Human Movement Sciences: Sport, Exercise and Health (MSc)

Vrije Universiteit Amsterdam - Faculteit der Bewegingswetenschappen - M Human Movement Sciences - 2017-2018

The one-year (60EC) programme Human Movement Sciences: Sport, Exercise & Health aims to teach students to collect and develop knowledge and understanding of human movement and to be able to apply this in the sports-, exercise- and health-related fields. The programme comprises four main tracks: biophysics in sport; rehabilitation; high performance coaching; and sport psychology. Given the nature of the study, exercise will form a key part of all tracks. The tracks are not strictly divided programmes and overlaps and switches to compose the ideal programme for each individual student are possible.

Next to the four tracks, the programme offers a limited number of students (we have approximately 15 -20 places available each year), the opportunity to acquire an accreditation for teaching in Higher Education. The programme “Teaching in Higher Education” amounts to 30 EC, which can partially be incorporated into the regular programme.

The MSc diploma, when combined with a small number of additional courses will allow students acces to the Postgraduate programme for Practical Sports Psychologist. This Postgraduate programme will take approximately one year (full time) and leads to accreditation as “Sportpsycholoog Vereniging voor Sportpsychologie in Nederland ®.

Overview of the programme

Schedule Master's Human Movement Science 2017-2018

Composition of the program
The programme consists of obligatory components and optional courses. All options to compose a programme closest to your personal interest can be found in section B of the Teaching and Examination Regulations (OER) of the Master’s programme. For options not mentioned in the Teaching and Examination Regulations you need approval from the Examination Board.

Programme objectives and exit qualifications
The Programme objectives and exit qualifications can be found in the Teaching and Examination Regulations (OER) of the Master’s programme.

(For more information about the courses, please see below)

Admission to the Master’s programme
For detailed information on admission requirements, please check the website.

Inhoudsopgave

Free Track Master Human Movement Sciences

Track Biophysics in Sport

Vakken:

Naam	Periode	Credits	Code
Applied Biomechanics	Periode 2	6.0	B_APPLBIOMEC
Clinical Exercise Physiology	Periode 3	3.0	B_CLINEXERC
Energy Flow Models	Periode 1	3.0	B_ENERFLOW
Maximal Neuromuscular Performance	Periode 1	3.0	B_MAXNEUR
Training, Aging and Disuse	Periode 2	6.0	B_TRAD

Docentenopleiding FBW

Vakken:

Naam	Periode	Credits	Code
Teacher Training at the Upper Secondary Level	Ac. Jaar (september)	30.0	B_DOCENTHBO

Master human movement sciences optional courses

Vakken:

Naam	Periode	Credits	Code
3D-Kinematics	Periode 4	3.0	B_3DKIN
Electromyography	Periode 5	3.0	B_ELECTROMYO
Entrepreneurship in Human Movement Sciences	Periode 5	6.0	B_ENTREPREN
Neuromechanics of Movement	Periode 5	3.0	B_NEUROMECH
Perception for Action	Periode 4	3.0	B_PERCACTION
Practical Internship	Ac. Jaar (september)	6.0	B_PRACINTERN
Short Literature Review	Ac. Jaar (september)	6.0	B_SLR
Special Topics in Sports Engineering	Periode 5	3.0	B_SPTOPICS
Sport and Performance Dietetics	Periode 4	3.0	B_SPPDIET
Teacher Training at the Upper Secondary Level	Ac. Jaar (september)	30.0	B_DOCENTHBO

Track High Performance Coaching

In period 2 students need to follow the course Applied Biomechanics, and next to that choose one of the two following courses: Sport Psychology: from Evidence to Applications, or Pereceptual-motor Leaning.

Vakken:

Naam	Periode	Credits	Code
Applied Biomechanics	Periode 2	6.0	B_APPLBIOMEC
Clinical Exercise Physiology	Periode 3	3.0	B_CLINEXERC
Current Issues in Sport and Exercise Psychology	Periode 1	6.0	B_CURRISSUES
Perceptual-motor Learning	Periode 2	6.0	B_PERCML
Sport Psychology: from Evidence to Application	Periode 2	6.0	B_SPORTPSYEV
Talent Identification and Development	Periode 3	3.0	B_TALDEVEL

Master human movement sciences obligatory courses

Vakken:

Naam	Periode	Credits	Code
Concepts in HMS	Periode 1	6.0	B_CONCEPTS
Master Research Project HMS	Ac. Jaar (september)	24.0	B_MARESPRJ

Track Rehabilitation

Vakken:

Naam	Periode	Credits	Code
Applied Biomechanics	Periode 2	6.0	B_APPLBIOMEC
Clinical Exercise Physiology	Periode 3	3.0	B_CLINEXERC
Coordination Dynamics: principles and applications	Periode 2	6.0	B_CLINCORDYN
Exercise and Health	Periode 3	3.0	B_EXERHEALTH
Topics in Rehabilitation	Periode 1	6.0	B_TOPICS

Track Sport Psychology

Vakken:

Naam	Periode	Credits	Code
Current Issues in Sport and Exercise Psychology	Periode 1	6.0	B_CURRISSUES
Perceptual-motor Learning	Periode 2	6.0	B_PERCML
Sport Psychology: from Evidence to Application	Periode 2	6.0	B_SPORTPSYEV
Talent Identification and Development	Periode 3	3.0	B_TALDEVEL

Overige Informatie

Opleidingsdelen:

- Overgangsregelingen

Overgangsregelingen

3D-Kinematics

Vakcode	B_3DKIN (900632)
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. H.E.J. Veeger
Examinator	prof. dr. H.E.J. Veeger
Docent(en)	prof. dr. H.E.J. Veeger
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	500

Literatuur
Relevant papers will be listed in Canvas.
A useful source is the book by Zatsiorsky (Zatsiorsky, Valdimir M., Kinematics of Human Motion. Champaign, Illinois: Human Kinetics, 1st edition, 1998. ISBN 0-880110767-5), which will be used as reference material.

Applied Biomechanics

Vakcode	B_APPLBIOMEC ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. S.M. Bruijn
Examinator	dr. S.M. Bruijn
Lesmethode(n)	Hoorcollege, Computerpracticum

Niveau	500

Doel vak
In this course the student will upgrade their mostly 2D biomechanical knowledge to the 3D world and they will learn to apply this new knowledge to perform biomechanical analyses in the context of Sport and Health. Examples of concepts included are joint angles, joint moments, energy (work, power), angular (and linear) momentum.

Students will learn to analyze laboratory measurements using a 3D inverse dynamics model. Furthermore, they will learn how to work with more simple measurement techniques, such as accelerometers found in phones. They will also learn how these complex and simple measurement tools can be applied in biomechanical research in both the laboratory and the field settings. Lastly, they will learn to think about what measurements are sufficient for a given problem; in other words; what are the most efficient ways to solve your problem, and at what cost (i.e. decrease in precision) does this come?

Inhoud vak
Every week consists of lectures and Matlab practicals. During the lectures the theory will be explained. During the Matlab practicals, the biomechanical theory will be applied to analyze different applied research questions. In the last weeks of the course, students will start working on a research proposal to combine the things they've learned over the course. During the penultimate week, there will be a personalized feedback moment for these project proposals.

All content will be targeted on hands-on applied biomechanical questions as examples for the theory to be studied; examples of questions studied are; What is the ankle load during a basketball jump landing? Is squat lifting really better for your back? How come field hockey players can give so much speed to a ball during a drag flick? How can gymnasts improve their jumps? How can we use mobile phones to gather meaningful data about human movement?

Every week, the motion to be analyzed will become more complex (few segments full-body).

Measurement using the following systems will be covered in this course:
• Laboratory grade 3D motion registration (Optotrak, Force plate)
• A wearable multi-inertial sensor suit for 3D full body motion capture
• Simple wearable accelerometers
• Mobile phones
• Kinect (demo)

Onderwijsvorm
21 hours of Lectures
48 hours of practicals
90 hours of self-study (preparing lectures, Writing assignments etc)

Toetsvorm
Weekly practical report + research proposal

Literatuur
Will appear on Canvas

Vereiste voorkennis
It is recommended, although not required, to have completed the following courses:
• Biomechanics
• Mechanische analyse van het menselijk bewegen (2D inverse dynamics)
If you did not take these courses, you should have at least some affinity with biomechanics. Furthermore, it is advisable to be familiar with Matlab since all biomechanical modeling will be done with this program.

Intekenprocedure
For more info on workgroups, laboratories, (computer) practicals etc. please see Canvas

Clinical Exercise Physiology

Vakcode	B_CLINEXERC (900670)
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. J.J. de Koning
Examinator	dr. J.J. de Koning
Docent(en)	dr. J.J. de Koning
Lesmethode(n)	Hoorcollege, Practicum, Werkcollege
Niveau	400

Doel vak
To provide the student with the fundamental knowledge of clinical exercise physiology as a variant of normal exercise physiology, which will enable the student to apply this knowledge in preventive and rehabilitative exercise programs.

Inhoud vak
Basic didactic information and laboratory experiences of the effect of pathophysiologic conditions on human energy metabolism and health. The focus will be on organ systems and their linkage to ATP generating pathways and on how this influences skeletal muscle performance. The application is to the use of exercise both diagnostically and as a therapeutic tool. After this course the student will have the fundamental knowledge and skills to use exercise in patients with cardiopulmonary/metabolic disease and to work cooperatively with other health care providers.

Onderwijsvorm
Lectures
ECG reading practical
Directed reading

Toetsvorm
multiple choice

Literatuur

A selection of articles and practical guide on BlackBoard

Vereiste voorkennis
Toegepaste Inspanningsfysiologie.

Intekenprocedure
For more info on workgroups, laboratories, (computer) practicals etc. please see Canvas.

Concepts in HMS

Vakcode	B_CONCEPTS ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. T.W.J. Janssen
Examinator	prof. dr. T.W.J. Janssen
Docent(en)	dr. C.E. Peper, prof. dr. J.H. van Dieen, prof. dr. T.W.J. Janssen
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak
The student is able to report the key behavioral concepts in contemporary HMS, to apply these concepts in describing research outcomes, and to judge the (dis)advantages of using a particular concept in a particular situation. The student knows the mechanical concepts that apply to control of joint position and movement, in particular equilibrium, stability, robustness, performance, and observability. The student understands these concepts and can explain how they are related to clinical problems and to motor control in patients with joint disorders. The student knows the physiological concepts of exercise intensity and workload in sports and clinical research and training, in particular, (sub-) maximal force/power generation, (sub)maximal energy expenditure, anaerobic threshold and critical power. The student understands these concepts and can explain how they are related to sports and rehabilitation research and practice.

Inhoud vak
In this course, the students are acquainted with biophysical and behavioural concepts that underlie current debates in HMS. One part of this course deals with behavioural concepts of HMS.
Human movement is a complex behavior. To interpret this complex behavior, the scientific literature uses concepts that are rather complex themselves. Examples of such concepts are information, stability, synergy, internal representation and motor programs. In this course, questions such as "What do these concepts mean exactly?" and "How do these concepts help us to understand the behavior we observe?" will be addressed. A second part of the course deals with biomechanical concepts in particular with (in-)stability of joints and joint movement. Instability is often used in the clinical setting to describe the state of the joint after injury or in degenerative disorders. The term is often poorly defined, which leads to confusion in the communication between disciplines, e.g. between physiotherapists and orthopedic

surgeons. Mechanics and control theory provide a rigorous framework for describing joint function. The relevance of this conceptual framework for the clinical context and the implications for diagnosis and treatment will be discussed. A third part of the course deals with physiological concepts in particular with the use of exercise intensity and relative workload. Relative workload is often used to induce similar loading of persons in sports and clinical studies, either to measure endurance or to induce a certain training stimulus. Relative workloads as percentage of maximal force/power or energy utilization (oxygen uptake) are used in various circumstances. While the choice for a given variable is essential for the result, it will be discussed whether the proper variables are chosen for the specific goals.

Onderwijsvorm
45 contact hours, divided in:
Lectures 21 * 2 hours
Exam 3 hours
115 hours self study
The course consists of 3 series of 7 lectures dealing with biomechanical, physiological, and behavioural concepts respectively. In the first lecture of each series a general introduction will be given. In subsequent lectures, the formal concepts will be introduced and explained and related to the applications in sports and health. In the 7th lecture of each series, questions by the students will be discussed.

Toetsvorm
Written test with open-ended questions, with equally weighted questions on the 3 parts of the course content.

Literatuur
Research articles, review papers and a syllabus will be made available at the start of the course.

Vereiste voorkennis
The student should have a basic knowledge and understanding of the human musculoskeletal anatomy as described for example in Human Anatomy. EN Marieb, J. Mallatt, Benjamin Cummings, 3rd edition, ISBN: 0-8053-5335-6, chapters 1.1-1.16; 4.88-4.102; 4.99-4.102; 9.212-9.239; 10.244-10.253;11.266-11.270.

The student should have a basic knowledge and understanding of biomechanics as described for example in: Fundamentals of Biomechanics. Equilibrium, Motion and Deformation. M. Nordin and N. Ozkaya; Human Kinetics, ISBN 0387982833, chapters 1-5.

The student should have a basic knowledge and understanding of exercise and muscle physiology as described in for example W.D. McArdle, F.I. Katch, V.L. Katch: Exercise Physiology: energy, nutrition & human performance, 7th edition (2010) Lippincott Williams & Wilkins, ISBN 1608318591, chapters 7-11, 15-17, 21.

Coordination Dynamics: principles and applications

Vakcode	B_CLINCORDYN (900666)
Periode	Periode 2
Credits	6.0
Voertaal	Engels

Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. M. Roerdink
Examinator	dr. M. Roerdink
Docent(en)	dr. M. Roerdink
Lesmethode(n)	Hoorcollege, Computerpracticum, Practicum, Bijeenkomst, Deeltoets extra zaalcapaciteit
Niveau	400

Doel vak
The coordination dynamics approach is pursued to study how patterns of coordinated movement come about, persist and change as a function task constraints, expertise and pathology. The student is acquainted with the key principles, concepts and methods of coordination dynamics. The student can explain these aspects in a qualitative manner. The student is able to indicate how these aspects may contribute to assessments and interventions in the context of sports and rehabilitation.

Inhoud vak
Coordination dynamics is governed on the one hand by principles of self-organization, and on the other hand by intentionality, perceptual information and explicit knowledge. Coordination patterns exist at multiple levels: 1. dynamics within or between body segments of a moving person; 2. dynamics between moving segments of multiple persons and 3. dynamics between person and external events, as well as between persons. Coordination dynamics provides a framework to study the nature of pathological, normal and expert movements by assessing stability and loss of stability of coordination patterns as a function of training and rehabilitation.

The first part of the course provides an overview of the key principles, concepts and methods of coordination dynamics by adopting a 3-stage empirical approach: 1. gaining background theoretical information through lectures and literature, 2. gaining hands-one experience by participating in experiments, formulating hypotheses and analyzing the so-obtained data, 3. gaining a thorough understanding of the key aspects of coordination dynamics by linking theory and practice.

The second part of the course focuses on the application of coordination dynamics in sports and rehabilitation, again by adopting a 3-stage empirical approach. In the context of rehabilitation, specific emphasis will be placed on interventions based on environmental coupling aimed at facilitating desired coordination patterns and/or stabilizing existing unstable coordination patterns. In the context of sports, the nature of interactions between two or more athletes will be the focal point, including their cooperative and competitive effects on pattern formation and coordinative stability.

Onderwijsvorm
Amount of contact hours (36 hrs), divided in:
Lectures: 10 * 1.75 hrs
Laboratories: 2 * 2.00 hrs
Computer Practicals: 5 * 2.00 hrs
Optional Midterm Exam: 1 * 1.75 hrs
Final Exam: 2.75 hrs

Self study: 132 hrs

Toetsvorm
Two written closed-book exams with open-ended questions (optional mid-term exam and compulsory final exam). The final grade is established with an accuracy of 0.5 and is determined by the optional midterm exam (50%) and the final exam (50%). However, in case the grade of the optional midterm exam is lower than that of the compulsory final exam, only the grade obtained for the Final Exam will count (i.e., Midterm Exam [0%], Final Exam [100%]). The same holds for students who did not complete the midterm exam.

Literatuur
A selection of relevant book chapters and articles.

Vereiste voorkennis
Basic understanding of statistics (What is a standard deviation?), sine waves (What is the amplitude, offset, frequency and phase?), integral and differential calculus (What is the derivative of a sine wave?) and Matlab (Can you run a script?). Please note that Matlab scripts and functions are provided and so programming skills are not required for the computer practicals. Computer practicals are included to become acquainted with the handling and interpretation of the experimental data and associated coordination dynamics outcome measures).

Current Issues in Sport and Exercise Psychology

Vakcode	B_CURRISSUES ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. R.I. Hutter
Examinator	dr. R.I. Hutter
Docent(en)	dr. R.I. Hutter
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak
The student is able to:
-outline the main findings from the sport psychology literature on the topics included in the course
-apply these theoretical findings to practical settings (the assignments include interviews, observations and analysis, intervention and questionnaire design)
-discuss practical findings from the assignments with peers and draw overall conclusions from these findings
-present practical findings from a sound theoretical basis.

Inhoud vak
In this course several important, current issues in both sport and exercise psychology are addressed. The course aims to provide in-depth information and to transfer this information to practical settings through different assignments.
The topics to be discussed are:
• Career development and transitions in sport

• Injury prevention and rehabilitation
• Clinical issues in sport psychology
• Ethical issues and moral behavior in sport
• Group dynamics in sport
• Leadership roles in teams and peer leadership

The course consists of one meeting per topic. For each topic, literature and review questions are provided. The students are required to study the literature and answer the review questions. In the first weeks the meetings consist of discussion of the review questions. In addition, for each topic a recent study on the topic is highlighted, future research directions are discussed, or practical cases presented and discussed.
Next, students work on practical assignments. In the last week of the course the findings of the practical assignments (from interviews, observations, measurements and analyses) are discussed, reviewed and presented.

Onderwijsvorm
Discussion meetings

Toetsvorm
Students hand in answers to the review questions (these are partly assesed, 40% of total grade), hand in one assignment (30%), and present one assignment with small groups (30%). All parts have to be scored sufficient to pass.

Literatuur
- Course manual (Available on Canvas);
- Recent articles and book chapters on sport and exercise psychology

Vereiste voorkennis
Students should have basic knowledge and understanding of sport and exercise psychology as is available in textbooks such as Cox, R.H. (2007). Sport Psychology: Concepts and Applications, 6th edition. Boston: McGraw-Hill, Biddle, S.J.H. & Mutrie, N. (2008). Psychology of Physical Activity: Determinants, well-being and interventions (2nd edition). New York, NY: Routledge, or Bakker, F.C. & Oudejans, R.R.D. (2012). Sportpsychologie. Nieuwegein: Arko Sports Media.

Intekenprocedure
For more info on workgroups, laboratories, (computer) practicals etc. please see Canvas.

Electromyography

Vakcode	B_ELECTROMYO (900815)
Periode	Periode 5
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. J.H. van Dieen
Examinator	prof. dr. J.H. van Dieen
Docent(en)	prof. dr. J.H. van Dieen
Lesmethode(n)	Hoorcollege, Computerpracticum

Niveau	400

Doel vak
- The student has a basic knowledge of electrophysiology and the background of electromyographical signals;
- the student has a basic knowledge of the different ways of collecting electromyograpical data in various fields of application;
- the student can choose the appropriate method for collecting and analyzing EMG data in a kinesiological study;
- the student knows the possibilities and limitations of EMG data;
- the student can interpret EMG data in relation to motor control, force and fatigue;
- the student can identify contamination in EMG data and can apply methods to reduce its effects.

Inhoud vak
In this course, the students are introduced to the electrophysical background of electromyography (EMG). Subsequently, the course focuses on methodological aspects of EMG acquisition and analysis, addressing the potential of this method as well as its pitfalls.

Onderwijsvorm
lectures 6 x 2 hours
practical 2 x 3 hours
The lectures introduce the following topics:
- electrophysiology;
- motor control (motor unit recruitment and firing);
- instrumentation and electrodes;
- HD- EMG and spatio- temporal information;
- onset determination;
- amplitude estimation;
- force estimation;
- cocontraction and cross- talk;
- motor unit firing and decomposition;
- frequency content, conduction velocity and fatigue.
Practicals concern analyzing EMG data.

Toetsvorm
2 hours; written test with equally weighted open- ended questions

Literatuur
Research articles and lecture handouts

Vereiste voorkennis
- knowledge of and skills in programming in MATLAB at the level described for example in ‘Verwerken van digitale signalen’.
- basic knowledge and understanding of the physiology of muscles and their control.

Energy Flow Models

Vakcode	B_ENERFLOW (900675)
Periode	Periode 1
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.

Coördinator	dr. J.J. de Koning
Examinator	dr. J.J. de Koning
Docent(en)	dr. J.J. de Koning
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	500

Doel vak
To provide the student with knowledge about energy flow models, and so to enable the student to apply this knowledge in the modelling of human endurance performance.

Inhoud vak
Research in which exercise physiology and biomechanics are combined as a 'toolbox' is apparently unique and successful. This course familiarizes the student with one branch of this approach. Energy flow models, based on power equations, will be used to study performance determining factors in endurance sports. This course explains the technique of modelling, how parameter values are obtained from experiments and how simulations with the model can be done. The student will construct a model of an endurance athlete to study the effect of parameter values on performance in cycling, speed skating and running. The models will be made in MATLAB. Knowledge of MATLAB is necessary to be successful in this course.

Onderwijsvorm
Lectures and guided practical;
84 hours (from which 28 practical, 6 lecture, 2 exam and 48 self study).

Toetsvorm
Written examination and practical report (30%/70%).

Literatuur
A selection of articles and practical guide on Canvas.

Vereiste voorkennis
900104: Biomechanica (Students are expected to have sufficient knowledge of this subject);

900215: Mechanische analyse van het menselijk bewegen (Students are expected to have sufficient knowledge of this subject)

Intekenprocedure
For more info on workgroups, laboratories, (computer) practicals etc. please see Canvas.

Entrepreneurship in Human Movement Sciences

Vakcode	B_ENTREPREN (65412020)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. E. Masurel
Examinator	prof. dr. E. Masurel

Docent(en)	prof. dr. E. Masurel
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak
Students obtain knowledge about and insight in the relevance of entrepreneurship and innovation for their own discipline. Students learn about the processes which are involved in the recognition and exploitation of opportunities, about creating economic and social value and about the nature and role of networks. In addition students gain knowledge of different entrepreneurial processes and the importance of valorization of findings and business ideas for a knowledge- based economy.

Inhoud vak
This course consists of two tracks: a theoretical track and a practical track. These two tracks run simultaneously.

In the first track you learn about entrepreneurship. Answers are found on questions such as: what is entrepreneurship? What defines an entrepreneur? What are entrepreneurial opportunities? What is the role of innovation in entrepreneurship? What is corporate social responsibility (CSR)? How can we judge the feasibility of entrepreneurial ambitions?

Simultaneously you work on an assignment (second track). In the first week of this course you search for an innovation in your own discipline (product, service, process etc.). Your choice must be approved by the lecturers. The first part of the assignment consists of a description of the innovation which you have chosen. Subsequently, you make a SWOT analysis and a network analysis of the innovation. Also a paragraph of CSR should be added. The final part of the assignment is your own feasibility study: how would you valorize the innovation to the market.

Onderwijsvorm
Lectures and workshops. Each week scientific lectures or practical workshops are given. These lectures are both the basis for the exam and for the assignment.

Toetsvorm
You conduct a written exam and an assignment. Both the exam and the assignment will determine 50% of the grade. The exam and the assignment must be of sufficient quality.

Literatuur
The course manual contains a list of online available articles.

Overige informatie
Optional course for Master students 'Human Movement Sciences' 'Sport, Exercise & Health', 'Fundamental and Clinical Movement Sciences'.

PRESENCE WITH ALL LECTURES IS MANDATORY

Exercise and Health

Vakcode	B_EXERHEALTH (900667)

Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. T.M. Altenburg
Examinator	dr. T.M. Altenburg
Docent(en)	dr. T.M. Altenburg
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak
The overall aim of this course is to enable you to 1) critically comment on an article describing the development and evaluation of an exercise/physical activity intervention addressing a public health problem and 2) write a grant proposal for future research addressing a public health problem by targeting to increase exercise/physical activity.

By the end of this course you should be able to:
Systematically analyse a public health problem, its underlying behavioural and environmental factors and its determinants;
Critically comment on an article describing the development and evaluation of an exercise/physical activity intervention addressing a public health problem - according to set criteria;
Write a grant proposal for future research aimed at improving a public health problem by stimulating exercise/physical activity;
Present and discuss your final research proposal.

Inhoud vak
The lectures in this course will provide you with knowledge on how to systematically analyse a public health problem, its underlying behavioural and environmental factors and the determinants of these factors. Additionally, the lectures will discuss how to systematically develop, implement and evaluate (effect, process and cost-effectiveness) a theory-based intervention addressing a public health problem. Parallel to these lectures, you will write a commentary in which you critically discuss an article describing the development and evaluation of an exercise/physical activity intervention addressing a public health problem (of your interest) - according to set criteria. Subsequently, you will write a grant proposal in which you explain an exercise/physical activity study that brings the research field of the public health problem of your interest a step further (i.e. overcoming the shortcomings in existing research). Finally, you will present and discuss your commentary and grant proposal.

Onderwijsvorm
This course will consist of lectures, seminars and a final (obligatory) presentation session.

Toetsvorm
You are required to 1) write a commentary critically evaluating a public health intervention (60% of final grade), 2) write a grant proposal that brings the research field of the specific public health problem a step further (30% of final grade) and 3) present your commentary and grant proposal (10%). All assignments must be of sufficient quality to pass the course.

Literatuur
- Bartholomew LK, Parcel GS, Kok G. 1998. Intervention mapping: a process for developing theory- and evidence-based health education programs. Health Educ Behav 25:5: 545-563
- Koelen MA, Ban van de AW. 2004. Health Education and Health Promotion. Wageningen Academic Publishers 157-182

Overige informatie
The last seminar is obligatory.

Master Research Project HMS

Vakcode	B_MARESPRJ ()
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. A.M.L. Kappers
Niveau	500

Doel vak
The objective of the master research project is to gain insight into the various components of the research process, as well as the cohesion between the various components. The intention being: how to phrase a question, formulate a hypothesis, prepare and perform experiments, classify data, interpret results (theory development) and write reports. Students are then able (under supervision) to apply this insight when preparing, performing and reporting on scientific research. This objective is mainly concerned with the technical aspects of scientific research. During the master research project you will also have varying, often valuable, experiences. You will experience what it is to plan a research project from start to finish and to independently implement it, and that working with others is an interesting and often educational experience and you can immerse yourself in a subject that interests you. You may also experience what can go wrong and how you react to such setbacks.

Inhoud vak
A master research project has to meet a number of requirements, which are formulated as follows:

1. The research is based on a subject that offers an adequate challenge
2. The research is performed in an ethically responsible way
3. The research is performed in a methodologically satisfactory manner
4. The research adds to, or is based on the theory valid for the scientific subject.

The following assignments are compulsary:
1. Submit an individual research proposal within two months after the start
2. Submit an individual final report
3. Present your work during one of the seminars
4. Attend at least 12 seminars
5. Upload the final version of your report to the library database

Note: At the end of your project you have to hand in all electronic data, paper-based data, etc. (see contract for details) to your supervisor. Your grade with not be valid as long as you do not fulfill this requirement.

Although it is still allowed to do this research with a partner, it is strongly encouraged to work on (slightly) different research questions, as each student has to write an individual report and give an individual presentation. However, working with a partner has major advantages during the hands-on phase of the project (such as building a set-up, recruiting participants, collecting data, etc.) and having a sparring partner for discussion facilitates decision making.

The length of the master research project is 24 study points (EC). In exceptional cases this can be extended to 30 EC. The decision to invest 30 EC in the master research project has to be arranged well in advance of the start of the research project and not post-hoc. Such an extension has to be approved by the Examination Board of Human Movement Sciences. You should request this extension through VUnet, where you have to provide a clear reason for the extension (for example an extra assignment or the development of equipment). This request should be accompanied by a written statement of approval and an explanation as to the content of the extension by your supervisor from Human Movement Sciences.

A master research project usually follows the following phases:

1) Choice of the Master Research Project
It is the student's own responsibility to find a suitable research project and a supervisor. These are possible ways to proceed:
• Check whether the list in Master Research Project possibilities on Canvas contains a project of your liking. If so, contact the supervisor;
• Contact a potential supervisor (a member of the academic staff of Human Movement Sciences), tell this person that you are interested in doing your research project under his/her supervision, and ask for possibilities;
• If you have a good idea for a research project yourself, ask a member of the academic staff of HMS whether s/he will be your supervisor.
For some research topics it is strongly advised that you first follow specific courses from the Master program. It is therefore encouraged to decide on a research project as early as possible.

It is also possible to undertake your Master Research Project outside the department or even abroad. It is strongly recommended that anyone doing a project abroad should participate in an existing research project there. In this way you will profit from the knowledge already available at the foreign location. When you undertake your Master Research Project outside the department or abroad, you will always need a supervisor from Human Movement Sciences.

2) Supervision
All master research projects, also those carried out outside the faculty, must be carried out under supervision of an academic staff member of the faculty. This supervisor has the final responsibility for the project. You are entitled to approximately 35 hours supervision time.

Your final report and your presentation will also be assessed by a second assessor. The role of this second assessor is that of an independent reviewer.

3) Preparing a proposal
Once the subject and the supervisor(s) have been determined, a research proposal must be prepared. The proposal should describe the aims, the approach and the theoretical framework within which the project is defined. In addition, in the plan you will have to formulate your research hypotheses and explain which experiments and statistical analyses you will apply to test your hypotheses. Finally, you must prepare a time plan and an overview of the equipment you will need (if applicable).

This Research proposal is the first assignment of this course and it has to be uploaded on Canvas within two months after the start of the project. Only after approval by your supervisor are you allowed to start with the actual research project.

4) The Ethical committee
Every research project needs approval of the Vaste Commissie Wetenschap en Ethiek (VCWE) of the faculty before the actual start of the project. In some cases the process can be limited to an extension of an already existing ethical approval, but it might be necessary to obtain approval for your specific project. In those cases where non-invasive experiments are performed, using healthy, adult volunteers, usually only the approval of the VCWE is sufficient. More information about this committee can be found on the FGB website.

The Ethical committee application is ALWAYS the end responsibility of your supervisor. This means that he or she will have to sign and, if necessary, defend the application. If your project includes measurements on patients, or invasive measurements, approval from the Medical Ethical Committee of the VUmc, or another hospital will be necessary. In that case the procedure might be lengthy, up to several months.

5) General lay-out of a master research project
Of course, the master research project is implemented according to your own work plan and the supervision agreement. But generally the implementation of an project can be divided into the following stages:

• An (extensive) read-up period
• Writing the research proposal
• Application for approval of the Ethical Committee
• Practice with measurement settings or instruments, and pilot experiments
• Making an exact plan for the research
• Collecting data
• Data processing
• Data analyses/statistics
• Interpretation of the results
• Write-up and presentation of results

It is recommended that you take into account the inevitable delay when preparing your planning. Make sure you have regular meetings with your supervisor; this can often be advantageous for your progress.

6) Final Report

Each student has to write an individual report, even if you conducted the research together with a partner. The report should be presented as a scientific paper. It is, however,
possible to deviate from this, depending on the project, project location and supervisor (for example by dividing it into chapters or by adding supplements). The report should follow the standard structure of a scientific paper.

Standard sections of a research report are:
• Abstract, keywords
• Introduction, including the research questions and the hypotheses
• Methods
• Results
• Discussion
• Conclusion
• References

The report is written in English. A Dutch summary can be added to the report when this is required by the institution, where the work is carried out.

The preferred style for referencing is the APA style for psycho-socially oriented reports (see http://guides.lib.monash.edu/citing-referencing/apa). For more medical-biological oriented subjects, the preferred style is the Vancouver style. See the link to the site of Monash University for more details on this style of referencing (http://guides.lib.monash.edu/citing-referencing/vancouver). Decide together with your supervisor which style to follow.

7) Presentation of the Research
You are required to present your results individually after the report has been approved by your supervisor(s). At these presentations, you are requested to present your results following the standard scientific structure, and at a level that will make it understandable for a scientifically trained, but not necessarily specialized, audience.

8) Attending seminars
Students have to attend at least 12 seminars organized at the faculty, in which students present their
Research Project. Students can start attending the seminars during the last Bachelor year or the
Premaster's programme of the Faculty of Behavioural and Movement Sciences.

These meetings are not only compulsary, but also very useful. It can work to your advantage to take note of what fellow students have to say about your research and/or the presentation. Besides this, it is also a good opportunity to meet students who are at the same stage in their research as you and who run into the same problems.

Onderwijsvorm
During the implementation of your master research project you are entitled to approximately 35 hours of supervision time. Your supervisor is required to comment on and to return draft and final versions within two weeks. It is important that you agree beforehand with your supervisor about when you will hand in your drafts and when these will be discussed. Obviously, these agreements are mutual: both parties are expected to adhere to the planning. By preparing a good plan with your supervisor and by writing down agreements in a contract,

planning problems can be
prevented. In the case that a dispute should arise with your supervisor, this can be taken up with the Coordinator of the master research. If the coordinator also happens to be your research supervisor, you can turn to the Education Director (dr. Kirsten Bijker)

Toetsvorm
When assessing the master research project the supervisor and second assessor have to agree on the mark that is given. The mark consists of four components:

1. The research proposal (10%)
2. Research process (30%)
2. The final report (50%)
3. Presentation (10%)
All components have to be assessed with a pass. More details about the assessment can be found on the Canvas site.

The final report has to be uploaded by every student on the Canvas page for a plagiarism check. Whether, and
to which extent there might be a case of plagiarism will be to the judgment of the Examination Board. Since plagiarism is considered as a serious offense to the scientific codes, any form of plagiarism might lead to serious sanctions.

In 2009, the Faculty has started with the electronic archiving of reports in the official VU library data base. You have to upload your report on http://www.ub.vu.nl/en/facilities/upload-your-thesis/index.aspx in order to get a grade for your report.

Vereiste voorkennis
There are no formal prior requirements for starting the master research project, other than being registered as a Master student in Human Movement Sciences.

Maximal Neuromuscular Performance

Vakcode	B_MAXNEUR ()
Periode	Periode 1
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. C.J. de Ruiter
Examinator	dr. C.J. de Ruiter
Docent(en)	dr. C.J. de Ruiter
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
The student has knowledge of the role of muscle activation and (changing) muscle properties on maximal human neuromuscular performance during high intensity exercise and the student has knowledge of the relevant research methods.
The student can apply this knowledge to questions regarding testing and improving of maximal neuromuscular performance in sports (and

rehabilitation).
The student is able to evaluate the validity and relevance of basic scientific literature for neuromuscular performance in a sport (rehabilitation) related context.
The students will learn to critically read scientific papers on neuromuscular performance published in international journals. The student will be able to communicate ('translate') the implications of basic scientific knowledge of neuromuscular performance to practical issues raised by coaches and therapists in the field of sports (and rehabilitation).
Students will not learn how to do research, or how to test athletes, or how to design exercise programs in sports or rehabilitation etc.
Students will learn what underlying factors/mechanisms they should be aware of while designing muscle function tests and exercise programs.

Inhoud vak
During the course, a critical overview will be given of the current knowledge of maximal neuromuscular performance during relatively high intensity exercise of short duration (40 ms up to 5 min). Many examples will be provided from own research. The emphasis will be on the coupling between basic knowledge of muscle activation and (changing) muscle properties during human movement and their consequences for testing and training. This is a fundamental sports related muscle physiology course, not an applied sports course.
The following subjects will be addressed:
• Voluntary activation;
• Explosive force/power;
• Influence of temperature (incl. warm-up);
• Potentiation;
• Fatigue;
• Shortening deficit and lengthening force enhancement;
• Recruitment of motor units.
• Muscle oxygenation

Onderwijsvorm
The course consists of a series of nine lectures condensed in a three week period (September 4th- September 22rd), during which relevant practical questions will be used as a starting point. Subsequently the focus will be on fundamental neuromuscular properties as studied in a series of accompanying scientific papers.

Toetsvorm
2 hours 15 minutes exam with open-ended questions in the week immediately following the three week lecture period (most likely on Wednesday September 27th).

Literatuur
The course will mainly use research papers. Basic background information is derived from Chapters 1-10 of: Skeletal muscle: from molecules to movement. A textbook of muscle physiology for sport, exercise, physiotherapy and medicine. Jones, D.A., Round, J. and A. de Haan, Edinburgh: Churchill Livingstone, Elsevier Science Limited, 2004. ISBN 0 443 07427 5

Vereiste voorkennis
Students with a Ba degree in physiotherapy or physical education are strongly advised to take the second year course Muscle Physiology (which from 2017 is no longer part of the obligatory pre-master program). In general, students with a 'HBO-degree' indicate that they lack the entry

knowledge required to successfully complete this high level Master course.

Sufficient knowledge of the basics of Muscle Physiology is absolutely necessary. In order to successfully participate, students have to understand the following concepts: anatomy of skeletal muscle, sarcomere function, twitch, tetanus, length-force, force- and power-velocity, and stimulation frequency-force relations, the size principle of motor unit recruitment, rate coding, EMG, electrical stimulation, fibre type related differences in contractile properties, cross-bridge kinetics, excitation contraction coupling, the basic metabolic changes during exercise (changes in ATP and CrP, glycolysis, oxidative phosphorylation) .

Neuromechanics of Movement

Vakcode	B_NEUROMECH ()
Periode	Periode 5
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. H. Maas
Examinator	dr. H. Maas
Docent(en)	dr. H. Maas
Lesmethode(n)	Hoorcollege, Werkcollege

Doel vak
- The student is able to explain the principles of neuromechanics and the mechanisms of the different subsystems of the motor system involved.
- The student is able to describe the possibilities and limitations of the state-of-the-art experimental methods and analytical approaches.
- The student is able to identify and critically evaluate scientific papers on neuromechanical topics.

Inhoud vak
In this course, students are introduced to the principles of neuromechanics, current knowledge about its main components and the methods applied to study it. Besides interactive lectures, this will be achieved through reading of the primary literature, presentation of ideas, and scholarly discussion with classmates and experts in the field. To produce coordinated movements, skeletal muscles, sensory receptors and the central nervous system need to interact. This involves the bi-directional transformation of information between neural structures and the musculoskeletal system. Neuromechanics is the study of such interactions and transformations that give rise to coordinated movements. Questions addressed are for example, what is the relative contribution of musculoskeletal and neural mechanisms in the regulation of limb stiffness, how do such contributions change with environmental conditions, motor learning, disease or ageing. By addressing topics that are currently studied, the student will also learn about the research performed at the Department of Human Movement Sciences.

Onderwijsvorm
The course consists of a series of lectures and workshops.

Toetsvorm
The exam of this course is based on a journal club paper (70%) and presentation (30%) about a self-selected scientific article that includes neuromechanics research.

Literatuur
The reading material consists of scientific papers, which will all be specified in the course manual.

Vereiste voorkennis
For this course, we expect that the students have basic, BSc degree level knowledge and understanding of musculoskeletal anatomy, biomechanics and (neuro)physiology. It is the responsibility of the students to fill gaps in knowledge, using for example:
• Human Anatomy. E.N. Marieb, P. Brady Wilhelm & J.B. Mallatt (Eds.), Pearson Higher Education, 8th edition (2016), Chapters 1, 4, 9, 10 & 11.
• Kinetics of Human Motion. V. M. Zatsiorsky (Ed.), Human Kinetics, 1st edition (2002), Chapters 1-5.
• Biomechanics of Skeletal Muscles. V. M. Zatsiorsky, B.I. Prilutsky
(Eds.), Human Kinetics, 1st edition (2012), Chapters 1-3.
• Physiology of Sport and Exercise, J.H. Willmore & D.L. Costill (Eds.), Human Kinetics, 6th edition (2015). Chapters 1-3.
• Neuroscience. D. Purves et al. (Eds.), Sinaur Associates INC. 5th edition (2012), Chapter 16.

Doelgroep
The course is an optional part of the Research Master program Fundamental and Clinical Human Movement Sciences and Master program Human Movement Sciences: Sport, Exercise & Health, but also open to students from other master specializations provided that the entry requirements are met. Within the above described Research Master program there are links to the courses Neurosciences, 3D Kinematics, Biophysics of Locomotion and Mechanical and Adaptive Myology. As students learn about the research opportunities within the Department of Human Movement Sciences and can explore self-selected research areas, this course is an ideal platform for finding a topic for their research internship.

Perception for Action

Vakcode	B_PERCACTION (900810)
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. J.B.J. Smeets
Examinator	prof. dr. J.B.J. Smeets
Docent(en)	prof. dr. J.B.J. Smeets
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	500

Doel vak
The student is able to:
- describe the functioning of the sensory systems relevant for motor control;
- interpret scientific literature in the area of perception (including psychophysics) and apply it to the field of motor control.

Inhoud vak
The topic of this course is the question: how is sensory information processed to guide one's action? More specific: how do we know where a target and (a part of) our body is? The answers to these questions require knowledge about the sensory organs, their signals, and how these signals are processed and combined in order to be used to control our actions. The focus will be on the quantitative analysis of perception, using the psychophysical method. Each topic (e.g. proprioception, motion perception) is introduced by a lecture discussing some phenomenology and the underlying mechanisms. Subsequently, the students read several (mostly relatively recent) papers on that topic and answer the questions of an assignment. These papers and questions are discussed in the next lecture.

Onderwijsvorm
Amount of contact hours:
Lectures/tutorial 14
Practical 2
Assignments & self-study 68

Each meeting will be a combination of tutorial consisting of a discussion of the previous assignment (1 hour), and a lecture introducing the topic of the next assignment (1 hour).In the practical, the students will compare two psychophysical techniques and discuss their effectiveness in answering the question what perceptual information is available.

Toetsvorm
After each lecture, students receive an assignment. Six of them have to be handed in before the next meeting. These assignments are graded and count for 10 % of the final grade. The assignment after the final lecture will contribute 35 %: the remaining 5% on completion of the practical.

Literatuur
Literature needed for the course will be announced during the course.

Vereiste voorkennis
No entry requirements.

Aanbevolen voorkennis
Basic knowledge of the nervous system is expected (e. g. function of various brain areas).

Perceptual-motor Learning

Vakcode	B_PERCML (900682)
Periode	Periode 2
Credits	6.0
Voertaal	Engels

Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. G.J. van der Kamp
Examinator	dr. G.J. van der Kamp
Docent(en)	dr. G.J. van der Kamp
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak
Knowledge and understanding: The student is capable of describing and summarizing the main tenets and concepts of contemporary theories of perceptual-motor learning (i.e., motor programming approach, common-coding approach, neuropsychological approaches, ecological approach, dynamic systems and nonlinear pedagogical approach), including their experimental methods and the key empirical evidence supporting them.
Applying knowledge and understanding: The student is capable of applying the knowledge and ideas emanating from contemporary theories of perceptual-motor learning to provide insight into existing habits and questions related to perceptual-motor learning in the practices of sports, rehabilitation and physical education.
Making judgments: The student is capable of critically assessing and evaluating the underlying assumptions and empirical evidence for the contemporary theories of perceptual-motor learning. The student is capable of evaluating the applied value of the contemporary theories for the practice of perceptual-motor learning in sports, rehabilitation and physical education. The student is capable of distinguishing between scientific theories and empirical facts on the one hand, and habits, routines and conventions in practice on the other.
Communication: The student is capable of presenting (orally and in writing) a concise summary of the main contributions of contemporary theories of perceptual-motor learning for applications in practice of sports, rehabilitation and physical education. The student is capable of contributing to discussions regarding the applied value of contemporary theories for the practice of sports, rehabilitation and physical education.

Inhoud vak
The course provides a capita selecta of contemporary theories of perceptual- motor learning, such as the motor programming approach, common-coding approach, neuropsychological approaches, the ecological approach and nonlinear pedagogy approach to perceptual-motor learning. Among others, the following topics will be addressed; variability of practice, video-feedback, self-controlled feedback, gaze-training, education of attention, anticipation, internal & external focus of attention, motor familiarity, observational learning, implicit & explicit learning, analogy learning, errorless learning, re-investment, constraints-led learning, transfer of learning. On the one hand, the course aims to deepen the understanding of contemporary theories and concepts with respect to learning of perceptual-motor skills. On the other hand, the course tries to bridge the gap between findings from theory-driven and experimental research and practices of training and (re-)learning of perceptual-motor skills in sports, rehabilitation and physical education.

Onderwijsvorm
Six lectures provide the student with an introduction into the contemporary approaches to perceptual- motor learning. The lectures give

a short background to the theories and provide a critical discussion of the key concepts and empirical evidence. During the tutorials the students (in groups) apply the contemporary theories to the practice of perceptual- motor learning in sports, rehabilitation and physical education by proposing theory- derived solutions to 'problems from practice'. Finally, in the practical students practice a new perceptual motor skill, and use the learning experience to reflect upon the explanatory value and limitations of the scientific approaches to perceptual-motor learning. Lectures 12 hours, tutorials 10 hours practical 4 hours, self study 142 (preparation lectures etc. 80 hours and assessments 60 hours).

Toetsvorm

Written exam (open-end question) 50%;
Essay (50%),
Evaluation report (pass/no pass)

Literatuur
A collection of recent theoretical and experimental papers from the scientific literature (details to be announced).

Vereiste voorkennis
The student is familiar with the type of problems and questions that are addressed in theories and research of perceptual- motor coordination, control and learning. The student is able to independently search for, acquire and report knowledge from contemporary scientific papers.

Intekenprocedure
For more info on workgroups, laboratories, (computer) practicals etc. please see Canvas.

Practical Internship

Vakcode	B_PRACINTERN (900680)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	drs. B.L. van Keeken
Examinator	drs. B.L. van Keeken

Doel vak
Het doel van de cursus is dat de student kennismaakt met een bedrijf, instituut of organisatie en daarbij zicht krijgt op de manier waarop bewegingswetenschappelijke kennis binnen een bedrijf, instituut of organisatie toegepast wordt, dan wel kan worden toegepast, waardoor de student zich beter profileert voor de betreffende sector van de arbeidsmarkt.

Inhoud vak
Praktijkstages kunnen plaatsvinden bij verschillende bedrijven, instituten en organisaties. Daarom bestaan er aanzienlijke verschillen met betrekking tot de invulling van de stage. In het algemeen zal de student een schriftelijke opdracht ontvangen waarin in ieder geval

vermeld staat wat er in het kader van de praktijkstage van de student verwacht wordt. De student oriënteert zich in ieder geval op de werkzaamheden van het bedrijf, instituut of organisatie en op de functie die de afdeling binnen de organisatie vervult. Daarbij gaat de student na welke bewegingswetenschappelijke kennis binnen de betreffende afdeling toegepast wordt of toegepast kan worden.

Onderwijsvorm
De student loopt individueel of per tweetal stage onder begeleiding van een facultair staflid. De student wordt binnen de organisatie, waar stage gelopen wordt, begeleid door een dagelijks begeleider. Het facultaire staflid dient de schriftelijke opdracht goed te keuren. Over de stage dient de student een verslag te schrijven waarin tenminste de volgende onderwerpen dienen voor te komen:

• Een beschrijving van de uitgevoerde taken binnen de stage
• Een beschrijving van de praktijksituatie (aard van bedrijf of instituut, taken van de afdeling binnen het bedrijf of organisatie waar de stage plaatsvindt
• De raakvlakken van het bedrijf of instituut met de bewegingswetenschappen
• De mogelijkheden voor het toepassen van de bewegingswetenschappelijke kennis binnen het bedrijf, het instituut of de betreffende afdeling
• De betekenis van het bedrijf of instituut voor de werkgelegenheid van bewegingswetenschappen
• Een uren-verwantwoording

Het verslag kan zowel in het Nederlands als in het Engels geschreven worden. Enkele voorbeelden van stageverslagen zijn te vinden op de Canvas pagina.

Toetsvorm
De beoordeling van het functioneren tijdens de praktijkstage en de beoordeling van het stageverslag dienen beide voldoende te zijn. Het eindcijfer voor de praktijkstage is het gemiddelde van het cijfer voor het functioneren tijdens de stage en het cijfer voor het stageverslag. Het facultaire staflid is de eindverantwoordelijke voor het cijfer voor het stageverslag en het eindcijfer.

Short Literature Review

Vakcode	B_SLR (900601)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. H.A.M. Daanen
Examinator	prof. dr. H.A.M. Daanen
Niveau	600

Doel vak
The aim of the Short Literature Review is to determine whether a student can formulate a research question and an objective answer to

this question related to Human Movement Sciences based on peer-reviewed literature and is subsequently able to express these findings in a written report. Secondly, the Short Literature Review will serve as an evaluation of the student's skills in scientific writing. The Short Literature Review is an individual product.

Inhoud vak
The student chooses a subject related to Human Movement Sciences on which to write the Short Literature Review. The subject of the Short Literature Review should not be related to the subject of the Research Internship.

Onderwijsvorm
The student formulates a question related to Human Movement Sciences, which should be approved by a staff member of the department. In fore coming cases, the coordinator my allocate a supervisor, usually on the basis of the chosen subject and availability. At the start of the writing process, the student draws up a plan. This plan must contain a detailed presentation of the question for the Short Literature Review, a literature search strategy and a temporary classification (i. e. chapters or paragraphs). The student collects and selects relevant literature for the Short Literature Review and writes a report on the chosen subject. Regular consultation with the supervisor is recommended. The student is entitled to 12 hours of supervision. The completed Short Literature Review may be presented during a research meeting of one of the specializations.

Toetsvorm
If the student or supervisor feels that this is necessary a second opinion can be asked for.

Literatuur
Course manual Short Literature Review (available on Canvas).

Overige informatie
The final version of the Short Literature Review has to be uploaded to the relevant Canvas site for a plagiarism check. The electronic evaluation form has to be filled in before the mark can be registered by the study secretariat.

Special Topics in Sports Engineering

Vakcode	B_SPTOPICS ()
Periode	Periode 5
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. H.E.J. Veeger
Examinator	prof. dr. H.E.J. Veeger
Docent(en)	prof. dr. H.E.J. Veeger
Lesmethode(n)	Werkcollege
Niveau	500

Doel vak
After following this course, students should understand the complexity of maximizing sports performance and the importance of the inclusion of material – athlete interaction. More specifically, students should be:

-Familiar with the Power Equation concept and be able to apply this to cycling;
-Have knowledge of methodological aspects of sports research, in particular error propagation, man – machine interaction (closed loop complexity), measurement techniques, internal and external validity.
-Have insight in the organizational and psychological complexities of sports innovation.
-Able to measure key parameters needed for power equations, related to their own field and have experience in the measurement of key parameters in adjacent fields;
-Able to provide a cycling performance simulation programme with the parameters necessary to evaluate performance on a realistic level;
-Able to collect and present to fellow group members, data on parameters for such a simulation program.
-Present research findings through an individual portfolio, and a group presentation/poster/brief oral.

Inhoud vak
Special Topics in Sports Engineering is an inter-university course for Master students in Mechanical Engineering, Movement Sciences, Sport Sciences and other related MSc programmes. The course has been organised as a two-week intensive course, and comprises lectures, demonstrations, practicals, hands-on research and presentations. The course will be taught by staff from Delft University of Technology, Sheffield Hallam University and VU Amsterdam. The course is organised around a basic theme relevant for sports engineering. In 2014 – 2015 this theme will be "Maximizing cycling performance". During the course students will work out what aspects determine cycling performance, and collect data (through experiments or literature research) that are needed to develop / feed a simulation programme for the estimation of the optimal bike – rider combination and the maximal performance humanly possible.

Onderwijsvorm
Two weeks fulltime course

Toetsvorm
Portfolio:
1. Overview of scientific literature studied
2. Test results for at least one of the parameter collection experiments
3. Description of the parameter collection experiment
4. Printout of the presentation to the
5. The final simulation model

Literatuur
Will be provided during the course

Vereiste voorkennis
Basic knowledge of Matlab

Overige informatie
- This course is an interuniversity course given for both TU and VU students: regular travel is thus required;
- The course is organised as a two-week intensive course. Full availability during these two weeks is mandatory

- The maximum number of attendants = 20

Sport and Performance Dietetics

Vakcode	B_SPPDIET ()
Periode	Periode 4
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. H.A.M. Daanen
Examinator	prof. dr. H.A.M. Daanen
Docent(en)	drs. ir. R.G. Memelink MSc, dr. ir. P.J.M. Weijs
Lesmethode(n)	Hoorcollege, Werkcollege, Practicum
Niveau	400

Doel vak
After completion of the course you will be able to:
• Outline the actual state of knowledge in sport & performance dietetics, based on the literature included in the course and the topics discussed during (guest) lectures.
• Apply the acquired knowledge to practical and research settings in the field of sport and performance dietetics.
• Apply guidelines for dietary intake to different types of sport.
• Make a substantiated choice for a specific method for assessment of dietary intake.
• Make a substantiated choice for a specific method to estimate or assess energy expenditure.
• Make a substantiated choice for a specific method for assessment of body composition.
• Prepare and present an innovative research proposal for the field of sport & performance dietetics.

Inhoud vak
In this course you will obtain in depth knowledge of selected relevant topics in sport and performance dietetics. Course topics are:
• Nutritional guidelines, requirements
• Nutritional assessment: dietary intake, body composition, metabolic state, performance.
• Interaction between nutrition and exercise.
• Sports nutrition.
• Nutritional supplements.
• Protein nutrition and metabolism.
• Special topics in sport and performance dietetics.

Application of this knowledge into practical and research settings is an essential part of the course and will be stimulated through assignments and practical work:
• Assess your own dietary intake (Assignment 1).
• Write an evidence based advice on a nutritional topic for athletes (Assignment 2).
• Prepare and present a research proposal on a hot topic or niche in the field of sport and performance dietetics. (Assignment 3)
• Body composition assessment (Lab session).

The course consists of 6 lectures, 4 class sessions, and 1 lab session.

Lectures must be prepared through study of the indicated literature. Class sessions are used to discuss Assignments 2 and 3. During the lab session, students will practise different methods of body composition analysis at the Amsterdam Nutritional Assessment Center.

Onderwijsvorm
Lectures, class sessions, lab session, assignments.

Toetsvorm
The exam consists of 5 parts:
• Written preliminary exam (individual; 40% of final grade).
• Assignment 1 (assessment of nutritional intake; individual; 20% of final grade).
• Assignment 2 (evidence based advice; in small group; 20% of final grade).
• Assignment 3 (presentation of research proposal; in small group; 20% of final grade).
• Lab session: body composition analysis.

The lab session has to be fulfilled before the final grade can be assigned. Fulfillment will be assessed with “yes”/”no”.

Literatuur
• Course manual (available on Canvas).
• Recent articles in the field of sport and performance dietetics.
• Book chapters from: Burke, L & Deakin, V. Clinical Sports Nutrition, 5th edition (2015). McGraw-Hill Education.

Vereiste voorkennis
Students should have basic knowledge of human physiology as is available in textbooks such as W.D. McArdle, F.I. Katch, V.L. Katch: Exercise Physiology: nutrition, energy, and human performance, 8th edition (2014). Wolters Kluwer / Lippincott Williams & Wilkins.

Overige informatie
More information on lectures, class sessions, lab session, and assignments will be shared via Canvas.

This course will be taught by Robert Memelink Msc and guest lecturers.

Sport Psychology: from Evidence to Application

Vakcode	B_SPORTPSYEV ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. R.R.D. Oudejans
Examinator	dr. R.R.D. Oudejans
Docent(en)	dr. R.R.D. Oudejans, dr. R.I. Hutter
Lesmethode(n)	Hoorcollege, Werkcollege, Bijeenkomst, Practicum
Niveau	500

Doel vak
The student is able to:
- give an overview of several psychological factors that play a role in sport, the assumed working mechanisms as well as ways of influencing these factors with mental training;
- give an overview of group dynamic processes in sport, theories on leadership and different coaching models.
- critically assess (recent) research literature in sport psychology on its thesis, content, empirical rigor and applicability;
- critically discuss (recent) research literature in sport psychology in a paper, culminating in the evaluation of the literature and a discussion of implications for sport (psychology) practice;
- critically assess and discuss papers of fellow students on contents, structure, writing and originality.
- link applied research to its theoretical background;
- discuss research on applied sport psychology;
- formulate advice in specific areas of applied sport psychology.
Furthermore, students will gain initial experience with applying mental training techniques and communication skills.

Inhoud vak
This course provides insight into research on (applied aspects) of sport psychology, particularly the areas of performance and social psychology. Performance Psychology focuses on research, theory, and practice intended to improve performance in sport. Social Psychology focuses on individual and group processes in sport settings. This area applies social psychological principles in examining factors related to the athletes, coaches and teams. Some of the topics that will be discussed are: performing under pressure, attentional control, motivation, as well as the broad topic of ‘coaching’ in sport, particularly group dynamics, leadership and coaching behaviours. In addition to the lectures, a practical is organized, to experience and apply a selection of 'performance
profiling', 'mental imagery', coaching models and communication skills. After the practical students
have to prepare and submit a practical report (in groups). Finally, the content
is for a large part determined individually as each student writes a paper on a key topic in sport psychology.

Onderwijsvorm
lectures: 10 times 2 hours
practical: 1 time 3 hours
discussion meeting: 1 meeting 4 hours
There are several lectures on topics in sport psychology and a practical. Students will produce an individual paper on a topic in sport psychology, write a practical report in small groups, and (individual) reviews of the papers of their fellow students. The papers will be discussed in discussion meetings at the end of the course. Participation in the practical and one discussion meeting is compulsory for students.

Toetsvorm
Students produce a paper (60% of the final grade), a practical report (25% of the final grade) and reviews about papers of other students (15% of the final grade). The paper, the practical report as well as the reviews must at least be of sufficient quality to pass the course.

Literatuur
- Course manual (Available on Canvas);
- Jones, G. (1993). The role of performance profiling in cognitive behavioral interventions in sport. The Sport Psychologist, 7, 160-172. (Available on Canvas);
- Murphy, S.M. & Martin, K.A. (2002). The use of imagery in sport. In: T. Horn (ed.) 2nd edition. Advances in sport psychology. Human Kinetics. p. 410-412; 416-417 and 431. (Available on Canvas);
- Recent articles and book chapters on psychological factors in sport and sport psychology.

Background literature:
- Cox, R.H., Sport Psychology: Concepts and Applications, 6th edition. Boston: McGraw-Hill, 2007.
or
- Bakker, F.C. & Oudejans, R.R.D. (2012). Sportpsychologie. Nieuwegein: Arko Sports Media.

Vereiste voorkennis
Students should have basic knowledge and understanding of sport psychology as is available in textbooks such as Cox, R.H. (2007). Sport Psychology: Concepts and Applications, 6th edition. Boston: McGraw-Hill, or Bakker, F.C. & Oudejans, R.R.D. (2012). Sportpsychologie. Nieuwegein: Arko Sports Media.

Talent Identification and Development

Vakcode	B_TALDEVEL (900672)
Periode	Periode 3
Credits	3.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. G.J.P. Savelsbergh
Examinator	prof. dr. G.J.P. Savelsbergh
Docent(en)	prof. dr. G.J.P. Savelsbergh
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
Students are able to summarize and examine the implications of adopting a multi- disciplinary research perspective for the comprehensive study of talent development and identification, and identify and elaborate upon the limitations of existing (mono- disciplinary) research on talent identification and development (expert performance). Additionally, students are able to make recommendations for future research on understanding talent development and for implementing talent developmental programs.

Inhoud vak
In recent years, research on expertise and the identification and development of talent has tended to be mono- disciplinary. In the current course a multi- disciplinary approach is emphasized. The lectures discuss the environmental influences, but also deal with genetic issues and the interplay between the two from the various

disciplines within human movements sciences among others, philosophy, psychology and physiology. The course addresses several issues, that all seem to play a part in talent identification and development. Like the amount of deliberate practice, the use of visual information, cognitive abilities, genetic make up or constraints, anthropometric characteristics, muscle structure and amount of fast and slow twitch muscle.

Onderwijsvorm
Eigth lectures provide the student with an introduction into the contemporary approaches to talent identification and development.

Toetsvorm
The course is concluded with a written test consisting of open- end questions.

Literatuur
A collection of recent theoretical and experimental papers from the scientific literature (details to be announced)

Vereiste voorkennis
None

Overige informatie
Although there is overlap in topics with the Bachelor's course Talent en Talentontwikkeling there are several important differences. First, instead of a textbook the study material consists of scientific papers, both theoretical and experimental. Second, several lectures are given by experts in the field. Third, the course is more multidisciplinary and uses a more concentric method to the concept of 'talent' approaching it from different perspectives.

Teacher Training at the Upper Secondary Level

Vakcode	B_DOCENTHBO (900630)
Periode	Ac. Jaar (september)
Credits	30.0
Voertaal	Nederlands
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	drs. M.G.J. Buijtenweg
Examinator	drs. M.L.A. Leijdekkers
Docent(en)	drs. M.L.A. Leijdekkers
Lesmethode(n)	Werkcollege
Niveau	400

Doel vak
Binnen de verschillende accenten bestaat voor de student de mogelijkheid zich te profileren in de richting van het beroep docent. Hiertoe dient de docentenopleiding gevolgd te worden. Reeds vele afgestudeerden zijn werkzaam als docent in het hoger beroepsonderwijs (hbo), onder meer aan de opleidingen Fysiotherapie en Lichamelijke opvoeding. Daar geven zij, afhankelijk van de richting, theorie- en vaardigheidslessen in vakken als anatomie, (inspannings)fysiologie, (sport)psychologie, gezondheidskunde, methodologie en bewegingsanalyse, begeleiden zij tutorgroepen en/of afstudeerstages en zijn zij actief betrokken bij

onderwijsontwikkeling.
Het doel van de docentenopleiding is dat de studenten de competenties van een beginnende docent verwerven. Zodat zij over kennis, inzicht, vaardigheden en attituden beschikken die hen in staat stellen als docent te functioneren en hun taken en taakuitvoering kritisch te evalueren en te veranderen.

Inhoud vak
Het opleidingsprogramma bestaat uit de volgende onderdelen: vijf didactische cursussen, een professionaliseringstraject en een stage. De didactische cursussen zijn
erop gericht de studenten kennis, inzichten, vaardigheden en attituden te verschaffen die nodig zijn voor het voorbereiden, uitvoeren, innoveren en
evalueren van onderwijs. Hierbij gaat het voornamelijk om het voorbereiden, verantwoorden en verzorgen van lessen (hoorcolleges, doceerlessen, werkgroepbegeleiding en vaardigheidslessen), het begeleiden van individuele studenten en het ontwikkelen en afnemen van toetsen. Het professionaliseringtraject biedt ondersteuning bij je ontwikkeling tot hbo-docent. De stage verschaft de studenten kennis en inzicht in de onderwijs- en lesgeefpraktijk op een hbo-opleiding alsmede vaardigheid in het geven van onderwijs. De stage is het onderdeel van de docentenopleiding waarin integratie van de theorie in de praktijk plaatsvindt: vrijwel alle cursussen lopen vooruit op of grijpen terug naar activiteiten die studenten in de stage ondernemen. De stage loopt van september tot en met april. In overleg met de stage-instelling maakt de student een rooster waarin hij aangeeft wanneer hij (gemiddeld 1 dag in de week) op de instelling aanwezig is. Tijdens de stage dienen zowel lessen geobserveerd als gedoceerd te worden. Minimaal één les staat onder supervisie van de docentenopleiding en één les wordt vakinhoudelijk beoordeeld door een vakinhoudelijk deskundige docent. Daarnaast wordt onder begeleiding van de stage-instelling en de docentenopleiding, in de stage gewerkt aan een aantal opdrachten.
Overzicht van de studieonderdelen:
• didactische basisprincipes
• onderwijs aan groepen
• toetsen en beoordelen
• innoveren
• studentbegeleiding
• professionaliseringstraject
• stage

Onderwijsvorm
Binnen de didactische cursussen vindt thuis kennisoriëntatie plaats aan de hand van opdrachten. Tijdens de bijeenkomsten staat veelal de praktische toepassing centraal en werken de studenten aan de hand van oefeningen/opdrachten veel met elkaar samen in subgroepjes. Deze werkwijze maakt het noodzakelijk dat de studenten elke bijeenkomst bijwonen en actief participeren; aanwezigheid is verplicht.

Toetsvorm
Om de docentenopleiding af te ronden dient de student aan de hand van een beoordelingsportfolio en een beoordelingsgesprek te bewijzen de docentcompetenties op het niveau van een beginnend docent te bezitten. Hiertoe zal de student voldoende bewijslast moeten verzamelen. Kenmerkend voor deze toetsvorm is dat de verantwoordelijkheid meer bij de student komt te liggen, aangezien deze deels zelf bepaalt hoe en waarmee hij de verschillende competenties onderbouwt. Een aantal bewijsstukken is voorwaarde om de docentenopleiding af te ronden.

Literatuur
De boeken en de handleidingen worden verkocht tijdens de bijeenkomsten. De kosten bedragen ongeveer €225,- en dienen voor het eind van de reguliere cursusduur betaald te worden.

Overige informatie
Het ministerie van OC&W heeft in de jaren 90 van de vorige eeuw regelingen opgesteld inzake
de benoembaarheideisen voor docenten hbo. Een hbo-docent dient naast het bezit van een bewijs/verklaring van bekwaamheid (een getuigschrift van met goed gevolg afgelegd afsluitend examen Bewegingswetenschappen) ook in het bezit te zijn van een bewijs/verklaring van voldoende didactische voorbereiding. De benodigde didactische vaardigheden dient de docent op sommige hogescholen zich eigen te maken door het volgen van een didactische scholing (hbo-didactische cursus) nadat hij is aangesteld als docent binnen het hbo. Studenten die de docentenopleiding BW met succes hebben afgerond wordt vrijstelling verleend voor de hbo-didactische cursus. Zij ontvangen bij het afronden van de Master de Basis Didactische Bevoegdheid en zijn daarmee bevoegd om les te geven binnen het hbo.

De docentenopleiding start in september en wordt afgesloten in mei. De vaste lesdag op de VU is de vrijdag.

Afhankelijk van de beschikbaarheid van externe stageplaatsen en de begeleidingsmogelijkheden is er een flexibele bovengrens in toelatingsplaatsen. Bij meer aanmeldingen dan plaatsen kan de docentenopleiding besluiten een toelatingsassessment te laten plaatsvinden.
Aanmelding dient schriftelijk te gebeuren vóór 22 mei op een daarvoor bestemd formulier. Voor een volledige beschrijving van het opleidingsprogramma wordt verwezen naar de programma informatie. Deze informatie en
het aanmeldingsformulier zijn te vinden op

http://www.vu.nl/nl/opleidingen/opleidingsaanbod-professionals/docenteno

Topics in Rehabilitation

Vakcode	B_TOPICS ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	prof. dr. T.W.J. Janssen
Examinator	prof. dr. T.W.J. Janssen
Docent(en)	dr. A. Ledebt, prof. dr. T.W.J. Janssen, dr. J.H.P. Houdijk, dr. E.E.H. van Wegen
Lesmethode(n)	Hoorcollege, Practicum, Computerpracticum
Niveau	500

Doel vak
This course provides an overview of contemporary insights, methods and research questions in the field of rehabilitation from a human movement sciences perspective. The topics range from abnormal motor development in children to rehabilitation after physical or neurological impairments in adults. After this course students should be able to identify, summarize, critically evaluate and expand upon topics regarding these issues. Specifically, students get acquainted with different types of qualitative motor assessments, instruments and methods to quantify motor performance. The students learn to understand the relevant issues, terms, concepts, mechanisms, and models relevant to human movement science in the context of rehabilitation, and relate those to various aspects of motor development, functional recovery, adaptation, compensation, training and learning of function and activities in the framework of restoration of mobility and upper-limb performance in persons with neurological and musculoskeletal impairments. They learn to understand the contexts as well as the practical process of scientific research and communication in the combined fields of rehabilitation and human movement sciences. They also appreciate clinical decision-making and acknowledge the importance of the ICF-framework (International Classification of Functioning, Disability and Health) in rehabilitation medicine.

Inhoud vak
During a part of this course, the understanding of abnormal motor development and developmental disorders in fetuses, infants and young children is deepened. Lectures and a tutorial provide insight into actual problems in the research and practice of disorders in which motor problems are the defining characteristics (i.e., cerebral palsy and developmental coordination disorder). Being the key issue in physical rehabilitation of adults, this course subsequently concentrates on the restoration of motor performance, and its underlying mechanisms, at the different levels of the International Classification of Functioning, Disability and Health (WHO 2001). Primarily a biophysical approach is taken: biomechanical, motor control and exercise (neuro)physiological principles, techniques and research findings will be discussed in specific patient populations, such as those with stroke, spinal cord injury, lower-limb amputation, Parkinson’s disease, breast cancer and arthrosis. Aspects of functional recovery, neuroplasticity, adaptation, compensation as well as concepts of learning and training mechanisms will be addressed. Research in this field will be presented and discussed in the format of ‘Capita Selecta’.

Onderwijsvorm
11 lectures of 2 hrs in which the current issues and state-of-the-art research in normal and abnormal motor development and in different patient populations is discussed; 2 site visits (4 hrs each) to rehabilitation centers Reade and Heliomare; 1 tutorial of 2 hrs. Attending the site visits and tutorials is compulsory. Six 2-hr meetings in which each student-pair gives a 15-minute presentation on a current rehabilitation topic. Each student should attend at least 3 of these meetings.

Toetsvorm
Multiple choice examination counting for 80% of the final grade. The mark for the presentation determines the remaining 20%.

Literatuur

A selection of scientific papers and a reader.

Vereiste voorkennis
Students should have basic knowledge and understanding of neuro-physiology, neuroanatomy, biomechanics, and exercise physiology.

Intekenprocedure
For more info on workgroups, laboratories, (computer) practicals etc. please see CANVAS.

Training, Aging and Disuse

Vakcode	B_TRAD ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. R.T. Jaspers
Examinator	dr. R.T. Jaspers
Docent(en)	dr. H.L. Gerrits, dr. R.T. Jaspers
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
The purpose of the course Training, Aging and Disuse is to acquaint students with physiological and molecular/cytological principles that determine (peak) power and fatigue characteristics of skeletal muscle and how these are changed by exercise training, disuse and aging. The level of knowledge that should be attained in those disciplines will allow students to understand how particular physiological conditions will affect muscle function at different levels of organizations (i.e. from whole motor unit to molecular signals in the muscle cells).

Inhoud vak
Neuromuscular performance in terms of muscle peak power and maximal steady state power is impaired during aging and with a chronic decrease in usage, such as during bed rest, diseases, injuries, neuromuscular disorders and (most extreme) after a spinal cord injury. During the course, a critical overview is given of the current knowledge of short and long term adaptations of the neuromuscular system in response to training, aging, disuse and chronic disease, and how these relate to impaired muscle function. Underlying (molecular) processes leading to atrophy and reduced force generating capacity as well as a reduced endurance performance of the neuromuscular system are discussed. To obtain indications for how training or other interventions could effectively prevent these adverse effects and improve muscle function, a detailed overview is given of training induced changes in muscle phenotype and how these are related to molecular regulators of protein synthesis and degradation and mitochondrial biosynthesis. The content is mostly based on recent own research.

Onderwijsvorm
(20 hrs / 10 lectures, 4 hrs / 2 working lectures, 4 hrs / 2 practicals, 120 hrs preparation for contact hours and exam.

The course will consist of a series of lectures during which relevant questions are addressed and discussed. Using the literature assignments students should study the material independently (even though group work is encouraged) to attain a good understanding. In additional meetings relevant items are addressed in group discussions based on prepared questions/statements. Contact hours are intended to support that process and have the following goals:
• To accentuate importance of the content
• To place contents within a theoretical framework
• To identify content importance for the movement sciences
• To discuss content difficulties that may arise during independent study of assigned literature
• To practice solving problems using learned content.
In addition to the lectures, there are two laboratory practicals during which students get acquainted with measurement techniques of human muscle function in vivo and molecular analyses of gene expression and protein synthesis.

Toetsvorm
The course ends with a written test consisting of short essay questions.

Literatuur
Obligatory reading
- Book: Skeletal Muscle (SM)
D.A. Jones, J. Round, and A. de Haan. Skeletal Muscle from Molecules to Movement; A textbook of Muscle Physiology for Sport, Exercise, Physiotherapy and Medicine. Edinburgh: Churchill Livingstone, Elsevier Science Limited, 2004. ISBN 0 443 07427 5.
- In addition, the reading material consists of a number of scientific papers, which will be made available at Black Board.

Overige informatie
The student should have a basic knowledge and understanding of molecular biology, exercise and muscle physiology.