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

Vrije Universiteit Amsterdam - Faculteit der Bewegingswetenschappen - M Human Movement Sciences - 2016-2017

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

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
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
Current Issues in Sport and Exercise Psychology	Periode 1	6.0	B_CURRISSUES
Electromyography	Periode 5	3.0	B_ELECTROMYO
Entrepreneurship in Human Movement Sciences	Periode 5	6.0	B_ENTREPREN
Perception for Action	Periode 4	3.0	B_PERCACTION
Perceptual-motor Learning	Periode 2	6.0	B_PERCML
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
Sport Psychology: from Evidence to Application	Periode 2	6.0	B_SPORTPSYEV
Talent Identification and Development	Periode 3	3.0	B_TALDEVEL
Teacher Training at the Upper Secondary Level	Ac. Jaar (september)	30.0	B_DOCENTHBO
Training, Aging and Disuse	Periode 2	6.0	B_TRAD

Track High Performance Coaching

Vakken:

Naam	Periode	Credits	Code
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

Opleidingsdelen:

- Track Rehabilitation
- Track Biophysics in Sport

Vakken:

Naam	Periode	Credits	Code
Research Internship	Ac. Jaar (september)	24.0	B_RI

Track Rehabilitation

Vakken:

Naam	Periode	Credits	Code
Exercise and Health	Periode 3	3.0	B_EXERHEALTH

Track Biophysics in Sport

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. J. Harlaar
Docent(en)	prof. dr. H.E.J. Veeger
Lesmethode(n)	Hoorcollege, Computerpracticum
Niveau	500

Doel vak
The student is capable to:
• Define and calculate local joint coordinate systems;
• use and understand different calibration methods and their limitations;
• translate technical motion descriptions into clinically relevant units;
• apply the above to experimental data;
• interpret and comment on methods as described in the literature.

Inhoud vak
In this course students are introduced to the fundamentals of three-dimensional kinematics, as well as the (more or less) standard application methods.
The course will comprise three separate blocks focusing on
1. the definition and use of local coordinate systems in the calculation of osteokinematics;
2. the use of technical marker sets as well as the practical implications of data processing, especially correcting for missing markers and;
3. the calculation procedures for obtaining helical axes, needed for the definition of functional axes-based coordinate systems

Onderwijsvorm
Lectures, computer practicals and tutorials

The three computer practicals are linked to in-term assessments. Each practical will contribute for 15% to the final score.

Toetsvorm
- completion of all 3 assignments is mandatory to qualify for the exam
- two in-term tests on calculation skills, partially exempting for exam
- final test on calculation skills + literature
- score: 3 x 20% for calculation questions (one for each block)
40% for essay question
above 100% = 9/10

Literatuur
Relevant papers will be listed in Blackboard.
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.

Vereiste voorkennis
This course requires proficiency in Matlab and matrix calculation. If there is a deficiency related to Matlab skills, students are strongly advised to take the TUE web-based matlab course that can be found at http://www.imc.tue.nl/
The BSc course “Mechanische Analyse …” is advised.

Aanbevolen voorkennis
Matlab and matrix calculation

Overige informatie
The maximum number of participants in this course is limited to 40.

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
Docent(en)	dr. G.S. Faber
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 blackboard

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 Blackboard.

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	prof. dr. C.C. Foster Jr.
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
Lecture
Practical laboratory exercises
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 Blackboard.

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)	prof. dr. J.H. van Dieen, prof. dr. J.B.J. Smeets
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. The student can interpret, present and discuss scientific literature in the area of coordination
dynamics. The student can design new coordination dynamics experiments. Students can critically evaluate the usefulness of coordination dynamics literature for science and education.

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.
Throughout the course, students will work individually and in small groups on journal club assignment using (relatively) new coordination dynamics literature from one of the 5 proposed areas of interest. Core aspects of the assignment are 1) highlighting the central concepts of the coordination dynamics framework employed in the paper, 2) presenting and discussing the novel insights obtained, 3) describing the next step(s) in terms of experimental research, and 4) elaborating on the suitability of the selected papers as reading material for next year's course.

Onderwijsvorm
Amount of contact hours (36 hrs), divided in:
Lectures: 10 * 1.75 hrs
Laboratories and journal club workshop: 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
Journal club assignments (presentation and writing assignment) and 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 (35%), the final exam (35%), the journal club presentation (10%) and the journal club writing assignment (20%). 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 [70%], Journal Club [30%]). 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).

Intekenprocedure
For more info on journal club workshops, laboratories, (computer) practicals etc.
please see Blackboard.

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 two meetings 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. 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 Blackboard);
- 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 Blackboard.

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, Practicum, 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 Blackboard.

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 Blackboard.

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'.

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
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	500

Doel vak
The main objective of this course is to provide you with the necessary tools to write a research proposal targeting a public health problem.
By the end of this course you should be able to:
§ Systematically analyse a public health problem and its underlying

behavioural and environmental determinants;
§ Evaluate an existing intervention study according to set criteria;
§ Write a research proposal aimed at improving a public health problem;
§ Present and discuss your final research proposal.

Inhoud vak
The overall aim of this course is to enable you to write a research proposal targeting a public health problem.
Terminology to describe a public health problem, analysis of behaviour and its determinants (personal and environmental), intervention development, theories and models for change, intervention implementation and evaluation (effect, process and cost-effectiveness) are discussed in-depth such that you are able to write your research proposal.
Examples from current studies are evaluated to develop a critical mind on shortcomings in existing research.

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

Toetsvorm
You are required to produce a research proposal (60%) and presentation (40%). Both 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
- Courneya KS. 2010. Efficacy, effectiveness, and behaviour change trials in exercise research. Int J Behav Nutr Phys Act 7:81
- Koelen MA, Ban van de AW. 2004. Health Education and Health Promotion. Wageningen Academic Publishers 157-182

Vereiste voorkennis
Fundamental knowledge on statistical techniques is strongly advised.

Overige informatie
The last seminar is obligatory.

Master Research Project HMS

Vakcode	B_MARESPRJ ()
Periode	Ac. Jaar (september)
Credits	24.0
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. K. Levels
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 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 should be taken at the start of the project and not post-hoc and there should be a clear reason for the extension (for example an extra assignment or the development of equipment).

The report has to adhere to a number of presentation and content demands, such as a special front page and a standard set-up. These demands can be found further down in this manual.

Procedure
You are expected to conduct your master research project with a partner. Working with a partner has major advantages during the hands-on phase of the project, while having a sparring partner for discussion facilitates decision making during the full period of the i master research project.

A master research project usually follows the following phases:

1) determining the subject
First, you are assumed to check the Blackboard site for first orientation on a general subject and / or research direction. A list of subjects can be found on the list provided on Blackboard. An alternative route is to check which staff member, postdoc, or PhD student is involved in research subjects to your liking. It is without question allowed to contact them to inform about master research project options.

In case you have serious difficulties deciding on who to contact or what to do, it is best to consult the master research project coordinator: Dr. Koen Levels (k.levels@vu.nl). You may also propose your own subject, whereby you can consult the list of projects to find some inspiration.
In case you prefer to do your own subject, you need to discuss this with the coordinator at a very early stage as he or she must grant permission, which will at least be partially dependent upon finding a suitable supervisor.

As has been mentioned earlier, it is also possible to perform your master research project outside the faculty or even abroad. In this case

you are required to consult with the master research project coordinator as it is important to make clear agreements about supervision. More information about what is involved in doing your master research project abroad can be found on VUnet. It is strongly recommended that anyone anticipating doing the master research 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 faculty or abroad, you will always need a supervisor from the faculty (see point 2).

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. Within two months after starting the master research project, a research proposal has to be approved by the supervisor. The final products of the master research project will be also be marked by a second assessor, but this usually is done after the draft report is completed. Your contacts as a student might only be limited to your supervisor during the project. The second assessor is only obligatory involved with your research report behind the scenes. The role of this second assessor is that of an independent reviewer.

3) Preparing a proposal
Once the subject and the supervisors 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'll apply to test your hypotheses. Furthermore you must prepare a time plan and an overview of the equipment you will need (when this is applicable).

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 an 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) Writing the Report
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. For a more detailed description on writing research papers see “Essentials of Writing Biomedical Research Papers” by Mimi Zeiger.

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 manuscripts (see http://www.apastyle.apa.org). For more medical-biological oriented subjects, the preferred style is the Vancouver style. See the link to the site of the University of Queensland for more details on this style of referencing (http://www.library.uq.edu.au/training/citation/vancouv.pdf). Referencing in the text can either be done following a numerical system, or by using author names. Decide together with your supervisor which style to follow.

7) Presentation of the Research
You are supposed to present your results 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. During the period in which you are conducting your research, you are obliged to be present at twelve research seminars. These meetings are not only obligatory, but are 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. Visiting research seminars is of course unrealistic when you do your master research project abroad. It is, however, expected that you visit research meetings at the guest

institution when applicable. For more information about the research seminars and the planning of these meetings, you can contact Brenda van Keeken (b.l.van.keeken@vu.nl).

Onderwijsvorm
During the implementation of your master research project you are entitled to approximately 100 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 supervision agreement (which can be found on the blackboard age) 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 project: Dr. Koen Levels. 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 three components:

1. How the research was performed (assessed by the supervisor). This takes into account the way in which measurements, organization, contact with test subjects, speed etc. are performed.
2. The report (assessed by the supervisor and the second assessor). The report is assessed on the basis of content as well as of layout.
3. Presentation of the research (assessed by the supervisor and the second assessor). The mark is based on arrangement, composition and content of the presentation, clarity, use of audiovisual support and presentation technique etc.

The first component accounts for 40% of the final mark. The report accounts for 50%, and the final 10% is determined by the presentation of the research. The final mark is rounded off to the nearest half mark.
The supervisor and second assessor use the assessment form (last page of this document) to determine the final grade. All components have to be assessed with a pass. Research projects marks can differ between partners, as marks are given on an individual basis.

If you do your master research project in a foreign institution, the assessment follows slightly different rules: the local supervisor will be asked to mark your work attitude (1) and the report (2), but the final marking will be the responsibility of your ‘home’ supervisor. Of course, he or she will also be responsible for both the report and the presentation.

The final report has to be uploaded by every student on the blackboard page for a plagiarism check. So, even when you did your master research project as a duo, both of you have to upload the report. Whether, and to which extent there might be a case of plagiarism will be to the judgment of the exam committee. Since plagiarism is considered as a serious offense to the scientific codes, any form of plagiarism might lead to serious sanctions. Consult the website for more detailed information on tasks and activities of the exam committee.

Evaluation
During one of the final meetings between you and your supervisor the process will be evaluated. The various components of the master research project are discussed (getting started, measurements, writing the report etc). During these discussions you should be given the opportunity to express your feelings about the supervision. If, during the research, you are unhappy about the supervision, do not wait until the official evaluation meeting to air them, as not much else can be done at that stage but ‘naming and shaming’. Keep in mind, however, that supervision is not a one-way process: you are also responsible for making a good supervision possible.

The electronic version of your report should be uploaded in pdf-format through the BB master research project plagiarism check entry. Please use the official front page and format. Not doing this might lead to unnecessary delays and extra work at a later stage.

Uploading to the library data base
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.ubvu.vu.nl 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 Masters student in Human Movement Sciences. However, Premaster students who are conditionally admitted to the program can only start the master research project when they completed the Premaster courses “Wiskunde”, “Verwerken van Digitale Signalen” and “Meten van Fysische Grootheden”. For some intern subjects it is strongly advised that you first follow specific courses from the Master program.

Maximal Neuromuscular Performance

Vakcode	B_MAXNEUR ()
Periode	Periode 1
Credits	3.0
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). Most 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;
• (Low frequency) fatigue;
• Shortening deficit and lengthening force enhancement;
• Recruitment of motor units.
• Muscle oxygenation

Onderwijsvorm
The course will consist of a series of nine lectures condensed in a three week period (September 5th- September 23rd), 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 28th).

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
Sufficient knowledge of the basics of Muscle Physiology is absolutely necessary. In order to successfully participate, the 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)
.

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 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 ones 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 quantitative analysis of perception, using the psychophysical method. Each topic (e.g. proprioception, motion perception) is introduced by a lecture, but he focus of the course is on the discussion
of papers of the last decade The discussion will be about both the phenomenology and the mechanisms.

Onderwijsvorm
Amount of contact hours:
Lectures (‘hoorcolleges’) 7
Tutorials (‘werkcolleges’) 7
Assignments & self study 68
Practicals 2

Each meeting will be a combination of tutorial consisting of a discussion of the previous assignment (1 hour), and a lecture introducing to 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 distributed during the course.

Vereiste voorkennis
No entry requirements. Basic knowledge of the nervous system is expected (e. g. function of various brain areas).

Overige informatie
- The maximum number of participants in this course is limited to 40

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 Blackboard.

Practical Internship

Vakcode	B_PRACINTERN (900680)

Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	dr. K. Levels

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 blackboardpagina.

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.

Research Internship

Vakcode	B_RI (900624)
Periode	Ac. Jaar (september)
Credits	24.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Examinator	dr. D.L. Mann
Niveau	600

Doel vak
All Master students of Human Movements Sciences are required to complete their study with a research internship. The internship is meant to work both as an integrator, as well as a means for further specialization. An integrator, because all abilities and knowledge collected during previous studies, projects and courses will come together during the internship. Also, it is an option for further specialization, since the internship will give you the opportunity to develop research qualities on the subject or in the specialization, of your choice.

This manual is intended to function as a guide for planning, preparing and implementing the research internship and for writing the internship report. There is also a list of internship possibilities available. This list can be found on the Blackboard site bb.vu.nl.

Inhoud vak
The objective of a research internship is to obtain 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 research internship 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.

A research internship 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 length of the internship is 24 study points (EC). In exceptional cases this can be extended to 30 EC. The decision to invest 30 EC in the internship should be taken at the start of the internship and not post-hoc and there should be a clear reason for the extension (for example an

extra assignment or the development of equipment).

The internship rapport has to adhere to a number of presentation and content demands, such as a special front page and a standard set-up. These demands can be found further down in this manual.

At this point there are no formal prior requirements for starting an internship, other than being registered as a Masters student in Human Movement Sciences. However, Premaster students who are conditionally admitted to the programme can only start the internship when they completed the Premaster courses "Wiskunde", "Verwerken van Digitale Signalen" and "Meten van Fysische Grootheden". For some intern subjects it is strongly advised that you first follow specific courses from the Masters programme.

Onderwijsvorm
You are expected to conduct your research internship with a partner. Working with a partner has major advantages during the hands-on phase of the project, while having a sparring partner for discussion facilitates decision making during the full period of the internship.

A research internship usually follows the following phases:

1) determining the subject
First, you are assumed to check the Blackboard site for first orientation on a general subject and / or research direction. A list of subjects can be found on the list provided on Blackboard. An alternative route is to check which staff member, postdoc, or PhD student is involved in research subjects to your liking. It is without question allowed to contact them to inform about internship options.

In case you have serious difficulties deciding on who to contact or what to do, it is best to consult the master program coordinator: Dr. Koen Levels (k.levels@vu.nl). You may also propose your own subject, whereby you can consult the list of internship subjects to find some inspiration. In case you prefer to do your own subject, you need to discuss this with the coordinator at a very early stage as he or she must grant permission, which will at least be partially dependent upon finding a suitable supervisor.

As has been mentioned earlier, it is also possible to perform your internship outside the faculty or even abroad. In this case you are required to consult with the master program coordinator as it is important to make clear agreements about supervision. More information about what is involved in doing your internship abroad can be found on VUnet. It is strongly recommended that anyone anticipating doing an internship 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 internship outside the faculty or abroad, you will always need a supervisor from the faculty (see point 2).

2) Supervision
All Master Internships, 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 internship. Within two months after starting the internship, a research proposal has to be approved by the supervisor. The final products of the internship will be also be marked by a second assessor, but this usually

is done after the internship draft report is completed. Your contacts as a student might only be limited to your supervisor during the internship. The second assessor is only obligatory involved with your research report behind the scenes. The role of this second assessor is that of an independent reviewer of the internship.

3) Preparing a proposal
Once the subject and the supervisors 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'll apply to test your hypotheses. Furthermore you must prepare a time plan and an overview of the equipment you will need (when this is applicable). Within the course "writing and designing a research proposal" which takes place in January, you have the opportunity to write a proposal for your research internship. Although it is not obliged to write the proposal for your internship during this course, it is strongly encouraged and can save you valuable time.

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 an internship
Of course, the research internship 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) Writing the Report

The internship 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. For a more detailed description on writing research papers see "Essentials of Writing Biomedical Research Papers" by Mimi Zeiger.
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 manuscripts (see http://www.apastyle.apa.org). For more medical-biological oriented subjects, the preferred style is the Vancouver style. See the link to the site of the University of Queensland for more details on this style of referencing (http://www.library.uq.edu.au/training/citation/vancouv.pdf). Referencing in the text can either be done following a numerical system, or by using author names. Decide together with your supervisor which style to follow.

7) Presentation of the Research
You are supposed to present your results 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. During the period in which you are conducting your research, you are obliged to be present at these Research Discussion Meetings. These meetings are not only obligatory, but are 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. Visiting Research Discussion Meetings is of course unrealistic when you do your internship abroad. It is, however, expected that you visit research meetings at the guest institution when applicable.

Supervision
During the implementation of your research internship you are entitled to approximately 100 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 adher to the planning. By preparing a good plan with your supervisor and by writing down agreements in a supervision agreement (which can be found on the blackboard age) 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 Program: dr.

Koen Levels. If the Coordinator also happens to be your research supervisor, you can turn to the Education Director (dr. Kirsten Bijker).

Toetsvorm
When assessing the research internship the supervisor and second assessor have to agree on the mark that is given. The mark consists of three components:
1. How the research was performed (assessed by the supervisor). This takes into account the way in which measurements, organization, contact with test subjects, speed etc. are performed.
2. The report (assessed by the supervisor and the second assessor). The report is assessed on the basis of content as well as of layout.
3. Presentation of the research (assessed by the supervisor and the second assessor). The mark is based on arrangement, composition and content of the presentation, clarity, use of audiovisual support and presentation technique etc.

The first component accounts for 40% of the final mark. The report accounts for 50%, and the final 10% is determined by the presentation of the research. The final mark is rounded off to the nearest half mark. The supervisor and second assessor use the assessment form (last page of this document) to determine the final grade. All components have to be assessed with a pass. Research projects marks can differ between partners, as marks are given on an individual basis.

If you do your research internship in a foreign institution, the assessment follows slightly different rules: the local supervisor will be asked to mark your work attitude (1) and the report (2), but the final marking will be the responsibility of your ‘home’ supervisor. Of course, he or she will also be responsible for both the report and the presentation.

The final report has to be uploaded by every student on the blackboard page for a plagiarism check. So, even when you did your internship as a duo, both of you have to upload the report. Whether, and to which extent there might be a case of plagiarism will be to the judgment of the exam committee. Since plagiarism is considered as a serious offense to the scientific codes, any form of plagiarism might lead to serious sanctions. Consult the website for more detailed information on tasks and activities of the exam committee.

Evaluation
During one of the final meetings between you and your supervisor the internship process will be evaluated. The various components of the internship are discussed (getting started, measurements, writing the report etc). During these discussions you should be given the opportunity to express your feelings about the supervision. If, during the research, you are unhappy about the supervision, do not wait until the official evaluation meeting to air them, as not much else can be done at that stage but ‘naming and shaming’. Keep in mind, however, that supervision is not a one-way process: you are also responsible for making a good supervision possible.

The electronic version of your report should be uploaded in pdf-format through the BB Research Internship Plagiarism Check entry. Please use the official front page and format. Not doing this might lead to unnecessary delays and extra work at a later stage.

Overige informatie
Uploading to the library data base
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.ubvu.vu.nl in order to get a grade for your report.

Short Literature Review

Vakcode	B_SLR (900601)
Periode	Ac. Jaar (september)
Credits	6.0
Voertaal	Engels
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
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 Blackboard).

Overige informatie
The final version of the Short Literature Review has to be uploaded to the relevant Blackboard 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

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
Faculteit	Fac. der Gedrags- en Bewegingswetensch.
Coördinator	drs. ir. R.G. Memelink MSc
Examinator	drs. ir. R.G. Memelink MSc
Docent(en)	drs. ir. R.G. Memelink MSc, dr. ir. P.J.M. Weijs
Lesmethode(n)	Hoorcollege, Werkcollege, Practicum
Niveau	400

Doel vak
The student is able to:
• Outline the actual state of knowledge in sport & performance dietetics, based on the literature included in the course.
• Apply the acquired knowledge to practical and research settings in the field of sport and performance dietetics.
• Make a substantiated choice for a specific method for assessment of nutritional intake.
• 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 & perfomance dietetics.

Inhoud vak
In this course students will obtain in depth knowledge of current issues in sport and performance dietetics.
Course topics are:
• Nutritional guidelines.
• Nutritional assessment: intake, body composition, performance.
• Interaction between nutrition and exercise.
• Sports nutrition.

• Nutritional supplements.
• Nutrition in recovery settings.
• Protein metabolism.
• Hot 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 nutritional intake (Assignment 1).
• Body composition analysis (Lab session).
• Do nutritional supplements work? Literature review on a selected supplement or food component (Assignment 2).
• Identifying knowledge gaps: prepare and present a research proposal on a hot topic or niche in the field of sport and performance dietetics. (Assignment 3)

The course consists of 5 lectures, 1 lab session, and 5 class sessions. Lectures must be prepared through study of the indicated literature and answer of the provided preparatory questions. Class sessions are used to discuss Assignments 1, 2, and 3. During the lab session, students will practise different methods of body composition analysis at the Amsterdam Nutritional Assessment Center.

Onderwijsvorm
Lectures, work groups, lab session, assignments, excursion (subject to available dates).

Toetsvorm
The exam consists of 5 parts:
• Written preliminary exam (individual; 40% of final grade).
• Assignment 1 (assessment of nutritional intake; individual).
• Assignment 2 (literature review; in small group; 30% of final grade).
• Assignment 3 (presentation of research proposal; in small group; 30% of final grade).
• Lab session: body composition analysis.

Assignment 1 and the lab session have to be fulfilled before the final grade can be assigned. Fulfillment will be assessed with "yes"/"no".
The written preliminary exam and assignments 2 and 3 have to be passed (scored at least 5.5) to pass the exam.

Literatuur
• Course manual (available on Blackboard);
• Recent articles and book chapters on sport dietetics, macronutrient metabolism, and body composition.

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). International edition.

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

This course will be taught bij Robert Memelink Msc.

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, two practicals are organized, one to experience and apply 'performance profiling' and 'mental imagery', and one to experience and apply coaching models and communication skills. After the practicals students have to prepare and submit their practical reports. 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
practicals: 2 times 3 hours

discussion meeting: 1 meeting 4 hours
There are several lectures on topics in sport psychology and two practicals. Students will produce an individual paper on a topic in sport psychology, write two practical reports 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 both the practicals and one discussion meeting is compulsory for students.

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

Literatuur
- Course manual (Available on Blackboard);
- Jones, G. (1993). The role of performance profiling in cognitive behavioral interventions in sport. The Sport Psychologist, 7, 160-172. (Available on Blackboard);
- 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 Blackboard);
- 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
lecture
Six 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

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.L.A. Leijdekkers
Examinator	drs. M.L.A. Leijdekkers
Docent(en)	drs. M.L.A. Leijdekkers
Lesmethode(n)	Werkcollege

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: vier didactische cursussen, een professionaliseringstraject, een onderwijsinnovatieproject 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 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. Voor het onderwijsinnovatieproject voeren studenten in een projectgroep een opdracht van een hbo-instelling gericht op een onderwijsvernieuwing uit. 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
• studentbegeleiding
• professionaliseringstraject
• onderwijsinnovatieproject
• 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 EUR 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 regelingen opgesteld inzake de benoembaarheidseisen 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 FBW met succes hebben afgerond wordt vrijstelling verleend voor de hbo-didactische cursus, mits zij niet langer dan vijf jaar na het afronden van de docentenopleiding met de hbo-didactische cursus beginnen. Geïnteresseerden die hun Master of Doctoraal reeds behaald hebben en niet meer ingeschreven staan als student kunnen indien er plaats is aan de opleiding deelnemen als contractstudent. De kosten hiervoor worden geschat op € 2780,- te voldoen aan het begin van de opleiding.
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 1 mei op een daarvoor bestemd formulier. Voor een volledige beschrijving van het opleidingsprogramma wordt verwezen naar het leerplan. Dit leerplan en het aanmeldingsformulier zijn te vinden op
http://www.exposz.nl/sport/docentenopleiding-fbw/

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, prof. dr. G. Kwakkel
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 normal- and abnormal motor development in children to rehabilitation after physical or neurological impairments. 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 become capable to understand the relevant issues, terms, concepts, mechanisms, and models in the restoration of mobility within the context of rehabilitation. They learn to appreciate and understand 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 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 normal and abnormal motor development and developmental disorders in fetuses, infants and young children is deepened. Lectures and tutorials provide insight into actual problems in the research and practice of perceptual-motor development, particularly in the area of health sciences. Disorders in which motor problems are either defining characteristics (i.e., cerebral palsy) or form part of a larger spectrum of difficulties (i.e., autism, ADHD) will be discussed and the main rehabilitation methods will be related to theories on development.
Being the key issue in physical rehabilitation of adults, this course subsequently concentrates on the ‘restoration of mobility’ and upper-limb 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, and multiple sclerosis. 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
15 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; 2 tutorials of 2 hrs. Attending the site visits and tutorials is compulsory. Six 2-hr meetings in which each student-pair gives a 15-minute lecture 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 lecture 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 Blackboard.

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.