

In the Name of God

Islamic Republic of Iran
Ministry of Health and Medical Education
Deputy Ministry for Education

Exercise Physiology
Degree: Doctor of Philosophy (PhD)

Total Course Credits

- Core: 21
- Non-core (Electives): 9
- Dissertation (PhD): 20

Program Description

Exercise physiology, as compared to the general physiology, focuses on the extremes of biological responses to physical activity and what pursues as adaptations then-after, for it pushes the body to its biological limits. Since the behavior of biological systems, the most complex of which is that of human body, is non-linear, a great number of mechanisms involved in homeostasis, *change* when it comes to extreme conditions. Therefore, attempts to advance the interdisciplinary field of the *Exercise Physiology* are to be amongst societal commitments of all life scientists.

Collecting data, turning it into knowledge, followed by the application of the knowledge for a better quality of life and human race health and longevity are at the center point of the PhD curriculum of *Exercise Physiology*. The interdisciplinary nature of the field fosters a *breadth* and its cellular and molecular approach a *depth* in the knowledge of candidates. The emphasis of the courses is to reinforce the candidates to adopt an integrative approach for problem solving based on community in the field of exercise physiology, for we believe *exercise intervention* is the top priority of all health management systems and administrations willing/aiming to slow down (or even to eradicate) the terrifying trend of non-communicating diseases. Course combination is oriented in such a way to guarantee capabilities of graduates in both teaching and performing independent scientific investigations at translational and interventional levels.

Exercise Physiology is an interdisciplinary branch of health sciences exploring the function of different biological systems in human body at extreme conditions, one of which is exercise, at all levels, from molecules to the whole system. It deals with the short- and long-term adaptations to physical activity of various modalities and intensities. Typical courses covered include bioenergetics and exercise metabolism, muscular and cardiovascular adaptations to exercise, respiratory control during exercise, neuroendocrine control during exercise and many other relevant topics.

The program is intended to promote education and quality research in the field of exercise physiology, focusing on an integrative approach and emphasizing on the application of knowledge at institutional, academic and societal levels that will enable the student to grow and develop as an independent scientist.

Admission Requirements

PhD candidates are required to have a Master of Science in any of physical education, physiology, physiotherapy, cellular and/or molecular biology, occupational therapy and physical education or a doctorate degree in medicine, dentistry, pharmacy and veterinary medicine when applying for the candidanship. Passing a written exam and an interview would finalize the admission process. Written exam materials will include topics in medical/human physiology, biochemistry, nutrition and metabolism and exercise physiology.

*Important note: These general conditions do not necessarily exclude specific conditions of each institute or university.

Expected Competencies at the End of the Program

General Competencies*

Specific Competencies and Skills

Given the emphasis on the impact of acute and chronic exercise on basic physiological systems, the exercise physiology curriculum tends to focus on integrative concepts. These physiological systems rarely work in isolation, if at all, and in many ways the human body is masterfully designed to have redundancies. PhD candidates are therefore envisioned to apply a systemic and an integrative approach to their academic activities. They are to be competent in breaking problems into meaningful detailed research questions when it comes to quest. Acquaintance with the contemporary subjects in the interdisciplinary fields of physical and biological sciences (at a broad sense) is anticipated and accordingly the elective courses are programmed to confer to this need and train candidates to think and act within bridged domains.

Educational Strategies, Methods and Techniques*

Student Assessment (Methods and Types) Type of Assessment:

- Formative (Quizzes and Midterm Exam)
- Summative (Final Exam)
- Comprehensive exam **Methods of assessment:**
- oral, written, observation, primarily essay based exams, competence assessments

Ethical Considerations*

*Note: The related document(s) can be found at <http://hcmeq.behdasht.gov.ir/>.

Tables of the Courses

Table 1. Compensatory Courses

Code of the Course	Title of the Course	Credits		
		Theoretical	Practical	Total
01	Medical Systems Information Technology	0.5	0.5	1
02	Exercise Physiology	3	0	3
03	Experimental Animal Handling	1	1	2
04	Exercise Biochemistry (1)	2	0	2
05	Physical Fitness	2	0	2
06	Physical (and movement) Fitness Assessments	2	0	2
07	The Science of Exercise Training	2	0	2
08	Research Methods in Life Sciences	1.5	0.5	2
09	Advances in Statistical Analysis	1.5	0.5	2
Total				16

* Student requires to take a maximum of 6 credits from the table 1, if they have not passed such credits during M.Sc. education.

Table 2. Core Courses

Code of the Course	Title of the Course	Credits		
		Theoretical	practical	Total
10	Cellular Adaptations in Exercise	2	0	2
11	Cardiovascular Adaptations in Exercise	2	0	2
12	Endocrinal Adaptations in Exercise	1	0	1
13	Respiratory Adaptations in Exercise	2	0	2
14	Exercise and Environment	2	0	2
15	Exercise and Immune System	1	0	1
16	Exercise Biochemistry (2)	2	0	2
17	Exercise Nutrition and Metabolism	2	0	2
18	Drug metabolism and Exercise	2	0	2
19	Fundamentals of Sports Psychology	2	0	2
20	Motor Control	2	0	2
21	Thesis/Dissertation			20
Total				41

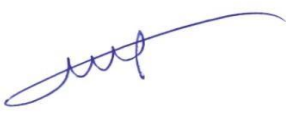
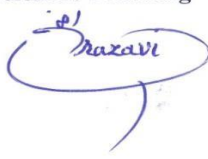
Table 3. Non- Core Courses (Electives)**

Code of the Course	Title of the Course	Credits		
		Theoretical	practical	Total
22	Bio-Control	2	0	2
23	Exercise Rehabilitation	2	0	2
24	Exercise Prescription	1	1	2
25	Molecular Biology	2	0	2
26	Fitness Tests	0.5	0.5	1
27	Biology of Movement and Biomechanics	2	0	2
28	Programming Exercise Protocols	2	0	2
29	Muscle Mechanics	2	0	2
30	Exercise Biomechanics Laboratory	1	1	2
31	Ergonomics and Human Factors	2	0	2
32	Essentials of Exercise Therapy	1	1	2
33	Functional Anatomy	1	1	2
34	Principles in Physiotherapy of Injuries	2	0	2
35	Physiology of Fatigue and Overtraining	2	0	2
36	Neuromuscular Functional Adaptations	2	0	2
37	Body Weight Management	2	0	2
38	Exercise Protocols	0	1	1
39	Laboratory Techniques in Exercise Physiology	0	2	2



40	Physiology of Neuromuscular Fatigue	2	0	2
41	Water, Electrolyte, Mineral and Vitamin Metabolism in Sports	2	0	2
Total				38

**Student requires to take a minimum of 9 credits from the table 3 in accordance with the thesis subject, by the agreement of the supervisor and confirmation of the University postgraduate committee.

<p>Jamshid Hajati PhD Secretariat of the Council for Education of Health and Basic Medical Sciences (Undergraduate and Postgraduate)</p> 	<p>Seyed Mansour Razavi MD Secretary of the Supreme Council for Medical Sciences Planning</p> 
<p>Bagher Larijani MD Deputy for Education Ministry of Health and Medical Education</p> 