DEMOCRITUS UNIVERSITY OF THRACE
DEPARTMENT OF PHYSICAL EDUCATION & SPORT SCIENCE

UNDERGRADUATE PROGRAM OF STUDY

COURSE TITLE:

Sport Biomechanics

COURSE CODE:	**ECTS CREDITS**
N311	7

RESPONSIBLE FOR THE COURSE:

NAME	Nickos Aggeloussis	
POSITION	Associate Professor	
SECTOR	Sports Training Theory and Application	
OFFICE	B3-8	
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CO-INSTRUCTORS	-	

SEMESTER:

1ST	[]	2ND	[]	3RD	[ ]	4TH	[ ]
5TH	[√]	6TH	[ ]	7TH	[ ]	8TH	[ ]

COURSE TYPE:

OBLIGATORY	[]
DIRECTION	[√]
SPECIALIZATION	[ ]
PREREQUIZITE FOR SPECIALIZATION	[ ]
ELECTIVE (*OPEN*)	[ ]

HOURS *(per week)***:** 2

DIRECTION

(only for 3rd & 4th year courses)

Sports Training Theory and Application	

SPECIALIZATION *(only for 3rd & 4th year courses)*

LANGUAGE OF TEACHING: GREEK [√] ENGLISH [ ]

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

To provide students with the appropriate knowledge in order to be able to understand and apply scientific concepts of biomechanics in the analysis of sport and exercise movements, as well as to interpret data in a way that is useful to sports scientists and coaches.

On completion of this course students should be able to:

1. objectively discuss the use and practical application of biomechanical analysis to maximize sports performance
2. assess technique using kinetic analyses to determine the role and function of specific muscle groups in dynamic sport movements
3. discuss the use of biomechanical analysis in the prevention and reduction of injury in sport

COURSE CONTENTS *(outline – titles of lectures)*

1. Introduction – Qualitative biomechanical analysis of sports technique
2. Musculoskeletal mechanics: Introduction
3. Musculoskeletal mechanics: Bones
4. Musculoskeletal mechanics: Tendon and ligaments
5. Musculoskeletal mechanics: Muscles
6. Kinematic analysis of sports motions
7. Methods for the analysis of the forces acting on the athlete's body
8. Human body segmental inertia properties
9. Calculation of internal joint forces and moments I
10. Calculation of internal joint forces and moments II
11. Electromyographic analysis of sports motions
12. Work, energy and power in sport activities
13. Sport biomechanical data analysis and interpretation

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

This course includes lectures, workshops and distance learning through the asynchronous distance learning platform e-Class, in the Academic Internet GUNet, at the URL: http://eclass.duth.gr/eclass/

ASSESSMENT METHOD(-S)

1. Project: 40%
2. Mid-term examination: 40%
3. Final examination: 20%

LEARNING OUTCOMES

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

1. know and understand the mechanics of the musculoskeletal system
2. know and understand the biomechanical methods for analyzing sport movements
3. analyze biomechanical data and interpret the respective results
4. propose solutions for the improvement of sport techniques and for the prevention of sport injuries, based on biomechanical data

LEARNING OUTCOMES - CONTINUED

Learning Outcomes	***Educational Activities***	***Assessment***	***Students Work Load (hours)***
Knowledge of the mechanics of the musculoskeletal system	Lectures, class project, study at home	Mid-term examination	40
Knowledge and understanding of the biomechanical methods for analyzing sport movements	Lectures, lab exercise, individual project, home study	Mid-term examination, project, final examination	50
Knowledge and understanding of the biomechanical methods for analyzing sport movements	Lectures, lab exercise, individual project, home study	Mid-term examination, project, final examination	50
Ability to propose solutions for the improvement of sport techniques and for the prevention of sport injuries, based on biomechanical data	Lectures, problem solving, class project	Project, final examination	70
		TOTAL	**210**

OBLIGATORY & SUGGESTED BIBLIOGRAPHY:

1. AGGELOUSSIS, N., GOURGOULIS, V., MAVROMATIS, G. (2005) *SPORTS BIOMECHANICS – COURSE CONTENT MANUAL*. KOMOTINI: DEMOCRITUS UNIVERSITY OF THRACE PRESS
2. HAY, J. (1993) *THE BIOMECHANICS OF SPORTS TECHNIQUE. 4TH EDITION*. LONDON: PRENTICE-HALL
3. MC GINNIS, P.M. (1999) *BIOMECHANICS AND SPORT EXERCISE*. CHAMPAIGN, IL: HUMAN KINETICS
4. VAUGHAN, C.L. (1989) *BIOMECHANICS OF SPORT*. BOCA RATON, FL: CRC PRESS