

**MPED – III Semester  
PART – A  
THEORY COURSES**

**MPCC – 301:  
Course Title: SPORTS AND EXERCISE PHYSIOLOGY**

Credit			Teaching Hours		
Lecture/Tutorials	Practical/Internship	Total	Lecture/Tutorials	Practical/Internship	Total
3	1	4	48	32	80

**THE COURSE OBJECTIVES ARE:**

- To assess basic concepts of exercise physiology
- To employ students to apply the knowledge of energy systems during exercise.
- To explain the effect of environment and ergogenic aids on exercise and training.
- Develop a thorough understanding of the relationship between physical activity and health.
- To develop the understanding of the physiological processes.

**STUDENT LEARNING OUTCOMES:**

- Describe and apply the fundamental and advanced concepts of exercise physiology.
- Define and describe the term exercise physiology
- Recognize the energy system for aerobic and anaerobic components of exercise.
- Summarize the underlying physiological basis of physical fitness, physical training, health and wellness.
- Discover the nutritional aspect of fitness and performance.
- Comprehend the physiological changes and adaptations during exercise in different environmental conditions

**UNIT I: Introduction and Muscular system**

- Meaning, Definition & Historical Development of Exercise Physiology
- Important of Exercise Physiology in Physical Education and Sports
- Macro & Micro Structure of the Skeletal Muscles, Chemical Composition, Sliding Filament theory of Muscular Contraction. Types of Muscle fiber
- Effect of exercises and training on the muscular system

**UNIT II: Cardio Respiratory System and Exercise**

- 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.
- Mechanics of Breathing, Minute Ventilation – Ventilation at Rest and During Exercise
- Diffusion of Gases, Exchange of Gases in the Lungs (external respiration)
- Exchange of Gases in the Tissues (internal respiration)
- Second Wind, Oxygen Debt
- Lung Volumes and Capacities
- Effect of exercises and training on the respiratory system

### **UNIT III: Metabolism**

- Metabolism
  - Anabolism
  - Catabolism
- Energy System
  - Phosphagen System
  - Anaerobic System
  - Aerobic System

### **UNIT IV: Environment and Altitude Exercise**

- Training in Hot and Cold Conditions
- Thermoregulatory Mechanism
- Physiological response, Health Risk, Associated with Exposure to heat and cold.
- Acclimatization
- Training in High Altitude
- Physiological response and associated health risk.

### **PRACTICUM: (PHYSIOLOGICAL ASSESSMENT)**

- Measurement of resting heart rate, immediately before and after activity and during activity.
- Measurement of Blood Pressure by Sphygmomanometer
- Measurement of Vital Capacity, and Peak Flow Rate.
- Assessment of Respiratory Rate.
- Measurement of body fat
- BMI method.
- Assessment of Body Composition by Skinfold caliper method
- Assessment of Cardio Respiratory Fitness, through various field methods

**TEACHING LEARNING STRATEGIES:** The class will be taught by using lectures and demonstration, seminars, classroom discussion, videos, charts and presentations method.

**ACTIVITIES:** Lecture//Laboratory Work/ Field Work/ Outreach Activities/ Project Work/ Vocational Training/Viva/ Seminars/ Term Papers/Assignments/ Presentations/ Self-Study etc.

**ASSESSMENT RUBRIC:** Classroom Test, Project Work, Assignments, Presentations

### **TEXT & REFERENCES:**

- Amrit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras: PoompugarPathipagam.
- BeotraAlka, (2000) Drug Education Handbook on Drug Abuse in Sports: Sports Authority of India Delhi.
- Clarke, D.H. (1975). Exercise Physiology. New Jersey: Prentice Hall Inc., Englewood Cliffs.
- David, L Costill. (2004). Physiology of Sports and Exercise. Human Kinetics.
- Fox, E.L., and Mathews, D.K. (1981). The Physiological Basis of Physical Education and Athletics. Philadelphia: Sanders College Publishing.
- Guyton, A.C. (1976). Textbook of Medical Physiology. Philadelphia: W.B. Sanders co.
- Richard, W. Bowers. (1989). Sports Physiology. WMC: Brown Publishers.
- Sandhya Tiwari. (1999). Exercise Physiology. Sports Publishers.
- Shaver, L. (1981). Essentials of Exercise Physiology. New Delhi: Subject Publications.
- Vincent, T. Murche. (2007). Elementary Physiology. Hyderabad: Sports Publication.

- William, D. Mc Ardle. (1996). Exercise Physiology, Energy, Nutrition and Human Performance. Philadelphia: Lippincott Williams and Wilkins Company.
- Kenney, W., Wilmore, J., & Costill, D.(2015) Physiology of sport and exercise. 9781450477673
- McArdle, W., Katch, F., & Katch, V. (2010). Exercise physiology. Baltimore, MD: Lippincott Williams & Wilkins. ISBN 978-1451191554
- Raven, P. (2013). Exercise physiology. Australia: Wadsworth Cengage Learning. ISBN 9780495110248
- Plowman, S., & Smith, D. (2014). Exercise physiology for health, fitness, and performance. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins Health. ISBN 9781451176117
- Farrell, P., Joyner, M., & Caiozzo, V. (2012). ACSM's advanced exercise physiology. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins. ISBN 0781797802