2 - Muscle Action

Origin, Insertion and action of muscles: Pectoralis major and minor, Deltoid, Biceps, Triceps (Anterior and Posterior), Trapezius, serratus, Sartorius, Rectus femoris, Abdominis, Quadriceps, Hamstring, Gastrocnemius.

Unit 3 - Motion and Force

Meaning and definition of Motion. Types of Motion: Linear motion, angular motion, circular motion, uniform motion. Principles related to the law of Inertia, Law of acceleration, and law of counter force. Meaning and definition of force Sources of force Force components. Force applied at an angle - pressure -friction Buoyancy, Spin - Centripetal force - Centrifugal force.

Unit 4 - Projectile and Lever.

Freely falling bodies Projectiles -Equation of projectiles - Stability - Factors influencing equilibrium - Guiding principles for stability -static and dynamic stability. Meaning of work, power, energy, kinetic energy and potential energy. Leverage classes of lever practical application. Water resistance -Air resistance -Aerodynamics.

Unit 5 - Movement Analysis

Analysis of Movement: Types of analysis: Kinesiological, Biomechanical. Cinematographic. Methods Sports and Games analysis.

Reference Books:

1. Deshpande S.H.(2002). ManavKriyaVigyan Kinesiology, Amravati Hanuman Vyayam Prasarak Mandal.
2. Hoffman S.J. Introduction to Kinesiology (Human Kinesiology publication In.2005).
3. Steven Roy, and Richard Irvin. (1983). Sports Medicine. New Jersey: Prentice hall.
4. Thomas. (2001). Manual of structural Kinesiology, New York: Me Graw Hill.
5. Uppal A.K. Lawrence Mamta MP Kinesiology(Friends Publication India 2004)
6. Uppal, A (2004), Kinesiology in Physical Education and Exercise Science, Delhi Friends publications.
7. Williams M (1982) Biomechanics of Human Motion, Philadelphia; Saunders Co.