

# Introduction to Exercise: Physiology & Sports Medicine

**Course Coordinator:** Dr. Yiftah Beer M.D.

## **Course Description:**

Sports and physical training are now considered the basis of healthy lifestyles. As such, many more people are working on their physical fitness. This lends to a whole new science, one that deals with measuring and adjusting physical activity to the patients' health status and also dealing with the various sports injuries that have been growing due the widespread tendency to exercise. This course will review the various topics related to both the physiology and the approach to treatment of sports injuries

**Credit** – 3 credits

## **Course Objectives:**

To understand the basis for the advantages of physical activity as a way of healthy living and to realize the scope of potential injuries and ways to both prevent and treat them.

Topics

### 1. **Exercise physiology** :

- a. Background: definitions, types of physical activity.
- b. Terms in physical activity
- c. Energy and body metabolism
- d. Changes with age
- e. The importance of physical activity

## **2. The muscle system:**

- a. The structure of the muscle
- b. Muscle contraction
- c. Types of muscle fibers
- d. Physical activity and muscle adaptations

## **3. The respiratory system:**

- a. The anatomy of the respiratory system
- b. Gas exchange and oxygen delivery
- c. Measurements of lung function
- d. The effect of physical activity on lung function

## **4. The heart and vascular system:**

- a. The structure of the heart and blood vessels
- b. The circulatory system
- c. Physiological adaptations to physical training
- d. Coronary artery disease

## **5. Primary and secondary prevention of cardiac disease:**

- a. Cardiac risk factors
- b. The effect of physical activity on cardiac risk factors
- c. Cardiac rehabilitation in Israel
- d. Physical activity recommendations for first and secondary prevention

## **6. Athletic training:**

- a. Background of professional training
- b. Physiological adaptations to athletic training
- c. Recommendations for aerobic and anaerobic training

## **7. Sports Injuries**

- a. Ankle injuries
- b. Knee injuries
- c. Hip injuries
- d. Shoulder injuries

## **8. Nutritional needs and physical activity**

## **9. Rehabilitation after sports injuries**

10. **Hands on training:** Basic physiotherapy treatments for sports injuries and strain

11. **Hands on training:** Accompaniment to practicing sports medicine specialists in their clinics

### **Course Requirements and Grading System:**

- a. Mandatory participation in at least 80% of classes: 10%
- b. Mandatory participation in at least 50% of practical experience: 10%
- c. Each participant should present up-to-date (from the last ~5 years) clinical research : 20%
- d. multiple-choice examination, based on the lectures, at the end of the course: 60%

## **Required Reading**

Balady GJ, Williams MA, Ades PA, et al. Core components of cardiac rehabilitation/secondary prevention programs: 2007 update: A scientific statement from the American Heart Association Exercise, Cardiac Rehabilitation, and prevention Committee, the Council on Clinical Cardiology; the Councils on Cardiovascular Nursing, Epidemiology and Prevention, and Nutrition, Physical Activity and Metabolism; and the American Association of Cardiovascular and Pulmonary Rehabilitation. *Circulation* 2007; 115 2675-2682.

Fletcher GF, Balady GJ, Amsterdam EA, et al. Exercise standards for testing and training: A statement for healthcare professionals from the American Heart Association. *Circulation* 2001; 104 1694-1740.

Nelson EM, Rejeski J, N. Blair SN. Physical Activity and Public Health in Older Adults. Recommendation from the American College of Sports Medicine and the American Heart Association. *Circulation* 2007;116;1094-1105.

Chodzko-Zajko WJ, Proctor DN, Fiatarone Singh MA, et al. Exercise and physical activity for older adults. *Medicine and Science in Sports and Exercise*, 2009. Position Stand by the American College of Sports Medicine.

ACSM's Guidelines for Exercise Testing and Prescription. Eighth Edition 2010.

McArdle W, Katch F, Katch V. *Exercise Physiology*. Fifth Edition 2001.