

## INSTRUMENTAL BIOMECHANICS APPLIED TO PHYSICAL ASSESSMENT(2024083)

**Credit:** 02 crédits      **Credit hours:** 30 hours/class

### **COURSE SYLLABUS:**

The course is focused in characterizing/discussingthe biomechanical concepts and principles of kinetics and kinematics associated with balance, strength, power and gait.The devices for collecting biomechanical data will be described, guidedby critical interpretation of the results for research and practical applicability (inertial sensors - accelerometry, gyroscopy and magnetometry, force platform, dynamometry, smartphone's applications to assess gait and power). The relationship between the results whiledata is collected and those substantiated by the literature will be discussed.

### **GOALS:**

To discuss the basic/essential concepts of Biomechanics for data acquisition using equipment for physical evaluation.To critically evaluate the results obtained by articles in the area of Physical Education and Health Sciences. To train graduate students to analyze research-related data concerning Physical Education domains, by interpreting the observed outcomes.

### **BIBLIOGRAPHY:**

#### **Books:**

- HAMILL J, KNUTZEN KM. Bases biomecânicas do movimento humano. 4<sup>a</sup> ed. Editora Manole, 2016. ISBN-10: 8520446701; ISBN-13: 978-8520446706
- MCGINNIS PM. Biomecânica do Esporte e do Exercício. 3<sup>a</sup> ed. Editora Artmed, 2015. ISBN-10: 8582712014; ISBN-13: 978-8582712016
- DUFOUR M, PILLU M. Biomecânica funcional: Membros, cabeça, tronco. 1<sup>a</sup> ed. Editora Manole, 2015. ISBN-10: 8520438563; ISBN-13: 978-8520438563

#### **Articles:**

- EAGLES AN, SAYERS MGL, BOUSSON M, LOVELL DI. Current Methodologies and Implications of Phase Identification of the Vertical Jump: A Systematic Review and Meta-analysis. Sports Med 2015;45(9):1311-1323. doi: 10.1007/s40279-015-0350-7.

STARK T, WALKER B, PHILLIPS JK, FEJER R, BECK R. Hand-held dynamometry correlation with the gold standard isokinetic dynamometry: a systematic review. *PM R.* 2011;3(5):472-9. doi: 10.1016/j.pmrj.2010.10.025.

GALLARDO-FUENTES F, GALLARDO-FUENTES J, RAMÍREZ-CAMPILLO R, BALSALOBRE-FERNÁNDEZ C, MARTÍNEZ C, CANIUEO A, CAÑAS R, BANZER W, LOTURCO I, NAKAMURA FY, IZQUIERDO M. Intersession and Intrasession Reliability and Validity of the My Jump App for Measuring Different Jump Actions in Trained Male and Female Athletes. *J Strength Cond Res.* 2016;30(7):2049-56. doi: 10.1519/JSC.0000000000001304.

CLARK RA, MENTIPLAY BF, PUA YH, BOWER KJ. Reliability and validity of the Wii Balance Board for assessment of standing balance: A systematic review. *Gait Posture.* 2018;61:40-54. doi: 10.1016/j.gaitpost.2017.12.022.

GOBLE DJ, BRAR H, BROWN EC, MARKS CR, BAWEJA HS. Normative data for the Balance Tracking System modified Clinical Test of Sensory Integration and Balance protocol. *Med Devices (Auckl).* 2019;8(12):183-191. doi: 10.2147/MDER.S206530.