CONTENTS

1 DEPARTMENT HUMAN MOVEMENT SCIENCES

1.1 GENERAL INFORMATION

The Department Human Movement Sciences provides the Master's degree programme in Human Movement Sciences and the Master's degree programme in Sport Sciences. Both Master's degree programmes are two-year programmes. English is the language of instruction.
The curricula and the constituent course units are outlined in Chapters 4 and 5.

1.2 PROFILE OF HUMAN MOVEMENT SCIENCES IN GRONINGEN

Over recent years, there has been increased public interest in health, fitness and the positive influence of physical activity. As a result movement, exercise and sport, now play an important role in daily living. This makes human movement a relevant issue of study and practice throughout the lifespan. Research within the Department Human Movement Sciences (CHMS) is concerned with understanding the nature, assessment and optimisation of human motor behaviour throughout the lifespan. The fundamental goal of the CHMS is to understand the physical and psychological processes underpinning human movement and how processes such as motor learning, development, training, ageing, impairment and recovery affect the motor system throughout the entire lifespan. This knowledge is pursued in relation to (and intends to contribute to) healthy ageing, sports performance, and individuals with disorders, in order to enhance and optimise human movement, health and quality of life.
In Groningen, human movement is not only studied in terms of muscles, joints and biomechanics, it is also seen as solving problems in an environment (not falling, not spilling your drink, walking and talking at the same time, avoiding obstacles, delivering a performance under time pressure and stress). Movement is the visible manifestation of an ongoing interaction between motor, cognitive and perceptual processes. To understand better how these processes contribute to achieving purposeful movement is one of the challenges we are faced with.
In short, Human Movement Sciences is the systematic scientific study of human movement, in which the following concepts are essential: change and recovery, flexibility and adaptation, learning, training and development, brain and behaviour. These concepts are deeply ingrained in the degree programme.
The Department Human Movement Sciences in Groningen aims to increase our understanding of human movement and to apply the results obtained to the fields of sports and health care (healthy ageing and rehabilitation).

Research Domains

In the educational programmes the research is organized in three domains (Rehabilitation and functional recovery, Motor function and cognition in healthy ageing, and Sport, learning and performance), which also guide part of the teaching, for example the final project (which incorporates the research internship) in the second year of the Master's degree programmes.

Core concepts and general principles of the research and teaching programmes are brain and behaviour, learning and development, change and recovery, and flexibility and adaptation, healthy ageing and, performance optimisation.

Five key research themes have been identified:

- Perceptual-motor mechanisms underpinning gait, balance and fall prevention
- Influence of physical activity on cognition, and physical and mental fitness
- Characteristics of performance & expertise

- Optimisation & functional recovery
- Motor learning, development & neuromuscular control of perceptual motor skills

Examples of research questions are:
- What are the perceptual-motor mechanisms underlying learning and coordination of movement?
- How is the neuromotor system organised to perform goal-directed movements?
- Which measuring instruments are most reliable in the identification of movement disorders?
- What is the relationship between cognition, sport and movement?

Related to the educational programmes the research is organised in three main lines:

Rehabilitation and Functional Recovery
Research in this domain focuses on aspects of diagnosis, adaptive technologies, treatment and assessment of children and adults with performance disabilities that hinder normal motor development and day-to-day functioning.
Topics studied within this domain include:
- children with DCD (Developmental Coordination Disorder) and adults who need to relearn motor skills after a stroke or other impairment of the cognitive/sensorimotor system
- recovery of normal skills levels after a stroke or paraplegia
- the limits of loadability and daily load bearing in children with chronic conditions such as cerebral palsy and DCD
- the development of ambulant registration techniques and objective parameters of function, activity and recovery in chronic movement disorders
- sensorimotor adaptation processes during the rehabilitation of people with an artificial arm or leg or when learning to operate an arm-drive wheelchair
- the role of visual-perceptual information during gait, running and ADL (activities of daily living) in people with and without motor disabilities
- the influence of fatigue on recovery during rehabilitation in adaptive sports
- the role of functional capacities in people with a physical disability returning to the workplace

Students can undertake research projects in research laboratories at the Department Human Movement Sciences, in the UMCG Centre for Rehabilitation and with cooperation partners in rehabilitation and health care.

Motor Function and Cognition in Healthy Ageing
This domain studies the psychological, physiological and social consequences of movement, in particular the relationship between movement, lifestyle, and the physical and mental condition and resilience of elderly people.
Topics studied within this domain include:
- effects of physical activity and inactivity on cognitive and mental processes (e.g. attention, memory)
- the relationship between movement and diseases such as dementia, stroke and Parkinson's disease
- the relationship between pain, cognition and movement
- falling in the elderly: predicting individual fall risks and developing preventive exercise programmes

Student research projects within this domain are usually conducted on-site in nursing homes and/or geriatric wards of hospitals, residential facilities for the elderly or individual homes.

Sports, Learning and Performance
This domain concerns the relationship between the physical and mental determinants of learning and achievement in recreational and professionals sports, and ways to influence these determinants.
Topics studied within this domain include:
- talent in general and in sports: what is it, how can it be recognized and what are the conditions for optimum development
- the relationship between motor, perceptual, cognitive and mental processes in individual and team sports
- What influence does physical (in)activity have on a child's motor and cognitive development?
- How can we analyse and optimize (match) performance in sports?
- What is the role of perception in expert performance?

Student research projects within this domain are conducted within professional sports organizations such as NOC*NSF, sports federations, TNO Sport and professional sports clubs.

The Department Human Movement Sciences has his own research program, titled "Smart Movements" , which is embedded in the research institute of Health research (SHARE)

1.3 GOVERNANCE STRUCTURE

The Department Human Movement Sciences provides teaching and research in the area of human movement sciences and falls under the UMCG/Faculty of Medical Sciences. The research director is Prof. K.A.P.M. Lemmink, who is also the overall head of the department. Dr Y.P.T. Kamsma acts as program director.

1.3.1 Degree programme advisory committee
The Degree programme advisory committee of Human Movement Sciences plays an important role in the programming and evaluation of the curriculum and makes recommendations concerning the teaching. The committee consists of four students, four members of the academic staff (WP) and three members of the administrative and support staff (OBP) who have an advisory capacity.
The official secretary of the advisory committee is mrs M. Abrahams.

Academic staff
Dr. E. Hartman, chair
Dr. M.S. Brink
Dr. A. Murgia
Dr. L.J. Mouton

Students
T. Tankink
M. Hafkamp
E.M. Nijmeijer
F.A. Uwland

Advisory members
C.H. Plaggenmarsch
E. Veenhoven
Drs. B.A. Dollekamp

1.3.2 Collective right of complaint

If at least five students feel that an aspect of a degree programme is not up to standards, they may lodge a written complaint with the Faculty Board, c/o the Dean of the Faculty. The Dean will usually forward the complaint to the Programme Director concerned. Before taking this step, students can first try to discuss the problem with the Programme Director, obviously without losing their right to petition the Dean.

1.3.3 Studiosi Mobilae study association

Studiosi Mobilae is the study association for students of Human Movement Sciences in Groningen. It was founded on 19 February 1985, with the aim of improving contacts between the various student cohorts and narrowing the gap between students and the department. Studiosi Mobilae has a five-member board consisting of a chair, a secretary, a treasurer, an Internal Affairs officer and an External Affairs officer. This year, within Studiosi Mobilae fifteen committees organize many enjoyable and interesting activities. These committees are: ActiviteitenCommissie (activities), AlmanakCommissie (yearbook), BenefietCommissie (benefit events), Binnenlandse Excursie Commissie (study trip in the Netherlands), Buitenlandse Excursie Commissie (study trip abroad), FeestCommissie (parties), IntroductieCommissie (introduction for new students), InternetCommissie (internet), the Master Committee (master programmes), the ReportCommissie (reports), the SportCommissie (sports), SymposiumCommissie (symposium) and WorkshopCommissie (workshops). These committees organize a wealth of activities. Annual events include the introduction camp, the foreign excursion, a symposium, the winter sports trip, study-related excursions and workshops, sports activities, the gala ball and the monthly drinks parties.
The association journal, Bewogen (Moved), is published four times a year. The annual yearbook lists all members. Studiosi Mobilae also sells textbooks at a discount.
Studiosi Mobilae also coordinates the Year Platform. There is a platform for every year in the degree programme and they contribute to the evaluation of course units. It provides an opportunity for all students to express their opinions about course units, examinations and all other aspects of the degree programme.
On Tuesdays, Wednesdays and Thursdays between 12 a.m. and 14 noon, students can meet with board members to ask questions or have a chat over a cup of coffee or tea. You do not need to make an appointment. These 'open hours' are held in the board room situated in the basement of Ant. Deusinglaan 1. For more information about Studiosi Mobilae, visit www.studiosimobilae.nl, where you will also find the telephone numbers of the board members.

Studiosi Mobilae
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9713 AV GRONINGEN
tel: 050-3616320
e-mail: bestuur@studiosimobilae.nl

1.4 ADMISSION

1.4.1 Entry requirements for the MSc programme in Human Movement Sciences and the MSc programme in Sport Sciences

To be admitted to the Master's degree programmes, students must meet various requirements (see section 2 of the Teaching and Examination Regulations).
Students who have a BSc in Human Movement Sciences awarded by a Dutch university meet the general entry requirements and can enrol in the Master's degree programme.

There are two starting dates for admission per academic year:
1 September and 1 February.

Conditional admission
Students with a Bachelor's degree in another discipline than Human Movement Sciences and those with a Bachelor's degree awarded by a foreign university may qualify for conditional admission. Conditional admission means that the student will be admitted if he or she has met the requirements set by the degree programme before the start of the programme. A written request to this end must be submitted to the Secretary of the Admissions Board of Human Movement Sciences, Ms C.H. Plaggenmarsch.

1.4.2. Admission of Minor students

Students of other degree programmes who want to follow course units from the Master's degree programme will only be admitted if there are places open in any course unit and if the student has sufficient background knowledge in the opinion of the lecturer teaching the course unit.

1.5 TEACHING AND ASSESSMENT

1.5.1 Teaching and Examination Regulations

Each degree programme has specific Teaching and Examination Regulations (OER). The OER sets out the curriculum and examination regulations of the degree programme. Topics included in the Teaching and Examination Regulations are the aim of the degree programme; entry requirements; content and extent of the programme; order, frequency and type of examinations and final assessments; marking and publication of examination and final assessment results; validity of marks; right of inspection; exemptions; and the right to supervision and support. The OER for the Master's degree programme in Human Movement Sciences and the OER for the Master's degree programme in Sport Sciences are included as appendixes in this study guide.

1.5.2 Board of Examiners

Questions about the implementation of the Teaching and Examination Regulations can be submitted to the Board of Examiners of Human Movement Sciences:
E. Veenhoven (curriculum manager)
Tel. (050) 3616060
E-mail: Examencommissie-BW@umcg.nl

1.5.3 Study delay

If you fall behind in your studies due to extraordinary circumstances, you should report this immediately to the study advisor, C.H. Plaggenmarsch, e-mail: studieadviseur-BW@umcg.nl. You will not be eligible for financial compensation provided by the University's Graduation Fund unless you report your study delay within one month. **Students are thus themselves responsible for reporting study delay in good time and to the proper authority.** You should therefore familiarize yourself with the Graduation Fund scheme. More information can be found on the University website (www.rug.nl/studievertraging) and in the Student Charter.

1.5.4 Appeals

Students who disagree with a decision taken by a University body can appeal against this decision. The procedure for curriculum matters differs from the one for registration and funding issues. For the former, students must lodge an appeal with the Board of Appeal for Examinations, for the latter with the Board of the University. The appeals procedures are set out in the Student Charter which can be consulted at www.rug.nl/studentenstatuut.

1.5.5 Examinations and final assessment

Examinations and resits
Each course unit includes one examination and one resit in each academic year. If the content of a course unit changes substantially, one additional old-style resit will be offered in the following academic year.

Registering for examinations
Students will automatically participate in an examination or resit, if they have registered for it in progress.www in good time according to the procedure set out in the Rules and Regulations of the Teaching and Examination Regulations (included in this study guide as an appendix).
The date, time and place of examinations are published on the web lecture timetables.

Examination results
The mark for an oral examination is given immediately after the end of the examination. The mark for a written examination is published as soon as possible and within ten working days of the day of examination and at least one week before the resit. The mark for a report is given within twenty working days of submission.
Results are published via ProgressWWW.

Post-mortem
Any examination may be reviewed at the initiative of the examiner or examinees.

Right of inspection
On request, students have the right to inspect their marked work and the marking standard during a period of thirty days after the results of the examination have been published.

Study progress registration
All student marks are stored in a marks registration system. Students can look up their marks on the website ProgressWWW.nl/rug.

Graduation

- Students must apply for approval of their course units via Progress no later than eight weeks before completion of the last course unit of their Master's degree programme.
- Once all approved course units have been successfully completed, the Board of Examiners will set the graduation date.
- The examination date entered on the certificate by the Board of Examiners is the date on which the Board deems the student to have passed the final assessment.
- Students who wish to postpone the date of graduation due to extra examinations must submit a written request to the board of examiners to this end within two weeks of the date of the last examination.
- There are two degree certificate ceremonies in each academic year.
- Students must sign up for a degree certificate ceremony at least 6 weeks before the planned date.
- The Board of Examiners shall determine whether or not the Master's degree certificate will be awarded an honours predicate.

Conditions

1. The mark for the Master's final graduation project must satisfy the following minimum conditions:
    - The individual parts of the graduation project may not be awarded a mark less than 7.0.
    - Cum laude: the mark for the graduation project must be at least 8.0
    - Summa cum laude: the mark for the graduation project must be at least 9.0
2. The weighted average (not rounded off) for all course units, excluding the graduation project, within the examination programme approved by the Board of Examiners is
    - greater than or equal to 8.0 for Cum laude
    - greater than or equal to 9.0 for Summa cum laude
3. No honours are awarded if the student workload of the exemptions in EC is more than half the total number of EC for the degree programme.
4. Honours may only be awarded if the examinations for the course units were taken only once.
5. Honours may only be awarded if no single course unit was awarded a mark less than 7.0.

In special cases, the Board of Examiners may deviate from the above stipulations.

1.5.6 Registering for course units

To follow lectures and/or participate in practicals, students must use Progress to register for the course unit concerned at least one week before it starts.

1.5.7 Teaching evaluation

To monitor the quality and feasibility of the degree programme, each course unit is evaluated after it has finished. At the request of the Programme Director, the Degree programme advisory committee carries out the teaching evaluation. This evaluation comprises four steps:

- Evaluation of each course unit is done digitally through a combined quantitative and qualitative questionnaire. If necessary, on request of the lecturer questions can be added.
- The Year Representation (YR) has a conversation with five (randomly designated) students based on information that is provided by them

prior to the conversation. The statistics from the digital questionnaire are also used.
- The lecturer and the YR discuss the course, transferring mutual experiences and adapting those if necessary. Afterwards, the YR finishes her report and sends it to the lecturer. The lecturer adds his (complementary) reaction, including interdisciplinary aspects and proposed adaptations.
- The results of the evaluation will be discussed in the study program committee. If there is reason to do so, the evaluation will be discussed with the Programme Director and/or the involved lecturer. Students are informed about the evaluations via the Student Portal/Nestor.

1.6 COST POLICY

The costs of books and materials for study are relatively low. In the master is €500,- usually sufficient for compulsory books, lecture notes, manuals etc.
The RUG has a policy on study costs. The policy aims to control costs so that the 'study cost' component does not exceed grant/loan budgets for Dutch students. The amount that students are required to spend on study materials will therefore not exceed the government grant. The Standard sum for 2019-2020 is € 767?. Each course phase has a cost 'ceiling' (standard sum x length of course). Sometimes it is not possible to avoid going beyond the ceiling amount. In such cases it is possible to apply to the Faculty Board for reimbursement of half the extra expenditure on the basis of receipts submitted as proof. Sometimes another arrangement may be possible.
Students can obtain information on the cost policy at: www.rug.nl/insandouts or Frequently asked questions on MyUniversity. They can also visit the University Desk or their study advisor.

1.7 EDUCATION DESK AND SECRETARIAT

The education desk is responsible for student administration and provides general information about the curriculum, the teaching, the lecture and examination timetables, how to register for course units and examinations, applying for a degree certificate, and so on. Appointments with the study advisor can be made via chplaggenmarsch.youcanbook.me.
The education desk of Human Movement Sciences is open for students from **Monday to Friday, 9-12 a.m.**

Bachelor's degree programme education desk: M. Abrahams
Tel: (050) 3616050
E-mail: Bachelor-BW@umcg.nl

Master's degree programme education desk: D. Gjaltema
Tel: (050) 3616050
E-mail: Master-BW@umcg.nl

General secretariat: W.A. Boersma
Tel: (050) 3616015
E-mail: Secretariaat-BW@umcg.nl

Visiting address: Ant. Deusinglaan 1, 9713 AV Groningen, building 3215, room 305.

1.8 NOTICES

Students are expected to consult daily the web lecture timetable, Nestor, the Student Portal and their University e-mail account.
Important information as changes to the lecture timetable, examinations and office hours are published through these media.

Take care that your contact address is up to date. You yourself are responsible for your contactability. Use your official University e-mail account, or link it to your personal account.

Students must report any changes in their address as soon as possible via Studielink.
See also www.rug.nl/insandouts

Less formal information is provided on the notice boards in the corridor of the third floor of building 3215.

1.9 STUDY ADVISOR AND DEGREE PROGRAMME MANAGER

For information about study planning, supervision and support, skills training and individual study advice and schemes, students are referred to the Human Movement Sciences study advisor:
C.H. Plaggenmarsch
Open consultation hours: Thursday 10.30-12 a.m.
Room 309, building 3215
E-mail: studieadviseur-BW@umcg.nl
Tel. (050) 3616061

For information about the degree programme, lecture timetables and regulations concerning examinations and final assessment, students can consult the curriculum manager:
E. Veenhoven
Room 313, building 3215
E-mail E.Veenhoven@umcg.nl
Tel. (050) 3616060

1.10 STAFF/LECTURERS

The staff rooms of the Department Human Movement Sciences are located at Antonius Deusinglaan 1.

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1.12 STUDENT PORTAL/NESTOR

The Student Portal/Nestor, the electronic learning environment of the University of Groningen, allows students and lecturers to exchange information and communicate with each other. Nestor will only link students to a particular course unit if they have registered for it via Progress. Important and general information about the degree programme can be found under "nice to know " or under 'announcements' in General Information Masters HMS and Sport Sciences. The Nestor home page lists various frequently used links. The internet address of Nestor is https://nestor.rug.nl.

1.13 COMPUTER FACILITIES AND COMPUTER ROOMS

All students registered with Human Movement Sciences have a student workstation. The student workstation is a Windows XP environment that can, in principle, be accessed from all computers in the reading rooms of all University of Groningen faculties. Use your student number to log on to any PC with this environment. Once logged on, your home drive (X:) will be available and you will see your personal desktop. If you have any questions on using the computer network, contact the IT helpdesk next to the Combizaal on the third floor of building 3214.

Students can use the PC's in the FMW PC-rooms on the third floor of building 3214, on the first floor of building 3215 and on the first and second floors of building 3219. Students should note that the IT facilities of the University of Groningen are intended for communication among students and between students and the Faculty. Students are expected to use these facilities for academic purposes only, which means that they may not be used for information about or the promotion of individuals, organizations or political parties not related to the Faculty. Other communication to and from students will occur only at their explicit request. General messages from one student to all fellow students should be placed on the relevant discussion forum in Nestor. Please consult the head of the Institute of Medical Education (R. Bezema) if you have questions about these rules.

2. MASTER'S DEGREE PROGRAMME in HUMAN MOVEMENT SCIENCES

2.1 LEARNING OUTCOMES

The general aims of the Master's degree programme and a specification of these aims in terms of competences and specific learning outcomes are set out in the Teaching and Examination Regulations (OER), which are included in this study guide as an appendix. Below you will find a general description of the profile of an MSc graduate in Human Movement Sciences, the learning outcomes and the teaching programme.

2.1.1 Profile of an MSc graduate in Human Movement Sciences

Graduates of the Groningen Master's degree programme in Human Movement Sciences are self-reliant, critical scientists with a broad vision on human movement sciences who also have specialized expertise in a socially relevant domain of their own choosing. Graduates are able to apply their scientific knowledge, understanding and skills to existing and new situations and make personal, well-considered choices when doing so. They are expected to investigate the problems they are asked to solve from a broad scientific and social perspective, conduct independent research within a specific domain in consultation with stakeholders and to adequately report their work both orally and in writing. They are also able to present their findings in national and international forums in the form of scientific publications in Dutch and English. MSc graduates in HMS have a thorough individual scientific grounding and profile and thus have excellent perspectives for both scientific and non-scientific careers.

Graduates of the two-year Master's degree programme in Human Movement Sciences in Groningen are thoroughly grounded in the fundamental aspects of the scientific study of human movement, including in-depth knowledge and understanding of the relationship between perceptual, cognitive and motor processes and the factors that may impair this relationship. This expertise is specifically deepened and applied in one of the four scientifically and socially relevant research domains. MSc graduates of Human Movement Sciences in Groningen do not have an immediately recognizable professional profile as, for example, physicians or lawyers do, but are academically trained specialists in the field of human movement who – depending on the profile they have chosen – will be able to work on one or several domains of human movement sciences.

2.2 STRUCTURE OF THE MASTER'S DEGREE PROGRAMME IN HUMAN MOVEMENT SCIENCES

The Master's degree programme takes two years and is concluded with a final assessment.
The programme consists of 120 EC, with each year comprising 60 EC. Each year has two semesters of twenty weeks, with a student workload of 30 EC each. The following rules are used to calculate student workload:
– students have 40 hours study time per week
– one EC is equivalent to 28 hours of study
– the average student can study 6 pages of literature per hour
– all elements of the degree programme (lectures, practicals, independent study) are awarded a specific number of EC

In the Teaching and Examination Regulations (section 1.2.L), a practical is defined as a practical and scientific exercise taking one of the following forms:
– conducting a research assignment and completing an internship and reporting on it
– writing a paper, for example a thesis or article; giving an oral presentation
– participation in another activity designed to teach certain skills

The following test formats may be used:
– written paper
– oral presentation
– written and oral examination

The focus of the two-year Master's degree programme is on deepening the students' knowledge and skills. They must learn to use their knowledge – for the most part still abstract and theoretical – to gain a better understanding of scientific and societal problems. Their methodological and statistical knowledge and skills are indispensable in this respect.

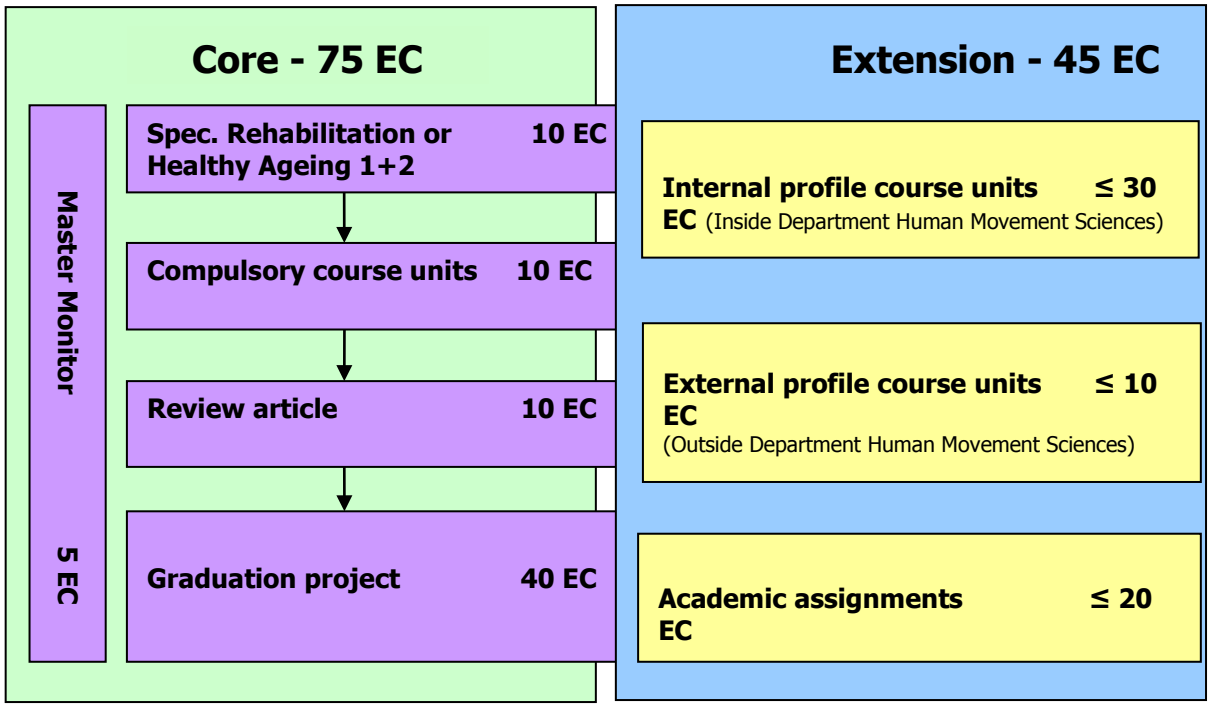
During block 1 of the first year of the Master's degree programme, students opt for one of the following specializations:
- motor recovery and rehabilitation
- movement, ageing and health

In addition, they will follow course units of their choice (up to 30 EC) in blocks 1, 2, 3 and 4 within the framework of their profile. This will enable them to deepen their understanding of human movement sciences and will support the specialization they have chosen. The course units 'Advanced Statistics' and 'Philosophy of Science and Ethics' are compulsory.

The second year of the Master's degree programme revolves around the final project, which should result in the writing of an article in English.
As much as possible, students will be given the opportunity to focus their research on the field of their choice. This means that a student who has chosen the domain of 'motor recovery and rehabilitation', for example, will – as far as possible – conduct patient-related or another type of research in a rehabilitation centre or a rehabilitation ward of a university medical centre. There are plenty of opportunities to do practice-related research in the other graduation domain too. In this respect, it is highly relevant that the Master's degree programme comprises two years since this will provide sufficient time to do substantial research (under supervision) and to produce results that are useful to workers in the field.
The final project gives students ample freedom to choose and develop their own interests within one of the research domains and conclude their project with the writing of an article in English.

Master' students can use up to 10 EC to further develop their professional and personal skills by following additional external profile course units (outside the Department Human Movement Sciences). Another option for master students is the development and execution of an 'academic assignment', in which a student works as a human movement scientist within a professional context to create a product.
During their Master's degree programme, students keep a Master Monitor, an electronic dossier.

Structure Master's degree programme Human Movement Sciences



This figure applies to students who begin their Master's degree programme from September 2018

Core (left panel): elements in recommended order. Graduation project usually starts in the 2nd year, entry condition is 40 EC from the 1st year (including review and spec. part 1 and 2).
Extension (right panel): elements in order of students preference across entire duration of the study.

First year Human Movement Sciences (60 EC)

<table>
<tr><th>Block 1</th><th>Block 2</th><th>Block 3</th><th>Block 4</th></tr>
<tr><td>Specialization part 1

Choose one from:
○ Rehabilitation and functional recovery
○ Motor function and cognition in healthy ageing

Start Master Monitor [1]</td><td>Specialization part 2

○ Rehabilitation and functional recovery
○ Motor function and cognition in healthy ageing</td><td>Review article</td><td>Review article</td></tr>
<tr><td>Profile course unit 1+2
Choose two from:
○ Motor control
○ Neuromechanics
○ Course unit from another specialization (also MSc Sport Sciences)[2]
○ External MSc course unit

○ Introduction to teaching (mentor system)[3]</td><td>Profile course unit 3
Choose one from:
o Physiology of training and exercise
○ Perception and action
○ External MSc course unit

Compulsory:
Advanced statistics</td><td>Profile course unit 4&5
Choose two from:
○ Clinical Mobility Lab
○ Sport & Talent
○ Structural Equation Modelling
○ Introduction to dynamical systems
○ External MSc course unit</td><td>Compulsory:
Philosophy of science and ethics

Profile course unit 6
○ Big data in Sport Sciences and Human Movement Sciences
○ Signal acquisition and analysis
○ External MSc course unit</td></tr>
</table>

Second year Human Movement Sciences (60 EC)

Graduation project (40 EC) Academic assignments and/or Internal/External course units

This tables apply to students who begin their Master's degree programme from September 2019

[1] Master Monitor (5 EC) runs over the two master years
[2] Choosing another specialization course unit is only possible during the first block
[3] Introduction to teaching / mentor system (5 EC) runs over all four blocks in the first year

2.3 COURSE UNIT CODES

M1

Specialization Rehabilitation and Functional Recovery

BWM150	Practice & patient-oriented research of functional recovery
BWM151	Disorders in motor control and current theories about rehabilitation processes
BWM152	Literature review Rehabilitation and Functional Recovery

Specialization Motor function and cognition in healthy ageing

BWM160	Mechanisms of motor function and cognition in ageing
BWM161	Interventions targeting motor function and cognition in ageing
BWM162	Literature review Motor function and cognition in healthy ageing

Sport, Learning and performance

BWM172	Literature review Sport, Learning and performance
BWM173	Development, perception and action in sports and exercise
BWM174	Talent and performance optimization in sports

BWM133	Neuromechanics
BWM134	Physiology of training and exercise
BWM135	Perception and action
BWM136	Advanced statistics
BWM137	Motor control
BWM139	Sport and Talent
BWM142	Introduction to dynamical systems
BWM143	Philosophy of science and ethics
BWM144	Structural Equation Modelling (SEM)
BWM145	Signal acquisition and analysis
BWM146	Big Data in Sport Sciences and Human Movement Sciences
BWM148	Clinical Mobility Lab

BWMAA	Academic Assignment
BWMMO	Master Monitor
BWVKOO	Introduction to teaching / Mentor system

M2

Master Graduation Project
BWM205203
BWM206
BWM207
BWM208

2.4 STRUCTURE OF ACADEMIC YEAR 20198-202019

Academic year 2019-2020 is divided into two semesters.
Semester I: 02-09-2019 to 01-02-2020
Semester II: 03-02-2020 to 31-08-2020
Each semester comprises 30 EC. There are two lecture-free weeks in the first semester: 24-12-2019 to 06-01-2020. In the second semester, teaching activities continue up to and including 3 July.

Holidays

23-12-2019 to 06-01-2020	Christmas break
10-04-2020	Good Friday
13-04-2020	Easter Monday
21-05-2020 and 22-05-2020	Ascension Thursday (+ the Friday following it)
1-06-2020	Whit Monday

3. MASTER'S DEGREE PROGRAMME in SPORT SCIENCES

3.1 LEARNING OUTCOMES

The general aims of the Master's degree programme and a specification of these aims in terms of competences and specific learning outcomes are set out in the Teaching and Examination Regulations (OER), which are included in this study guide as an appendix. Below you will find a general description of the profile of an MSc graduate in Sport Sciences, the learning outcomes and the teaching programme.

3.1.1 Profile of an MSc graduate in Sport Sciences

Graduates of the Groningen Master's degree programme in Sport Sciences are self-reliant, critical scientists with a broad vision on human movement sciences who also have specialized expertise in a socially relevant sport domain of their own choosing. Graduates are able to apply their scientific knowledge, understanding and skills to existing and new situations and make personal, well-considered choices when doing so. They are expected to investigate the problems they are asked to solve from a broad scientific and social perspective, conduct independent research within a specific area in consultation with stakeholders and to adequately report their work both orally and in writing. They are also able to present their findings in national and international forums in the form of scientific publications in English. MSc graduates in Sport Sciences have a thorough individual scientific grounding and profile and thus have excellent perspectives for both scientific and non-scientific careers.

Graduates of the two-year Master's degree programme in Sport Sciences in Groningen are thoroughly grounded in the fundamental aspects of the scientific study of sport and human movement, including in-depth knowledge and understanding of the relationship between perceptual, cognitive and motor processes and the factors that may impair this relationship. This expertise is specifically deepened and applied in the scientifically and socially relevant research domains of sport. MSc graduates of Sport Sciences in Groningen do not have an immediately recognizable professional profile as, for example, physicians or lawyers do, but are academically trained specialists in the field of sport who – depending on their profile – will be able to work on one or several domains of Sport and Sport Sciences.

3.2 STRUCTURE OF THE MASTER'S DEGREE PROGRAMME IN SPORT SCIENCES

The Master's degree programme takes two years and is concluded with a final assessment.
The programme consists of 120 EC, with each year comprising 60 EC. Each year has two semesters of twenty weeks, with a student workload of 30 EC each. The following rules are used to calculate student workload:
– students have 40 hours study time per week
– one EC is equivalent to 28 hours of study
– the average student can study 6 pages of literature per hour
– all elements of the degree programme (lectures, practicals, independent study) are awarded a specific number of EC

In the Teaching and Examination Regulations (section 1.2.L), a practical is defined as a practical and scientific exercise taking one of the following forms:
– conducting a research assignment and completing an internship and reporting on it
– writing a paper, for example a thesis or article; giving an oral presentation

– participation in another activity designed to teach certain skills

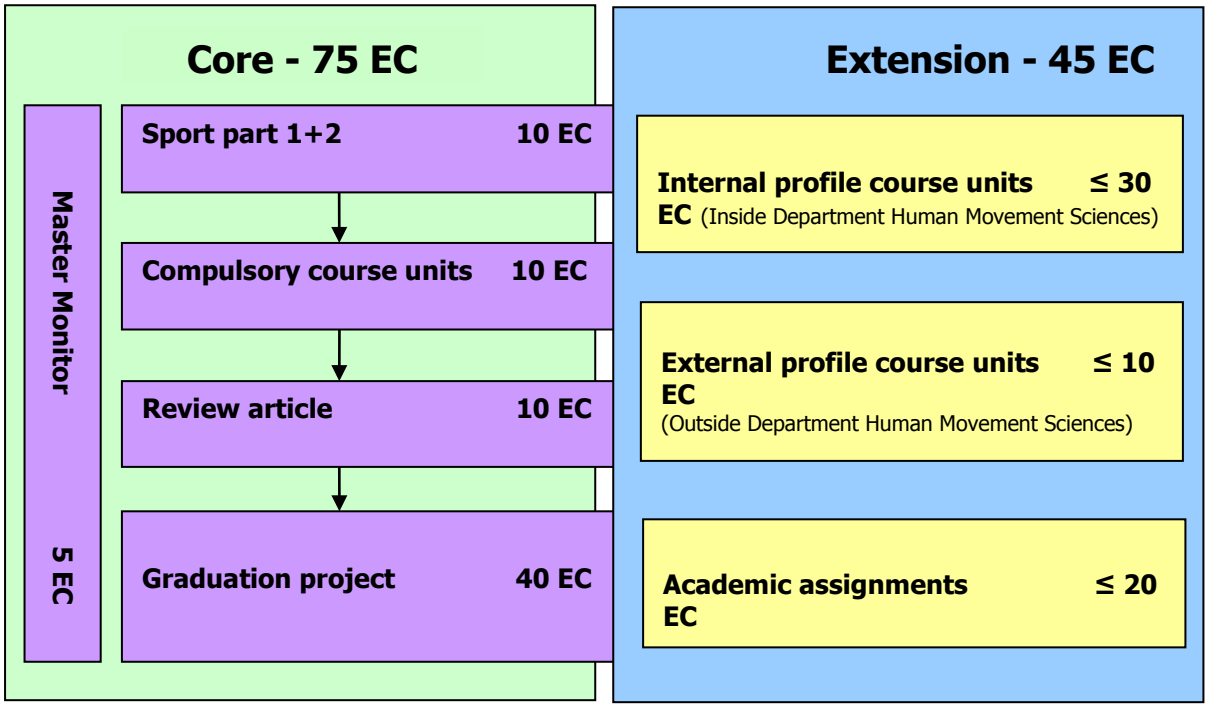
The following test formats may be used:
– written paper
– oral presentation
– written and oral examination

The focus of the two-year Master's degree programme is on deepening the students' knowledge and skills. They must learn to use their knowledge to gain a better understanding of scientific and societal problems. Their methodological and statistical knowledge and skills are indispensable in this respect.
During the programme, students follow the sport, learning and performance course units and the literature review article on a sport related topic.
In addition, they will follow course units of their choice (up to 30 EC)in blocks 1, 2, 3 and 4 within the framework of their profile. This will enable them to deepen and support their understanding of sport sciences. The course units 'Advanced Statistics' and 'Philosophy of Science and Ethics' are compulsory.

The second year of the Master's degree programme revolves around the final project, which should result in the writing of an article in English.
It is highly relevant that the Master's degree programme comprises two years since this will provide sufficient time to do substantial research (under supervision) and to produce results that are useful to workers in the field.

Master' students can use up to 10 EC to further develop their professional and personal skills by following additional external course units (outside the Centre of Human Movement Sciences). Another option for master students is the development and execution of an 'academic assignment', in which a student works as a human movement scientist within a professional context to create a product.
During their Master's degree programme, students keep a Master Monitor, an electronic dossier.

Structure Master's degree programme Sport Sciences



This figure applies to students who begin their Master's degree programme from September 2018

Core (left panel): elements in recommended order. Graduation project usually starts in the 2nd year, entry condition is 40 EC from the 1st year (including review and sport part 1 and 2).
Extension (right panel): elements in order of students preference across entire duration of the study.

First year Sport Sciences (60 EC)

<table>
<tr><th>Block 1</th><th>Block 2</th><th>Block 3</th><th>Block 4</th></tr>
<tr><td>Sport part 1

Start Master Monitor[1]</td><td>Sport part 2</td><td>Review article</td><td>Review article</td></tr>
<tr><td rowspan="2">Profile course unit 1+2
Choose two from:
o Motor Control
o Neuromechanics
o Specialization part 1 of MSc Human Movement Sciences[2]
o External MSc course unit

o Introduction to teaching (mentor system)[3]</td><td>Profile course unit 3
Choose one from:
o Physiology of training and exercise
o Perception and action
o External MSc course unit</td><td rowspan="2">Profile course unit 4 + 5
Choose two from:
o Clinical Mobility Lab
o Sport & Talent
o Structural Equation Modelling
o Introduction to dynamical systems
o External MSc course unit</td><td>Compulsory:
Philosophy of science and ethics</td></tr>
<tr><td>Compulsory:
Advanced statistics</td><td>Profile course unit 6
o Big data in Sport Sciences and Human Movement Sciences
o Signal acquisition and analysis
o External MSc course unit</td></tr>
</table>

Second year Sport Sciences (60 EC)

Graduation project (40 EC) Academic assignments and/or Internal/External course units

This tables apply to students who begin their Master's degree programme from September 2019

[1] Master Monitor (5 EC) runs over the two master years
[2] Choosing a specialization course unit of MSc Human Movement Sciences is only possible during the first block
[3] Introduction to teaching / mentor system (5 EC) runs over all four blocks in the first year

3.3 COURSE UNIT CODES

M1

Sport, Learning and performance

BWM172	Literature review Sport, Learning and performance
BWM173	Development, perception and action in sports and exercise
BWM174	Talent and performance optimization in sports

Specialization Rehabilitation and Functional Recovery

BWM150	Rehabilitation: Practice & patient-oriented research of functional recovery
BWM151	Disorders in motor control and current theories about rehabilitation processes
BWM152	Literature review Rehabilitation and Functional Recovery

Specialization Motor function and cognition in healthy ageing

BWM160	Mechanisms of motor function and cognition in ageing
BWM161	Interventions targeting motor function and cognition in ageing
BWM162	Literature review Motor function and cognition in healthy ageing

BWM133	Neuromechanics
BWM134	Physiology of training and exercise
BWM135	Perception and action
BWM136	Advanced statistics
BWM137	Motor control
BWM139	Sport and Talent
BWM142	Introduction to dynamical systems
BWM143	Philosophy of science and ethics
BWM144	Structural Equation Modelling (SEM)
BWM145	Signal acquisition and analysis
BWM146	Big Data in Sport Sciences and Human Movement Sciences
BWM148	Clinical Mobility Lab

BWMAA	Academic Assignment
BWMMO	Master Monitor
BWVKOO	Introduction to teaching / Mentor system

M2

Master graduation project

BWM205	Research internship
BWM206	Scientific article
BWM207	Forum
BWM208	Poster presentation

3.4 STRUCTURE OF ACADEMIC YEAR 2019-2020

Academic year 2019-2020 is divided into two semesters.
Semester I: 02-09-2019 to 31-01-2020
Semester II: 03-02-2020 to 31-08-2020
Each semester comprises 30 EC. There are two lecture-free weeks in the first semester: 23-12-2019 to 06-01-2020. In the second semester, teaching activities continue up to and including 5 July.

Holidays

23-12-2019 to 06-01-2020	Christmas break
10-04-2020	Good Friday
13-04-2020	Easter Monday
21-05-2020 and 22-05-2020	Ascension Thursday (+ the Friday following it)
1-06-2020	Whit Monday

4. COURSE UNITS MASTER PROGRAMMES

Specialization Rehabilitation & functional recovery

coordinator Dr. M.T. Levinglecturer(s) Dr R.M. Bongers, , Dr H.G. van Keeken, Dr L.J. Mouton, Prof. E. Otten, Dr A.R. den Otter, Dr M.M. Schoemaker, Dr R.J.K. Vegter, Dr. M.T. Leving, S. Weiland

description The specialization Rehabilitation & functional recovery comprises of three components:

- Rehabilitation & functional recovery: practice & patient-oriented research (BWM150)
- Disorders in motor control and current theories about rehabilitation processes (BWM151)
- Literature review Rehabilitation & functional recovery (BWM152)

code **BWM150**

name **Rehabilitation & Functional Recovery: Practice & patient-oriented research**

semester 1
credits (ECTS) 5
contact hours Lectures/tutorials/practicals (20), visits to rehabilitation centers (16)
coordinator Dr. M.T. Leving
lecturer(s) Dr. M.T. Leving a.o.
objective

- Students acquire knowledge, understanding of and develop affinity with the rehabilitation care practice and its patient-oriented research
- Students learn in group assignments (mini-review & poster) to analyse and present a patient-oriented research problem.
- Students develop a perspective on their personal role as a human movement scientist in that context
- Students begin to write a first start of a master plan for their individual study program, planning and for their academic and/or professional future role

connection This is an introduction into the field of rehabilitation, practice and research, and into the logical role that is there for human movement sciences, both from a theoretical perspective as well as from a practical one. The course introduces into the specialization Rehabilitation & Functional Recovery and into the master program as such. The course is part of the writing and professional skills cluster as it aims to start the learning of English scientific writing and presentation skills in the context of rehabilitation research. It gives a first boost to the master plan and gives an overview of opportunities for the review article, academic assignments and the 2nd year Master research project.

description The course provides two interlinked streams of academic information:

1. Staff members from the specialization 'Rehabilitation' of the Department Human Movement Sciences, will present their personal scientific perspective on a number of current rehabilitation issues and human movement oriented rehabilitation research and is combined with a lab tour. Theoretical as well as

conceptual frameworks will be highlighted in the context of human movement and rehabilitation sciences and practice.

2. A series of presentations at the Department Rehabilitation (CfR) in Beatrixoord and Rehabilitation Friesland (Beetsterzwaag) is offered by clinical rehabilitation professionals and focusses on current rehabilitation practice, research developments and theory around different typical patient groups and/or interventions (diagnosis, prognosis, treatment indication, treatment protocol, evaluation etc.).

Underlying scientific questions and themes (as well as potential topics for literature review, academic assignment or master project) will be discussed, as well as the rehabilitation practice and the role of the human movement scientist in this context. Theory and practice of scientific patient-oriented research will be exemplified, studied and discussed through the group assignment and consequent mini review and poster presentations.

assessment

- Group assignments leading to a mini-review on basis of one of the lectures and accompanying literature
- Group assignment leading to a poster presentation on basis of one of the lectures and accompanying literature
- Students will perform two peer reviews of presented mini-reviews, which contribute to the actual grading there-off
- In two final mini-symposium sessions students will present the results of their work on the mini-review and poster, which will be discussed accordingly

literature: Articles for each individual lecture as well as the PowerPoint's will be reading material and instrumental to the mini-review and poster assignments.

special details

- Compulsory attendance of lectures and meetings
- A wheelchair basketball session is offered; attendance is no obligation
- Maximum number of participants: If the course is chosen as a profile course there may be a limit to the number of participants. Admission will then be determined through random selection.

code: **BWM151**

name: **Disorders in motor control and current theories about rehabilitation processes**

semester: 1
credits (ECTS): 5
contact hours: Introduction (1), tutorials (22)
coordinator: Dr M.M. Schoemaker
lecturer(s): Dr M.M. Schoemaker a.o.
objective: Students acquire knowledge about how current theories about motor control in adults and children with motor disorders influence research, and how the results of research lead to knowledge about possible underlying mechanisms of motor disorders, and how this research informs intervention in clinical practice.

	Students learn to communicate the content of scientific papers, to read scientific papers in a critical way, and to present their viewpoint in discussions about scientific papers.
connection	This course is a sequel to Practice & patient-oriented research of functional recovery (BWM150)
description	Topics: - mechanisms underlying disorders in fine motor control and disorders in gait and balance in children with motor disorders (i.e. DCD, CP) and in patients with central and peripheral motor disorders (i.e. Parkinson, CVA, amputees, spinal cord injuries) - comparison of intervention methods for these disorders. - implications for treatment in these clinical groups.
assessment	Written exam (open book)
literature	Course reader
special details	- Students are expected to prepare and present a PowerPoint presentation about one of the topics that will be addressed during the course. After the presentation, the presented theories and results will be discussed, and students are expected to participate in a lively way in this discussion. - Compulsory attendance: 100% - Maximum number of participants: 30 Students who follow the specialization Rehabilitation as their primary specialization are first admitted to the course. If the course is chosen as a profile course there may be a limit to the number of participants. Admission will then be determined through random selection.

code	**BWM152**
name	**Literature review Rehabilitation & Functional Recovery**
semester	2
credits (ECTS)	10
coordinator	Dr. M.T. Leving
lecturer(s)	Dr R.M. Bongers, , Dr H.G. van Keeken, Dr L.J. Mouton, Prof. dr. E. Otten, Dr A.R. den Otter, Dr M.M. Schoemaker, Dr. R.J.K. Vegter, Dr. M.T. Leving
objective	The student acquires and demonstrates knowledge, insight and overview with regard to a small section of the international state of the art of a specific domain of human movement sciences. The student learns to critically read and analyse scientific literature and produce a scientific manuscript accordingly.
connection	The literature review is connected to the specialization courses in which students are introduced to various research themes. The literature review may prepare for the Master's research project.
description	The writing of a review article on a subject that is related to current research themes within the specialization Rehabilitation and Functional Recovery.
literature	Scientific articles, to be collected by the student him- or herself. Costs depend on the chosen research subject (and availability of the articles).

Specialization Motor function and cognition in healthy ageing

coördinator	Prof. T. Hortobágyi
lecturers	Dr S. Caljouw, Dr M.J.G. van Heuvelen, Prof. T. Hortobágyi, Dr Y.P.T. Kamsma, Dr C.J.C. Lamoth, Dr A. Murgia.
description	The specialization Motor function and cognition in healthy ageing comprises of three components: - Mechanisms of motor function and cognition in ageing (BWM160) - Interventions targeting motor function and cognition in ageing (BWM161) - Literature review Motor function and cognition in healthy ageing (BWM162)

code **BWM160**

name	**Mechanisms of motor function and cognition in ageing**
semester	1
credits (ECTS)	5
contact hours	Lectures and tutorials (24)
coordinator	Prof. T. Hortobágyi
lecturers	Dr S. Caljouw, Dr M.J.G. van Heuvelen, Prof. T. Hortobágyi, Dr Y.P.T. Kamsma, Dr C.J.C. Lamoth, Dr A. Murgia.
objective	Students will acquire knowledge and an understanding of the (neuro)physiological and biomechanical processes of ageing, learn about the influence of ageing and ageing-related diseases on sensorimotor functions, cognition, and its effects on everyday life.
connection	The course has a strong interdisciplinary approach and therefore it will integrate information from (neuro)physiology, (neuro)psychology, biomechanics and neurology. Insights into the ageing process gained from this course will provide the basis for the design and evaluation of interventions to reduce the deleterious effects of ageing, addressed in the next specialization course 'Interventions targeting motor function and cognition in ageing' (BWM161).
description	The general introduction will describe the causes of ageing and the physiological processes involved in the ageing motor system, cognition, and daily function. The course will also discuss the interactions between perception and action and coordination of movement dynamics in the context of ageing. Furthermore, the course will review the influence of ageing in conjunction with various disorders, dementia, and Parkinson's disease, with a focus on the interaction between disorder characteristics and the normal ageing process.
assessment	Written exam with essay questions
literature	Course reader
special details	- Compulsory attendance: 100% - Maximum number of participants: If the course is chosen as a profile course there may be a limit to the number of participants. Admission will then be determined through random selection.

code	**BWM161**
name	**Interventions targeting motor function and cognition in ageing**
semester	1
credits (ECTS)	5
contact hours	Lectures and tutorials (24)
coordinator	Prof. T. Hortobágyi
lecturers	Dr S. Caljouw, Dr M.J.G. van Heuvelen, Prof. T. Hortobágyi, Dr Y.P.T. Kamsma, Dr C.J.C. Lamoth, Dr A. Murgia.
objective	Students will acquire specialist knowledge and an understanding of the general principles and specific applications of movement and exercise interventions in ageing.
connection	The course is a logical follow-up of the previous specialization course 'Mechanisms of motor function and cognition in ageing' (BWM160). Together they provide themes for the literature review that the student will write in the following phase of study.
description	This course focuses on interventions designed to preserve somatic, motor, cognitive and daily function in healthy old adults and on interventions that improve and/or recover these functions in elderly individuals who suffer from chronic somatic disorders (e.g. sarcopenia) or degenerative diseases of the central nervous system (e.g., dementia or Parkinson's disease), and in old adults who have experienced a fall. Lectures will focus on the theoretical basis of movement and rehabilitation programs. Interventions will include sports-related programs to improve physical and cognitive fitness and neurorehabilitation interventions to treat specific aspects of a disorder. In the context of neurorehabilitation of motor function and cognition, the course will address issues such as the plasticity of the central nervous system and related concepts, including neurogenesis, synaptogenesis and angiogenesis, as well as compensatory processes for disturbed motor and cognitive functions.
assessment	Written exam with essay questions. Students will also write, present, and defend a research proposal as a part of the exam.
literature	Course reader
special details	- Compulsory attendance: 100% - maximum number of participants: If the course is chosen as a profile course there may be a limit to the number of participants. Admission will then be determined through random selection.

code **BWM162**

name **Literature review Motor function and cognition in healthy ageing**
semester 2
credits (ECTS) 10
coordinator Prof. T. Hortobágyi
lecturers Dr S. Caljouw, Dr M.J.G. van Heuvelen, Prof. T. Hortobágyi, Dr Y.P.T. Kamsma, Dr C.J.C. Lamoth, Dr A. Murgia.
objective The student acquires and demonstrates knowledge, insight and overview with regard to the international state of the art of a specific domain of human movement sciences. The student learns to critically read and analyse scientific literature and produce a scientific paper.
connection The literature review is connected to the specialization courses in which students are introduced to various research themes. The literature review generally prepares for the Master's research project.
description The writing of a review article on a subject that is related to current research themes within the specialization Motor function and cognition in healthy ageing.
literature Scientific articles, to be collected by the student him- or herself. Costs depend on the chosen research subject (and availability of the articles).

Sport, Learning and performance

coordinator Prof. K.A.P.M. Lemmink
lecturers Dr M. Brink, Dr M. Elferink-Gemser, Dr E. Hartman, Prof. K.A.P.M. Lemmink, Dr H.J.de Poel, Dr J. Smith, Dr R.G. Withagen and Dr F.T.J.M. Zaal
description Sport, learning and performance comprises of three components:
- Development, perception and action in sports and exercise (BWM173)
- Talent and performance optimization in sports (BMW174)
- Literature review (BWM172)

code **BWM173**

name **Development, perception and action in sports and exercise**
semester 1
credits (ECTS) 5
contact hours Lectures, discussion groups, and tutorials (24)
coordinator Dr. E. Hartman
lecturers Dr. E. Hartman, Dr. H.J. de Poel, Dr. J. Smith, Dr. R.G. Withagen, Dr. F.T.J.M. Zaal
objective 1) To acquire theoretical knowledge on development, perception and action within sport and exercise sciences.
2) To specialize within the research topics in this domain.
3) To develop academic skills: writing and presenting in English.

connection	Together with the course 'Talent and performance optimization in sports' (BWM174), this course covers the research topics of sports research at the CHMS. These two courses plus guest lectures on on-going projects within Sport sciences, and 'midterm presentations second year' (in which students present their master graduation projects) will orient students on their literature review, master graduation project, and on the job market.
description	The course starts with two introductory lectures. After that, students will in tutorials discuss research articles that form the basis for a writing assignment (assignment 1) and an oral presentation (assignment 2). Topics that will be covered are 1) Child development in sports and exercise and 2) Perception and action in motor and sport-specific skills. Students specialize in one of the two topics. Per research topic, four sessions will take place in order to supervise the students in the process of preparing for the presentation and the writing assignment. The presentations will be in a forum format where students will be involved in the discussion. In addition, a site-visit will be scheduled to orient students on the job market. Active attendance is graded during each class.
assessment	The assessment consists of three parts: 1) One writing assignment which is related to either the topic 'Child development in sports and exercise' or the topic 'Perception and action in motor and sport-specific skills' 2) One oral presentation based on a scientific paper that is related to the written assignment; 3) Active attendance during classes. Final grade is based on the average of the written assignment, the presentation, and active attendance.
literature	Scientific papers/book chapters (to be announced on NESTOR).
special details	Maximum number of participants: If the course is chosen as a profile course there may be a limit to the number of participants. Admission will then be determined through selection on the basis of letters of motivation.

code	**BWM174**
name	**Talent and performance optimization in sports**
semester	1
credits (ECTS)	5
contact hours	Lectures, tutorials, discussion groups, site-visit, and mid-term presentations (26)
coordinator	Dr. M.T. Elferink-Gemser
lecturers	Prof. dr. K.A.P.M. Lemmink, Dr. M.S. Brink, Dr. M. Kempe, Dr. M.T. Elferink-Gemser, Dr. A. Benjaminse
objectives	1) To acquire theoretical knowledge on talent and performance optimization in sports. 2) To specialize within the research topics in this domain. 3) To develop academic skills: writing and presenting in English. 4) To orient on the job market as well as on-going projects within sport sciences.

connection	This course covers two of four research topics of sports research at the CHMS. The other 2 research topics are covered by the course 'Development, perception and action in sports and exercise' (BWM173). Besides, it prepares students to choose a topic for their literature review and master graduation project in Sport sciences.
description	The course starts with one lecture in which the organisation of the course is explained, followed by two lectures in which the topics are introduced. After that, students will in tutorials and discussion groups discuss research articles that form the basis for the writing assignment (assignment 1) and a poster presentation (assignment 2). Topics that will be covered are 1) talent in sports and 2) performance optimization in sports. Students specialize in one of the two topics. Per research topic, three sessions will take place in order to supervise the students in the process of preparing for the poster presentation and the writing assignment. To orient students on the job market as well as on the on-going projects within sport sciences, in the master midterm presentations second year students will present their master graduation projects. In addition, site-visits and guest lectures will be scheduled. Active attendance is graded during each class.
assessment	The assessment consists of three parts: 1) A writing assignment which is related to either the topic 'talent in sports' or to 'performance optimization in sports'. 2) A poster presentation based on a scientific paper that is related to the writing assignment. 3) Active attendance during classes Final grade needs to be at least 5.5 to pass and is based on the writing assignment, the poster presentation, and active attendance. The grades on the writing assignment and the poster presentation need to be at least 5.5.
literature	Scientific papers/book chapters (to be announced on NESTOR).
special details	Maximum number of participants: If the course is chosen as a profile course by students from another master than the master Sport Sciences there may be a limit to the number of participants. Admission will then be determined through selection on the basis of letters of motivation.

code	**BWM172**
name	**Literature review Sport, Learning and performance**
semester	2
credits (ECTS)	10
coordinator	Dr. M.S. Brink
lecturers	Dr. M. Brink, Dr. M. Elferink-Gemser, Dr. E. Hartman, , Dr. M. Kempe, Prof. dr. K.A.P.M. Lemmink, Dr. H.J.de Poel, Dr. J. Smith, Dr. R.G. Withagen and Dr. F.T.J.M. Zaal
objective	The student acquires and demonstrates knowledge, insight and overview with regard to the international state of the art of a specific domain of human movement sciences. The student learns to critically read and analyse scientific literature and produce a scientific paper.

connection	The literature review is connected to the specialization courses in which students are introduced to various research themes. The literature review generally prepares for the Master's research project.
description	The writing of a review article on a subject that is related to current research themes within the master Sport Sciences.
literature	Scientific articles, to be collected by the student him- or herself. Costs depend on the chosen research subject (and availability of the articles).

code	**BWM133**
name	**Neuromechanics**
semester	1
credits (ECTS)	5
contact hours	Lectures (28), tutorials (14)
coordinator	Prof. dr. E. Otten
lecturer(s)	Prof. dr. E. Otten
objective	Neuromechanics as a course is aimed at the advanced neurophysiology of the neural system, the sensory system, and the physiology of skeletal muscles. The integration of all the parts into a working control system is highlighted with control theory. The dynamics of multi-joint systems forms a large part of the course and both 2D and 3D problems and examples are worked out. The objective of the course is to understand the properties of neurons, and sensors and see their reflection in the operation of the whole system. Since 3D multi-joint dynamics is so complex, both the mathematics and the translation of problems into matrix algebra structures is explained and should be mastered.
connection	This course builds on the programming abilities of the students in MatLab they have already acquired. Also matrix algebra (as used in statistics) and trigonometry (as used in Introduction NeuroMechanics) is worked out extensively. In terms of physiology the course forms a link with the neurophysiology and neuromechanics courses in the bachelor phase of Humen Movement Sciences. Also neuro-anatomy is an essential basis. The course is a preparation for the translation of neuromechanical problems in sports, rehabilitation and healthy aging into mathematical structures and software blocks than help to understand the control of the human body in complex biomechanical situations.
description	- NeuroPhysiology, (Neurons, Mechano Receptors) - Muscle Physiology (Contractile Machinery, Muscle Architecture, Muscle Activation, Fatigue) - Control Theory (Stability, Control with Internal Models, Control of Complex Systems) - Multi-Joint Kinematics and Dynamics (2D Kinematics, 3D Kinematics, 2D Dynamics, 3D Dynamics, Dynamics of a 7 segment 3D human body model) - Vector Algebra and Matrix Algebra (3D rotations, Solving sets of equations)
assessment	- The course has five problems in neuromechanics that need to be solved using MatLab and that are filled in and evaluated using

	Nestor. These five assignments are rated and part of the final rating. - Open book exam that consists of five problems that can be solved without programming. Both the assignments together and the exam need to score at least a 5.5, while together they provide a weighted total rating, in which the exam is twice as important as the assignments.
literature	An electronic book in PDF format ("NeuroMechanics" by E. Otten, 251 p.) that covers all material, including the MatLab code with the examples and the functions that are needed, is provided.
special details	- It is important that basic programming skills are present and a knowledge of mathematics that includes basic linear algebra, goniometry and integration/differentiation as well as differential equations. Biomechanics is an important basis of this course. - Minimum number of participants: 5 - Maximum number of participants: 60

code	**BWM134**
name	**Physiology of training and exercise**
semester	1
credits (ECTS)	5
contact hours	Lectures and tutorials (24)
coordinator	Dr. M.S. Brink
lecturer(s)	Dr. M.S. Brink and guest lecturers
objective	By the end of this course, the student is able to: 1) describe physiological performance indicators; 2) explain adaptations as a result of training and exercise; 3) explain training principles and programs; 4) describe tools to monitor and test adaptations to training and exercise; 5) select and evaluate scientific articles based on quality and practical relevance for the design of a training program; 6) develop a training program aimed to improve physiological variables. All learning objectives are in the domain of healthy ageing, rehabilitation and sport.
connection	The course is a follow-up on the courses general physiology and exercise physiology in the Bachelor program.
description	The course comprises 1) general lectures on physiological performance indicators, physiological adaptations, training principles and programs, and monitoring and testing of training 2) lectures/discussions on specific topics related to healthy ageing, rehabilitation and sports, such as physiological adaptations in older adults, patients with a spinal cord injury, or team sport players. In addition, sessions will be organized to guide students in writing the assignment that comprises a training program for a specific target group for improving physiological variables based on recent scientific literature.
assessment	Written exam, written assignment and Perusall assignments.
literature	- Powers SK, Howley ET. Exercise physiology: Theory and application to fitness and performance. McGraw-Hill (10th edition). - Scientific papers.
special details	Minimum number of participants: 5

code	**BWM135**
name	**Perception and action**
semester	1
credits (ECTS)	5
contact hours	Tutorials (28)
coordinator	Dr F.T.J.M. Zaal
lecturer(s)	Dr F.T.J.M. Zaal
objective	The student has an understanding of the concept of Direct Perception, and concepts within Ecological Psychology and Dynamical Systems Theory that are fundamental to theorizing about direct perception.
connection	This course fits in with courses on motor control and development.
description	In this course, we will read and discuss a number of journal articles and book chapters on Ecological Psychology, Dynamic Systems Theory, and related theoretical work. Assignments will invite the students to develop a deeper understanding of some important concepts.
assessment	To be announced
literature	- Reading list available through Nestor
special details	- Minimum/maximum number of participants: 5/30 - Compulsory attendance of 80%

code	**BWM136**
name	**Advanced statistics**
semester	1
credits (ECTS)	5
contact hours	Introduction lecture (1), e-lectures (± 12), tutorials (20) and feedback sessions (12)
coordinator	Dr. M.J.G. van Heuvelen
lecturer(s)	Dr. M.J.G. van Heuvelen
objective	The student is able (1) to translate research questions and research hypotheses in statistical hypotheses, (2) to choose and perform statistical techniques adequately, (3) to interpret and present the results.
connection	Advanced Statistics is a continuation of the statistics courses of the Bachelor program Human Movement Sciences. Students from other Bachelor programs should have knowledge with respect to: basic parametric and non-parametric tests, correlation and regression, analyses of variance (one-way, factorial, multivariate, repeated, covariance) and factor analyses. Furthermore, students should be able to analyse data using SPSS. Advances Statistics prepares for the Master Research Project. The written reports are incorporated in the line academic writing.
description	The first five course weeks will have a central theme: (1) testing differences, (2) correlation, (3) regression, (4) analyses of variance, (5) scale techniques. For each theme on overview of theory will be given during an online e-lecture. Each lecture is followed by a tutorial (4hrs). Based on an introduction of a paper with an accompanying data set, the students will be trained to investigate research questions statistically using SPSS and to report the data analyses method and the results in text,

	tables, and figures. For each task the students have to write a short report (maximal 2hrs additional to tutorial). During the feedback sessions (2hrs), the results will be presented and additional feedback will be given by the lecturer. Furthermore, the written reports will be commented by peer review with extensive guidance by the lecturer. In the last two course weeks the students have to perform two tasks without supervision. The results will be presented and feedback will be given analogous to the first five course weeks.
assessment	The written reports and the presentations are judged by fail/pass. The final exam consists of computerized tasks in which the student has to analyse data and present the results. The final exam will be judged with a grade between 0 and 10.
literature	Information with respect to the tasks is provided by Nestor. For additional reading the following book is recommended: Field A. Discovering statistics using SPSS for Windows. Sage. Third edition 2009 ISBN 978-1-84787-906-6; fourth edition 2013 ISBN 978-1-4462-4918-5; or fifth edition 2018 ISBN 978-1-5264-1952-1
special details	none

code	**BWM137**
name	**Motor control**
semester	1
credits (ECTS)	5
contact hours	Tutorials and discussion groups (28)
coordinator	Dr. R.M. Bongers
lecturer(s)	Dr. R.M. Bongers
objective	This course has two objectives: In terms of contents the student has to become knowledgeable in modern approaches used in the study of motor control. The second objective is that the student learns to form an opinion about these approaches and learns to defend this opinion in a discussion.
connection	This course is related to the courses Perception and action (BWM135) and Neuromechanics (BWM133). Moreover, this course serves as a preparation of the review and the master graduation project.
description	This course concentrates on several topics and accounts that define the current domain of motor control. The focus is on contemporary issues in motor control. As a starting point of the course a combined approach based on Dynamical Systems Theory and Ecological Approach to Action-perception is taken, with an emphasis on Dynamical Systems Theory. While a framework is laid out based on these approaches several meetings will consider accounts that may be opposite the presented approach. The course readings addresses a wide range of fields of study within motor control, such as biomechanics, neurocomputation, behavioral studies, and neuroscience. The student learns the essentials of recent contributions to our understanding of motor control. Moreover, he/she will learn to read carefully and learn to deduce the messages in a scientific paper. The student will learn to make connections between different approaches of motor control and see pros and cons of the different accounts.

	In the course students will be trained to develop an opinion about a paper or an approach and also learn to defend their position in a debate/discussion. Therefore, large part of the meetings are small group discussion and plenary discussion.
assessment	The assessment of this course is an oral exam of 20-30 minutes. This exam will have the same logic and level of discussion as in the meetings within the course. The contributions during the course will be taken into account for the final mark.
literature	A list of scientific papers
special details	Minimum number of participants: 5

code	**BWM139**
name	**Sport & Talent**
semester	2
credits (ECTS)	5
contact hours	Lectures, discussion groups, and presentations (20)
coordinator	Dr. M.T. Elferink-Gemser
lecturer(s)	Dr. M.T. Elferink-Gemser, guest lecturers
objective	1) Understand the scientific models on sport and talent; 2) Describe the underlying mechanisms of talent detection, identification, selection, development, and transfer; 3) Evaluate relevant scientific literature on practical application for sport and talent; 4) Detect a practical problem in the domain of sport and talent; 5)Develop a product in order to address the practical problem; 6) Evaluate the value, feasibility and practical use of the product for the practical field
connection	The course is a profile course in the second semester of the master Sport Sciences. It follows on from the courses in the Specialisation Sport. For students with an interest in sport and talent, it prepares them for their master graduation project in Sport Sciences.
description	Following classes on scientific models for talent identification and talent development, students work on assignments, i.e., Perusall assignments, written and oral presentations resulting in an applied scientific paper for people interested in sports practice (trainers, coaches, talented athletes, parents etc.).
assessment	The assessment consists of a written assignment, Perusall assignments and an elevator pitch.
literature	- Elferink-Gemser, M.T., Jordet, G., Coelho-E-Silva, M.J., Visscher, C. (2011). The marvels of elite sports: how to get there? British Journal of Sports Medicine, 45(9), 683-684. - Other literature to be announced.
special details	There is a limit to the number of participants (n=24). Admission will be determined through letters of motivation.

code	**BWM142**
name	**Introduction to dynamical systems**
semester	2
credits (ECTS)	5
contact hours	Lectures (14), practicals (28) and individually executed assignments
coordinator	Dr. H.J. de Poel
lecturer(s)	Dr. H.J. de Poel

objective The student will be introduced into the field of linear and non-linear dynamical systems with reference to the study of human movement (e.g., motor control) and acquires understanding of the basics of the underlying mathematical principles, concepts and methods. The student further learns to adopt this through model based computer simulations using Matlab/Simulink.

connection Basic skills and knowledge with respect to programming (Matlab) and mathematics (e.g., differential equations) are required. Students that do not yet have sufficient skills are emphatically requested to take proper preparatory actions by themselves **before the start of the course**. In the course, models of human movement are studied by applying the mathematics in computer simulations. The course builds up towards abstract scientific thinking.

description The lectures will cover theoretical issues (e.g., metaphysics, analytical and numerical mathematics) and examples/illustrations with regard to the contents in the course material (see literature). These issues will subsequently be applied and practiced in practical assignments.
Issues that will be studied are:
- What is a dynamical system?
- Introduction to Simulink (the simulation environment of Matlab)
- Description and analysis methods for (non-) linear systems: differential equations, phase diagram, transformations, state/phase description, fixed points, etc.
- Effects of feedback and coupling
- Non-linear systems, stability, limit cycles, chaos, etc.

assessment Written assignment(s) or written exam (depending on the number of participants)

literature
- Selected chapters from Fuchs, A. (2013). *Nonlinear dynamics in complex systems: theory and applications for the life-, neuro- and natural sciences*. Berlin; Heidelberg: Springer.
- Selected chapters from Hof, A.L. & De Poel, H.J. (2016). Reader '*Introduction to Dynamical Systems*'.
- Additional book chapters and articles, t.b.a. in the course guide.

special details - Minimum number of participants: 5
Because of the limited capacity of this course there will be a selection procedure. Therefore you have to **write a letter of motivation and submit this no later than 1 month before the start of the course**. This letter should contain: list of master courses followed and intended, reason for wanting to follow this course, link to research project and Master Plan and a statement of ability in the prior knowledge and skills requirements outlined above. The course organiser will assess the student's motivation letter and decide whether the student is permitted to enrol in the course. There will be given priority to M1 students.

code **BWM143**
name **Philosophy of science and ethics**
semester 2

credits (ECTS)	5
contact hours	Lectures and seminars (26)
coordinator	Dr. R.G. Withagen
lecturer(s)	Dr. R.G. Withagen
objective	The student is able to describe the different perspectives in philosophy of science and ethics and to critically reflect on them in the context of human movement sciences. Learning outcomes: - Academic level of thought and practice (learning outcome II) - Professional and personal development (learning outcome III) - Has basic instrumental and intellectual skills (learning outcome II) - Has a scientific approach (learning outcome II) - Is skilled in communicating and collaborating (learning outcome II) - Places matters in their scientific, social and organizational context (learning outcome III)
connection	In the part on philosophy of science we will discuss different perspectives on what science is and how it ought to work. Thereby this course is relevant for all specializations. The same holds true for the part on ethics.
description	In the first part of the course we will discuss different perspectives in the philosophy of science and examine how they manifest themselves in human movement sciences. The second part of the course is concerned with ethical issues. After a general introduction into ethics, we discuss some ethical issues that are relevant for human movement sciences (including research ethics). The course consists of lectures, assignments, and plenary discussions.
assessment	Each seminar includes an assignment in which students have to reflect on philosophical and ethical issues in human movement sciences. At the end of the course there is a written exam to test whether students are able to describe the different perspectives on philosophy of science and ethics.
literature	Godfrey-Smith, P. (2003). *Theory and Reality: An introduction to the philosophy of science.* Chicago: University of Chicago Press. Sandel, M.J. (2010). *Justice: What's the right thing to do?* London: Penguin Books. A couple of papers (announced on Nestor)

code	**BWM144**
name	**Structural Equation Modelling (SEM)**
semester	2
credits (ECTS)	5
contact hours	Lectures (10) and practical's (22)
coordinator	Dr. J. Smith
lecturer(s)	Dr. J. Smith
objective	By the end of this course the student should be able to: 1. Understand the main concepts and principles of structural equation modelling (SEM) 2. Develop, programme, apply and test (complex) models using LISREL software 3. Generate experimental hypotheses and select an appropriate type of model for a given data set 4. Interpret and scientifically report findings of SEM analyses
connection	This module is a part of the methodology programme in the master course and is relevant for conducting scientific research. It follows on from the course Advanced Statistics and is aimed at first year Master students interested in learning more about advanced statistics before they begin their final Master Research Project. This course requires sufficient prior knowledge and skills in: hypothesis testing, (multiple) linear regression analysis, factor analyses, Chi-squares, covariance and correlation matrices, and calculation of confidence intervals. Students also require a sufficient level of computer programming skill to successfully complete this course.
description	Structural equation modelling is a form of quantitative statistical analysis used to test causal relationships between multiple variables. It is commonly used to test and develop new scientific theories. In this course students will focus on the role and application of SEM models in scientific research. Principles of model construction, testing and application will be studied in a number of scientific areas related to human movement and sport science. Each week there will be a lecture followed by a practical session in which students will develop and programme diverse models and test these using LISREL software. In weeks 1-3 we will cover the background theory, basic knowledge and skills required to perform and interpret SEM analyses. In weeks 4-6 the knowledge and skills will become more advanced and be applied to different types of datasets (eg. ordinal, multiple groups, longitudinal), finally in weeks 7-8 the focus will be on how to scientifically report SEM analyses. All students are expected to complete weekly self-study to keep up-to-date on all reading and practical tasks, and to actively participate in lectures and practical sessions.
assessment	The course will be assessed using a combined written exam consisting of a practical exam (50%) and a test of theoretical knowledge (50%). Practical sessions have a compulsory participation and attendance of 80%. Students that do not meet this requirement will not be permitted to take part in the final exam.
literature	Course booklet ± € 25,00 Details of research articles, user guides and websites will be made available on Nestor.

special details
- Minimum number of participants: 5
- This course is aimed at first year Master students interested in learning more about advanced statistics before they begin their final Master Research Project.
- Because of the limited capacity of this course there will be a selection procedure. Therefore you have to write a letter of motivation not later than 1 month before the start of the course. This letter should contain: list of master courses followed and intended, reason for wanting to follow this course, link to research project and Master Plan and a statement of ability in the prior knowledge and skills requirements outlined above. The course organiser will assess the student's motivation letter and decide whether the student is permitted to enrol in the course. There will be given priority to M1 students.

code **BWM145**
name **Signal acquisition and analysis**
semester 2
credits (ECTS) 5
contact hours Lectures and tutorials (26)
coordinator Dr. A. Murgia
lecturer(s) Dr. A. Murgia
objective The student who successfully completes this course will be able to:
- Demonstrate knowledge on how to acquire analog and digital signals using electronic equipment
- Perform signal acquisition using serial communication, including the use of MATLAB as an acquisition environment, and diagnose related problems
- Operate and program the Arduino (or similar) microcontroller
- Use technical knowledge to analyze analog and digital signals, including the use of MATLAB as a processing environment
- Compare and assess different techniques for the analysis of analog and digital signals
- Formulate and appraise innovative technical solutions to analyze signals based on scientific research questions
- Demonstrate professionalism in the interactions with colleagues during the design, formulation and presentation of innovative solutions to signal analysis problems

connection This course has strong relationships with Neuromechanics (BWM133) and Introduction to Dynamical Systems (BWM142).

description Students learn methods and techniques to acquire and analyze signals, starting from fundamental research questions applicable to human movement sciences. Students use a prototyping electronic platform (Arduino) and flexible hardware components, as well as analysis software (Arduino and MATLAB) in order to develop solutions during the practicals. Students write individual technical notes, giving a brief solution to problems on specific developments, techniques, procedures and research questions that are presented during the lectures. A final, written exam will take place at the end of the course with theoretical and practical questions on the topics presented during the lecture.

assessment	Grade is based on written assignments and final exam. The final grade is split as follows (all submissions are compulsory): - Individual technical notes: 45% of the final grade - Individual lab notebook: 5% of the final grade - Written exam: 50% of the final grade
literature	Course guide, materials from the lectures and the practicals; electronic books and web-based resources.
special details	**This course requires good programming skills and familiarity with, or interest in, electronics.** Requirements: - The student have to attend the pre-course lecture - Students must have MATLAB on a fast and up-to-date laptop computer (administrator rights). - Students must purchase a lab notebook and several electronic components. These include Arduino Uno R3, USB cable, Breadboard, Light-emitting diodes, Push buttons, Potentiometers, some wires and measuring equipment, as specified in the course manual. - Minimum number of participants: 5 Because of the limited capacity of this course there will be a selection procedure. Therefore students have to write a letter of motivation and submit it not later than 1 month before the start of the course. This letter should contain: a list of master courses followed and intended, a reason for wanting to follow this course, a description of the student's research project and a statement of ability and skills required to follow the course (described above). The course coordinator will assess the student's motivation letter and decide whether the student is permitted to enrol in the course. Priority will be given to M1 students.

code	**BWM146**
name	**Big Data in Sport Sciences and Human Movement Sciences**
Semester	2
Credits (ECTS)	5
contact hours	Lectures, tutorials, and feedback sessions (±22)
coordinator	Dr. M. Kempe
lectures(s)	Dr. M. Kempe, F.R. Goes, and guest lecturers
objective	The students achieve theoretical knowledge of data analytics, machine learning, and data visualisation. Students learn to utilize their knowledge to analyse, interpret, merge and visualize complex data sets in human movement science context.
connection	This course is related to the courses Advanced Statistics (BWM136), Physiology of Training and Exercise (BWM134), Talent and Performance Optimization in Sports (BWM174), Introduction to dynamical systems (BWM142), Signal Acquisition (BWM145)
description	The first six course weeks will have a central theme: (1) Introduction to Data Science & Data pre-processing, (2) Basics in Data bases & Big data, (3) Introduction to Machine Learning (4) Regressions (5) Classification & Clustering (6) Neuronal Networks & Reinforcement Learning.

	For each theme, an overview of theory will be given during the lecture. Each lecture is followed by a tutorial in which students will acquire different data science skills using published data sets. For each task students have to hand in their code. Based on their acquired knowledge the students have to carry out a research project in data science in groups with a maximum of 5 students. The first part of the group assignment is to formulate a research idea that will be presented in week 4 and hand in a research proposal. The research idea should include one of the methods presented in the lectures and tutorials. Data sets for the research ideas will be organized and pre-processed by the lecturer. Based on their research idea, students will complete a data science research project and present their result via a poster presentation at the end of the course Data sets can be related to any specialization of the masters (e. g.: Sports, Rehabilitation, Healthy aging)
assessment	The assessment consists of four parts: Presentation of the research idea (20%) Research proposal (30%) Poster presentation of the research project (30%) Tutorial code (20%) Final grade needs to be at least 5.5 to pass.
literature	Course reader and a list of scientific papers (t.b.a. on Nestor)
special details	Minimum number of participants: 5 Requirements: Profound programming skills (possibility of an online pre-course to enhance skills)

code	**BWM148**
name	**Human Activity & Performance Lab: Clinical Mobility Lab**
semester	2
credits (ECTS)	5
contact hours	22
coordinator	Dr. C.J.C. Lamoth
lecturer(s)	Dr. C.J.C. Lamoth and guest lecturers
objective	Within the context of human movement sciences, students acquire: • specialist clinical knowledge of specific patient populations, • an understanding of technical and clinical assessment, • technical and clinical assessment skills • an understanding of data analysis methods • skills to translate results to clinical relevant outcomes The student gets acquainted with various state of the art technologies, analysis methods and clinical tests to obtain information about human movement in a clinical setting. Students will actively contribute to the course content through the development and testing of 'Clinical Mobility Modules'. In addition to the aforementioned specific objectives, students also acquire general academic skills such as communication, reporting and working in teams, necessary for working in a interdisciplinary setting.
connection	The course is part of our 'Academic Workplace", a learning and working environment for research and education. More specifically it relates to the specializations Healthy Ageing and Rehabilitation. In general, knowledge of technology for movement analysis (physiology,

biomechanics, performance and activity) and functional tests are essential for clinically related research.

description The course is a follow up of the former Clinical Lessons course.
assessment To obtain the credits, active participation is required in all parts of the course including co-creation sessions, module development and testing, interactive lectures and seminars. The final mark is based on a report and (video) presentation of the developed Clinical Mobility Module.

literature Documents on Nestor and during meetings
special details - Maximum number of participants: 35
- Course is available for Master 1 and Master 2 students, and is also open to students who have followed clinical lessons in 2018.

code **BWMMO**
name **Master Monitor**
semester All semesters
credits (ECTS) 5
contact hours Cannot be specified
coordinator(s) Dr. Y.P.T. Kamsma, B.A. Dollekamp MA
objective Throughout the Master's degree programme, the student is responsible for the continuous development of his/her personal profile as a Human Movement Scientist/Sport Scientist. According to the final qualifications of the programme, he/she has to find a balance between HMS related, academic and professional competencies. The Master Monitor supports the student in making choices and realizing goals in a proper way, thus becoming the Human Movement Scientist he wants to be.
connection The Master Monitor is connected to the master's programme as a whole.
description The Master Monitor is a Nestor-based course. It contains five questionnaires and a dropbox. The questionnaires are linked to the successive phases of the master programme, starting at the outset and ending after the completion of the programme. In five Master-plans the student formulates and justifies goals and choices on his route and reflects on experiences and results of the major course components and activities.
In the drop-box the student has to create three maps:

1. Master-plans: here the filled out questionnaires are filed. It is advised to accomplish periodic consultation of and discussion with lecturers of the chosen specialization, on questions and reflections and other topics that the student has recorded in his Master-plans. Fellow students may also be involved in this process.
2. Professional orientation: here all activities concerning exploration of the professional field are documented, such as:
   - Attendance of relevant lectures, symposia and events
   - The writing of a CV, networking, labor market orientation, visiting alumni and the like
   - Other relevant HMS related activities like board membership and organizing a symposium or excursion.

3. Archive: contains all documents produced by the student during the Master's program (review, work plan, article, internship report etc.).

assessment	After completing the master program, the student finishes the Master Monitor. This will be checked by the above mentioned coordinators, who can be advised by the coordinators and lecturers of the involved specializations when required. When de Master Monitor is judged sufficient, the student can apply for the final interview with the Examination Committee. The evaluation of the Master Monitor is an important topic of this interview.
literature	Manual on Nestor
special details	The Master Monitor is intended to facilitate and stimulate the student to work on his profile in an active way. Therefore, the student is expected to independently manage and timely (at least once per semester) update the Master Monitor.

code	**BWMAA**
name	**Academic Assignment**
semester	1 and 2
credits (ECTS)	5-20
contact hours	Variable
coordinators	Prof. dr. T. Hortobágyi & dr. Y.P.T. Kamsma (Healthy Ageing) Dr. F.T.J.M. Zaal & dr. E. Hartman (Sport) (Rehabilitation: to be announced)
lecturer(s)	All lecturers of the Department of Human Movement Sciences
objective	Deepen the understanding of human movement and/or sport sciences. Contribute to professional and personal development.
description	An academic assignment (AcA) gives students the opportunity to work as a human movement scientist or sport scientist within a professional context and contributes to the professional and personal development. On the one hand it enables students to deepen or broaden their own knowledge and insights in a relevant movement-related field, on the other hand the students can train their academic skills. Based on an original assignment or problem, an AcA can be an internship at a company or organization. It can also be in the form of supporting or assisting with ongoing research projects or educational activities, in which the student develops and applies his knowledge and academic skills. Assignments can be carried out within the various sectors where students can ultimately end up as a movement scientist or sport scientist: in science, health care, business, sport, education or government. A student can initiate an assignment himself or choose an assignment offered by the staff or a "third party".
assessment	The final product for the organisation is a short written report, the guidelines can be found in the Manual AcA on Nestor. After consultation of possible external supervisors, the internal supervisor or the AcA coordinator performs the final assessment and fills in the 'Assessment Form Academic Assignment'. Both documents must be sent to the master education office.

special details	Before starting the academic assignment the student fills out the 'Application Form Academic Assignment' (downloaded from Nestor), containing objectives, planning, intended final product and justification of the number of credits and asks permission of the external and/or internal supervisor or the AcA coordinator of the specialisation. The internal supervisor or AcA coordinator sends the approved form to the master education office.

code	**BWVKOO**
name	**Introduction to teaching / Mentor system**
semester	1 and 2
credits (ECTS)	5
contact hours	Training, group meetings and study progress conversations (72)
coordinator	B.A. Dollekamp MA
lecturer(s)	B.A. Dollekamp MA, Dr. M.T. Elferink-Gemser, C.H. Plaggenmarsch MSc, lecturers Human Movement Sciences
semester	1 and 2
objective	The student as a mentor is actively involved in supervising a group of about eight to ten first year bachelor students HMS. As a part of this task the student acquires the needed educational skills, which provides an orientation for future teaching activities. Specification learning outcomes - the student is able to: - Prepare and lead mentor group meetings independently on the basis of a fixed schedule with associated guidance - Perform structured study progress interviews with the individual students from his/her group and report and eventually advice on this to the study advisor - Perform appropriate guided feedback and assessment on student performances at assignments, reports and presentations from the course Introduction to HMS - Learn from intervision, reflection and reporting concerning his educational tasks.
connection	The core of the Mentor system is that study guidance is connected with the contents of the bachelor course 'Introduction in Human Movement Sciences'. This concept leads to a diversity of teaching duties and is so justly an orientation to the teaching profession. Further development of teaching competences within the HMS curriculum can be obtained as a student assistant, in the master cross-linked by means of an Academic Assignment, or the Teacher Training course provided by VU University Amsterdam.
description	After a didactic start-up training, an interview training and an instruction about the bachelor course 'Introduction to HMS', the student (assisted by a teacher) leads the first meeting with his own mentor group. Then he leads together with another mentor successively the practical Academic Writing and two other meetings, in which an article in English is discussed and the examination is prepared. The mentors themselves assist the lecturer of 'Introduction to HMS' in assessing the open questions of the examination.

From the second block, the student is solely responsible for the guidance of his mentor group. Beside, regular consultations on experiences take place with some other mentors, who also cooperate in formulating there feedback on written reports on the HMS case study.
During the academic year the student has some structured study progress interviews with the student of his/her group. After each block a short progress report is written.

assessment
- reports of meetings and discussions
- Feedback and assessment by teachers involved/coordinator
- active participation in training and intervision
- an educational report or portfolio, with a reflection on the mentor role, completed personal learning outcomes and his future ambitions for teaching activities.

literature
- Course reader Introduction to teaching / Mentor system
- Course reader Bachelor course 'Inleiding Bewegingswetenschappen'

special details
- Language: Dutch
- The mentorship can be fulfilled by senior Bachelor students HMS and by Master students Human Movement Sciences and Sport Sciences.

code **_____BWM205, BWM206, BWM207, BWM208_____**
name **Master graduation project**
semester 1 and 2
credits (ECTS) 40
coordinator Dr. Y.P.T. Kamsma
supervisors
- Rehabilitation and functional recovery:
  Dr. R.M. Bongers, Dr. H.G. van Keeken,
  Ms Dr. L.J. Mouton, Prof. dr. E. Otten, Dr. R. den Otter,
  Dr. M.M. Schoemaker and Dr. R.J.K. Vegter
- Motor function and cognition in healthy ageing:
  Dr. S. Caljouw, Dr. M.J.G. van Heuvelen,
  Prof. dr. T. Hortobágyi, Dr. Y.P.T. Kamsma, Dr. C.J.C. Lamoth and Dr. A. Murgia.
- Sports, learning and performance:
  Dr. M.S. Brink, Dr. M. Elferink-Gemser, Dr. E. Hartman,
  Dr. M. Kempe, Prof. dr. K.A.P.M. Lemmink, Dr. H.J.de Poel, Dr. J. Smith, Dr. R.G.Withagen and Dr. F.T.J.M. Zaal

objective
Based on acquired knowledge, insight and skills the student must show:
- to be able to independently perform scientific research within a human movement sciences research context
- to be familiar with an academic way of thinking and acting and to be proficient with regard to the necessary instrumental and communicative skills
- to be able to adapt research to the scientific, societal and organizational context, and to function in a task-conscious and improvement oriented manner.
- to be able to analyse research results, produce a scientific article and a poster and to present and defend the research outcomes in front of a competent panel (forum)

description The graduation project is the individually performed integral completion of the master program. The project involves the independent development and execution of research or parts of research during an internal or external research internship. The results of the research are written down in a scientific article, visually presented in a poster and orally presented and defended in front of a competent panel.

assessment All parts of the graduation project are separately evaluated and graded. To finish the project, all parts must be sufficient. For judgement of the different parts a fixed protocol must be followed.
Components:

- Research internship (BWM205 - 25 EC)
- Scientific article (BWM206 – 10 EC)
- Forum (BWM207 – 4EC)
  discussorship & attending fora (to be fulfilled)
- Poster presentation (BWM208 – 1EC)

special details
- Students can only start after permission has been requested (see Nestor). The permission indicates that the student has made sufficient progress during the first year and is eligible for a graduation project. This means 40 EC including specialization course units and review.
- Every year an information meeting is scheduled during which the ins and outs of the graduation project are explained.
- In the Graduation Project Manual all parts of the graduation project are described and all necessary forms and protocols are included. The manual can be downloaded from Nestor.
  All students are supposed to be aware of the contents of the Master Graduation Project Manual and are expected to act according to the presented rules and regulations with regard to the graduation project.

5 FROM GRADUATION TO CAREER

5.1 NEXT CAREER SERVICES

Address: Broerstraat 40, 1st floor University Library.
The NEXT Service can help students to make the switch from academia to the labour market, they help you to check your CV, your motivation and your LinkedIn account. They also organize courses and training activities and you can ask for an appointment with a carreer advisor. More information you can find on the website: www.rug.nl/next

5.2 PROFESSIONAL ASSOCIATION

Netherlands Society of Human Movement Sciences (VvBN)
Founded on 1 January 2002, the VvBN is the outcome of a merger between the *Vereniging voor Bewegingswetenschappen (NVB),* the *Vereniging voor Inspanningsfysiologie (VIF)* and the *Bewegingswetenschappen Arbokring.* The VvBN aims to represent all professionals working in the field of human movement sciences in the Netherlands. It regards itself as a scientific association but also sets great store by the practical application of knowledge in areas such as sports, labour, movement education, rehabilitation and health care. A secondary aim of the VvBN is promoting the interests of the profession.
The membership consists of graduates of Human Movement Sciences or professionals with a comparable academic level. In addition, the association has student members and associate members.
Consult the VvBN website (http://www.bewegingswetenschappen.org) for more information.

5.3 CAREER PROSPECTS

Most Human Movement Sciences/Sport Sciences graduates work in positions where expertise in Human Movement Sciences is required or useful, for example in teaching, research and policy advice in the fields of sports and health care. HMS graduates are widely employable. Research shows that networking and applying for jobs are successful ways to find work. More information about courses on Tips & Tricks for finding a job and networking can be found on www.rug.nl/science-and-society/alumni-and-fundraising/career.
Every two years, the Department Human Movement Sciences and Studiosi Mobilae organize a career afternoon for master students. During these events, graduates of Human Movement Sciences talk about their work, the organizations where they work and how they got there. The last career afternoon was held in 2018.