

**OBJECTIVES:**

- To get the clear understanding of application of mechanics in medicine.
- To study the properties bone and soft tissues like articular cartilage tendons and ligaments
- To gain necessary knowledge about accident and injuries.

**UNIT I ANATOMY OF HUMAN LOWER LIMB**

6

Introduction to Biomechanics – Terminology – Anthropometry – Skeletal Mechanics – Structure of bones – Composition and properties of bones and relationship to structure – Elastic properties of bones – Characterizing elastic anisotropy - Modelling and Remodelling of bones(Wolfe's law of bone remodelling); Reference planes of limb motion; limb movements; motion of joints; bones of pelvis and legs; joints and ligaments; muscles and tendons.

**UNIT II BIOMECHANICS**

4

Force; Moments of Force; Kinetics and Kinematics; Work, Energy and Power.

**UNIT III NORMAL GAIT**

12

Force Platforms; Mechanical Analysis; Mathematical Modelling; Terminology used in Gait Analysis; Gait cycle timing; Foot Placement; Cadence, Cycle time and Speed; Outline of Gait Cycle; Gait cycle in detail; Ground Reaction Forces; Energy Transfers; Determinants of Gait.

**UNIT IV ABNORMALITY OF GAIT**

11

Specific Gait abnormalities; Functional leg length discrepancy; Abnormal Hip rotation; Excessive Knee Flexion; Excessive Knee Extension; Abnormal Foot Contact; Abnormal foot Rotation; Abnormal Walking Base; Common Pathologies affecting Gait.

**UNIT V METHODS OF GAIT ANALYSIS**

12

Visual Gait Analysis; General gait Parameters; Motion Measurement systems; Electrogoniometers; Pressure beneath the foot; Mapping Systems; Electromyography; Energy Consumption; Force Platforms; Dynamics of Reaching – Inverse dynamic modelling

**TOTAL: 45 PERIODS**

**OUTCOME:**

- The study of mechanical properties of biological tissues and the properties of musculo-skeletal system give us a wide understanding about its structure and when it undergo wear and when it fails so many precautions can be given by ourselves to rehabilitate subjects.
- The knowledge gained will be helpful in doing research in properties of hard tissues like bones and to generate a mathematical model of bone structure, prosthetic and orthotic assistive devices design and soft computing analysis for non-invasive testing.

**REFERENCES**

1. Journals of: (a) Biomechanics; (b) Biomedical Engineering; (c) Gait and Posture; (d) Clinical Biomechanics.
2. Gait Analysis – an Introduction; Michael W Whittle, Butterworth Heinemann Publications.

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