

**UNIVERSITY OF THRACE**  
**DEPARTMENT OF PHYSICAL EDUCATION & SPORT SCIENCE**

*UNDERGRADUATE PROGRAM OF STUDY*

**COURSE TITLE:**

Biochemistry of exercise
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**COURSE CODE:**

N314
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**E.C.T.S. UNITS**

7
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**RESPONSIBLE FOR THE COURSE:**

NAME	Ioannis Fatouros	
POSITION	Assistant Professor	
SECTOR	Sports Training Theory and Application	
OFFICE	B3-10	
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CO-INSTRUCTORS	Chatzinikolaou A	

**SEMESTER:**

1ST	<input type="checkbox"/>	2ND	<input type="checkbox"/>	3RD	<input type="checkbox"/>	4TH	<input type="checkbox"/>
5TH	<input type="checkbox"/>	6TH	<input checked="" type="checkbox"/>	7TH	<input type="checkbox"/>	8TH	<input type="checkbox"/>

**COURSE TYPE:**

OBLIGATORY	<input type="checkbox"/>
DIRECTION	<input checked="" type="checkbox"/>
SPECIALIZATION	<input type="checkbox"/>
PREREQUIZITE FOR SPECIALIZATION	<input type="checkbox"/>
ELECTIVE ( <i>OPEN</i> )	<input type="checkbox"/>

**HOURS (per week):**

2
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**DIRECTION**

*(only for 3<sup>rd</sup> & 4<sup>th</sup> year courses)*

Sports Training Theory and Application	DIRECTION COURSE
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**SPECIALIZATION** *(only for 3<sup>rd</sup> & 4<sup>th</sup> year courses)*

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**LANGUAGE OF TEACHING:**

GREEK

ENGLISH

**AIM OF THE COURSE** (*content and acquired skills*)

Students will understand the fundamental biochemical adaptations following acute and chronic exposure to various exercise modes and athletic activities. Moreover, they will be able to apply the basic biochemical knowledge and principles in the development of athletes' physical conditioning and understand the biological adaptations of the athletes competing in the sport events that constitute their area of specialization as well as monitor their progress and health status through proper procedures of biochemical testing and evaluation.

**COURSE CONTENTS** (*outline – titles of lectures*):

1. Review of basic biochemistry, cellular structure and function, homeostatic regulation, and proteins.
2. Genes and exercise.
3. The biochemistry of muscle contraction.
4. Mechanisms of muscle hypertrophy.
5. Metabolic regulation during exercise, phosphagens and carbohydrate metabolism during acute exercise.
6. Lipid and protein metabolism during acute exercise.
7. The coordination of energy substrates' metabolism during exercise.
8. Hormones and exercise.
9. The biochemistry of individual and team sports.
10. Biochemical adaptations of chronic exercise training.
11. Exercise-induced muscle damage and inflammation.
12. Muscle fatigue – Acid-base balance during exercise.
13. Biochemical monitoring of athletes.

**TEACHING METHOD** (*lectures – labs – practice etc*):

The course includes lectures and on-line learning.

**ASSESSMENT METHOD(-S)**

1. Pop-quizzes during the semester on practical applications of exercise biochemistry: 30%
2. Final written exam: 70%

**LEARNING OUTCOMES**

Upon the completion of this course the student will be able to:

- Demonstrate a good understanding of skeletal muscle contraction and the mechanisms of muscle growth.
- Demonstrate a good understanding of exercise metabolism.
- Demonstrate a good understanding of chronic exercise training adaptations.
- Demonstrate a good understanding of biochemical monitoring of athletes.

<i>Learning Outcomes</i>	<i>Educational Activities</i>	<i>Assessment</i>	<i>Students Work Load (hours)</i>
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1. Students will be able to explain the biochemistry of skeletal muscle contraction and mechanisms of muscle growth.	Lectures and on-line learning	Individual evaluation with quizzes and final written examination	70
2. Students will be able to explain the regulation of exercise metabolism.	Lectures and on-line learning	Individual evaluation with quizzes and final written examination	60
3. Students will be able to identify the biochemical adaptations of exercise training.	Lectures and on-line learning	Individual evaluation with quizzes and final written examination	40
4. Students will be able to explain the principles of athletes' biochemical monitoring.	Lectures and on-line learning	Individual evaluation with quizzes and final written examination	40
		<b>TOTAL</b>	<b>210</b>

**OBLIGATORY & SUGGESTED BIBLIOGRAPHY:**

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| <ol style="list-style-type: none"> <li>1. Mougios V. Biochemistry of exercise. Medical Publications P.C. Paschalidis, Athens, 2008.</li> <li>2. Vander, Sherman &amp; Luciano. Human Physiology (8<sup>th</sup> ed., Hellenic edition), Medical Publications P.C. Paschalidis, Athens, 2001.</li> </ol> |
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