# Functional Assessment and Experimental Research Applied to the Exercise Sciences (in memory of Prof. Marcello Faina)

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***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

Experimental research: from the analysis of the scholarship literature to developing a research protocol, from data collection and analysis to presenting the results.

Knowledge of the related health tests, interpreting their results in order to define, according to the guidelines for the physical exercise prescribed based on the scientific evidence, the most appropriate personal exercise regime for a healthy population and for special groups of people.

Students will acquire a critical awareness of the different forms of functional assessment adapted to different age groups, and will master the main international guidelines related to physical activity for health and well-being.

***COURSE CONTENT***

Content of the theoretical lessons

The functional test applied to the research methodology

*– Conceptual part*: identify the problem, consult the academic literature, formulate a hypothesis.

*– Operational part*: analytical research, sample selection, measuring tool selection, data collection.

*– Analysis part*: descriptive statistics, inferential statistics.

*– Diffusion part*: writing an experimental thesis, writing an abstract.

Health-related physical fitness test

*–* Energy expenditure and life style test.

*–* Assessment of CV risk factors and PWS.

*–* Anthropometric measurements and body composition.

*–* Oxygen consumption, muscular strength and endurance, flexibility test.

*–* Assessment of physiological responses to exercise.

Skill-related physical fitness test

*–* Agility, speed, power, coordination, balance, reaction times.

Guidelines for evidence-based physical exercise

*– Learn*: to identify the bibliographic sources that provide the guidelines for evidence-based physical exercise.

*– Interpret*: understanding how the guidelines are defined.

*– Application*: from the functional test to the application of the guidelines.

Content of the practical lessons (workshop + internship)

Methods and tools for evaluating:

* Energy expenditure during sleep (direct and indirect measures).
* Lifestyle (questionnaire and accelerometry).
* Maximum oxygen consumption:
* Direct and indirect maximal tests;
* Direct and indirect submaximal tests.
* Cardiovascular risk factors.
* Muscle strength:
* Isometric dynamics (Handgrip test);
* Repeated maximal exercise (indirect test);
* Muscle endurance (curl-up, push-up).
* Flexibility (V-Sit & Reach).
* Anthropometry (BMI, Body circumference, Waist/Hip ratio, Waist/Height ratio).
* Body composition (plicometry and centimetry).
* Skill-related components (Semo agility test, One-foot stand test, Soda pop coordination test, Standing long jump, Yardstick test, 50-yard dash).
* Physiological responses to exercise.

Exercise prescription:

* ACSM guidelines.
* FITT-VP principle.

Case study analysis

– The use of Functional Assessment in different contexts

Applied experimental research:

* Using online databases for bibliographic research.
* Data collection and spreadsheet use.
* Basic concepts and applications of descriptive and inferential statistics.
* Critical analysis of an abstract or a scientific article.

***READING LIST***

American College of sports medicine, *ACSM’s guidelines for exercise testing and prescription,* Lippincott Williams & Wilkins, 2017,10th edition.

American College of sports medicine, *ACSM’s resource manual for guidelines for exercise testing and prescription,* Lippincott Williams & Wilkins, 2013, 7th edition.

American College of sports medicine, *ACSM’s health-related physical fitness assessment manual,* Lippincott Williams & Wilkins, 2017, 5th edition.

V.H. Heyward-A.L. Gibson, *Advanced Fitness Assessment and Exercise Prescription,* Human Kinetics, 2019, 8th edition.

W.L. Kenney-J.H. Wilmore-D.L. Costill, *Physiology of sport and exercise*, Human Kinetics, 2022, 8th edition.

W.D. Mcardle-F.I. Katch-V.L. Katch, *Exercise physiology - - Nutrition, Energy, and Human Performance,* Lippincott Williams & Wilkins, 2022, 9th edition.

J.R. Morrow (Jr.)-D.P. Mood-W. Zhu -M. Kang, *Measurement and evaluation in human performance,* Human Kinetics, (5th edition), 2023, 6th edition.

G.G. Haff-C. Dumke, *Laboratory manual for exercise physiology,* Human Kinetics, 2019, 2nd edition.

***TEACHING METHOD***

Lectures in the classroom and in the lab.

Internship.

***ASSESSMENT METHOD AND CRITERIA***

A single exam divided into a written test followed by an oral interview. The three open-ended questions asked in the interim written test will all carry the same mark, from 0 (in the case of no answer) to 30 (in the case of an exemplary answer). The oral exam includes two assessments. The mark obtained for the oral test is averaged with the mark obtained for the written test. The final single mark is based 40% on the mark for the written test and 60% on that for the oral interview.

The grade is represented by a mark out of thirty.

***NOTES AND PREREQUISITES***

Students must possess a basic knowledge of the concepts of exercise physiology and biomechanics.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG, or on the Faculty notice board.