

Course Code	Course Name	Credits
26PE506	Exercise physiology	04

Course Objectives

- Introduce the structure, function, and composition of skeletal muscles and their response to exercise.
- Explain the functioning of cardiovascular and respiratory systems during physical activity.
- Understand energy systems and metabolic processes involved in exercise performance.
- Apply knowledge of physiological adaptations to training and sports performance.
- Analyse the effects of climatic conditions on exercise and sports performance.
- Evaluate the impact of ergogenic aids and substances on athletic performance and health.

Learning Outcomes

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

- Understand basic structure and function of muscular, cardiovascular, and respiratory systems.
- Apply knowledge of energy systems in different types of exercise.
- Analyze physiological responses to acute and chronic exercise.
- Evaluate the effects of environmental conditions on sports performance.
- Understand the role and risks of ergogenic aids and performance-enhancing substances.

Unit 1 - Skeletal Muscles and Exercise

Macro and Micro Structure of the Skeletal Muscle, Chemical Composition. Sliding Filament theory of Muscular Contraction. Types of Muscle fiber. Muscle Tone, Chemistry of Muscular Contraction Heat Production in the Muscle, Effect of exercises and training on the Muscular system.

Unit 2 - Cardiovascular System and Exercise

Heart Valves and Direction of the Blood Flow Conduction System of the Heart Blood Supply to the Heart Cardiac Cycle, Stroke Volume, Cardiac Output Heart Rate Factors Affecting Heart Rate, Cardiac Hypertrophy, Effect of exercises and training on the Cardio vascular system.

Unit 3 - Respiratory System and Exercise

Mechanics of Breathing Respiratory Muscles, Minute Ventilation, Ventilation at Rest and During Exercise. Diffusion of Gases Exchange of Gases in the Lungs ~Exchange of Gases in the Tissues Control of Ventilation Ventilation and the Anaerobic Threshold. Oxygen Debt Lung Volumes and Capacities Effect of exercises and training on the respiratory system

Unit 4 - Metabolism and Energy Transfer

Metabolism ATP PC or Phosphagen System, - Anaerobic Metabolism, Aerobic Metabolism, Aerobic and Anaerobic Systems during Rest and Exercise. Short Duration High Intensity Exercises High Intensity Exercise Lasting Several Minutes Long Duration Exercises

Unit 5 - Climatic conditions and sports performance and ergogenic aids

Variation in Temperature and Humidity Thermoregulation Sports performance in hot climate. Cool Climate, high altitude. Influence of: Amphetamine, Anabolic steroids, Androstenedione, Beta Blocker, Choline, Creatine, Human growth hormone on sports performance. Narcotic, Stimulants: Caffeine, Ephedrine, Stimulants and sports performance

Reference Books:

1. Arnit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras Poompugar Pathipagam.
2. BeotraAlka, (2000) Drug Education Handbook on Drug Abuse in Sports: Sports Authority of India Delhi.
3. Clarke, D.H. (1975). Exercise Physiology. New Jersey: Prentice Hall Inc., Englewood Cliffs. - David, L Costill. (2004). Physiology of Sports and Exercise. Human Kinetics.
4. Fox, E.L., and Mathews, D.K. (1981). The Physiological Basis of Physical Education and Athletics. Philadelphia: Sanders College Publishing.
5. Guyton, A.C. (1976). Textbook of Medical Physiology. Philadelphia: W.B. Sanders co. - Richard, W. Bowers. (1989). Sports Physiology. WMC: Brown Publishers. - SandhyaTiwaji. (1999). Exercise Physiology. Sports Publishers.
6. Shaver, L (1981). Essentials of the Exercise Physiology. New Delhi: Subject Publications.
7. Vincent, T. Murche. (2007). Elementary Physiology. Hyderabad: Sports Publication.
8. William, D. Mc. Aradle. (1996). Exercise Physiology, Energy, Nutrition and Human
9. Performance, Philadelphia: Lippincott Williams and Wilkins Company. Wilmore J H and Costill DL. (2005) Physiology of Sport and Exercise: 3rd Edition.