Course Title	**BIOCHEMISTRY OF EXERCISE**				
Course Code	SSBIO205-1				
Course Type	MANDATORY				
Level	BSc (Level 1)				
Year / Semester	1st / Spring				
Teacher's Name	Dr Elena Papacosta & Dr. Kyriakos Kyriakou				
ECTS	6	Lectures / week	3	Laboratories / week	
Course Purpose	The purpose of the course for the Exercise Biochemistry course involves understanding the biochemical processes that occur during physical activity. Students will develop knowledge about energy conversion, nutrient metabolism, and the reactions that occur in muscles during exercise. Through the application of biochemical principles, students will be able to analyze changes in the levels of certain molecules during exercise and evaluate the contribution of biochemistry to physical activity and athletic performance.				
Learning Outcomes	Upon completion of the course, students will be able to: • They describe the biochemical processes that occur in the human body during and after exercise. • They explain the metabolism of muscle substrates for energy production during exercise. • They distinguish the effect of various kinds of exercise on the mobilization of energy production processes. • They interpret the biochemical process of muscle contraction production • Evaluate biochemical processes for muscle repair after ascitic muscle injury. • They apply the biochemical principles they have learned to practical examples of sports situations and combine with best practices to improve athletic performance.				
Prerequisites	No	Corequisites	No		
Course Content	Introduction: Principles of metabolism during exercise, chemical elements and chemical bonds, enzymes, molecules and ions,				

	polarity, homeostasis and pH, structure and function of the cell. Metabolism: anabolism and catabolism, energy production and adenosine triphosphate, biochemical processes of metabolism, metabolism of compounds with high phosphate group potential, redox reactions. Carbohydrate metabolism during exercise: monosaccharides, oligosaccharides and polysaccharides, glycogen and glucose metabolism during exercise, insulin-dependent and non-insulin-dependent glucose entry into cells, glycolysis, lactic acid production and anaerobic carbohydrate metabolism, gluconeogenesis, Cori cycle, lactate accumulation and elimination during and after exercise. Lipid metabolism during exercise: Lipids, fatty acids and triacylglycerols, fatty acid oxidation, lipid metabolism and energy production during exercise, changes in plasma fatty acid concentration during exercise, mobilization of energy substrates during exercise of different duration and intensity, effect of exercise on triacylglycerols and plasma cholesterol. Protein metabolism and exercise: Proteins, amino acids and their function, myoglobin, hemoglobin and their properties, urea cycle, effect of acute exercise and training on amino acid metabolism, restoration of muscle energy sources after exercise. Biochemistry of neuromuscular processes of movement: Nerve impulse, resting potential and action potential, muscle contraction, actin, myosin and mechanism of production of contraction force Biochemistry of muscle injury and muscle repair after exercise: ascetic muscle injury and inflammation, immune cell mobilization, muscle tissue catabolism and exercise, importance of exercise and nutrition in muscle reconstruction.
Teaching Methodology	**Theory** The teaching of the course includes lectures on the offer of the theoretical background. The teaching uses detailed notes with PowerPoint and material rich in images and videos. Methods such as case studies, clinical scenarios, discussion, questions/answers are used in teaching methodology depending on the nature of the course. Relevant material published in international scientific journals is also used to follow the latest developments related to the subject of the course.
Bibliography	Μούγιος, Β. (2008). Βιοχημεία της Άσκησης. Αθήνα: Πασχαλίδης.

	Maughan, R., Greenhaff, P. & Gleeson, M. (2011). Biochemistry of Exercise and Training. Oxford Medical Publications. Oxford, ISBN: 0192627414. MacLaren, D. & Morton, J. (2011). Biochemistry for Sport and Exercise Metabolism. Willey Publishers, Hoboken, New Jersey. ISBN: 978-0470091845 Hargreaves, H. (2006). Exercise Metabolism. (2nd ed.). Human Kinetics Publishers. Champaign, Illinois. ISBN: 9780736041034.
Assessment	**Continuous evaluation (50%):** The assessment shall include a combination of the following: • Online quizzes or interactive assessments (30%): Online quizzes or interactive assessments can be used through the Moodle platform to create quizzes with various question formats. These assessments are timed, and immediate feedback can be provided to students. • A written literature review paper (20%) on a topic related to the Biochemistry of Exercise is designed in a way that requires critical thinking, research, analysis and synthesis of information. Students are assessed on the quality of their work, the depth of understanding they demonstrate and their ability to effectively explain their ideas in writing. Then, there is peer evaluation and self-assessment where students are assigned to review and provide feedback on others' work, encouraging them to critically evaluate their fellow students' understanding and provide constructive suggestions. • Class discussions: Students participate in class discussions to assess their theoretical knowledge. Active participation is encouraged to hone their critical thinking skills, asking open-ended questions and facilitating their dialogue. **Final exam (50%):** Comprehensive final exam to assess students' overall theoretical knowledge. These assessments cover a wider range of topics and learning outcomes from across the curriculum, to assess students' understanding and integration of knowledge in various areas.
Language	Greek / English