



## LITHUANIAN SPORTS UNIVERSITY

### STUDY MODULE PROGRAMME (SMP)

Module Code	B	115	M	009	Accredited until				Renewal date		
	Branch of Science		Progr.	Registr. №.							

Entitlement

Mechanical Properties of Biological Tissues

Prerequisites

Bachelor's degree

Course (module) Learning Outcomes

№.	Learning Outcomes	Teaching / Learning Methods	Assessment Methods
1	Will be able to analyze and interpret the biomechanical properties of muscles and tendons, the causes and consequences of their change.	Case analysis (Case study), Discussion, Formal lecture, Seminar	Examination
2	Will be able to perform research on the biomechanical properties of muscles and tendons, analyze and interpret the results.	Individual project, Laboratory classes, Library / information retrieval tasks, Practical exercises (tasks)	Control work, Oral presentation, Report

Main aim

To provide students with knowledge about the biomechanical properties of muscles and tendons, their relationship with the structure of muscles and tendons; to acquaint with research and analysis methods; to provide skills in interpreting the characteristics of biomechanical properties of muscles and tendons, analyzing their changes in terms of age, gender, physical activity, sports workload, and to provide practical skills in the study of biomechanical properties of muscles and tendons.

Summary

The module is designed for specialists in various fields seeking to gain knowledge about the biomechanical properties of muscles and tendons, to get acquainted with the mechanical models of muscles and tendons and to understand their connection with the morphology of the biotissues; to learn to plan and perform studies of biomechanical properties of muscles and tendons using complex methods and measuring devices (isokinetic dynamometer, electromyograph, ultrasound); to acquire skills of data processing, analysis and data interpretation of the research.

Level of module

Level of programme		Subject group (under the regulation of the area)	Subject level
Cycle	Type		
Second	Master	Bendrojo universitetinio lavinimo	Deepening

Group under financial classification

Syllabus

№.	Sections and themes	Responsible lecturer
1.	The importance of muscle and tendon structure and genetic factors for their biomechanical properties. Mechanical models of muscles and tendons.	
2.	Methodology of research on biomechanical properties of muscles and tendons.	
3.	Peculiarities of biomechanical properties of muscles and tendons in terms of age, gender and training.	
4.	Interface between mechanical properties of muscles and tendons, and their damage.	
5.	Influence of sports training on the mechanical properties of muscles and tendons.	
6.	Significance of biomechanical properties of muscles and tendons for athletic performance.	

Evaluation procedure of knowledge and abilities:

References

№.	Title	Edition in Lithuanian Sports University library		In Lithuanian Sports University bookstore	Number of ex. in the methodical cabinet of the depart.
		Pressmark	Number of exemplars		
1.	BARTLETT, R., & BUSSEY, M. (2013). Sports biomechanics: reducing injury risk and improving sports performance. Routledge.			No	
2.	Hayes, A., Easton, K., Devanaboyina, P. T., Wu, J. P., Kirk, T. B., & Lloyd, D. (2019). A review of methods to measure tendon dimensions. Journal of orthopaedic surgery and research, 14(1), 18.			No	
3.	Freitas, S. R., Mendes, B., Le Sant, G., Andrade, R. J., Nordez, A., & Milanovic, Z. (2018). Can chronic stretching change the muscle-tendon mechanical properties? A review. Scandinavian journal of medicine & science in sports, 28(3), 794-806.			No	
4.	McCrum, C., Leow, P., Epro, G., König, M., Meijer, K., & Karamanidis, K. (2018). Alterations in leg extensor muscle-tendon unit biomechanical properties with ageing and mechanical loading. Frontiers in physiology, 9, 150.			No	
5.	Lepley, A. S., Joseph, M. F., Daigle, N. R., Digiacomo, J. E., Galer, J., Rock, E., ... & Sureja, P. B. (2018). Sex Differences in Mechanical Properties of the Achilles Tendon: Longitudinal Response to Repetitive Loading Exercise. The Journal of Strength & Conditioning Research, 32(11), 3070-3079.			No	
6.	Herbert, R. D., & Gandevia, S. C. (2019). The passive mechanical properties of muscle.			No	
7.	Benjamin, M., Kaiser, E., & Milz, S. (2008). Structure-function relationships in tendons: a review. Journal of anatomy, 212(3), 211-228.			No	

Additional literature

№.	Title

Coordinating lecturer

Position	Degree, surname, name	Schedule №.
		303

Subdivision

Entitlement	Code
	40

Study module teaching form №. 1

Semester	Mode of studies	Structure				Total hours	Credits	
		Theory	Seminars	Lab Works	Ind. work			
A	S	D	4	12	14	230	260	10

Languages of instruction:

Lithuanian	L	English	E	Russian	R	French	F	German	G	Other	Oth.
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