

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Izbirni predmet : Modeliranje procesov vadbe hitrosti
Course title:	Modeling in Speed training Processes

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študijski program		1	1 ali 2
Doctoral study program		1	1 or 2

Vrsta predmeta / Course type

Izbirni/elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
25	25	10		65		5

Nosilec predmeta / Lecturer:

prof. dr. Milan Čoh

Jeziki /

Predavanja / Lectures: Slovenski/Slovene

Languages:

Vaje / Tutorial:

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

Izpolnjevanje pogojev za vpis na doktorski študij Kineziologija.

Prerequisites:

General conditions for enrolment into the Doctoral Programme of Kinesiology

Vsebina:

Predmet je razdeljen na naslednje vsebinske sklope:

- Hitrost kot biomotorična sposobnost (motorični vidik, neuralni, fiziološki, biokemični)
- Razvoj hitrosti in biološki razvoj – genetski dejavniki
- Hitrost reakcije, vpliv treninga evociranih možganskih pretokov
- Trening reaktivnosti možganov pri različnih stimulacijah (cold pressor test, ultra zvočna doplrska metoda -TCD)
- Diagnostika hitrosti na osnovi 2 D in 3 D kinematičnih analiz
- Kontrola gibanja s pomočjo pospeškomerov
- Diagnostika hitrosti na osnovi dinamičnih parametrov (paromed, pritiskovne plošče)
- Diagnostika hitrosti z uporabo laserske tehnologije

Content (Syllabus outline):

The course is divided in the following substantive parts:

- Speed as biomotor ability (motor, neural, physiological, biochemical aspects)
- Development of speed and biological development – genetic factors
- Speed of reaction, impact of the training of evoked cerebral blood flows
- Training of cerebral reactivity in different simulations (cold pressor test, transcranial Doppler ultrasound method)
- Speed diagnostics based on 2-D and 3-D kinematic analyses
- Motor control using accelerometers
- Speed diagnostics based on dynamic parameters (paromed, force plates)
- Monitoring of electromyographic (EMG) activity of muscles in the conditions of maximum speed and block acceleration
- Functioning of kinetic muscle chains in sprint in terms of EMG

- Spremljanje elektromiografske EMG aktivnosti mišic v pogojih maksimalne hitrosti in startne akceleracije
- Delovanje kinetičnih mišičnih verig z vidika EMG pri sprintu
- Modeliranje hitrosti s pomočjo GPS tehnologije
- Modeliranje treninga hitrosti s pomočjo integriranih merskih postopkov (kinematika, dinamika, akcelerometrija, EMG, izokinetika)
- Obremenitve mišic pri sprinterskem teku na osnovi termovizije toplotnih polj.
- Aplikacija znanstvenih metod in postopkov v športno prakso.

- Speed modelling using the GPS technology
- Speed training modelling using the integrated measurement procedures (kinematics, dynamics, accelerometry, EMG, isokinetics)
- Muscle loading in sprint running based on thermovision of temperature fields
- Application of scientific methods and procedures in sport practice.

Temeljni literatura in viri / Readings:

- Morrow J.: Measurement and valuation in Human Performance, Human Kinetics, Champaign, IL, 2005.
- Zatsiorsky V.: Biomechanics in Sport, Blackwell Science, 2000.
- Robertson D., Caldwell G., Hamill V. , Kamen G., Whittlesey S.: Research Methods in Biomechanics. Human Kinetics, Champaign, IL, 2004
- Brown, L., Ferrigno, V., Santana J.: Training for Speed, Agility and Quickness. Human Kinetics, Champaign IL, 2000.
- Meinel K., Schnabel G.: Bewegungs Sport Lehre Motorik. Sudwest Verlag, 2004.
- Weineck, J.: Optimales Training. Spitta Verlag GmbH & Co, 2008
- Čoh M., Jošt B.: Biomechanical characteristics of technique in certain cosen sports. Ljubljana, Fakulteta za šport, Inštitut za kineziologijo, 2000.
- Čoh, M. *Biomehanika atletike*. Ljubljana: Fakulteta za šport, 2001. 251 str., ilustr., graf. prikazi.
- Čoh, M., K. Mackala. Biodynamic analysis of sprint, jumps and agility. Institute of Kinesiology, Faculty of Sport, Ljubljana, 2019
- Škof B. in sod.: Šport po meri otrok in mladostnikov – Pedagoško-psihološki in biološki vidiki kondicijske vadbe mladih, Fakulteta za šport, Univerza v Ljubljani, 2007.
- Bompa T.: Periodization – Theory and Methodology of Training. Human Kinetics, Champaign, IL, 1999
- Enoka, R.: Neuromechanical Basic of Kinesiology, Human Kinetics, Champaign, IL, 1994

Cilji in kompetence:

Objectives and competences:

<p>Cilji:</p> <ul style="list-style-type: none"> • Študenti bodo dobili specifična, poglobljena znanja na področju razvoja hitrosti, ki ga bodo povezali z znanstveno-raziskovalnim in razvojnim delom, • Seznanili se bodo z sodobnimi diagnostičnimi tehnologijami razvoja hitrosti, • Naučiti študente povezovanja znanstveno raziskovalno delo z prakso, • Razviti komunikacijske sposobnosti študentov z vidika prezentacije rezultatov znanstvenega dela na konferencah, kongresih in okroglih mizah. <p>Specifične kompetence:</p> <ul style="list-style-type: none"> • Sposobnost samostojnega znanstveno-raziskovalnega in razvojnega dela na področju kineziološke znanosti, • Razviti sposobnost pisanja znanstveno raziskovalnih del za mednarodne in domače znanstvene revije, • Razviti kritičen odnos do rezultatov lastnega znanstveno raziskovalnega dela, • Razviti sposobnost timskega sodelovanja s strokovnjaki različnih področij, • Obvladati delo z raziskovalnimi tehnologijami. 	<p>Objectives:</p> <ul style="list-style-type: none"> • Students will gain specific, in-depth knowledge in the field of speed development that they will connect with their scientific-research and development work. • They will learn about modern diagnostic technologies of speed development. • They will learn how to connect the scientific-research work with the practice. • Students will develop communication skills in terms of presentation of the results of the scientific work at conferences, congresses and round tables. <p>Specific competences:</p> <ul style="list-style-type: none"> • Ability to independently perform scientific-research and development work in the science of kinesiology. • Develop the ability to write scientific-research papers for international and domestic scientific journals. • Develop a critical attitude to the results of their own scientific-research work. • Develop the ability for team work with experts from various fields. • Gain proficiency in working with research technology. 	
<p>Predvideni študijski rezultati:</p> <ul style="list-style-type: none"> • Znajo smiselno načrtovati in izvesti eksperiment, • Znajo upravljati z raziskovalno tehnologijo, • Znajo oblikovati znanstveni tekst, • Znajo komunicirati z raziskovalci s sorodnih področij. 	<p>Intended learning outcomes:</p> <p>Knowledge and understanding:</p> <ul style="list-style-type: none"> • They learn how to reasonably plan and conduct an experiment. • They learn how to manage the research technology. • They learn how to make a scientific paper. • They learn how to communicate with the researchers from related fields. 	
<p>Metode poučevanja in učenja:</p> <p>Predavanja, seminarji, eksperimentalne vaje, javni kolokviji, laboratorijske meritve, terenske meritve.</p>	<p>Learning and teaching methods:</p> <p>Lectures, experimental exercises, public hearings, laboratory testing, field measurements.</p>	
<p>Načini ocenjevanja:</p> <p>Način (pisni izpit, ustno izpraševanje, naloge, projekt)</p>	<p>Delež (v %) / Weight (in %)</p> <p>100 %</p>	<p>Assessment:</p> <p>Type (examination, oral, coursework, project):</p>

Ustni izpit, uspešno izveden eksperiment, seminar z zagovorom.		Oral examination, successful completion of an experiment, presentation of a seminar.
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Reference nosilca / Lecturer's references:

ČOH, Milan, HÉBERT-LOSIER, Kim, ŠTUHEC, Stanko, BABIĆ, Vesna, SUPEJ, Matej. Kinematics of Usain Bolt's maximal sprint velocity. *Kinesiology : international scientific journal of kinesiology and sport*, ISSN 1331-1441. [English ed.], 2018, vol. 50, iss. 2, 9 str.

ŠIROK, Brane, GOSTIŠA, Jurij, SEČNIK, Matej, MAĆKAŁA, Krzysztof, ČOH, Milan. Application of wind tunnel device for evaluation of biokinetic parameters of running. *Symmetry*, ISSN 2073-8994, 2021, vol. 13, no. 3, str. 1-17.

ČOH, Milan, BONČINA, Nejc, ŠTUHEC, Stanko, MAĆKAŁA, Krzysztof. Comparative biomechanical analysis of the hurdle clearance technique of Colin Jackson and Dayron Robles : key studies. *Applied sciences*, ISSN 2076-3417, May 2020, vol. 10, iss. 9, art. 3302, 10 str.

ČOH, Milan, PEHAREC, Stanislav, BAČIĆ, Petar, MAĆKAŁA, Krzysztof. Biomechanical differences in the sprint start between faster and slower high-level sprinters. *Journal of Human Kinetics*, ISSN 1640-5544, 2017, vol. 56, str. 7-20.

MAĆKAŁA, Krzysztof, VODIČAR, Janez, ŽVAN, Milan, KRIŽAJ, Jožef, STODÓŁKA, Jacek, RAUTER, Samo, ČOH, Milan. Evaluation of the pre-planned and non-plan[n]ed agility performance: comparison between individual and team sports. *International journal of environmental research and public health*, ISSN 1660-4601

MAĆKAŁA, Krzysztof, RAUTER, Samo, ŠIMENKO, Jožef, KREFT, Robi, STODÓŁKA, Jacek, KRIŽAJ, Jožef, ČOH, Milan, VODIČAR, Janez. The effect of height on drop jumps in relation to somatic parameters and landing kinetics. *International journal of environmental research and public health*, ISSN 1660-4601

MIRKOV, Dragan, KNEZEVIC, Olivera M., GARCÍA RAMOS, Amador, ČOH, Milan, ŠARABON, Nejc. Gender-related differences in mechanics of the sprint start and sprint acceleration of top national-level sprinters. *International journal of environmental research and public health*, ISSN 1660-4601. [Online ed.], 2020, vol. 17, iss. 18, art. 6447, str. 1-11.

ČOH, Milan. Analisi biomeccanica della tecnica di sprint - Usain Bolt. *Atleticastudi*, ISSN 0390-6671, 2019, anno 49, nu. 1, str. 3-10.

ČOH, Milan, BONČINA, Nejc. Profilo biomeccanico della tecnica di passaggio dell'ostacolo di Sally Pearson. *Atleticastudi*, ISSN 0390-6671, 2019, anno 49, nu. 2/3, str. 31-35.

ČOH, Milan, MACKALA, Krzysztof. Differences between the elite and sub-elite sprinters in kinematic and dynamic determinations of countermovement jump and drop jump. *Journal of strength and conditioning research*, ISSN 1533-4287, nov. 2013, vol. 27, issue 11, str. 3021-3027

ČOH, Milan. *Track and field applied research in sprint and jump*. Saarbrücken: Lambert Academic Publishing, 2014.

ČOH, Milan, TOMAŽIN, Katja, RAUSAVLJEVIĆ, Nikola. Differences in morphological and biodynamic characteristics of maximum speed and acceleration between two groups of female sprinters. *Biol. Sport*, 2007, vol. 24, no. 2, str. 115-128

ČOH, Milan, PEHAREC, Stanislav, BAČIĆ, Petar. The sprint start: Biomechanical analysis of kinematic, dynamic and electromyographic parameters. *New stud. athl.*, 2007, vol. 22, no. 3, str. 29-38.