Measuring Movement
Course coordinator: Dr. H. Houdijk and T. Ijmker MSc
Period: 1 (September – November)
Tuition forms: lectures, practicals
Assessment type: Practical assessment (30%) and Knowledge assessment MC (70%)
Credits: 6
Used literature
- Syllabus “Measuring movement”

Content

Within physiotherapy research a large set of measurement techniques and methods is available, ranging from a psychosocial towards a biophysical approach. This course will only cover some of the most frequently used techniques from the biophysical approach to objectively quantify different aspects of human movement. The following techniques will be addressed specifically: measurement of kinematic quantities using Optotrak or video camera, measuring external forces with a force platform, measuring linear and angular accelerations with an accelerometer, and measuring muscle activity with electromyography (EMG).

The focus of this course is on the general principles techniques which apply to the measurement of almost any physical signal, and the processing of these signals into meaningful quantities. Students will learn how to perform measurements with the aforementioned equipment, and how to process the acquired signals using Matlab. Additionally, students will learn to analyze the reliability and precision of the given methods and to make a sound judgment as to the adequacy and limitations of a given measurement method to quantify human movement.

Aims of the course (with relation to end qualifications between brackets)
- To gain knowledge of common principles in signal processing. (2)
- To gain knowledge of the common function, applicability and limitations of measurement tools often used for measuring movement in physiotherapy research. Specifically: motion analysis, force sensors, accelerometers and electromyography (2)
- To be able to select the appropriate measurement set-up and parameters to answer a given research question (3,4)
- To be able to operate common measurement tool in movement analysis (3,4)
- To be able to process data collected with the designated measurement tools using Matlab (3,4)
- To be able to interpret and report the results of the measurement outcomes. (9,14)
- To be able to critically evaluate the accuracy and validity of the measurement outcomes. (9)

Assessment information

Practical assessment
Conditional requirements
Students need to attend the data collection part of each practical, in order to receive a grade for the practical exam.
Examination and grading
For each practical, the student has to hand in an assignment through BlackBoard before the deadline. Each assignment will consist of open-end questions covering the material of the practical in question. The average grade for the four practical assignments will make up 30% of the final grade for this course.

Final exam
Conditional requirements
Students need to be in time and to bring their VU_ID to the exam in order to be admitted. Students who are more than half an hour late are not allowed to take the interim exam. Their exam will be graded with a 1.0.

Examination and grading
The final exam will cover lecture sheets and syllabus material, and will consist of multiple choice questions. The exam will last 3 hours and will be administered electronically. The grade for the exam will be determined using the standard procedure for setting of a cutting score. This procedure can be found on Blackboard. You pass for the interim exam if you score a 5.5 or higher, and the grade will be rounded of at half point.

Determining final grade
The final grade will be determined as follows:

0.3 x grade practical exam (rounded off at half point) + 0.7 x final exam (rounded off at half point).