



Faculty of Physical Education and Sport Sciences
Dept. of Exercise Physiology

Module code: 8718105

Module name: Advanced exercise Physiology

Module Pre-requisite: -----

Module Coordinator/s: Prof. Vahid Sari-Sarraf

Assessment due date: Follow the University program

Credit: 2 /32

On successful completion of this module, students should be able to appreciate:

Week 1

1. Historical Prospective: Origin to recognition

Learning Goals and Objectives

- › Contribution from the river civilizations
- › Contribution from Greece
- › Emergence of Christianity, the medieval period, and the renaissance
 - The legacy of Avicenna
- › The seventeenth century
- › The eighteen century
- › The ninetenn century
 - Establishment of formal courses in exercise physiology
 - Investigations that enhanced the recognition of exercise physiology
- › Exercise physiology in Iran
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 2,3

2. Exercise responses of biological systems

The nervous system and movement

Learning Goals and Objectives

- › How is movement generated?
- › Spinal control of posture and locomotion
- › Automaticity in posture and locomotion
- › Central nervous system
- › Muscle atrophy and movement control
- › A continuously adapting synaptic milieu for motor control
- › Effects of mental practice and cross education on motor performance
- › Regions of the brain activated during exercise
- › Changes in neural control properties after dynamic and resistance training
- › Exercise, nerve growth factors, and learning
- › Adaptation of the neuromuscular junction to changing levels of dynamic and resistive exercise
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 4

3. The skeletal-articular system

Learning Goals and Objectives

- › Skeletal-articular physiology
- › Tissue response to mechanical stimuli
 - Ligament and tendon
 - Meniscus
 - Bone
- › Interaction with exercise
- › Mechanisms of bone adaptation
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 5-7

4. The Muscular System:

Structure and Functional Plasticity

Learning Goals and Objectives

- › The macroscopic and molecular anatomy of skeletal muscle
- › Muscle fiber type and polymorphism
- › linking structure to function
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 8

5. The Muscular System: The Control of Muscle Mass

Learning Goals and Objectives

- › Hypertrophy
- › Atrophy
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 9

6. The Muscular System: Fatigue Processes

Learning Goals and Objectives

- › The effect of fatigue on muscle mechanics
- › Central fatigue
- › Substrates and fatigue with high intensity exercise
- › Low frequency fatigue
- › Prolonged exercise and fatigue resistance exercise.
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 10: Evaluation

Week 11

7. The Autonomic Nervous system

Learning Goals and Objectives

- › Measurement of autonomic nervous system activity
- › ANS changes during acute dynamic exercise

- › Autonomic nervous system adaptation to chronic exercise
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 12, 13

8. The Respiratory System

Learning Goals and Objectives

- › Control of breathing
- › Exercise hyperpnea
- › Mechanics of breathing
- › Pulmonary gas exchange
- › Respiratory system across the life span
- › Sex difference in respiratory function
- › Training effects and plasticity in the respiratory system
- › Respiratory limitations to exercise
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 14

9. The Cardiovascular System:

Design and Control and Cardiac Function

Learning Goals and Objectives

- › Feed-forward and feedback reflex cardiovascular control during exercise
- › Physical activity and inactivity
- › General cardiovascular adjustments to acute exercise
- › Myocardial mechanisms for heart rate control
- › Myocardial mechanisms influencing stroke volume during exercise
- › Bioenergetics of the exercised heart
- › Adaptations of the heart to chronic exercise training
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 15

10. The Gastrointestinal System

Learning Goals and Objectives

- › Basic anatomy and functions of the GI tract
- › Basic GI regulation

- › Compare and contrast concentric and eccentric dynamic contractions.
- › GI blood flow
- › Gastric emptying during exercise
- › Intestinal absorption during exercise
- › GI barrier function during exercise
- › GI symptoms during exercise
- › Key points
- › A milestone of discovery
- › Test Yourself

Week 16

11. Journal Club

Learning Goals and Objectives

- › Presenting the related novel articles (Original, Review and meta-analysis)

Week 17: **Final Exam**

Note: Compensatory sessions will be held virtually by prior appointment.

Teaching and Learning Methods: Lectures, community based learning, practical classes (role play)

Assessment Details

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
Presentation	Role Play		15%	TBC
Fieldwork	Laboratory works, Journal Search		5%	7, 16th
Final Exam			80%	17

Note: To pass this module overall-a pass must be obtained in both the service learning component and the end of semester exam.

Reference:

1. Farrell, PA; Joyner, ML and Caiozzo, VJ (2013): ACSM's Advanced Exercise Physiology. Lippincott Williams & Wilkins.
2. Ehram, JK; Kerrigan, DJ and Keteyian, SJ (2018). Advanced Exercise Physiology. Human Kinetics

Recommended Reading List:

Note: This is for reference only. It is NOT necessary to buy these references. Many are available in the faculty library. A list of websites you might find useful is also included.

