

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL</b>	PHYSICAL EDUCATION & SPORT SCIENCES		
<b>DEPARTMENT</b>	PHYSICAL EDUCATION & SPORT SCIENCES		
<b>LEVEL OF STUDIES</b>	7		
<b>COURSE CODE</b>	L204	<b>SEMESTER</b>	B
<b>COURSE TITLE</b>	BIOMECHANICS OF MUSCULOSKELETAL INJURIES		
<b>TEACHING ACTIVITIES</b> <i>If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.</i>	<b>TEACHING HOURS PER WEEK</b>	<b>ECTS CREDITS</b>	
	3	7,5	
<i>Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.</i>			
<b>COURSE TYPE</b> <i>Background, General Knowledge, Scientific Area, Skill Development</i>	SCIENTIFIC AREA		
<b>PREREQUISITES:</b>	NO		
<b>TEACHING &amp; EXAMINATION LANGUAGE:</b>	GREEK		
<b>COURSE OFFERED TO ERASMUS STUDENTS:</b>	NO		
<b>COURSE URL:</b>	<a href="https://eclass.duth.gr/courses/PHYED3107/">https://eclass.duth.gr/courses/PHYED3107/</a>		

### 2. LEARNING OUTCOMES

#### Learning Outcomes

*Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.*

Course objectives include:

- understanding of the biomechanical factors related to the injuries of the tissues of the musculoskeletal system.
- acquiring knowledge regarding the mechanisms of musculoskeletal injuries and the approaches followed for their prevention.
- presentation of the evaluation methods of the factors responsible for injuries of the musculoskeletal system

Upon successful completion of this course students will be able to:

- understand normal mechanical function of muscle, bone, tendon, ligament and cartilage.
- understand pathomechanics of injury on muscle, bone, tendon, ligament and cartilage.
- discuss current research topics in musculoskeletal tissue biomechanics.
- discuss experimental approaches used to assess musculoskeletal tissue mechanics.
- critically analyze current literature and utilize this literature to address common research questions.
- apply the knowledge of musculoskeletal tissue biomechanics to current problems within the rehabilitation and fitness setting.

#### General Skills

*Name the desirable general skills upon successful completion of the module*

*Search, analysis and synthesis of data and information,  
ICT Use*

*Adaptation to new situations*

*Decision making*

*Autonomous work*

*Teamwork*

*Working in an international environment*

*Project design and management*

*Equity and Inclusion*

*Respect for the natural environment*

*Sustainability*

*Demonstration of social, professional and moral responsibility and*

*sensitivity to gender issues*

*Critical thinking*

*Working in an interdisciplinary environment*

*Promoting free, creative and inductive reasoning*

*Production of new research ideas*

The general skills that are supported involve:

- Search, analysis and synthesis of data and information, using appropriate ICT
- Adaptation to new situations
- Decision making
- Autonomous work
- Teamwork
- Working in an interdisciplinary environment
- Production of new research ideas
- Project design and management
- Critical thinking
- Promoting free, creative and inductive reasoning

### 3. COURSE CONTENT

1. Introduction to the properties of body tissues
2. Neuromechanics of musculoskeletal function
3. Mechanical properties of muscles – part one
4. Mechanical properties of muscles – part two
5. Mechanical properties of tendons and ligaments
6. Mechanical properties of bones
7. Mechanisms of musculoskeletal injury
8. Biomechanical methods of musculoskeletal risk assessment
9. Biomechanics of upper extremity injuries
10. Biomechanics of lower limb injuries
11. Biomechanics of spine injuries
12. Biomechanics of musculoskeletal injury rehabilitation training
13. Biomechanics of orthotic aids

### 4. LEARNING & TEACHING METHODS - EVALUATION

<b>TEACHING METHOD</b> <i>Face to face, Distance learning, etc.</i>	<ul style="list-style-type: none"> <li>- Face to face</li> <li>- Theoretical lectures &amp; Laboratory courses</li> <li>- Distance learning</li> </ul>	
<b>USE OF INFORMATION &amp; COMMUNICATIONS TECHNOLOGY (ICT)</b> <i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i>	Utilization of new technologies in teaching, laboratory education and communication with students	
<b>TEACHING ORGANIZATION</b> <i>The ways and methods of teaching are described in detail. Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research &amp; analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.</i>  <i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i>	<b>Activity</b>	<b>Workload/semester</b>
	Lectures	39
	Lab exercises	25
	Project	70,5
	Home study	50
	Examination	3
<b>Total</b>	<b>187,5</b>	
<b>STUDENT EVALUATION</b> <i>Description of the evaluation process</i>  <i>Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others</i>	<ol style="list-style-type: none"> <li>1. Interim evaluations</li> <li>2. Individual project</li> <li>3. Written exams including: multiple choice tests, short answer questions and development questions designed to solve problems</li> </ol> <p>The assessment languages are Greek</p>	

Please indicate all relevant information about the course assessment and how students are informed

## 5. SUGGESTED BIBLIOGRAPHY

1. Yubo Fan & Lizhen Wang. Biomechanics of Injury and Prevention. Singapore:Springer, 2022. ISBN: 978-981-16-4268-5
2. Whiting W., C. & Zernicke R.F. Biomechanics of musculoskeletal injuries. Champaign, IL:Human Kinetics, 2008. ISBN:9780736054423
3. Whiting, William C. PhD, CSCS. Biomechanics of Common Musculoskeletal Injuries in American Football. Strength and Conditioning Journal: December 2015 - Volume 37 - Issue 6 - p 79-87. doi: 10.1519/SSC.000000000000166

## ANNEX OF THE COURSE OUTLINE

### Alternative ways of examining a course in emergency situations

<b>Teacher (full name):</b>	Nikolaos Aggelousis, Erasmia Giannakou
<b>Contact details:</b>	nagelous@phyed.duth.gr
<b>Supervisors: (1)</b>	Nikolaos Aggelousis, Erasmia Giannakou
<b>Evaluation methods: (2)</b>	Written or oral examination with distance learning methods, via eClass. Identification and monitoring of examinees through Microsoft Teams
<b>Implementation Instructions: (3)</b>	<p>The total examination duration of each group will be 90 minutes. In the first thirty minutes of the examination period, the examinees will be identified through the MS Teams app. For this purpose, there must be a camera, microphone and headphones connected to their terminal device (PC or smartphone). The relevant link will be sent via eClass, exclusively to the institutional accounts of those who have registered for the course and have accepted the terms of distance examination. For identification, students will display their student ID on camera when requested.</p> <p>The main examination will be carried out through the "Exercises" application of eClass. In particular, at the end of the identification process, an exercise entitled "Examination L204" will be activated in the eClass, which will include 40 questions. The time limit for answering the questions will be 60 minutes. During this period, all questions should be answered and finalized. Each of the questions will be graded with 0.25 points.</p> <p>Students should log in to the eClass platform through their institutional account.</p> <p>Also during the exam the camera and microphone of the examinees have to be continuously activated and the MS Teams application should be open.</p>

(1) Please write YES or NO

(2) Note down the evaluation methods used by the teacher, e.g.

- *written assignment* or/and exercises
- written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.

(3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:

a) in case of **written assignment and / or exercises**: the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and any other necessary information.

b) in case of **oral examination with distance learning methods**: the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.

c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.

There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.