UCLouvain	lfsm1109 2024	Biomechanics and analysis of the musculoskeletal system

5.00 credits	45.0 h + 15.0 h	Q2

Teacher(s)	Dewolf Arthur ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	Basic knowledge of mathematics and physics acquired in secondary school and during the BAC LFSM1105 course
Main themes	• Statics and dynamics of movement • Analysis of walking, running and other movements specific to physiotherapists and specific to physical educators (running, throwing, jumping and rotation) • Biomechanical parameters that influence walking and running, such as speed, cadence, symmetry, balance, coordination, etc.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 - Apply the concepts of mechanics to the human body (2.1, 11.1 Physio – 9.1 EP) - Analyze the movement of the human body in terms of joint and muscular mechanisms (2.1, 11.1 Physio – 9.1 EP) - Apply the principles of biomechanics to real applications (sport, clinical/daily life actions) (11.1, 11.2 Physio – 9.1 and 9.2 EP) - Use biomechanical analysis tools (such as kinematics, kinetics) to measure the biomechanical parameters of movements (2.1, 11.1 physiotherapist – 9.1 EP) - Apply the concepts of energy, work and muscular power to the analysis of the movement of the human body (2.1, 5.1, 11.1, 11.2 Kiné – 9.1 and 9.2 EP) - Identify the suitable and unsuitable technical characteristics of a gesture (5.1, 11.1, 11.2 Kiné – 9.1 and 9.2 EP) - Analyze sports practices and highlight the biomechanical principles used to improve motor performance (5.1, 11.1, 11.2 Kiné – 9.1 and 9.2 EP) - Describe the biomechanical adaptations that occur during recovery from injury/immobilization or after training and the consequences on musculoskeletal function. (11.1, 11.2 Physio – 9.1 and 9.2 EP)
Evaluation methods	The written exam includes questions on exercises and theory. The assessment is conducted using a multiple-choice exam (MCQ). For each question, 5 answer choices will be provided, along with a 6th choice "I don't know the answer." Among the 5 choices, only 1 correct answer is expected per question. No points are awarded for unanswered or incorrect responses. A quarter of the points will be awarded if the student selects the "I don't know the answer" option. The minimum mastery threshold (c) for learning outcomes (corresponding to a score of 10/20) is determined by the following formula: $c = ((n+1)/2n) \times 100$, where n represents the number of choices per question. In this case, the "minimum passing threshold" (c) is set at 60%.
Teaching methods	The course aims to give students mathematical tools for modelling and understanding the movement of the human body. Theory (lecture) + practical sessions
Content	The course content will be divided into three parts: - Anthropometry: concepts of the rigid body, the centre of gravity and moment of inertia - Kinetic analysis: calculation of forces and moments of force in a static situation - Dynamic situations and concepts of energy, work and power The student will have to use the basics of biomechanics in an integrated way in the fields of motor science: analysis of joint movements; segmental modelling of the body; inertia; balance and posture; muscular leverage; energy transformation during a movement
Inline resources	Moodle
Other infos	This course is strictly reserved for FSM students and is not open to other UCLouvain students.

Faculty or entity in charge	FSM

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Motor skills : General	EDPH1BA	5		🔍
Bachelor in Physiotherapy and Rehabilitation	KINE1BA	5		🔍