

Syllabus for the PhD Entrance Examination

Subject: Physical Education

Unit I: Sports Training

1.1 Scientific Principles & Structure of Training: Meaning, Definition, and Characteristics of Sports Training. Principles of Training (Overload, Specificity, Reversibility, Progressive Loading, Individualization). Components of Training (Warming up, Conditioning, Cooling down).

1.2 Development of Motor Components: Scientific methods for developing Strength, Endurance, Speed, Flexibility, and Coordinative Abilities. Methods of training (Interval, Circuit, Fartlek, Weight training, Plyometrics).

1.3 Planning and Periodization: Types of Planning (Long term, Short term). Periodization: Meaning, Aims, and Types (Single, Double, Triple). Structure of training cycles (Macro, Meso, Microcycles).

1.4 Talent Identification and Technical/Tactical Training: Process of Talent Identification. Technical and Tactical training methods. Assessment of training load and recovery.

Unit II: Physiology and Anatomy

2.1 Musculoskeletal & Nervous System Adaptations: Microscopic structure of muscle fibres, Sliding filament theory. Muscular adaptations to exercise (hypertrophy). Neuro-muscular junction and neural control of motor skills.

2.2 Cardio-Respiratory Responses: Acute and Chronic Cardiovascular and Respiratory adaptations to exercise. Minute ventilation, Oxygen consumption, and Cardiac Output.

2.3 Bioenergetics and Metabolism: Energy systems (ATP-PC, Lactic Acid, Aerobic). Metabolic responses to exercise (Prolonged, Short-term, Intermittent). Lactate Threshold and Recovery.

2.4 Environmental Physiology & Ergogenic Aids: Physiological responses to heat, cold, and altitude training. Types of Ergogenic Aids (Mechanical, Psychological, Pharmacological) and Doping Control (WADA/NADA).

Unit III: Biomechanics and Kinesiology

3.1 Fundamental Concepts in Biomechanics: Planes and Axes of motion. Joints and their movements. Motion (Linear and Angular), Laws of Motion (Newtonian), and Projectile Motion.

3.2 Kinematics and Kinetics of Human Movement: Force, Torque, Lever systems, Friction, Spin, Impact, and Elasticity. Linear and Angular Kinematics and Kinetics.

3.3 Kinesiological Analysis of Movement: Muscle attachments (Origin, Insertion, Action) of principal muscles. Kinesiological analysis of fundamental movements (Walking, Running, Throwing, Jumping).

3.4 Biomechanical Instrumentation and Analysis: Force platforms, Accelerometers, Electrogoniometry, High-speed motion analysis (Cinematography). Methods of Center of Gravity (CG) determination.

Unit IV: Sports Psychology

4.1 Foundations of Sport Psychology: Meaning, Definition, Scope, and Need for Psychology in sports. Personality: Theories and Assessment (16 PF, Big Five).

4.2 Mental Factors Affecting Performance: Motivation (Types, Theories), Anxiety, Arousal, Aggression, Concentration, and Self-confidence. Psychological Skill Training (PST): Imagery, Goal Setting, Relaxation Techniques.

4.3 Group Dynamics and Motor Learning: Group cohesion, Team leadership, and Social facilitation in sports. Principles of motor skill learning, Types of transfer of training.

Unit V History of sports

5.1 History and Evolution of Sports: Development of Physical Education in Ancient Greece, Rome, and Modern Europe. History of the Modern Olympic Games, Asian Games, and Commonwealth Games. Development of Physical Education and Sports in India.

Unit VI Measurement and Evaluation in Sports

6.1 Meaning, concept, importance, and principles of measurement and evaluation in physical education and sports

6.2 Criteria of a good test: validity, reliability, objectivity, and norms

6.3 Types of tests: physical fitness tests, skill tests, and psychological tests

6.4 Components of physical fitness and standard fitness tests (AAHPER, Cooper test, Harvard step test)

6.5 Sports skill testing and anthropometric measurements (height, weight, BMI)

6.6 Steps in test construction, administration, scoring, and recording