MANGALORE UNIVERSITY

DEPARTMENT OF PHYSICAL EDUCATION

MASTER OF PHYSICAL EDUCATION

Semester II Theory Course

MDH453: PHYSIOLOGY OF EXERCISE

Number of credits :	4	Number of hours :	4	Marks :	Internal	- 30	External	- 70

Objectives / Learning Outcomes

At the end of the course the student should understand

- The meaning and scope of sports physiology in physical education.
- The skeletal and muscular system and their role in improving performance.
- The changes in cardio vascular, respiratory and hormonal system during exercise.
- The effect of exercise on various physiological systems.
- Exercise prescription for special conditions such as hypertension, diabetes, obesity etc.
- The changes during exercise in various environmental conditions.
- The physiological differences in women and their performances.

Unit I: Meaning of Physiology of Exercise and Musculoskeletal System

- Meaning, Scope and Uses of Exercise Physiology in Physical Education and Sports.
- Skeletal system, structure of bone and effect of exercise on skeletal system.
- Muscle physiology – Types of muscle fibers, types of muscular contraction, gross and microscopic structure of muscle, sliding filament theory of muscular contraction.

Unit II: Cardiovascular and Pulmonary Response to Exercise

- Cardio vascular adjustments to exercise – Description of Cardio vascular system, Cardiac output and factors affecting cardiac output, Heart rate and Stroke volume and their regulation, changes in cardiac output during exercise, cardiac cycle.
- Pulmonary function and gas exchange – Meaning and types of respiration, process of gas exchange and transportation of oxygen and carbon dioxide in blood, Oxygen disassociation curve, Respiratory exchange ratio, Minute ventilation, changes in minute ventilation during exercise, Lung volumes and capacities, VO2 max.

Unit III: Bioenergetics and Development of Motor Abilities

- Bioenergetics and exercise metabolism – ATP CP, Lactate (Anaerobic) and Oxidative (aerobic), Anaerobic threshold, Oxygen debt, Metabolism of carbohydrates, fats and proteins for energy.

- Energy requirements of various activities – long activities like marathon, long duration games like football, hockey, basketball etc., power games like volleyball, Badminton etc. Caloric value of food, glycemic index.
- Hormonal response to exercise, effects of exercise on muscular system, nervous system, cardiovascular system and respiratory system,
- Physiological basis of developing strength, endurance, speed, flexibility.

Unit IV: Physiological Considerations and Exercise Benefits

- Physiological consideration in female performance in sports, Physiological differences between males and females and their effect on female performers.
- Environmental considerations during exercise – Mechanism of thermo regulation
- Hot, Humid and cold climate – physiological changes and adaptation, heat and cold related illness
- Exercising at high altitude – physiological changes and adaptation.
- Ergogenic aids – Meaning, classification and their effects on performance and health.
- Health benefits of training and exercise, exercise prescription for obesity, diabetes and hypertension.

REFERENCES:

Amrit Kumar, R, Moses. (1995). Introduction to Exercise Physiology. Madras: Poompugar Pathipagam.

Beotra Alka, (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 Tiwaji. (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. McAradle. (1996). Exercise Physiology, Energy, Nutrition and Human Performance. Philadelphia: Lippincott Williams and Wilkins Company.