

	UČNI NAČRT PREDMETA/COURSE SYLLABUS
Predmet	Biomehanska analiza
Course title	Biomechanical Analysis

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizioterapija / 2. stopnja	Ni smeri študija	2. letnik	3.
Physiotherapy / 2 nd Cycle	No study field	2 nd year	3 th

Vrsta predmeta/Course type izbirni/elective

Univerzitetna koda predmeta/University course code 2_FTH_IP_UN6

Predavanja	Seminar	Sem. vaje	Lab. vaje	Teren. vaje	Samost. delo	ECTS
Lectures	Seminar	Tutorial	Laboratory work	Field work	Individ. work	
25		30			155	7

Nosilec predmeta/Lecturer: izr. prof. dr. Franci Merzel

Jeziki/ Languages:	Predavanja/Lectures:	slovenski/Slovenian
	Vaje/Tutorial:	slovenski/Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

- Vpis v drugi letnik študijskega programa.
- Študent mora pred izpitom pripraviti in predstaviti ter zagovarjati projektno/raziskovalno nalogo.

Prerequisites:

- A prerequisite for inclusion is enrolment in the second year of study.
- Student has to prepare, present and defend a project/research paper before the exam.

Vsebina:

- *Biomehanski strukturni elementi telesa:* skelet, sklepi, mišice in kite.
- *Osnove premikanja:* kinematika, dinamika, težnost, trenje, biomehanske lastnosti mišic, mišično delo, navor.
- *Stoja, padanje, drsenje:* ravnovesje, biomehanika stoje, variacija stoje, stabilizacija, biomehanika drsenja, padanja in padcev, varnost pri padcih.
- *Hoja in teka:* biomehanika hoje in teka, optimizacija in izboljšanje, varnost.
- *Rokovanje z objekti:* biomehanika oprijema, dviganja in prenašanja, varnost.

Content (Syllabus outline):

- *Biomechanical structural elements of the body:* skeleton, ligaments, muscles and tendons.
- *Foundations of movement:* kinematics, dynamics, gravity, friction, biomechanical properties of muscles, muscular work, torque.
- *Standing, falling, slipping:* balance, biomechanics of standing, variations of standing, enhancement of standing, biomechanics of slipping, falling and landing, safety by falling and landing.
- *Walking and running:* biomechanics of walking and running, enhancement and optimization, safety.

<ul style="list-style-type: none"> • <i>Skakanje, metanje, udarjanje:</i> biomehanika pri skoku, metu in udarcu, izboljšanje, varnost. • <i>Plavanje:</i> biomehanika plavanja, varnost, učinek pri plavanju. 	<ul style="list-style-type: none"> • <i>Object manipulation:</i> biomechanics of gripping, lifting and carrying, safety. • <i>Jumping, throwing, striking:</i> biomechanics of the jump, throw and strike, enhancement, safety. • <i>Swimming:</i> biomechanics of swimming, safety, efficiency in swimming.
---	---

Temeljna literatura in viri/Readings:

Temeljna literatura/Basic literature

- Chapman A. E. (2008). *Biomechanical analysis of fundamental human movements*. Human Kinetics.

Priporočljiva literatura/Recommended literature

- *Bohinc, K. (2016).* Fizika človeškega telesa. Ljubljana: Zdravstvena fakulteta, Univerza v Ljubljani.
- Halliday, D., Resnick, R. in Walker, J. (2013). *Fundamentals of physics*. 6. ed. New York: Wiley and sons. – izbrana poglavja.

Cilji in kompetence:

Učna enota prispeva predvsem k razvoju naslednjih splošnih in specifičnih kompetenc:

- celovito kritično mišljenje, sposobnost analize, sinteze in predvidevanje rešitev s področij fizioterapije, izobraževalnih, družboslovnih, humanističnih, organizacijskih, naravoslovno matematičnih ter drugih ved (interdisciplinarnost),
- usposobljenost za delovanje v najzahtevnejših okoljih dela v fizioterapiji, sposobnost reševanja kompleksnih problemov,
- sposobnost kreativne uporabe znanja v strokovnem/poslovnem okolju,
- usposobljenost za kakovostno in varno strokovno delo na področju fizioterapije,
- usposobljenost za organizacijo, spremljanje in nadzor dela na področju fizioterapije,
- usposobljenost za komuniciranje v domačem in mednarodnem okolju,
- avtonomnost pri odločanju in odgovornost za sprejete odločitve,
- obvladovanje raziskovalnih metod, postopkov, procesov in tehnologije,
- usposobljenost za prepoznavanje potreb po spremembah in uvajanje inovacij v strokovno okolje,

Objectives and competences:

The learning unit mainly contributes to the development of the following general and specific competences:

- comprehensive critical thinking, ability to analyse, synthesise and predict solutions in the fields of physiotherapy, educational and social sciences, humanities, organiaational sciences, natural sciences, mathematics and other sciences (interdisciplinarity),
- the ability to work in the most demanding work environments in physiotherapy, the ability to solve complex problems,
- the ability to use knowledge creatively in a professional / business environment,
- qualification for high quality and safe professional work in the field of physiotherapy,
- the ability to organise, monitor and control work in the field of physiotherapy,
- the ability to communicate in the domestic and international environment,
- autonomy in decision making and responsibility for decisions taken,

<ul style="list-style-type: none"> • avtonomnost pri pisanju strokovnih in znanstvenih besedil, • sposobnost za prepoznavanje potreb po spremembah, kritično uvajanje inovacij, obvladovanje sprememb, odločanje in sprejemanje odgovornosti, • ozaveščenost o nujnosti lastnega izpopolnjevanja, dopolnjevanja, poglobljanja in posodabljanja znanja. 	<ul style="list-style-type: none"> • mastery of research methods, procedures, processes and technology, • the ability to identify the need for change and introduce innovation into the professional environment, • autonomy in writing professional and scientific texts, • the ability to identify the need for change, critically innovate, manage change, make decisions and take responsibility, • awareness of the need to improve, supplement, deepen and update knowledge.
---	---

Predvideni študijski rezultati:

Študent/študentka:

- spozna uporabnost kvalitativne in kvantitativne biomehanske analize gibanja,
- razume pomen osnovnih principov biomehanike človeškega telesa,
- razvije sposobnost za analitično mišljenje in za kvantitativni opis opažanj,
- se usposobi za kritično presojo mehanskih vplivov na človeško telo.

Intended learning outcomes:

Students:

- know the importance of qualitative and quantitative biomechanical analysis of movements,
- recognise the importance of fundamental biomechanical principles of the human body,
- develop abilities for analytical thinking and for quantitative description of observations,
- develop skills for critical evaluation of mechanically driven effects on human body.

Metode poučevanja in učenja:

- *predavanja* z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov),
- *seminarske vaje:* predstavitev in uspešen zagovor projektne/raziskovalne naloge (reševanje problemov, študije primera, kritično presojanje, diskusija, refleksija izkušenj, vrednotenje, projektno delo, timsko delo).

Learning and teaching methods:

- *lectures* with active student participation (explanation, discussion, questions, examples, problem solving),
- *seminar tutorial:* presentation and successful defence of a project/research paper (problem solving, case studies, methods of critical thinking, discussion, reflection on experience, evaluation, project work, teamwork).

Načini ocenjevanja:

Načini:

- 100 % udeležba na predavanjih in vajah ter priprava, predstavitev in zagovor projektne/raziskovalne naloge,

Delež (v %)

Weight (in %)

100 %

Assessment:

Types:

- 100% attendance of lectures and tutorials including preparation, presentation

<ul style="list-style-type: none"> • če študent ni 100 % udeležen na predavanjih in vajah: <ul style="list-style-type: none"> - izpit, - priprava, predstavitev in zagovor projektne/raziskovalne naloge. <p>Ocenjevalna lestvica: ECTS.</p>	<p>70 % 30 %</p>	<p>and defence of a project/research paper,</p> <ul style="list-style-type: none"> • if the student has not fully attended lectures and tutorials (100%): <ul style="list-style-type: none"> - examination, - preparation, presentation and defense of a project/research paper. <p>Grading scheme: ECTS.</p>
--	----------------------	---