COURSE OUTLINE
ASSESSMENT OF HUMAN MOVEMENT & FUNCTION (MP12)

1. GENERAL

SCHOOL	School of Health Sciences		
DEPARTMENT	Physiotherapy		
LEVEL OF EDUCATION	Postgraduate		
COURSE CODE	MP12	**SEMESTER OF STUDY**	A
COURSE TITLE	Assessment of Human Movement & Function		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDIT UNITS**	
Theory + Exercise tutorials	**2**	**6**	
Laboratory	**2**	**2**	
COURSE TYPE	Special Background		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek/English		
ERASMUS STUDENTS	NO		
ECLASS COURSE CODE	PHYSIO_P_101		
COURSE RESPONSIBLE	Dr. Asimakis K. Kanellopoulos, Assistant Professor		
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2. LEARNING OUTCOMES

Learning results

Upon successful completion of the course, the student will be able to:

1) To know the means and techniques of recording and analyzing human movement & activity. To be able to choose the most appropriate of them for each clinical or research question.
2) To be able to understand and critically comment on relevant scientific - research results and texts concerning human movement.
3) To record and analyze in detail, validly and reliably human movement and activity and their individual characteristics, using the necessary equipment for laboratory evaluation.

General & Special Skills

The course aims to develop the following **general** skills:

- Searching for the best way to assess human movement
- Searching for the best human motion assessment tools
- Decision making
- Autonomous work
- Generating new research ideas
- Promotion of free, creative and inductive thinking

The course aims to develop the following **specific** skills:

- Ability to analyze and evaluate the signal recorded by tools for measuring the kinetic characteristics of human movement.
- Ability to analyze and evaluate the signal recorded by tools for measuring the kinematic characteristics of human movement.
- Ability to analyze and evaluate the signal recorded by force measuring instruments.
- Ability to analyze and evaluate the Electromyographic signal.
- Ability to carry scientific knowledge and research through all of the above in clinical practice.

3. COURSE CONTENT

Theoretical part:

1. Fundamentals of Human Movement and Activity - Engineering Laws Governing Human Movement.
2. Signal- analog & Digital signal Digitization - Signal processing.
3. Methods of recording and evaluating Kinetic characteristics I.
4. Methods of recording and evaluating Kinetic characteristics II.
5. Methods of recording and evaluating strength - Isokinetics I.
6. Methods of recording and evaluating strength – Isokinetics II.
7. Methods of recording and evaluating muscle activity - EMG I.
8. Methods of recording and evaluating muscle activity - EMG II.
9. Tutoring on assignments.
10. Measurement of muscle fatigue and proprioception.
11. Temporal & spatial parameters of movement. Methods of recording and evaluating Kinetic characteristics I.
12. Anthropometry. Methods of recording and evaluating Kinetic characteristics II.
13. Methods of recording and evaluating human balance.

Laboratory part:

1. Introduction to the laboratory - mode of operation - regulations – safety.
2. Measurement of Kinetic Characteristics I – Gait.
3. Measurement of Motor Characteristics II – jumping, running, clinical cases.
4. Force Measurement – Isokinetics I.
5. Isokinetics II – analysis of clinical cases.
6. Measurement of muscle activity - EMG I.
7. EMG II – analysis of clinical cases.
8. Measurement of Proprioception and muscle fatigue – clinical examples.
9. Functional tests of human movement assessment.
10. Introduction to the complexities of measuring kinematic characteristics – Measurement tools.
11. 3Dimensional measurement of kinematic characteristics with infrared cameras I.
12. 3D measurement of kinematic features with infrared cameras II – clinical examples.
13. Measuring Human Balance.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

METHOD OF TEACHING	Face-to-face, Hybrid education, Distance education at 20%
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Use of PC, projector , video , and ICT (eclass , email, MS Teams , google docs) in teaching and communicating with students
TEACHING ORGANIZATION	

Activity	***Semester Workload***
Lectures / Workshop / Interactive teaching	52
Independent Study & article analysis	80
Elaboration of work study	30
Writing assignments	38
Total Course (25 workload hours per credit unit)	***200***

STUDENT EVALUATION	The evaluation of the students in the theoretical part of the course is carried out in accordance with the regulation of the MSc. and the relevant decisions of the Department Assembly as a weighting of their grade in the written exams (65%) and their performance in the individual work (35%). Written exams include Multiple Choice Tests, and Analytical/Combined Answer Questions. The laboratory part of the course is evaluated by the average of the three (3) assignments (individual). Each assignment must have at least a grade of five (5) on the ten -point scale to be considered successful. Tasks include: Theory: one (1) individual research proposal paper of approximately 5000 words. There is feedback for students in a personal message about their mistakes. Lab: three (3) individual assignments, submitted through e-class at a predetermined time to be checked for plagiarism by Turnitin plagiarism software. There is feedback for students in a personal message about their mistakes.

5. RECOMMENDED BIBLIOGRAPHY

- Proposed Bibliography :

1. *David A. Winter (2009): "Biomechanics and Motor Control of Human Movement". Wiley, New Jersey.*
2. *Gordon Robertson, Graham Caldwell, Joseph Hamill, Gary Kamen, Saunders Whittlesey (2004): "Research Methods in Biomechanics". Human Kinetics.*
3. *Nihat zkaya , Margareta Nordin , David Goldsheyder , Dawn Leger (2012): "Fundamentals of Biomechanics: Equilibrium, Motion, and Deformation". Springer.*
4. *Aydin Tzeren (2000): "Human Body Dynamics: Classical Mechanics and Human Movement". Springer.*
5. *Vladimir Zatsiorsky (2002): "Kinetics of Human Motion". Human Kinetics.*
6. *Jacquelin Perry, Judith Burnfield (2010): "Gait Analysis: Normal and Pathological Function". Slack Incorporated.*
7. *David Levine, Jim Richards, Michael W. Whittle (2012): "Whittle's Gait Analysis". Churchill Livingstone.*
8. *Bodo Rosenhahn , Reinhard Klette , Dimitris Metaxas (2010): "Human Motion: Understanding, Modeling, Capture, and Animation". Springer.*
9. *Gary T. Yamaguchi (005): "Dynamic Modeling of Musculoskeletal Motion: A Vectorized Approach for Biomechanical Analysis in Three Dimensions". Springer.*
10. *James Morrow Jr., Allen Jackson, James Disch , Dale Mood (2010): "Measurement and Evaluation in Human Performance". Human Kinetics*

- Related scientific journals:

1. *Journal of biomechanics,* https://www.sciencedirect.com/journal/journal-of-biomechanics
2. *Clinical Biomechanics,* https://www.journals.elsevier.com/clinical-biomechanics
3. *Gait & Posture,* https://www.sciencedirect.com/journal/gait-and-posture