

Admission requirements Research Master Human Movement Sciences

Faculty:	Faculty of Behavioural and Movement Sciences
Credits:	120
Language:	English

General requirements:

- A relevant WO bachelor's degree, such as human movement sciences, medicine, dentistry, health sciences, medical biology, or biomedical technology; or a successfully completed Human Movement Sciences Premaster's program (Dutch students).
- Good grades - a GPA of 7.0 (out of 10) or higher (or the international equivalent, e.g. a B+ or a GPA of 3.3) for the final two years of the Bachelor's program.
- Strong interest in and aptitude for research, as demonstrated in research oriented courses, internships and/or thesis.
- Highly motivated.
- Proficiency in English (see language requirements below).
- General academic competencies, such as critical thinking, quantitative literacy, written and oral communication.

Requirements Fundamental Knowledge:

This category comprises the fundamental theoretical knowledge pertaining to anatomy, physiology, psychology, and neurophysiology, which form the indispensable foundational elements for this field. The following knowledge comprehension, acquired at the Bachelor's degree level from an institution of higher academic education, are prerequisites:

1. Knowledge of the anatomical nomenclature, knowledge and understanding of the conceptual aspects of the structure and function of muscles, knowledge and understanding of form and function of joints; *Example of textbook: Human Anatomy and Physiology, E.N. Marieb*
2. Knowledge and understanding of the cardiovascular and respiratory system and the human energy systems; *Example of textbook: Essentials of Exercise Physiology, W.D. Mc Ardle et al.*
3. Knowledge and understanding of muscle physiology and mechanics: understanding of the morphology of skeletal muscle, cross-bridge kinetics, excitation contraction coupling, the basic metabolic changes during exercise, sarcomere function, length-force, force-velocity, and stimulation frequency-force relations, the size principle of motor unit recruitment, rate coding, fiber type related differences in contractile properties; *Example of textbook: Skeletal Muscle from Molecules to Movement, D.A. Jones et al.*
4. Basic knowledge and understanding of human psychology (principles on learning, perception, memory and emotion); *Example of textbook: Psychology, the Science of Mind and Behavior, M.W. Passer & R.E. Smith*
5. Basic knowledge and understanding of the neurophysiology of brain processes and neuromuscular control concerning membrane potential, ion channels, ion pumps, between neuron communication, spinal cord circuits and motor units, function of different brain

structures, movement control, proprioceptive feedback; *Example of textbook: Neuroscience, Purves et al.*

Requirements Analytical and Practical Skills:

This category encompasses the necessary analytical and practical skills in mathematics, biomechanics, statistics, digital signal processing, and measurement techniques that are essential for both research and practical application in this field. The following knowledge, comprehension, and skills at the Bachelor's degree level, acquired from an institution of higher academic education, are required:

1. Knowledge and understanding of mathematics (differential, integral and vector calculus, matrix calculations); *Example of textbook: Maths in Motion, T. de Haan*
2. Basic knowledge and understanding of biomechanics (translation, rotation, free body diagrams, kinetic energy, work done by forces and moments, power). *Example of textbook: Biomechanics and Motor Control of Human Movement, D.A. Winter*
3. Basic understanding of, and skills in, statistics (correlation, regression analysis, Student's t-tests, ANOVA) in R or comparable tool/programming language; *Example of textbook: Discovering Statistics Using IBM SPSS, A. Field*
4. Understanding of, and skills in, processing digital signals in MATLAB or comparable tool/programming language (e.g. Python); *Example of textbook: MATLAB for Beginners: A Gentle Approach, P.I. Kattan*
5. Knowledge and understanding of, and skills in, common measurement and data processing techniques in human movement sciences (direct and indirect measurement techniques of movement analysis, measuring velocity, acceleration and kinematics, measuring force from force plates and other force transducers, measuring and analyzing electromyography, measurement of energy expenditure). *Example of textbook: Biomechanics and Motor Control of Human Movement, D.A. Winter*

Language requirements:

The language of instruction is English. VU Amsterdam requires all non-Dutch applicants who have not completed their education in Canada, USA, UK, Ireland, New Zealand or Australia to take an English language test and to submit their score as part of their application. You can apply online for the Master's program without having the English test results yet. We do advise you to plan a test date as soon as possible. Below you will find the minimum English test scores for the program:

IELTS (academic): 6.5

TOEFL

- Paper based test 580
- Internet based test 92-93

Cambridge English

- Cambridge Proficiency Exam A, B, C
- Cambridge Advanced Exam A, B, C

TOEFL and IELTS tests must have been completed no more than two years before 1 September of the year in which your course starts.