

Code:MFSE 0410	Course title: <b>Physiology of Sport and Exercise</b>		
Level: <b>preclinical</b>	Study year: <b>II</b>	Semester: <b>IV</b>	ECTS: <b>1</b>
Status: <b>elective</b>	Total contact hours: <b>20</b>		
Prerequisites:	<b>According to the Study Regulation</b>		
Lecturers: <b>Professors and associates involved in the implementation of the course in accordance with the plan of the teaching process</b>			
1. Overall aim	The overall aim of the Physiology of Sport and Exercise course is to increase understanding of the integrated response of human body on acute and chronic physical load, mechanisms of organ systems function changes in the process of training adaptations and harmonization of functions of the organism with increased metabolic demands during exercise.		
2. Course contents	The following topics will be covered during the Modules: Module 1. Introduction to Physiology of Sport and Exercise - objectives and tasks. Organ systems involved in response to physical activity. Module 2. The Cardiovascular System in Exercise Module 3. Respiration in Exercise Module 4. Bioenergetics and Muscle Metabolism. Hormonal Control During Exercise Module 5. Aviation and Deep - Sea Diving Physiology. Exercise in Hot and Cold Environments and Exercise at Altitude Module 6. The Physiology of Physical Training. Body fitness. Adaptations to Aerobic and Anaerobic Training		
3. Learning outcomes (Knowledge, skills and competences)	<p>Students will acquire knowledge necessary to understand the acute and chronic physiological changes that occur in the body in response to exercise stress. They will be able to understand integrated response of human body on acute exercise as well as adaptation on training process. Through practical work, they will acquire knowledge in the performance, understanding and interpretation of basic physiological assessment.</p> <p><i>Through the lectures and seminars the students will gain following knowledge and competences:</i></p> <ol style="list-style-type: none"><li>1. Functional Heart Test - Guidelines and protocols for Exercise Stress testing.</li><li>2. Static and Dynamic Spirometry in Athletes.</li><li>3. Energy consumption in sports - Personalized Daily Meal Plan.</li><li>4. Body Composition Analysis. Calculation and analysis of new anthropometric indices.</li><li>5. Maximal Oxygen Consumption - testing protocols</li></ol> <p><i>Through the practical laboratory work students will acquire following skills:</i></p> <ol style="list-style-type: none"><li>1. Measure and evaluate a person's physical performance, including aerobic fitness, anaerobic fitness, cardiovascular and respiratory capacities</li><li>2. Review training programs for different fitness components.</li><li>3. Examine how adaptations to cardiorespiratory function affect the athlete's endurance capacity.</li></ol>		

	<p>4. Understand how human body adaptations on altitude occurred.</p> <p>5. Evaluate factors that affect training success and factors purported to improve human performance.</p>
4. Teaching methods	<p>Lectures: 8 hours, Seminars: 6 hours Laboratory practical work: 6 hours</p>
5. Method of knowledge assessment and examination	<p>Continuous knowledge and skills assessment will be carried out through Partial exam 1, Partial exam 2, Seminars and Practical exam.</p> <p><b>Partial Exams</b> The Partial exam 1 is written exam in the form of Multiple choice questions (MCQs) test - 20 MCQs. A student can have maximum 20 points in total. In order to pass the 1<sup>st</sup> Partial Exam, student must achieve minimum 11 points.</p> <p>The Partial exam 2 is written exam in the form of MCQs test - 20 MCQs. A student can have maximum 20 points in total. In order to pass the 1<sup>st</sup> Partial Exam, student must achieve minimum 11 points.</p> <p><b>Seminars</b> The Seminars are in the form of oral presentations. During the seminars, the teacher monitors and evaluates the student's work. The student must be prepared for the seminar in advance. Activity, interest and contribution to the successful realization of the seminar are evaluated. The student can score the maximum of 30 points for all seminars. The maximum number of points on the each Seminar is 10. A student must achieve minimum 5.5 points for each Seminar.</p> <p><b>Practical Exam</b> The Practical exam is written exam in the form of MCQs test - 30 MCQs. A student can have maximum 30 points in total. In order to pass the Practical Exam, student must achieve minimum 16.5 points.</p> <p><b>Final exam</b> The final exam consists of those parts the student did not pass during the Course. The final exam is conducted according to the previously defined criteria.</p> <p><b>The repeated and correction exams</b> The repeated and correction exams are conducted according to the previously defined criteria of the final exam.</p>
6. Literature	<p>Recommended:</p> <ol style="list-style-type: none"> <li>1. John E. Hall, Michael E. Hall - Guyton and Hall Textbook of Medical Physiology (Guyton Physiology) 14th Edition Elsevier Saunders; 2020.</li> <li>2. McArdle, William, Katch, Frank, and Katch, Victor. (2011). <i>Essentials of Exercise Physiology</i>, 4<sup>th</sup> ed. Baltimore: Lippincott Williams and Wilkins. ISBN: 978-1-60831-267-2</li> </ol> <p>Additional</p> <ol style="list-style-type: none"> <li>1. American College of Sports Medicine. (2014). <i>ACSM's Guidelines for Exercise Testing and</i></li> </ol>

### COURSE PLAN: Elective Course - Physiology of Sport and Exercise

Week	Form of Instructions and materials	Number of hours
Week 1	<b>Lecture</b> Introduction to Exercise Physiology - Course objectives and tasks. Organ systems involved in response to physical activity.	1
Week 2	<b>Lecture</b> The Cardiovascular System in Exercise. Acute physiological responses to exercise. Systemic and Coronary blood flow during exercise. Effects of exercise on the heart and circulatory system (Athletic Heart Syndrome)	2
Week 3	<b>Lecture</b> Respiration in Exercise. Oxygen Consumption and Pulmonary Ventilation in Exercise. Blood Gases During Exercise. Respiratory Regulation During Exercise.	2
Week 4	<b>Practical work</b> Functional Heart Test - Guidelines and protocols for Exercise Stress testing.	1
Week 5	<b>Practical work</b> Static and Dynamic Spirometry in Athletes.	1
Week 6	<b>Seminar</b> Energy sources and energy usage during physical activity. Consumption of oxygen at rest and during exercise. Maximal consumption of oxygen. Anaerobic processes and anaerobic threshold. Recovery of the Muscle Metabolic Systems after Exercise and the Oxygen debt.	2
Week 7	<b>Seminar</b> <b>Partial exam 1</b>	1
Week 8	<b>Lecture</b> Aviation and Deep - Sea Diving Physiology. Acute and chronic physiological responses to altitude changes.	1

Week 9	<b>Practical work</b> Energy consumption in sports - Personalised Daily Meal Plan. Body Composition Analysis. Calculation and analysis of new anthropometric indices.	2
Week 10	<b>Seminar</b> Hormones and sports	1
Week 11	<b>Practical work</b> Maximal Oxygen Consumption - testing protocols	1
Week 12	<b>Practical work</b> <b>Practical exam</b>	1
Week 13	<b>Seminar</b> Thermoregulation during exercise. The importance of hydration and electrolytes in exercise	1
Week 14	<b>Lecture</b> The concept of training and the basics of planning the training process. The concept of body fitness. Overtraining.	2
Week 15	<b>Seminar</b> <b>Partial exam 2</b>	1
Week 17-18.	<b>Final exam</b>	
Week 19-20.	<b>Re-sit exam</b>	