GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Biomechanics, PG_00047815		
Field of study	Biomedical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Wiktor Sieklicki	
	Teachers	dr inż. Wiktor Sieklicki	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	15	5.0	5.0	25

Subject objectives

basic knowledge in biomechanics, motoric functions, walking, and tissue biomechanics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W51] Knows and understands, to an advanced extent, selected aspects of human anatomy and physiology, constituting general knowledge related to the field of study	Student is able to analyze and understand sub-systems that are combined in a human mobility	[SW2] Assessment of knowledge contained in presentation
[K6_U07] can apply methods of process and function support, specific to the field of study	student is able to analyze physical phenomenons crucial for biomechanics	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	student understands physical phenomenons which determine functioning of the human body and it's motoric function	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

- basic information about biomechanics, mass-geometrical identification of human body segments
- defining the center point of mass of body segments
- body dynamics in the translational and rotational movement, body inertion
- kinematic pairs, manipulator mobility, levers in biomechanics
- muscle biomechnics
- mechanical characterisation of human body tissues, spring-elastic behavior, cyclic movement
- bone structures, bones adaptation scheme
- tissues loading schemes, anisotropy of tissues,
- bones biomechanics,
- modelling in biomechanics,
- arm biomechanical model,
- nerve system biomechanics.

Prerequisites and co-requisites	strength of the materials basics material science basics of mechanics human anatomy	
Assessment methods and criteria		

Subject passing criteria	Passing threshold	Percentage of the final grade
lecture - presence	85.0%	30.0%
lecture - tests	56.0%	70.0%

Recommended reading	Basic literature	Bober T., Zawadzki Z. Biomechanika układu ruchu człowieka, Wyd. BK, Wrocław 2001 Świtońskiego, Marka Gzika. Wydawnictwo Politechniki Śląskiej, 2011, Gliwice Błaszczyk J. W. Biomechanika kliniczna. Wyd. Lek. PZWL, Warszawa 2004 Dega W., Milanowska K. red. Rehabilitacja medyczna. PZWL Warszawa 1983 Erdmann W. S. Biomechanika ogólna. Wyd. May, Gdańsk 2010 Mrozowski J., Awrejcewicz J.: Podstawy biomechaniki. Politechnika Łódzka, 2004, Łódź
	Supplementary literature	Erdmann W. S. Metody obrazowe. Akademia Wych. Fiz. i Sportu Gdańsk 2007. Będziński R. Biomechanika inżynierska. Zagadnienia wybrane. Politechnika Wrocławska, Wrocław 1997 Biomechanika narządu ruchu. Pod redakcją Dagmary Tejszerskiej, Eugeniusza
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	define what are planes of the body, directions of movements, center point of mass and pressure, position of the center point of mass, anatomical position, inertia, rotational inertia, central interia momentum, Steiner's theorem, Hooks law, Young modulus	
Work placement	Not applicable	